Facing society : A study of identity through head shaping practices among the indigenous peoples of the Caribbean in the ceramic age and colonial period

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NWO | Netherlands Organisation for Scientific Research

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Identity and processes of identification revolve around connections between people and the same can be said for the scientific process behind this dissertation. Scientists and studies do not exist in isolation and the current project is inherently tied and indebted to numerous scholars, scientific investigations, and institutions.

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"Another train..."

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1 INTRODUCTION

'No man is an Island'
John Donne (1624)

It is a truth universally acknowledged that humankind – and perhaps Western culture in particular – has always been fascinated by the abnormal and odd, especially when it comes to the human body. Exemplified by the Victorian interest in freak shows and human oddities, it is in this light that the enduring historic fascination with deformed and warped head shapes can be considered. First mentioned in the classical works of various Greek and Roman scholars and further explored by the medieval and early modern works on human anatomy, the subject of cranial modification continues to fascinate and divide scholars in equal measures to this day.

It should be emphasised that both the perspectives on the subject and the objectives of research have shifted significantly – some might even say dramatically – from what could essentially be considered as describing abnormalities and oddities to an attempt at understanding the full social relevance of these important and lasting cultural traditions. Head shaping, as an intentional cultural practice undertaken by social agents, can provide valuable insights into past societies and identities. This ties in with the fact that human bodies are no longer understood as merely a biological construct, but viewed as the nexus between biology and culture (Buikstra and Scott 2009; Sofaer 2006). Deliberately altered crania thus represent the vital intersection between the biological human body, the cultural perceptions of an individual, and their social relationships, which are so often inaccessible to archaeologists dealing with past societies.

Accordingly, head shaping practices offer a rare window into past embodied identity formation and expression on many different levels, ranging from the individual to the social. Identity and the process of identification are central to human social life and yet – or perhaps rather therefore – difficult to define. For now, identity can be seen as a dynamic and situational social construct describing who a person is, especially in relation to others. This will be expended upon in a review of the topic in Chapter 2, where the intricacies of the issues can be explored. Applying these latest theoretical perceptions into identity to studies of intentional cranial modification has yielded vital insights into the formation and expression of past social identities, boundaries, and structure as well as early socialisation processes and personhood (Blom 2005a,b; Duncan and Hofling 2011; Geller 2004, 2006; Hoshower et al. 1995; Tiesler 2012, 2013; Torres-Rouff 2003, 2009).

The altered head shapes produced by intentional cranial modification among the indigenous inhabitants of the Caribbean archipelago were noticed by Columbus and his crew, who records it in his accounts of the first voyage (Dunn and Kelley 1991). Despite five centuries of interest and investigation into the history of the Caribbean, the full potential of investigating the practice of cranial modification and its social relevance in the mosaic of communities that comprised the Caribbean before and after contact has not been fulfilled. By moving beyond cranial shapes to investigate the social values and ties of head shaping practices in the Amerindian communities of the Caribbean, this study will contribute to our understanding of social identities in these societies.

1.1 CONTESTED IDENTITIES

Reconstructions of past indigenous identities in the Caribbean that are based on archaeological proxies for social identification and differentiation, information gained from historic documents, or a combination of the two, have so far proven complicated and contested. One of the founding fathers of Caribbean archaeology, Irving Rouse, created a culture history framework of the region that remains dominant to this day. In his own words, Rouse forms 'styles or complexes of pottery and other artefacts, each of which is indicative of a single people and culture, and plot their distribution on chronological charts in order to determine their units in time as well as in space' (Rouse 1990:59). The resulting homogeneous bounded cultures do not match our current understanding of the dynamic communities and ethnic groups leaving traces of their existence in the archaeological record. Furthermore, Roussian styles are often incorrectly correlated with ethnic identity and accordingly critiques of the Roussian system have been abundant in Caribbean archaeology in the last few decades (e.g. Curet 2003; Oliver 1999; Pestle et al. 2013; Rodríguez Ramos 2010; Wilson 2007).

Recent investigations have moved beyond the seriation of ceramics as a proxy for a singular group identity by studying various aspects of material culture, languages, settlement patterns, social organisation, mortuary practices, and food ways to provide a more holistic and diverse picture of Caribbean communities (see Keegan and Hofman 2017 and Keegan et al. 2013 for an overview of the current state of affairs). Each of these aspects provides important building blocks for understanding past communities and implies human actions, yet the social agent is often lost and little attention is paid to notions of personhood or individual identities. By studying the intentional modification of individual social bodies, this study will be able to address identity and society from the personal perspective of the social agent as well as on various collective levels providing a novel approach to the (re)construction of Caribbean identities.

On the other side of the historical divide, issues around ethnic identities are equally complex starting with Christopher Columbus, who contrasts the peaceful and noble Taíno or Arawak living on the Greater Antilles with the savage and cannibalistic Carib of the Lesser Antilles. This dichotomy was perpetuated in other early colonial European writing and eventually formalised by Rouse in 1948 (Hofman et al. 2008; Patterson 1991, Whitehead 1995). This false dichotomy is based on a misunderstanding of indigenous sources, and such confusion, errors, inherent biases of the writer, and attempts to fit indigenous social structure into the mould of European social organisation familiar to the authors, plague the historic sources of the colonial period. This complicates attempts to understand past social processes such as group identity formation and expression in the Caribbean despite what at first glance appears to be convenient historic documentation. The notion of the Taíno as a homogeneous ethnic group living on the Greater Antilles has, for example, been refuted based on archaeological evidence of heterogeneous material cultural assemblages and social processes (Curet 2003; Hofman et al. 2008; Keegan 2013; Wilson 2007). By combining osteo-archaeological evidence on head shaping practices with a critical approach to historic sources, this investigation can enhance our knowledge of indigenous identities and their role in the cultural mosaic of the early colonial period.

Though the insights into identity that can be gained from investigating intentional cranial modification are paramount to understanding and contextualizing the archaeological and historic record of the region, they will also contribute to modern issues. The current identities of the inhabitants of the Caribbean are based on the early colonial melting pot with influences from Amerindian, European, African, and Asian ancestors. This amalgamation can be seen quite literally by studying the DNA of modern islanders (Martínez-Cruzado et al. 2005; Moreno-Estrada et al. 2013; Schroeder et al. 2015), but is also intimated through more intangible social concepts that shape what it means to be Caribbean. Past indigenous identities have left enduring traces in the modern social fabric of the region, illustrated by the recent Taíno revival movement on Puerto Rico. Reconstructing past identity practices using intentional cranial modification will improve our understanding of the rich cultural mosaic of current Caribbean people and reconnect modern islanders with their ancestors. Such community outreach is vital to efforts to protect the threatened cultural heritage of the region before it is destroyed by natural disasters or human actions (Hofman and Hoogland 2016; Siegel and Righter 2011).

1.2 FACING SOCIETY

The principal aim of this investigation is to study the creation, embodiment, and transformation of personal and collective identities in indigenous Caribbean communities through a reconstruction of head shaping practices. A multidisciplinary approach combining archaeology, anthropology, history, and sociology will be advanced to investigate the social entanglements of intentional cranial modification against the backdrop of the wider social, cultural, and political developments before and after the pivotal intercultural contact of 1492.

Fundamental in approaching these objectives is the (re)analysis of skeletal material from the region in order to reconstruct cranial modification patterns in Caribbean communities at local and regional levels. Such patterns include the prevalence of head shaping and the cranial shape(s) found in different communities. Other social variables that may serve as proxies for elements of identity, such as biological sex, geographic origins of individuals elucidated via isotopic analysis, and various aspects of mortuary practices, will also be taken into account whenever available. However, understanding the full social relevance of intentional cranial modification requires moving beyond skeletal remains towards an understanding of living people and their dynamic social setting. This will be done by combining the osteological data on human crania with a theoretical approach that connects a social constructionist view of identity formation and expression with agency and practice and incorporates social and cultural elements of appearance and early socialisation processes recovered from historic sources.

The patterns of modification produced by this investigation, complimented with additional data from archaeology and history, will be studied in a multiscalar fashion using a twofold approach incorporating the complementary spatial and diachronic dimensions of the practice. After all, head shaping unites the individual and the social through cultural practice and therefore allows the exploration of identities at numerous levels ranging from individual personhood to communal identities at various scales. The potential social boundaries demarcated by altered cranial shapes will be explored within and between communities, as head shaping practices may be tied to internal differentiation between social actors or groups of individuals within the community or serve as an external distinction between different social collectives at scales ranging from villages to regional interaction spheres.

Trends in Caribbean head shaping practices are also investigated from a diachronic perspective. The embedded nature of intentional cranial modification suggests that broader social and cultural changes will impact the identities expressed through altered head shapes and by extension the practice itself. Patterns of cranial modification will be evaluated against the dynamic social history of the region characterised by interaction and exchange. Particular attention will be paid to shifts in social structure and political organisation seen during the transition from Early to Late Ceramic Age, as well as the intercultural interaction and social transformations seen in the Early Colonial period.

1.3 DISSERTATION OUTLINE

Chapter 2 introduces the concept of cranial modification from a biological and anatomical perspective. Insight into altered cranial shapes starts with an understanding of the biological processes of cranial development and the ways in which humans have adapted these to suit their own needs. Human anatomy dictates both the possibilities and limitations for cranial alterations and establishes the framework in which the practitioner operates. Human head shaping practices are explored to illustrate both the variety of cranial shapes and the manner in which these are achieved.

Chapter 3 presents the heuristic framework developed to elucidate the social ties of intentional cranial modification in indigenous Caribbean communities. Social constructionist perspectives on identity and social boundaries are combined with motivations for modification extracted from historical and ethnographical sources to provide potential rationales for shaping the heads of infants and inform an understanding of how these altered head shapes function in society.

Chapter 4 deals with the history of Caribbean societies from the first explorers to set foot on the islands to the European colonisation of the region after 1492. The current knowledge regarding cranial modification in the region, obtained from archaeological, historical, and ethnographic sources, is reviewed and placed in its social context to present an integrated view of the indigenous peoples of the Caribbean. From a social and cultural perspective, head shaping practices are embedded in a series of cultural decorations and modifications of the human head and body as well as a host of other early socialisation processes aimed at creating a social person. These customs generally leave little to no evidence in the archaeological record due to their immaterial or ephemeral nature, but will be reconstructed using information gathered from historic or ethnographic accounts.

Chapter 5 presents the methodology used throughout this investigation into Caribbean head shaping practices. This includes a discussion on the criteria for sample selection and the osteological methods employed, including the classification of cranial modification. Information on the manner of documentation, consisting of forms, photographic protocols, and a database will be presented followed by a section on the statistical methods employed to analyse the data.

Chapter 6 introduces the skeletal collections that form the basis of this study of identity and intentional cranial modification. The spatial and temporal distribution of the entire sample is discussed. This is followed by a presentation of the contextual information for each of the 76 sites that comprise the sample.

Chapter 7 presents the results of the analyses carried out on the data collected from Caribbean skeletal assemblages. This chapter has been divided into four separate sections discussing the demographic composition of the sample, the cranial metrics, the cranial modification patterns and various social variables, and the temporal patterns.

Chapter 8 discusses the results presented in Chapter 7 through the lens of the heuristic framework developed in this study: a multiscalar approach from individual experiences to regional connections embedded in the broader social and cultural context of Caribbean societies. A chronological overview will discuss the rise, decline, and revival of cranial modification and the implications for social identities as a result of social, cultural, and political transformations before and after 1492.

Chapter 9 presents the conclusions of this research and discusses three themes that emerged during the study of Caribbean head shaping practices. This is followed by an exploration of future avenues of investigation.

2 CRANIAL MODIFICATION

The varieties of cranial deformation are so numerous that they are bewildering.
Hooton (1940:273)

The human skull is a complex structure with a range of important biological functions, principally the protection of the human brain. However, the head also occupies an important social position supporting facial recognition of individuals and complex systems of human interaction, including verbal and nonverbal forms of communication, and rich cultural meaning is often attributed to it. Accordingly, the alteration of facial and cranial features, through a mechanism like the practice of intentional cranial modification, will have profound biological, social, and cultural implications on numerous levels.

This chapter discusses the biological aspects of the altered head shapes encountered in the archaeological record. In order to fully understand the practice of intentional cranial modification and its biological and social implications, knowledge regarding the normal developmental patterns of the human skull is required. This chapter will present standard cranial development and morphology and contrasts it with deviations from this pattern that produce abnormal skull shapes. The focus will be on those medical conditions and environmental factors that can reasonably be expected to affect skull shape within an archaeological assemblage. Furthermore, attention in this chapter will be first and foremost on those conditions and factors that create a head shape that could be confused with the results of intentional cranial modification and as a result could skew investigations into the social motivations behind head shaping.[1]

Attention will then turn to head shaping practices and the various ingenious ways humans have developed to influence the natural growth of the human skull. The terminology used throughout this dissertation will be presented, followed by a discussion on different typologies and the various devices used to create the altered head shapes. Finally, the consequences of cranial modification will be discussed,

1 The medical literature describes a wide range of pathological conditions which can create abnormal human skull shapes. Some of these conditions are extremely rare, however, and the chances of encountering them within an archaeological assemblage are very small indeed. Others produce distinctive cranial shapes that cannot be confused with the results of cranial modification.

including the ramifications for cranial morphology, non-metric traits, and potential side-effects purported to have been caused by head shaping.

2.1 HUMAN CRANIAL DEVELOPMENT

The human skull is an extremely complex composite structure, which protects the fragile human brain and supports the respiratory system and digestive tract (Moriss-Kay and Wilkie 2005). A full description of the embryology and development of the different cranial elements is beyond the scope of this dissertation and for this the reader is referred to several excellent texts (Friede 1981; Moriss-Kay and Wilkie 2005; Moss and Young 1960; Scheuer and Black 2000, 2004; Tubbs et al. 2012). However, a brief summary will be provided here.

The embryonic skull consists of two regions: the viscerocranium (face) and the neurocranium (braincase). The neurocranium can be further subdivided into the chondrocranium (cranial base) and the cranial vault. The viscerocranium, with the exception of the nose, forms in membranous tissue as do the bones of the cranial vault. The cranial base and the majority of the nose, on the other hand, are formed in cartilage (Moriss-Kay and Wilkie 2005; Moss and Young 1960; Scheuer and Black 2004; Tubbs et al. 2012; White and Folkens 2005). Despite these distinct developmental trajectories and the different functions of certain cranial components, the regions of the skull grow in an integrated manner (Lieberman et al. 2000; Moss and Young 1960). The growth process of the neurocranium is primarily driven by the expansion of the brain, which develops rapidly in utero and during the first years of life. The growth of the viscerocranium is directed by the development of sensory organs and dental eruption patterns, which occur later (Bronfin 2001; Ridgway and Weiner 2004; Ross and Williams 2010; White and Folkens 2005). As a result, at birth the cranial vault has already achieved 65% of adult size and is almost fully grown at 95% by the age of 10. In contrast, the face of a newborn is only 40% of adult size and reaches 65% by the 10th year indicating a protracted growth trajectory (Bronfin 2001).

Human cranial growth is driven by the ontogeny of the infant skull, which is composed of forty-five distinct elements at birth (White and Folkens 2005). The articulations of the bones that compose the vault are called cranial sutures. At the intersection of sutures are fontanelles, open spaces made of cartilaginous membrane (see Figure 1). During the growth process, bone is deposited at the margins of these fontanelles and sutures until the cranial sutures interlock by the age of two. Growth continues to take place along these sutures – albeit at a slower rate – and they remain open until ossification commences in adulthood. The articulations between the bones of the base are known as cartilaginous synchondroses. These remain open until the growth of the skull has been completed in early adult life (Moriss-Kay and Wilkie 2005; Ridgway and Weiner 2004; White and Folkens 2005).

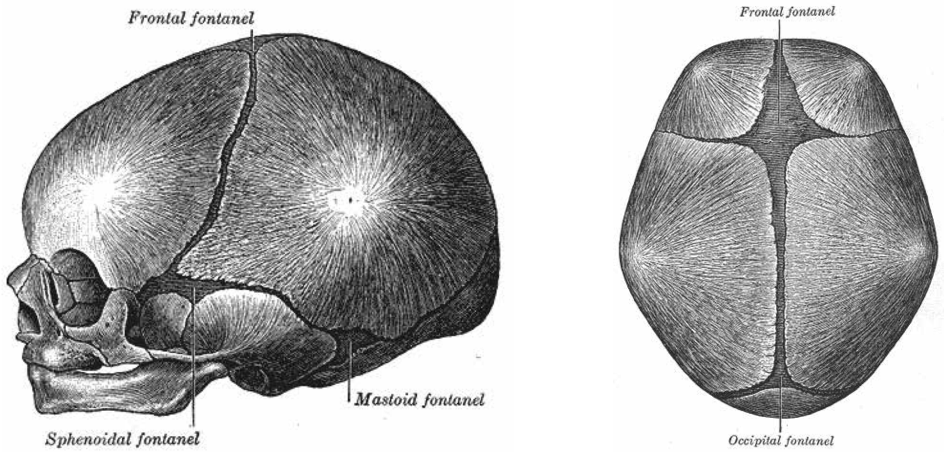


Figure 1 **Lateral and superior view of the infant skull showing the cranial sutures and fontanelles (Gray 1918).**

Although the growth of the human skull is completed during late adolescence or early adulthood, the process of cranial development never fully halts. Several investigations have found subtle changes in cranial morphology taking place during adulthood (Akgül and Toygar 2002; Ross and Williams 2010; Sarnas and Solow 1980).

Each human face is a unique composition of features and the same can be said for the underlying skull. There is a wide range of natural variation in human cranial morphology, resulting from genetic, epigenetic, and environmental influences. An example of this diversity is the cranial index, a ratio of cranial length to breath, which varies between different populations from dolichocephalic (long and narrow) to brachycephalic (broad) (Bass 1987; Martin 1928). This natural variety in cranial morphology based in the interaction of genetic and environmental factors should be kept in mind when studying cranial pathologies and dysmorphologies (Bronfin 2001; Mooney and Siegel 2002; Ridgway and Weiner 2004).

2.2 DEVIATING CRANIAL GROWTH PATTERNS

The complex and intricate nature of human skull growth and development can be disrupted by a variety of genetic and environmental factors. Cranial dysmorphology can be classified into malformations or deformations based on the aetiology of the primary or earliest defect. Malformations are morphological defects that result from an abnormal developmental process. Deformations are the result of pre- and/or post-natal mechanical forces, which disturb the otherwise normally developing cranial features or regions (Mooney and Siegel 2002; Ridgway and Weiner 2004). Certain types of cranial malformations and deformations can create abnormal cranial shapes, which are similar to the results of intentional cranial modification.

Malformations

Of the multitude of cranial and craniofacial malformations known to medical science, only one type of pathology can create a skull shape that could readily be mistaken for the results of intentional cranial modification. Craniosynostosis is the premature fusion of one or multiple cranial sutures (Bronfin 2001; Moriss-Kay and Wilkie 2005; Ridgway and Weiner 2004; Tubbs et al. 2012). This developmental abnormality currently occurs at a rate of approximately 1 in every 2500 neonates (Bronfin 2001). Craniosynostosis is described as simple if a single suture is involved and compound if multiple sutures have closed prematurely. Furthermore, cases are also divided into isolated craniosynostosis, where the infant presents no other abnormalities and syndromic, where premature fusion of the suture is one of several associated anomalies (Bronfin 2001; Ridgway and Weiner 2004; Tubbs et al. 2012). The syndromic variant is less prevalent, representing approximately 20% of all cases despite the fact that over 150 syndromes are known to produce craniosynostosis (Tubbs et al. 2012).

The aetiology and pathogenesis of craniosynostosis are relatively complex. A wide range of both genetic and environmental factors have been established as the cause, though a single gene or chromosomal defect is the most common aetiology (Cohen 1993; Moriss-Kay and Wilkie 2005; Tubbs et al. 2012). Environment-based determinants are much more rare, but can include exposure to various teratogens (disruptors of embryonic and foetal development), a range of metabolic and hematologic diseases, and abnormalities of ossification (Bronfin 2001; Moriss-Kay and Wilkie 2005; Tubbs et al. 2012). Investigation has also indicated that intrauterine head constraint may predispose the infant to craniosynostosis (Ridgway and Weiner 2004). Finally, malformations of the cranium linked to a lack of brain growth can also result in the condition (Bronfin 2001; Cohen 1993).

The mechanism by which the premature fusion of a cranial suture can create an abnormal skull shape was first described by Otto and Virchow in the 19th century (Jane et al. 2000; Ridgway and Weiner 2004). The prematurely fused suture halts the growth of the brain at this articulation, causing brain growth to be redirected and creating an abnormal head shape. Compensatory growth tends to be greatest at the nearest open sutures and the volume of the brain and skull tend to extend perpendicular to the fused suture. Thus, craniosynostosis produces a range of abnormal head shapes depending on the location of the prematurely fused suture (see Figure 2) (Bronfin 2001; Ridgway and Weiner 2004).

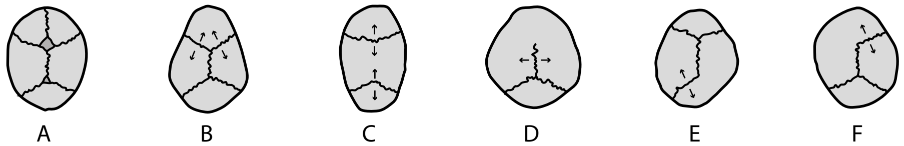


Figure 2 **An overview of the head shapes produced by craniosynostosis. A) normal, B) Trigonocephaly, C) Scaphocephaly, D) Brachycephaly, E) Posterior Plagiocephaly, F) Anterior Plagiocephaly.**

Deformations

Cranial deformations are a relatively common natural occurrence, with up to a third of newborns affected to some degree. In contrast to the previously mentioned malformations, the results of cranial deformation are typically mild and reversible. These cranial deformations can be grouped under the terms non-synostotic deformational or positional plagiocephaly.[2] The term plagiocephaly – derived from Greek and meaning bent or twisted head – refers to 'an asymmetrical, flattened deformity of the skull that can occur anteriorly or posteriorly' (Robinson and Proctor 2009:284). The resulting head shape is dependent on the location of mechanical pressure. Deformational brachycephaly refers to a shortening and widening of the cranial shape, in combination with a symmetrical flattening at the back of the skull. Deformational dolichocephaly or scaphocephaly results in a long and narrow head combined with facial asymmetries. The most common form of cranial deformation is referred to as occipital or posterior plagiocephaly and involves a flattening of both the occipital and forehead, resulting in a classic parallelogram shape (Littlefield et al. 2005; Ridgway and Weiner 2004; Robinson and Proctor 2009). A rare case of non-synostotic plagiocephaly is anterior plagiocephaly, where a prone sleeping position causes unilateral frontal flattening (Robinson and Proctor 2009).

The external forces that create non-synostotic deformational plagiocephaly can occur pre- and post-natally. Perinatal moulding is a common cause of cranial deformation, with approximately one in three infants affected. However, the results are generally mild and will subside within hours to weeks of birth without any medical mediation

2 The term plagiocephaly is also used to refer to the asymmetric head shapes produced by unilateral lambdoid or coronal synostosis. However, in this dissertation deformational or postional plagiocephaly refers solely to those deformations created by extrinsic forces.

(Bronfin 2001; Ridgway and Weiner 2004). Accordingly, infants should only be assessed for cranial deformation or malformation of a more permanent nature from six weeks of age onwards (Slate et al. 1993). Moulding occurs as a result of foetal head constraint, which is more common in first pregnancies, larger infants, cephalopelvic disproportion, a deficiency of amniotic fluid, multiple births, prolonged labour, *caput succedaneum*[3], and *cephalohematoma*[4] (Bronfin 2001:193). Babies in breech position generally have craniofacial and limb deformities due to the irregular in utero position. The skull becomes long and narrow, features a marked occipital shelf, overlapping lambdoid sutures and occasionally an indentation below the ears. Furthermore, babies born in breech position are more likely to develop torticollis, which is a causal factor in the development of non-synostotic plagiocephaly.

Figure 3 **Infant in a traditional Nez Perce cradleboard. Photograph by Edward S. Curtis (1911).**

Throughout early infancy, mechanical forces imposed on an infant's skull can create an asymmetric skull shape. The two most common factors in creating occipital or posterior plagiocephaly is a preferential supine sleeping position and a restriction of the movement of the infant's head. Since the promotion of a supine sleeping position for infants with the introduction of the American 'Back to Sleep' campaign[5] in the early nineties, an increase in this type of plagiocephaly has been detected (Bronfin 2001; Littlefield et al. 2005; Ridgway and Weiner 2004; Robinson and Proctor 2009). Other factors include prolonged time in car seats or baby swings. Likewise, this type of unintentional cranial deformation can also be observed among prehistoric populations using cradle boards or cradle constructions, an example of which can be seen in Figure 3, which restricted the movement of the infant (Littlefield et al. 2005).

3 *Caput succedaneum* 'is due to edema of the skin and subcutaneous tissues of the scalp resulting in a 'conehead' appearance, which normally resolves in less than 6 days' (Bronfin 2001:193).

4 *Cephalohematoma* is defined as 'a traumatic subperiosteal hemorrhage that does not cross a suture line. This deformity is initially soft and, with time, becomes firm and calcifies; it generally requires up to 4 months to resolve entirely' (Bronfin 2001:193-194).

5 This campaign was introduced by the American Academy of Pediatrics to reduce the occurrence of Sudden Infant Death Syndrome (SIDS) (Littlefield et al. 2005). Similar programs are in effect in most of the Western world (Carpenter et al. 2004).

Restriction in head movement can also be caused by medical conditions, including scoliosis and torticollis. Torticollis, also known as wry neck, involves an abnormal tilt of the head to one side and a rotation of the head in the opposite direction (Bronfin 2001; Cheng and Au 1994). This condition is usually due to strain on the neck during problematic deliveries or abnormalities of the cervical spine (Bronfin 2001). The posteriorly tilted side of the occipital will become flattened, since the child will tend to sleep on this side.

2.3 INTENTIONAL CRANIAL MODIFICATION

The practice of intentional cranial modification can be considered a cranial deformation from a medical point of view, as the altered head shapes are the result of mechanical forces on an otherwise normally developing skull. However, the premeditation of the human agent responsible for the extrinsic pressure on the skull clearly sets it apart from the naturally occurring deformations. Hence, intentional cranial modification warrants a separate discussion.

Terminology

Before turning to the practice of head shaping in all its diversity, a brief note on the terminology used in this dissertation is necessary. The term cranial deformation was often employed in the past to refer to such customs and this is technically correct when deformation is defined as 'an alteration of a body part that is developing normally until a mechanical force is applied' (Bronfin 2001:193). However, from an anthropological point of view the term leaves much to be desired. The word has clear negative connotations in the English language that are in direct opposition to the way in which the custom is viewed by its practitioners. Such derogatory terminology may in part be based on early Western prejudices against 'the Other' and such a Eurocentric perspective does not aid in detangling the complex social and cultural dynamics of the custom (Geller 2004, 2006). This thesis therefore opts to use more neutral terminology such as cranial modification, head shaping, or variations thereof.

The term intentional cranial modification is not universally accepted, as distinguishing between intentional and unintentional types of modification in the archaeological record can be problematic. Although the altered head shapes produced as unintentional side effects of child rearing practices generally consist of occipital flattening with a high degree of asymmetry, such asymmetry may also be seen among intentionally produced cranial shapes. An example of the difficulty associated with establishing intentionality in the past is the use of cradleboards among a wide variety of North American Amerindian groups. Cradleboards are generally considered to produce occipital flattening as a mere side-effect. However, certain groups, for example the Chinookan people of the Pacific Northwest coast, adapted the construction of the cradleboards with the aim to create a different cranial shape, thus moving cradleboards into the domain of intentional modifications (Dingwall 1931). Even without such additions in construction, the resulting occipital flattening produced by the cradleboard may be purposefully sought after. Among the Osage, the flattened occipital created by the cradle was considered an important marker of ethnic identity (Logan et al. 2003). Clearly, deducing this type of human behaviour in the past would be very difficult based solely on archaeological remains.

These difficulties have led some researchers to prefer the term artificial cranial modification, as an overarching term which incorporates all intentional and unintentional alterations of the human skull for which human agents are responsible. This research acknowledges the difficulty of determining intentionality behind past human actions, and particularly without the benefit of written sources, but the distinction is crucial when it comes to discussing social motivations behind altered head shapes. Clearly, unintentional modifications will lack the underlying social associations which are exactly what this study hopes to discuss in the Caribbean communities under investigation. Throughout this dissertation, it will be demonstrated that the cranial shapes found in the indigenous societies of the Caribbean are predominantly the result of intentional cranial modification practices and represent an important premeditated social choice.

Classifications

Since the first recorded typology of cranial modification was created by Gosse in 1855, a wide variety of classification systems have been proposed. This is partially due to differences in the criteria selected as the basis for the typologies: the shape of the skull, the type of modification device, the geographic distribution of different head shapes, or even ethnic or community names (Dingwall 1931). Numerous systems were created, but three stood the test of time and are still in common use: Hrdlička (1919, 1920), Imbelloni (1930), and Neumann (1942). The use of different typologies and terminology can complicate understanding of head shaping and hinder comparisons between investigations using different systems. Therefore, these three systems will be reviewed here and the parallels and correlations among the classifications will be shown, including the terminology chosen for this study.

Hrdlička

Hrdlička (1919) discusses all types of cranial deformations, dividing them into pathological, posthumous, and artificial categories. The pathological category consists of several variations of craniosynostosis and plagiocephaly. Hrdlička uses the term posthumous deformation to refer to any alteration of the skull shape caused by taphonomic processes, which can be accompanied by cranial warping or fractures. Finally, the term artificial deformation is used to group all alterations to the human skull as a result of cultural customs. Hrdlička further subdivides this category into non-intentional and intentional, with the unintentional modifications occurring as a side-effect of other child rearing practices as previously discussed (i.e. positional plagiocephaly).

Hrdlička subdivided intentional cranial modification into three main types: fronto-occipital, circumferential, and occipital modification. Fronto-occipital modification is defined as a flattening of the front and back of the skull accompanied by compensatory parietal bulging, the presence of a post-bregmatic depression, and a potential depression along the posterior part of the sagittal suture. The fronto-occipital compression creates a shortening and broadening of the cranial vault (Hrdlička 1919:191). Circumferential modification is typified by an annular depression along the frontal, temporal, inferior part of the parietals, and the lower section of the occipital. Compensatory growth of the skull takes place at the superior parts of the parietals and occipital, creating a narrow but long skull shape (Hrdlička 1919:191). Occipital modifications are characterised by a flattened occipital region. Hrdlička described this type as very similar to deformational plagiocephaly but generally more marked in appearance. Like fronto-occipital modifications, the skull becomes broader and shorter (Hrdlička 1919:191).

Hrdlička states that each of these main types may be subject to a number of variations, which relate to the different local modification devices. He does not, however, clarify what these varieties might be (Hrdlička 1919:191).

Imbelloni

The classification system devised by Imbelloni (1930) consists of two main types, tabular and annular modification. These can be subdivided into two subtypes or variations, oblique and erect, depending on the exact construction of the modification device and the resulting compensatory growth direction of the skull.

Tabular modification is a result of pressure on the front and back of the skull and leads to a shortening and broadening of the cranial vault (Dembo and Imbelloni 1938:255). The oblique variant is defined by a flattened plane on the occipital roughly parallel to the frontal flattening, whereas the erect variant shows an upright flattening of the back of the skull.

Annular modification is created by bandages wrapped tightly around the skull, causing a circumferential flattening and consequently a longer and narrower cranial vault (Dembo and Imbelloni 1938:255). Again, tabular and oblique varieties of this shape exist depending on the placement of the bandages.

Neumann

Neumann, building on the work of Hrdlička, Stewart and other scholars, created a classification of six types of altered skull shapes, which includes several variations on Hrdlička's main types. Like Hrdlička, Neumann's classification is based on the altered regions of the cranium and uses anatomical terminology (Neumann 1942).

The first type is obelionic deformation, previously described by Stewart (1939). The flattening takes place between bregma and lambda, at an angle of about 30-40 degrees with the ear-eye plane. Cranial growth is balanced by an expansion of the cranial vault at the anterior sections of the parietal and temporal bones (Neumann 1942). The second type is simple occipital deformation, a flattening of the occipital bone at a right angle to the ear-eye plane. The resulting skull shape is frequently asymmetric and tends to be unintentional, i.e. a result of cradle boarding (Neumann 1942). A variation of this shape is referred to as lambdoid deformation, in which the flattened plane is at an angle of 50-60 degrees to the ear-eye plane. This seems to be a shape sporadically encountered among certain societies in the south-eastern United States (Neumann 1942).

Bifronto-occipital modification is created by a bilateral flattening of the frontal bone and vertical flattening of the occipital. This produces a narrow frontal bone and is found in the north-eastern and midwestern United States (Neumann 1942). Fronto-verticoöccipital is typified by frontal and vertical occipital flattening. This type is created by boards tied to the front and back of the skull, where the occipital board can consist of cradleboard or a loose board. The compensation of growth takes place in a superior direction (Neumann 1942). Fronto-parieto-occipital modification, first described by Stewart, has three planes of flattening at right angles to each other. Since cranial growth is restricted in a superior direction, the skull expands laterally, in contrast to the fronto-verticoöccipital type (Neumann 1942). The final type in Neumann's typology is parallelo-fronto-occipital modification, in which the planes of flattening at the front and the back of the skull are roughly parallel. Skull growth is redirected in a lateral fashion, creating a broadening of the cranial vault (Neumann 1942).

Neumann did not include circumferential modification in his typology, despite referring to it in his article as annular modification (Neumann 1942). Although Neumann fails to provide an accurate description of the way in which this type is produced, he does mention that compensatory growth takes place in a superior-posterior direction (Neumann 1942). In all, Neumann succeeded in clarifying and enhancing the classification provided by Hrdlička. However, some of his types represent very local variations of intentional cranial modification which may have limited use in other geographical areas.

Comparing Classifications

Despite the different terminologies used in these systems, there are clear correlations between the main categories. In fact, the two main types created by Hrdlička and Imbelloni are identical in all but name, as can be seen in Table 1. These typologies are applied in different parts of the world, with the system proposed by Hrdlička widely used by the Anglophone scholarly community whereas Imbelloni's classification is widespread among Latin American scholars. The compatibility between the systems is advantageous, as it allows for cross-cultural comparisons between different regions.

This study has opted to use the nomenclature from the system proposed by Hrdlička with the added differentiation in the direction of occipital flattening. A category for frontal flattening was also added. A full description of this system and the justification for this choice can be found in the description of the methodology in Chapter 5, but it has been reproduced here as this is the terminology that will be used throughout the rest of the study for ease of comparison between different investigations into head shaping practices.

Table 1 **A comparison of the three main classification systems and the nomenclature used in the current study, demonstrating the high degree of overlap between the systems. * Annular is not technically a part of the division of cranial shapes by Neumann (1942) as it does not occur within his sample, but he does mention the term elsewhere in his article.**

Hrdlička	Imbelloni	Neumann	Current Study
Fronto-Occipital	Tabular Oblique	Parallelo-Fronto-Occipital	Fronto-Occipital Parallel
Fronto-Occipital	Tabular Erect	Fronto-Verticoöccipital	Fronto-Occipital Vertical
Circumferential	Annular	Annular*	Circumferential
Occipital		Occipital	Occipital Flattening
		Bifronto-Occipital	
		Fronto-Parieto-Occipital	
		Lambdoid	
			Frontal Flattening

Means of Modification

There is an important correlation between the altered head shapes and the modification devices that can be used to create intentional cranial modification. The location of external pressure determines the direction of compensatory growth and thus the resulting shape of the skull (Hrdlička 1920; Dembo and Imbelloni 1938). Hence, an analysis of skull shapes encountered in an archaeological context can yield important information on the type of device used by the society in question. Furthermore, differences among skulls within a population may point to minor or major variations in the construction of the modification device and thus different communities of practice (Hoshower et al. 1995; Tiesler 2012).

Besides the variation in altered head shapes, the degree of cranial modification ranges from very mild alterations to extreme changes to the skull shape. This fluctuation in degree can be attributed to several factors: the age of the subject when the practice is commenced, the length of time during which pressure is exerted, the amount of pressure applied, and the degree of flexibility of the materials used in the construction of the modification device (Littlefield et al. 2005; Oetteking 1930; Tiesler 2010).

Several methods can be used to exert pressure on the infant skull and intentionally alter its shape. In most cases, the practice seems to be executed by a female: the mother, a midwife or another female family member (Dingwall 1931; FitzSimmons et al. 1998; Tiesler 2010, 2011, 2012). Knowledge on the practice is held and passed on by women, while men tend to have little awareness of the custom (FitzSimmons et al. 1998).

Moulding or massaging the infant's head is a common element of child care practices, both in ethnographic case studies (Dingwall 1931) and modern populations (FitzSimmons et al. 1998; Herskovits 1964). The moulding of the head is occasionally accompanied by the use of oils or the massaging of other body parts (Dingwall 1931; FitzSimmons et al. 1998; Hatt 1915). The resulting cranial alterations are very mild and would be extremely difficult to detect in the archaeological record without additional knowledge of child-rearing practices (FitzSimmons et al. 1998:90). In several cases, the use of tight caps or coverings is reported to maintain or enhance the desired head shape (FitzSimmons et al. 1998; Hatt 1915). The entire process, with or without the additional use of constricting head coverings, takes place from birth until approximately one year of age, after which the resulting shape is fixed.

Head coverings may also be used as the sole modification device. These coverings can take the form of caps, hats, or ribbons and are often part of the traditional infant costume (Barge 1912; Delisle 1902; Dingwall 1931). These restrictive coverings can produce mild or marked modifications of the skull, depending on the tightness of the headgear and the location of exerted pressure. The resulting cranial modification can be seen as intentional or unintentional, since in milder cases it can be difficult to judge the practitioner's objectives.

Textiles, in the form of bandages or cords, may also be wrapped tightly around the skull in a circular fashion, resulting in the circumferential type of modification (Blackwood and Danby 1955; Dembo and Imbelloni 1938; Flower 1898). Animal hair, animal skin, bark, kelp, and other natural materials may also be used (Dingwall 1931; Oetteking 1930). The exact location of the bandages may create varieties of circumferential modification, and the amount of pressure and flexibility of the chosen material can create differential degrees of modification ranging from mild to marked (Dembo and Imbelloni 1938; Hrdlička 1919).

The use of firm tablets to modify the shape of the skull has an almost global spread (Dembo and Imbelloni 1938; Dingwall 1931). However, there are a multitude of ways in which these devices are constructed (Allison et al. 1981; Dembo and Imbelloni 1938). The board is usually made of wood, but can be substituted by other rigid materials or pads filled with clay, sand, or other natural materials. One or multiple boards may be used, with the location of each board determining the resulting cranial shape. A common construction uses two boards, located at the front and back, which are tied together by textiles. Another variant uses a board at the front of the skull held in place by a band around the occipital. The basic design of a cradleboard may also be altered to include a tablet or pad at the front of the skull (Dembo and Imbelloni 1938; Dingwall 1931; Mason 1889). All variations create fronto-occipital modification, a broadening and shortening of the skull with flattened areas in the exact location of the boards. In rare cases, parietal flattening is achieved by a device consisting of two boards at the sides of the skull (Dingwall 1931; Neumann 1942).

The cradle in which infants spend the first part of their lives can also cause alterations to their cranial shape. Flattening of the occiput can take place if the infant's head rests on a firm surface in the same position for some time. This was the case with infants from many Amerindian groups who were bound to cradleboards, that simultaneously served as a resting place for the infant and a transportation device (Mason 1889:161). However, such unintentional modifications may result from any situation in which the movements of the infant are restricted and the head rests on a hard surface, for example swaddling practices in post-medieval Europe (Dingwall 1931) or prolonged use of modern car seats (Tubbs et al. 2006). The resulting occipital flattening, which is often asymmetrical in nature, may be unintentional and simply a side-effect of child rearing practices or the cradle's construction. However, certain cradle designs show deliberate attachments aimed at creating an altered head shape (Dingwall 1931; Mason 1889).

Consequences of Cranial Modification

It is readily apparent that head shaping practices will have an impact on cranial shape and many studies have focussed on these effects of cranial modification on the human skull, both in general and in relation to particular types of modification. These will be presented following the system of cranial shapes selected for this study. The integrated nature of cranial growth and development implies that there may be additional changes to the skull resulting from the human influence on the natural cranial shape. The varying results of studies into the relationship between cranial modification and cranial non-metric traits will be presented, followed by a discussion of potential negative side-effects reported in ethnohistorical and ethnographic sources.

Cranial Morphology

The changes to the shape of the cranial vault created by head shaping are readily discernible through visual inspection and as a result, vault alterations are often used as a basis for descriptions. However, changes to the base and facial regions of the skull have been subject to a substantial debate since they were first recorded at the beginning of the 20th century. Part of the inconsistencies reported to date may stem from underlying genetic differences between populations or methods used to gather data. Here, a brief overview will be given of the most reliable studies using the classification system selected for this study.

The pressure placed on the front and back of the skull in fronto-occipital modification results in a compensatory reduction in cranial length, increased cranial breath, and a broadening and flattening of the cranial base (Cheverud et al. 1992; Dembo and Imbelloni 1938; Hrdlička 1919; Oetteking 1930). Facial changes have also been reported for fronto-occipital modification, although there is some variation between different studies. Anton's (1989) study of Peruvian crania showed that fronto-occipital modification produced significant differences in upper facial height, bizygomatic breath, interorbital breath, pyriform aperture breath, and the upper facial index. Cheverud and colleagues (1992) concluded that fronto-occipital modification resulted in a shorter and wider face, mainly as a response to the changes in the cranial base and vault, and a posterior and inferior shift of the orbital rim. Similar facial differences in relation to fronto-occipital modification, increased breath and height measurements, were found by Rhode and Arriaza (2006) and Manríquez and colleagues (2006).

However, Cheverud et al. (1992) also noticed significant differences between the two populations with fronto-occipital modification used in their study, which may result from different population genetics or variation in the manner in which fronto-occipital modification was achieved. Intriguingly, a study using 3D morphometric analysis of crania by Ross and Ubelaker (2009) showed no significant differences in the position of the facial landmarks in crania with fronto-occipital modification. This may be due to the elimination of individual size differences in this new methodology.

Circumferential modification is achieved by a tight wrapping of the skull. This lateral restriction of cranial growth results in a compensatory longitudinal development of the vault and base (Dembo and Imbelloni 1938; Hrdlička 1919; Kohn et al. 1993; Oetteking 1930). Among a population from Ancon in Peru, this type of cranial modification caused a reduction of the upper facial index, palatal breath, and palatal length as well as an increased orbital height, orbital index, and palatal index (Anton 1989). Blackwood and Danby (1955), Brown (1981), and Rhode and Arriaza (2006) report similar changes. Kohn and colleagues (1993) report an increase in antero-posterior facial growth and a decrease in antero-lateral to postero-medial dimensions. However, Frieß and Baylac (2003) report an increased anterior and interior projection of the face, but consider the relative dimensions of the face to be unchanged. Furthermore, a study by Kohn et al. (1993) shows differential facial involvement between the Kwakwaka'wakw and Nuu-chah-nulth in their sample, despite both being populations from the Pacific Northwest Coast.

Frontal flattening is created by direct pressure on the frontal bone and leaves a corresponding plane of flattening. Occasionally, the board used in this procedure is held in place by ties at the back of the head. In those cases, very mild occipital changes may be observed. Most investigations into the effects of cranial modification on morphology have focussed on the differences between the fronto-occipital and circumferential types, as these are both more common and more marked in degree. Frontal flattening may have an impact on cranial morphology similar to that reported for fronto-occipital modification, but it is likely to be far less marked.

Flattening of the occipital can result from the application of a hard board to the back of the head, the use of a cradleboard, or resting on a hard surface for a prolonged period of time (Kohn et al. 1995; Mason 1889; Tubbs et al. 2006). A little more investigation has been done into the effects of occipital flattening. The practice of cradleboarding did not impact the cranial base in the study by Kohn and colleagues (1995). Statistically significant differences were observed in upper and lower facial height in a prehistoric Hawaiian sample with occipital flattening (Schendel et al. 1980). However, a study of the Lebanese practice of cradleboarding produced no facial differences (Ewing 1950). If the flattening is asymmetrical, compensatory changes may occur such as contralateral occipital bossing and a forward displacement of the ipsilateral ear (Ridgway and Weiner 2004).

Cranial Non-metric Traits

Investigations have also focused on the potential influence of cranial modification on non-metric traits. Non-metric or discrete traits are 'morphological variants of anatomy' (Saunders and Rainey 2007:533) that can be found in any human tissue. Osteologists have described several hundred of these skeletal and dental variations, which are generally non-pathological in nature (Hauser and De Stefano 1989; Saunders and Rainey 2007). Initial investigations pointed to a high degree of genetic influence in the development of these variations (Berry and Berry 1967), but later studies demonstrated that these traits in fact represent the phenotype of an individual and may be influenced by physiological (i.e. sex and age) and environmental (i.e. activity and pathology) factors (Hauser and De Stefano 1989; Saunders and Rainey 2007). As was the case with the changes to cranial morphology, different investigations have found divergent results. Still, a general overview of the most important differences and the potential to use these in the visual determination of cranial modification status will be presented here.

Konigsberg and colleagues (1993) investigated the correlation between three different types of cranial modification (circumferential, fronto-occipital, and lambdoidal flattening) and 39 non-metric traits. Their results show that cranial modification only impacts a minority of traits.[6] If we exclude the effects on wormian bones, which will be discussed below, only two traits are affected. Konigsberg et al. (1993) conclude that the overall impact of modification on non-metrics is trivial. Interestingly, their results do show that the traits and locations of the skull most impacted by modification are dependent on the type of modification and the points at which most pressure is exerted on the cranium in the early years of life. These conclusions are supported by a recent study of Argentinian material by Del Papa and Perez (2007), who suggest that the traits most impacted will be those that develop postnatally and near the cranial regions which endure the greatest pressure and shape alterations during the modification process.

An examination of lambdoid sutural complexity in a small sample of southwest Native American crania shows an apparent increase in the complexity of the upper half of the lambdoid suture (Gotllieb 1978). Gottlieb proposes this is a direct result of increased pressure on the suture, based on the work by Moss (1958), which shows a relation between interdigitation of sutures and external forces. A later study by Anton and colleagues (1992) showed a rather limited increased sutural complexity

6 'Specifically, in the Hopi, deformation acts to decrease the relative frequency of left masto-occipital ossicles, and increases the relative frequency of the right foramen spinusom open, right foramen of Huschke, and sagittal ossicles. Among the Nootka, deformation increases the relative frequency of left and right coronal ossicles, while for Ancon, deformation acts to increase the relative frequency of sagittal ossicles. Among the Kwakiutl, deformation decreases the relative frequency of left epipteric bones, while increasing the relative frequency of the right parietal notch bone, right masto-occipital ossicles, and left and right coronal ossicles.' (Konigsberg et al. 1993:39-40).

in the coronally oriented sutures associated with circumferential modification. They suggested a variety of factors might limit the effect of modification on sutural interdigitation, although their evidence does support a link between head shaping and wormian bones.

Others have argued that the pressure exerted on the cranial sutures during the modification process may lead to premature closure of a suture, a condition also known as craniosynostosis. In a discussion on Andean cranial modification practices, Allison et al. (1981) observe several cases of premature closure of the sagittal or coronal suture in modifications which produce a high vault. However, they do not give a clear number of cases and produce an estimate that this occurs in 5 to 10 percent of cases without providing the actual prevalence in their sample. Similarly, Posnansky (1896, in Guillen 1992) reports a single case of premature suture closure in relation to annular modification without indicating the affected suture and extrapolates that this must be related to extreme modifications. These reports have been rather incidental, simply reporting on one or a handful of cases in a sample.

Gerszten (1993) observed earlier suture closure as well as a different pattern of suture closure in a number of populations from Northern Chile. However, the age of individuals was established based on dental wear patterns. With a sample spanning from 6000 BC to AD 1600, the use of dental wear patterns for ageing is extremely problematic due to potential shifts in dietary practices as well as food preparation techniques. Thus, it is difficult to assess the reliability of age assessment in the sample, a vital component for discussing whether sutures have indeed fused prematurely. White (1996) specifically studied the relation between premature sagittal suture closure and modification in the Lamanai site in Belize. This study reports a substantial difference in the prevalence of sagittal synostosis between the modified and normal subset of the sample. White hypothesises that this may result from deformations of the cranial base as a result of intentional modification practices or from extrinsic forces placed on the sagittal suture during key moments in the development of the skull (White 1996). However, the evidence for differential suture closure due to head shaping is still very tentative and some authors do not observe different rates of sutural closure (Blackwood and Danby 1955). More research should be executed, similar to White's work on carefully selected samples from different populations, before conclusions can be drawn.

Wormian Bones

Wormian bones - also referred to as supernumerary bones, sutural bones, and ossicles – are isolated bones of variable size and shape that form from independent ossification centres within the cranial sutures and fontanelles (El-Najjar and Dawson 1977; O'Loughlin 2004). The aetiology and developmental trajectory of these supernumerary bones have been a tropic of scholarly debate for over a century, ever since Dorsey (1897) proposed a link between the presence of wormian bones and the pressure exerted by cranial modification. Since then, numerous studies have attempted to clarify the origin and development of wormian bones with results ranging from complete genetic control (Berry and Berry 1967; Finkel 1976; Torgersen 1951; Wilczak and Ousley 2009) to environmental stress (Bennett 1965; Ossenberg 1970). Recently, researchers have favoured a hypothesis which suggests wormian bones are epigenetic in nature: their presence is determined genetically yet environmental factors can exert an influence on the frequency per individual (Anton et al. 1992; Del Papa and Perez 2007; El-Najjar and Dawson 1977; Konigsberg et al. 1993; O'Loughlin 2004; Sanchez-Lara et al. 2007; van Arsdale and Clark 2012; Wilczak and Ousley 2009; White 1996).

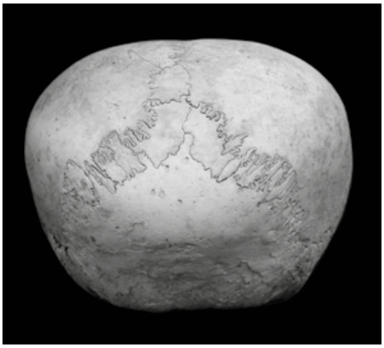


Figure 4 **Multiple wormian bones visible along the sagittal and lambdoidal sutures in the occipital view of individual LGC443, catalogue No. 349443, from the Department of Anthropology, Smithsonian Institution.**

However, these studies do not agree on the degree of influence created by cranial deformations and modifications. These disparities are due to several limiting methodological factors that should be taken into account when undertaking these types of studies and comparing results: using sample sets compiled of biologically different populations, not accounting for differences in modification type, and variations in the degree of cranial modification and thus the amount of pressure present.

Hanihara and Ishida (2001) have shown significant inherent differences in the frequencies of four types of wormian bones[7] between populations. This substantial interregional variation can skew the results of studies that group populations from different biological and geographical backgrounds, such as those by O'Loughlin (2004), Konigsberg et al. (1993), and Sanchez-Lara et al. (2007). However, such a mixed dataset can be employed to investigate whether different types of modification – and thus different points of pressure on the skull – will have a distinctive result on occurrence and frequency of wormian bones. The effect of localised pressure on specific types of supernumerary ossicles was shown by both O'Loughlin (2004) and Konigsberg and colleagues (1993).

7 Lamdoidal wormian bones, parietal notch bones, asterionic bones and bones in the occipito-mastoid suture (Hanihara and Ishida 2001).

Despite the small inconsistencies between the different studies, most of which are due to the methodological issues discussed previously, the overarching conclusion would have to be that wormian bones are indeed epigenetic in nature. Supernumerary ossicles are partially hereditary, explaining their presence in normal crania throughout the world and the varying degrees in which they are encountered. However, it seems that environmental influences, such as external pressure on the skull from a modification device, can have a moderate proximal effect on these traits (O'Loughlin 2004; Del Perez and Papa 2007; Saunders and Rainey 2007; van Arsdale and Clark 2012).

Post-bregmatic depression

One of the earliest references to a potential correlation between a post-bregmatic depression and cranial modification can be found in Hrdlička's Anthropometry (1920) and Oetteking's Account of the Jesup North Pacific Expedition (1930). Hrdlička (1920:48) discusses the presence of a depression 'along and just posterior to the coronal suture' in both fronto-occipital and circumferential modifications. Oetteking (1930) mentions that this transverse groove, just behind the coronal suture, is found occasionally in crania with fronto-occipital and circumferential types of modification and is produced by pressure on the frontal bone during the modification process. Goldstein (1940:313) refers to a 'saddle-like depression' which 'often occurs just back of bregma' and posits that this groove is due to simultaneous compression of the front and back of the skull.

Figure 5 **Post-bregmatic depression visible in the lateral view of individual DCAJ025, 1895 4038, from Limestone Cave, Jamaica, Duckworth Laboratory, LCHES, Cambridge.**

Post-bregmatic grooves or depressions have been identified in several other studies of intentional cranial modification (Anton and Weinstein 1999; Brown 1981; Clark et al. 2007; Ricci et al. 2008; Tiesler 2012; van Duijvenbode 2010). Although the trait is seen more frequently in the modified subset of the sample, it is not universally present in modified crania. Tiesler (2012) hypothesises that these grooves represent the redirection of cranial growth after the disappearance of the fontanelles and demonstrates that the degree of expression of the post-bregmatic depression is related directly to the severity of the modification and the amount of the frontal bone which is subjected to flattening.

Despite the evidence suggesting post-bregmatic depressions are a result of cranial modification, these grooves are also encountered as a non-metric trait in normal crania. In fact, the trait is often used in the forensic assessment of ancestry, as individuals of

African descent are more likely to have a slight concavity of the area behind bregma (Byers 2008; Gill 1998; Rhine 1990; cf. Hefner et al. 2012). More research is required into the origin and development of this trait, which similar to wormian bones, may be epigenetic in nature.

Sagittal depression

Another depression found in association with head shaping is a groove along the posterior section(s) of the sagittal suture (Dembo and Imbelloni 1938; Hrdlička 1920; Tiesler 2012). Crania with this indentation are often referred to as bilobed (Hrdlička 1920:48; Dembo and Imbelloni 1938:271), as the depression separates the two parietal lobes and creates a heart-shaped form in the superior view.

There is some debate in the literature on the nature of the sagittal depression. Dembo and Imbelloni (1938) consider it a direct result of pressure by an overlying bandage, while Hrdlička (1920) suggests it is an indirect consequence of the compression of the cranium, similar to the aetiology of the post-bregmatic depression. Tiesler (2012) hypothesises that both explanations may be valid, as depressions along the sagittal suture may result from direct pressure produced by a part of the modification device or as a result of the general compression of the skull. Evidently, more research is needed to determine the precise cause of these sagittal grooves and the resulting bilobed appearance of the skull in the superior view.

Sagittal keeling

There is only anecdotal evidence of the relation between cranial modification practices and metopic or sagittal keeling, bulging on the outer cranial vault located along the respective sutures. A study by Anton and Weinstein (1999) has shown slightly higher levels of sagittal keeling associated with fronto-occipital modification in a mixed sample from South America. Circumferential modification was associated with higher frequencies of metopic keeling yet lower frequencies of sagittal keeling. So far, no other studies have confirmed this correlation and it should be noted that the South American sample is composed from populations from four different regions (i.e. Bolivia, Chile, Peru, and Argentina) and an unknown number of sites. Hence, the biological distance between these populations is unknown and their grouping into a single sample can be questioned. Furthermore, the study does not separate vertical and parallel subtypes of modification which may further confuse the results.

Lesions

One of the first associations between cranial lesions and head shaping was made by Broca in the 19th century (Broca in Topinard 1879). Broca suggested that the pressure exerted on the skull during the modification process could lead to inflammation of the bone. A report by Dingwall on the use of bandages to create circumferential modification in 19th century France includes a description of infected and festering ulcers (Dingwall 1931). Reports of periosteal lesions, invariably on the occipital, have been reported by several authors in various Peruvian individuals and populations (Allison et al. 1981; Guillen 1992; Stewart 1976; Weiss 1932, 1958), a population from New Mexico (Holliday 1993), and a number of individuals from Northern Chile (Gerszten 1993).

Stewart (1976) suggests the pressure of the modification device impedes the circulation of blood within the growing occipital bone in early childhood, resulting in necrosis of the tissue and the potential development of lesions on the bone at the point of most pressure. Furthermore, these lesions are almost always associated with fronto-occipital vertical modification or cradleboarding practices (Stewart 1976; Holliday 1993), since these types of modification would produce the highest pressure on the supra-inion region of the skull.

However, Stewart's study also found these lesions, which he refers to as supra-inion depressions, in skulls without cranial modification, albeit in lower percentages than in the populations practicing head shaping. This lead him to conclude that 'the presence of a type of deformation in which the deforming pressure was exerted at the most prominent part of the occiput enhances a natural tendency towards the formation of a depression just above inion' (Stewart 1976:426). Anton and Weinstein (1999) have shown a high frequency of the trait in a non-modified population from Australia, suggesting that there may indeed be an underlying genetic aetiology to the trait which varies between modern human populations.

Potential Adverse Secondary Effects

Since the earliest descriptions of skulls with cranial modification in popular and academic writing, a debate has raged about the potential negative side effects of such alterations, including diminished intelligence, pain, and even death. The evidence for such adverse secondary effects will be discussed here.

Some scientists believed such remodelling of the brain case and by extension of the brain itself must result in serious intellectual consequences for the individual in question (Broca 1875; Gosse 1855; Posnansky 1924; Wyman 1881-1882). However, others were convinced that cranial modification would not impair the function of the brain (Dingwall 1931; Oetteking 1930; Rogers 1975; Wells 1964). Studies have shown that head shaping forces the human brain to adapt its shape under the influence of the pressure exerted by the modification device, but that the intrinsic rate of growth remains the same (Moss 1958). Cranial capacity and brain volume are similar in modified and normal skulls, suggesting the normal function of the brain is not significantly impacted

(Gerszten 1993; Moss 1958). Overall, the argument has been made that any practice with gross negative impact on cognitive function would not have been continued (Gerszten and Gerszten 1995; Lekovic et al. 2007).

The absence of substantial impact on mental capability is supported by a variety of ethnographic accounts that do not report any negative impacts on the intelligence of populations with modified crania in comparison to their peers (Flower 1898; Lewis et al. 1843; Morton and Combe 1839; Scouler 1829). An interesting example is the following description provided by Townsend, who despite his rather obvious negative attitude towards the altered head shapes encountered during his travels in the American northwest, does not appear to have been biased in his description of the mental capacity:

> 'The appearance produced by this unnatural operation is almost hideous, and one would suppose that the intellect would be materially affected by it. This, however, does not appear to be the case, as I have never seen (with a single exception, the Kayouse) a race of people who appeared more shrewd and intelligent' (Townsend 1839:175).

A potential connection between cranial modification and apoplexy (stroke) is infrequently mentioned (Scouler 1829; Rogers 1975) but this hypothesis has never been proven (Dingwall 1931:181). The same applies to the potential for cranial modification to cause epileptic fits (Dingwall 1931:50).

Another long-lasting debate has raged on the topic of infant suffering during the modification process. Certain sources report children appear to be in pain when undergoing these modifications, with a mention of continual nose bleeds under pressure and the frequent reporting of a bulging appearance of the eyes (Breton 1999 [1665]; Dingwall 1931; Flower 1898; LeBlond 1813; Scouler 1829). This latter feature is described in a colourful fashion by Cox: 'The appearance of the infant, however, while in this state of compression, is frightful, and its little black eyes, forced out by the tightness of the bandages, resembled those of a mouse choked in a trap' (Cox 1831:302). On the contrary, others describe children as calm and not distressed (Blackwood and Danby 1955) and apparently not in any pain (Flower 1898; Mayntzhusen in Dingwall 1931:203; Meares 1790). These discrepancies on the issue of suffering may stem from different modification procedures: the location and degree of pressure may be important. Unfortunately, this disagreement cannot be solved based on the original sources and must remain an uncertain factor.

It is of some importance, however, as chroniclers have reported that the suffering may in some cases have been extreme enough to cause death. Father Cobo, in his discussion of Peruvian modification practices, mentions 'he knew of one child who died from the pain caused by the operation and doubtless there were others also who suffered a similar fate' (in Dingwall 1931:214). This remark was repeated by Diez de San Miguel in regards to the practice in Peru (in Guillen 1992) and Bishop Diego de Landa in his description of head shaping among the Maya (Dingwall 1931:153). Similar assertions of cranial modification as the cause of death have been made by Guillen and colleagues (in Boston 2012:111) for two individuals and Mendonça de Souza and colleagues (2008) for a Peruvian mummified infant. Such anecdotal evidence has been used to propose death as a serious side-effect of cranial modification.

Attempts have been made to investigate whether cranial modification does in fact result in higher infant mortality rates, despite the inherent issue of the osteological paradox (Wood et al. 1992) and the problems of establishing cause of death through the analysis of archaeological human remains (Sauer 1998; Waldron 2001). The vast majority of fatal afflictions, be it disease or trauma, do not leave evidence behind on the skeleton. As Waldron puts it in his discussion on palaeopathology:

> 'Skeletal diseases are uncommon, as most diseases affect the soft tissues: this is certainly the case for the killing diseases. Thus, it is generally impossible for palaeopathologists to determine the cause of death of those they examine' (Waldron 2009:1).

Additionally, even active skeletal lesions present in an individual at the time of death cannot simply be assumed to be the causative agent, as other factors or complications that leave no skeletal traces could also be involved. Therefore, physical anthropologists are often hesitant to declare a cause of death for an individual apart from those rare cases where the nature of the trauma is clearly fatal (e.g. a gunshot wound to the head). In addition to these important issues, which complicate a meaningful assessment of the relationship between mortality and cranial modification, other factors have further complicated previous investigations.

Boston's (2012) study is one of the major investigations looking at the relationship between mortality and cranial modification beyond the level of anecdotal evidence. The study concludes that the practice of head shaping leads to increased morbidity and mortality in populations, using a pooled sample from Chile spanning almost 9,000 years. Although such pooling is a statistical necessity in most osteological investigations, it means that significant cultural and environmental changes that could affect disease and mortality rates in these populations cannot be accounted for. Furthermore, the fact that postcranial remains were apparently not available for analysis means that a full osteological and pathological assessment of the individuals could not be conducted and a significant amount of data necessary for the proper diagnosis of age, sex, and pathological conditions is missing. Thus, a proper investigation of all factors, specifically disease and trauma, contributing to population mortality was not possible. Overall, these factors make the sample inappropriate for the analysis as executed and call into question some of the conclusions.

This does not mean that extreme compression of the skull may not have occasionally resulted in the death of an infant undergoing cranial modification. However, incidental fatal consequences are a far cry from structural health risks and increased mortality of infants in societies which practiced head shaping. As of yet, no compelling evidence for the latter has been found. In fact, considering the enormous amount of adult modified crania found in skeletal collections across the globe representing individuals that survived the practice into adulthood, death as a result of cranial modification should probably be considered a highly unusual and atypical outcome.

A Question of Motivation

Human cranial development can be altered by numerous factors, including genetic and environmental influences, resulting in a variety of different cranial shapes. The role of humans as intentional agents in this process has been highlighted throughout this chapter and illustrated with several examples that hint at the wide temporal and geographical distribution of such head shaping practices. The social and cultural dimensions of intentional cranial modification, including the intriguing question of motivations, will be explored further in the discussion of the social skull.

3 THE SOCIAL SKULL

The body is man's first and most natural instrument
Mauss (1973 [1936]:75)

Exploring the process of cranial modification and its physical ramifications invariably leads to the important question of motivation. Why did people in the past initiate and continue head shaping practices over generations? The process requires an investment of time and energy as well as a commitment to the permanent outcome by the practitioner and close kin on behalf of the infant. Intentional cranial modification must have been considered worthwhile given the enduring and socially integrated nature of the practice.

Understanding the reasons for practicing cranial modification provides archaeologists with an important window into the social world of past individuals and societies. In order to grasp the intangible issue of motivation, examples from historic and ethnographic sources will be used to paint a picture of the varied social rationales behind head shaping. Merely copying these motivations recorded in historic and ethnographic sources and pasting them onto archaeological societies is not sufficient. To comprehend the practice, we must understand how altered head shapes function within social settings. Theoretical perspectives on identity from across the humanities will be used to discuss identity formation, maintenance, and expression. The body, and in particular the head, is placed at the nexus of biology and culture and its ability to literally embody and express elements of identity is a key part of this approach.

Returning to cranial modification with this wider theoretical approach in mind, the possibilities and limitations inherent in using an altered head shape to act as a marker of identity will be investigated. The theoretical insights from this chapter combined with the motives for modification extracted from historical and ethnographic sources will provide several potential social rationales for cranial modification that can be investigated in the archaeological record of the Caribbean and beyond.

3.1 MOTIVES FOR MODIFICATION

Although cranial modification is a practice found in a wide range of social and cultural contexts, several shared motivations for the practice can be extracted from anthropological, (ethno)historical, medical, and archaeological sources. This is a heuristically helpful exercise, as it will create plausible options for the sorts of social ties and motivations in cases where additional contextual information is lacking. The following section will show such general trends through carefully selected examples from a range of societies from various regions and periods.[1]

An issue that must be addressed before delving into the variety of motivations for head shaping, is the reliability of ethnographic and historical sources in representing the indigenous social world. When reading discussions on the reasons behind head shaping in such sources, it becomes readily apparent that the personal convictions of the writers may have tainted their descriptions. Disgusting, frightful and queer, monstrous, hideous, and horrid deformity are only a few of the derogatory terms reproduced by Dingwall (1931) from various sources. Furthermore, several partially successful attempts at outlawing head shaping in early colonial South America indicate European discomfort with the practice and its results (Dingwall 1931:215). All of this reveals the prejudiced position from which some writers engaged with the concept of cranial modification, a bias which may have impacted both their manner of conducting interviews with indigenous informants and the subsequent reporting of their findings. This implies that care should be taken not to use explanations from written sources in a direct and uncritical manner, as of course is generally true for all types of written source material (Tosh 2010).

Besides this potentially biased view and the resulting, unconscious or conscious, misunderstanding of the social role of altered head shapes, the original sources from which authors obtain their information can also create problems. The following example by Sala (1897) demonstrates this eloquently: 'The only reason for this barbarity is that in this manner their hair does not hinder their sight and they have a larger forehead'.[2] Sala's reference to cranial modification as barbaric already indicates a negative predisposition towards the custom. His explanation for the presence of altered head shapes, to allow the indigenous population to see without their view being obstructed by their own hair, was righteously dismissed by Dingwall as 'a misunderstanding on his part, or have been given by those who had little knowledge of the custom' (Dingwall 1931:201). Similarly,

1 This is by no means meant as a comprehensive overview of cranial modification practices around the world. Readers are referred to the classic and invaluable compilation of Eric Dingwall (1931).

2 'La única razón que dan de esta barbaridad es que de este modo no les tapa la vista los cabellos y tienen la frente más grande' (Sala 1897:80).

Dembo and Imbelloni (1938:61) contend that such 'explanations' may be created to soothe the curiosity of inquisitive visitors. In this context, they mention Rochefort's assertion (1667) that the Caribbean Carib population flattened their foreheads to facilitate shooting arrows to the top of trees while hunting.

Despite these drawbacks and issues, written historical or anthropological sources on intentional cranial modification often represent one of the few direct ways of assessing why humans practiced head shaping. The following overview of motivations behind cranial modification necessarily relies heavily on these sources, but they have been assessed critically in an attempt to diminish the impact of any prejudices present, while simultaneously understanding that such biases can never fully be eliminated from this type of investigation. Though this overview consists of different categories, these should not be considered singular or mutually exclusive explanations of head shaping practices. As will become readily apparent in the remainder of the heuristic framework presented in this chapter, the social ties of intentional cranial modification are simultaneously multiscalar and plural.

Cultural and Aesthetic Ideals

Based on the sheer quantity of citations in written sources, altered head shapes are considered aesthetically pleasing by most societies that practice intentional cranial modification. The Scandinavian Lapps provide an interesting example in this respect. Manual massaging of an infant's head and nose was combined with tightly wound textiles, in the form of a tight scarf or traditional narrow cap, to produce a rounder skull shape (Hatt 1915). The rounder shape was considered beautiful, but the improved health of the infant was also mentioned as a factor. Massaging and bandaging the cranium was considered to increase the rate of closure of the anterior fontanel, which the Lapps believed to be crucial for the proper and healthy development of the infant. Delayed closure of the fontanel was believed to result in headaches and a delay in learning how to walk (Hatt 1915).

A desire to ensure an infant remains healthy and will grow up to be intelligent has also been enmeshed with the practice of intentional cranial modification. An ethnographic study of traditional child care practices among modern immigrants in the United States showed a persistence of mild forms of cranial modification produced by massaging the head in early infancy (FitzSimmons et al. 1998). Informants mentioned beauty, health, and intelligence as prime motivators for cranial modification. Hatt considers the relationship between head shaping and health to be the original motivation behind the practice and debates whether social notions of beauty and aesthetics became associated afterwards (Hatt 1915).

Gender

Cranial modification may also have been used to express gender differences. Several examples are provided here, but it should be noted that authors have generally equated biological sex with social gender and have not attempted to distinguish the two phenomena – perhaps unsurprisingly since most of these sources date from before the theoretical paradigm shift that underlies our current understanding of these concepts. To clarify, sex refers to biological differences between males and females in reproductive organs and chromosomes, whereas gender is a social construct (Gowland and Thompson 2013; Meskell 2007; Moore 1994).

Blackwood and Danby (1955) mention slight differences in the execution of cranial modification between the sexes among the Arawe population of Melanesia. The main reason given for cranial modification was aesthetic, with women reported to have more marked modifications created by a longer and tighter application of the modification device since a greater degree of modification made them more attractive to prospective partners. This pattern of gender differentiation, with more marked modification in females, was also seen among other populations in Melanesia and Indonesia (Dingwall 1931:124-128) and on the island of Marken in The Netherlands. Here, islanders used traditional headdresses consisting of several tight layers to create a mild cranial modification (Barge 1912). Although both men and women were subjected to this practice, female caps were generally tighter and kept in place for a longer period of time (Barge 1912).

A more clear-cut division between males and females can be found in central Celebes, where the sexes were subjected to different methods of modification. For males, the modification apparatus consisted of three boards placed in lateral and superior positions which created an altered cranial shape reportedly meant to terrify enemies. Females, for reasons of beauty, were subjected to circumferential modification using bark (Dingwall 1931:128). This situation is comparable to the modification practices encountered among the indigenous inhabitants of Tahiti. Here, both sexes underwent cranial and nasal modification, but the heads of men were subjected to additional shaping in order to 'strike terror in the hearts of his enemies' (Dingwall 1931:149).

Religion

Cranial modification is occasionally linked to religious beliefs. Houston and colleagues (2006:45) propose that head shaping among the Classic Maya was a direct imitation of the corn-cob shaped head of the Maize God. As the Maize God was associated with notions of beauty, this may have been a reiteration of the relationship between altered head shapes and aesthetics. Although Tiesler (2012) agrees with the hypothesis by Houston and colleagues (2006), she cautions that such an argument can only apply to the minority of the population who were modified in the depicted manner and therefore is at best only a partial explanation for cranial modification in this population. Her argument corresponds to the notion of plural social motivations for head shaping suggested by the heuristic framework constructed in this chapter.

In relation to the altered head shapes encountered in the Inca Empire, Agrand proposes that frontal flattening is an attempt to imitate the shape of a snake's head as a reference to the mythological serpent ancestor of the ruling family (Agrand in Wiener 1874:82). However, it is unclear on what factual information this notion was based and it is in fact dismissed outright by Dingwall (1931:219). Emulating the shape of a totemic ancestor, in this case the turtle, was also proposed for the indigenous inhabitants of the Caribbean by Herrera Fritot (Herrera Fritot and Youmans 1946). Again, similarity between the cranial shapes observed by the authors seems to be the only basis for this assertion and it is not based on or supported by indigenous information on head shaping practices. The latter should inform our understanding of intentional cranial modification and the relation between turtles and head shaping in the Caribbean is therefore considered invalid.

Group Identity

Collective social identities exist on numerous scales and can express differentiation within and between different communities. Cranial modification can be used within a society to display the group affiliation of an individual. Such collective identities can exist on many different levels, from local expressions of family, lineage, or community to regional concepts such as province, ethnicity, or even nation.

Cranial shapes may be used as embodied expressions of status differentiation within societies. A classic and well documented example can be found among the Chinookan speaking peoples of the Pacific Northwest of the United States. At the beginning of the 19th century, Lewis and Clark described cranial flattening among the men and women of these societies (Lewis et al. 1843). Several authors reported that enslaved individuals within these communities had normal head shapes, although there were different opinions on the notion that freed slaves were allowed to modify the heads of their children (Dingwall 1931:166-169). The altered head shape was seen as a marker of freedom and can thus be considered an indicator of a particular type of social status – free or enslaved – within these communities.

Studying the long history of cranial modification in France, which arguably dates back to the Neolithic (for this discussion see Dingwall 1931:19-20), demonstrates that the social reasons behind head shaping may change significantly through time. During the Medieval Period, cranial modification in France began as an elite practice emphasizing high social standing, but was subsequently rejected by the aristocracy when it was emulated by the lower classes (Gerszten and Gerszten 1995; Littlefield et al. 2005; Tubbs et al. 2006). The practice, mainly in the form of tight bandages known as a bandeau, continued among the lower ranks of society until the beginning of the 20th century (Delisle 1902; Dingwall 1931). By this time, however, different regions had developed unique types of caps and bandages resulting in distinct cranial shapes, the most well-known of these being the so-called déformation toulouisaine (Delisle 1902; Dingwall 1931; Soto-Heim 2004; Wells 1964). Such distinct regional differences could be used to identify the region of origin and as such could be considered markers of regional or group identity.

In the Andes, group identity was displayed directly on the human body using distinct styles of clothing, headdress, hair, and cranial modification (Blom 2005a). These visual markers allowed for rapid identification by those who understood and shared the symbolic language. These communal indicators of group identity also served to create internal cohesion within larger and complexly organised communities, a fact exploited by the Inca who actively encouraged the process of regional diversification in the Andes after the expansion of their empire (Blom 2005a,b; Gerszten 1993; Hoshower et al. 1995; Torres-Rouf 2009).

Investigations into the expansion of the Tiwanaku influence sphere between AD 500 and 1100 in the Andes have shown distinct regional patterns of modification styles. While the cemeteries from the surrounding valleys show only a single style, either fronto-occipital or circumferential, cemeteries from the city actually show a mixture of both. These types of modification represent the regional identities of the surrounding valleys, which are both encountered at the point of interaction between the two in the capital city of Tiwanaku (Blom et al. 1998, 2005a,b).

A study by Hoshower and colleagues (1995) looked at the modification styles found in the Omo M10 site in one of the valleys near Tiwanaku. There were minor variations in the construction of modification devices within this site, which could be linked to spatially distinct cemeteries. The authors conclude that this pattern was produced by *ayllus* (kin groups) who constructed modification devices in different manners. These constructions appeared to be relatively conservative in nature, as they remain stable throughout different periods in the site's habitation (Hoshower et al. 1995).

Among the Osage, a group of Native Americans living on the Great Plains, the occipital flattening created by their traditional cradleboards was considered an important marker of ethnic/group identity. Historical sources confirm that the cradles were deliberately constructed and used to create the altered head shape. The 19th century brought rapid social changes to the group, including a significant increase of marriages between Osage and White Americans, which led to a gradual loss of the traditional cradleboards and the associated ethnic identity communicated through altered head shapes. The absence of such a clear identifying marker may even have been considered advantageous against racial discrimination in the later parts of the 19th century (Logan et al. 2003).

Many societies relate group identity to notions of shared ancestry, be it biological or mythical. Among the Peruvian Collaguas of Arequipa, the altered cranial shape was said to have been derived from the shape of the volcano that was their mythological place of origin (Blom 2005a; Dingwall 1931:217). A similar story has been recorded for the Kol'awas in Peru, whose cranial modification mimicked the shape of the Kol'awata volcano (Schijman 2005). However, in both cases the cranial shape of the neighbouring communities with distinct mythological origins were very different. These examples could be considered as (indirect) signals of group identity, rooted in a communal ancestral origin and (re-)established in mythology.

Towards an Interpretive Framework

This analysis of source material from numerous social and cultural contexts has provided an interpretive framework showing the range of variation in motivations for head shaping practices. Cultural and aesthetic ideals, gender, religion, and group affiliations on various levels ranging from small scale differentiation within a community to markers of ethnic identity have all been proposed as rationales behind intentional cranial modification. The cases cited above have also shown that altered head shapes are often associated simultaneously with several of these concepts. Such plurality and multidimensionality must be kept in mind whilst exploring the social ties of head shaping practices.

Though the interpretive framework has seemingly produced many disparate concepts underlying head shaping practices, there is a shared common thread: each represents an element of identity. The altered head shape serves as a visual social signal expressing who a person is and how they relate to others. Cranial modification can therefore be considered a way of articulating an aspect of social identity in terms of a cultural bodily practice and a manner of facilitating social identification and interaction. The following sections will discuss identity, the body, and embodiment from a social constructionist perspective to understand the ways in which altered head shapes are created, embedded, and used to signal meaning within social contexts.

3.2 *DEFINING IDENTITY?*

The concept of identity became a key focus of research in the social sciences and humanities during the latter half of the twentieth century. Interest in the matter started with anthropological queries regarding the self and society, but the popularisation of the term identity has generally been attributed to psychologist Erik Erikson (Byron 2002:292; Hoover and Ericksen 2004; Verkuyten 2005). The topic fits well with the paradigm shift taking place in archaeological theory at the time away from the culture-historical perspective towards the new golden rule that 'pots are not people' (Díaz-Andreu and Lucy 2005; Insoll 2007; Jones 1997, 2007; Terrell 2010). Identity theory provided valuable novel ways to further our developing understanding of past communities. Within bioarchaeology, identity has only emerged as a topic of interest in the last two decades but studies have been prolific, likely due to the exceptional direct access to past human bodies (Baadsgaard et al. 2012; Buikstra and Scott 2009; Knudson and Stowjanowski 2009; Sofaer 2006).

Despite this surge of interest in the topic within all social disciplines – and indeed outside of academia in Western culture as a whole – defining identity is extremely challenging (Byron 2002; Brubaker and Cooper 2000; Cornell and Hartman 1998; Hoover and Ericksen 2004; Jenkins 2014). The Oxford Dictionary (2015) defines identity as: 'the characteristics determining who or what a person or thing is'. However, there is an inherent ambiguity in the use of the term within the social sciences, as it seems to be composed of two tangled issues: personal and collective identity (Byron 2002; Jenkins 2014; Díaz-Andreu and Lucy 2005).

Personal or self-identity refers to those aspects that make an individual unique and different from others (Byron 2002; Díaz-Andreu and Lucy 2005; Jenkins 2014). This is the way the term is most often used intuitively in day-to-day Western life: that what composes who I am. Collective or group identity, on the other hand, refers to the way an individual relates to groups or categories based on shared similarities or differences. In this way, collective identities provide humans with an understanding of their place in society. Ethnicity is one of the most commonly cited and studied examples of this type of identity (Barth 1969; Cornell and Hartmann 1998; Eriksen 1993; Jenkins 2008; Jones 1997; Lucy 2005; Verkuyten 2005).

These two aspects compose the identity of a person and have often been treated as separate phenomena despite the fact that they are intertwined within the embodied individual and are difficult to entangle (Cornell and Hartmann 1998; Hoover and Ericksen 2004; Jenkins 2008, 2014). The construction of individual and collective identity both take place during interaction through the process of identification of similarities and differences. In this respect, they share important features and can be considered one phenomenon. The most productive way of understanding the relation between these two aspects is by studying identity as a process that takes place at three different scales: the individual and social are connected through a level of interaction. This idea is found in the original work of Erikson that views identity as relation and in essence the middle ground between the individual and society (Erikson 1950; Hoover and Ericksen 2004) and recurs in several disciplines, albeit phrased differently, including social psychology (Côté and Levine 2002; Verkuyten 2005) and sociology (Goffman 1958; Jenkins 2008, 2014). In the words of Jenkins (1997:56):

> 'This scheme is only a way of thinking about society. It simply says that society can be thought of as made up of individuals, as made up of the interaction between individuals, and as made up of institutions. It also says that it cannot be thought of as any of these in isolation from the other two.'

For this study, the strength of this simplified view of society and identification processes is that it is grounded in embodied individuals (Jenkins 2000, 2008), the same level of analysis used when accessing cranial modification in individual crania. This model demonstrates the way in which individual and collective identities are entangled and embodied in the human body and how altered head shapes may inform us about individual and collective identities.

Identification

Our current theoretical understanding of identity has come from multiple academic disciplines where scholars have developed separate but often parallel lines of thought on the matter since the start of investigations in the fifties and sixties (Jenkins 2014; Hall 1996). The importance of identity in the social sciences and humanities has produced a treasure trove of scholarly works that cannot all be discussed here. In the following section, a pragmatic choice will be made from sociological and social anthropological literature on the prevailing current theoretical understanding of identity, which could be summarised as social constructionism. These social constructionist views on how humans articulate their identities are particularly helpful in connection to head shaping practices as they reflect the dynamic multidimensional identification processes identified in the source material for the interpretive framework, while at the same time providing room for the more stable and permanent aspects of intentional cranial modification.

Plurality is important in the social constructionist approach and there is no such thing as a single dominant identity. Although individuals may feel they have a single unified identity in the sense of a unique self, this is composed of many different elements of identity or partial identities. Certain aspects become ingrained from a very early age as a part of the socialisation process of an infant, whereas other aspects are acquired over the course of life time of social ties and experiences (Cohen 1994; Cornell and Hartmann 1998; Hoover and Ericksen 2004; Jenkins 2000, 2014 Verkuyten 2005). Identities are inherently dynamic in nature and produced through a continual process of identification during interaction with other social agents (Jenkins 2000, 2014; Hall 1996; Verkuyten 2005). In fact, Jenkins (2014) argues that the term identity should be replaced with identification as this is a much more accurate reflection of the continual process that shapes and reshapes who we are from before birth to beyond the grave.

Identification is essentially a process of comparison between the self and others based on similarities and differences. This can take place internally in a process of self-identification or externally in a process of categorisation by other actors. The differences or similarities used in the process are those that are socially determined to be important. This process is the same for both individual and collective identities, although the emphasis is slightly different: individual identities tend to accentuate difference from other humans whereas collective identities stress similarities within the group and differences with outsiders. Both arise from the interplay between similarity and difference, since one cannot exist without the other. These processes of identification are important building blocks of society, as they provide humans with an insight into themselves and others as well as an understanding of where they stand in society and how to relate to others (Barth 1969; Brubaker and Cooper 2000; Cornell and Hartmann 1998; Jenkins 2000, 2014; Jones 1997).

An important aspect of these processes of identification is the nature of social boundaries. Barth's work (1969) has had a major impact on archaeological and wider sociological thinking on identities. Barth points out that ethnic collectives cannot exist in isolation, as the comparison of similarities and differences at the basis of the identification process requires interaction between two entities (Barth 1969). This argument is in fact applicable to all types of identities. Although the term boundary might conjure up connotations of an impassable divide, these social boundaries are in fact the location of continuous interaction, for it is there that identity is constructed, expressed, and revised. This may take place at various levels: an ethnic identity requires the creation of an in- and out-group or us versus them, whereas personal identity uses a similar process in establishing self versus other (Cohen 1994; Cornell and Hartmann 1998; Eriksen 1993; Jenkins 2014; Voss 2008).

Identities are contextual and situational in nature. The social context will determine which of the many elements of identity is actively expressed by the actor or performed in the words of Goffman (1958). This situational aspect explains how many different and sometimes even opposing elements of identity are integrated in an embodied individual. The same principle applies on a more general level regarding the synthesis of personal and collective identity (Cohen 1994; Cornell and Hartmann 1998; Díaz-Andreu and Lucy 2005; Eriksen 1993).

Despite the constructed and fluid nature of identity, there are certain constraints present due to the dual process of self-association and classification by others. For example, although anyone can claim British nationality, such a claim will be assessed by others and must in some way be validated to be socially effective. So, identities are open to manipulation by actors but simultaneously constrained by social structure. In other words: identity is malleable but not infinitely so (Eriksen 1993; Jenkins 2014; Verkuyten 2005).

This strategic and positional view of identity stresses fluidity and agency, yet some identities can also be stable and continuous. Certain identities, primary identities in Jenkins' terms (2014) or identities grounded in (constructed) primordialities (Cornell and Hartmann 1998), become ingrained in both society and the individual through transmission to children during the early socialisation process. These provide them with a basic understanding of their social world through the lens of these identity elements. Gender or ethnic affiliations are prime examples of identities that are often instilled at a young age and tend to be relatively stable. Established identities that have become ingrained in society and can in the correct situational circumstances take on an almost self-perpetuating quality (Bentley 1987; Cornell and Hartmann 1998; Jenkins 2008, 2014; Verkuyten 2005).

These characteristics compose the theoretical understanding of socially constructed identity used in this investigation, selected as it reflects both the multidimensional and stable aspects of intentional cranial modification. However, the archaeological nature of the current investigation provides certain limitations and challenges for individual and collective identities. A helpful concept from anthropological and archaeological theory already briefly referenced is that of ethnicity, which will be discussed in more detail in relation to collective identities.

The Self

Personal identity, also referred to as the self, selfhood, or personhood with definitions varying slightly depending on the preferred theoretical paradigm and academic discipline, refers to our notion of ourselves as unique individuals with our own tastes and preferences – essentially who we think we are (Cohen 1994; Fowler 2004; Jenkins 2014). The term identity spread rapidly after its mid-20th century introduction not only in global academia, but also in popular culture. This led to widespread use of the term in the media and has resulted in lay use of the term in everyday life by social actors who have developed an understanding of the meaning through their own experience, which is different from the academic use of the term (Brubaker and Cooper 2000; Hoover and Ericksen 2004). This intuitive understanding is very much wrapped up with the cultural background of individuals and the Western point of view may not be applicable to the Amerindian ontologies from indigenous Caribbean populations (Conklin 1996; Conklin and Morgan 1996; Fowler 2004).

In fact, Conklin and Morgan (1996) and Fowler (2004) have demonstrated that notions of personhood vary widely between different societies. We cannot simply assume that our own view of what it means to be a person can simply be transposed back onto past people. This is not to say that the concept of self-identity is a modern notion as some have claimed (see Jenkins 2014 for this discussion), but is simply a reminder that archaeologists must take care in their analyses and take social context and cultural meanings into account.

What can be said about personal identity in relation to cranial modification is that the altered head shapes of past people would have played a vital role in how people shaped their own identity. As the infant would be surrounded by the altered head shapes of close family members during early socialisation, this would likely be incorporated, in some degree, into the concept of personhood (Conklin and Morgan 1996). Furthermore, the altered head shape represented a permanent aspect of personal appearance and the image of self, as the individual would have no memories of a time without it. This embedded nature of head shaping practices would have had an important impact on the socially informed aesthetics of individuals and the community as a whole.

This reinvokes the multidimensionality of constructed identities and the difficulty in separating the layers of analysis: how much of what we consider beautiful is personal preference and how much is dictated by social convention? Cranial modification would have undisputedly have had an important impact on the personal identities of past individuals, but the specifics of this will be extremely difficult to trace through archaeology alone and must be assessed in conjunction with other lines of evidence.

The Collective

The social function of collective or group identities is to provide individuals with an accurate understanding of where they stand in relation to others within the social organisation. These categorisations can take place using similarities and/or differences in a variety of different characteristics including: gender, age, social status, occupation, kinship, and religion. Any characteristic can be used to create a social identity as long as the difference or similarity is deemed to be socially important (Díaz-Andreu et al. 2005; Eriksen 1993; Jenkins 2008, 2014; Voss 2008).

Using kinship as an example, different types, or perhaps more accurately, different scales of group identity based on kinship ties can be found: family, clan, community, chiefdom, ethnicity, and perhaps even nation. Here, kinship is not restricted to actual biological relations or blood ties between individuals, but used in a much broader sense as an agreement of shared ancestry based on the views of influential early sociologist Weber: 'The fact of common descent is less important than belief in common descent' (in Cornell and Hartmann 1998:16). Extending kinship in this fashion allows for larger collectives such as ethnic groups to be formed (Eriksen 1993; Emberling 1997; Jones 2007; Lucy 2005). Ethnicity and ethnic identities have been at the forefront of identity studies in all disciplines and will be discussed in a little more detail here as they are particularly pertinent to archaeological studies of social collectives and boundaries.

Beyond the 'Tribe'

Collective identities have always been a mainstay of anthropological and archaeological theory and practice. The basic units of analysis were homogeneous bounded entities with a shared set of (material) cultural characteristics: peoples, cultures, tribes, or races (Eriksen 1993; Jenkins 2008; Jones 1997, 2007; Lucy 2005). Within archaeology, these earliest attempts at connecting the remnants of the past to particular peoples led to the culture-history framework that dominated archaeological thinking in the early 20th century (Jones 1997, 2007; Lucy 2005). In anthropology, 'tribe' became the dominant concept for describing and understanding the 'primitive' subjects of study. The tribe provided a Eurocentric theoretical model that simultaneously marked the difference in the way in which academia studied our own social organisation and that of others (Eriksen 1993; Jenkins 2008).

Fundamental changes took place in anthropological and archaeological theory and practice in the 1950's and 1960's. Anthropologists working in a post-colonial context moved away from cultures as homogeneous bounded wholes and started working with ethnic groups and minorities to gain a better understanding of culture as a complex, composite, and changing entity (Eriksen 1993; Jenkins 2008; Jones 1997, 2007). Archaeology, perhaps partially in response to the negative connections of the culture-history paradigm with racist ideas and Nazi ideology in German archaeology, turned towards attempting to understand the processes that create culture and cultural change in a movement known as processual archaeology (Insoll 2007; Jones 1997, 2007; Lucy 2005). These transitions coincided with the introduction of the terms identity and ethnicity and an increased interest in both within wider academia (Eriksen 1993; Cornell and Hartmann 1998; Jenkins 2008; Jones 1997, 2007).

The term ethnicity, much like that of identity, is relatively new but has ancient roots (Sokolovskii and Tishkov 2002). Introduced by sociologist Riesman in 1953, it derives from the Greek ethnikos (Eriksen 1993; Jenkins 2008). Although definitions of ethnicity and ideas regarding what constitutes an ethnic identity vary widely, most agree that at the core lies the distinction between us and them (Cornell and Hartmann 1998; Jenkins 2008; Voss 2008). Theoretical approaches have ranged from primordialist views of ethnicity as a fundamental and fixed concept ingrained at birth and closely related to descent to instrumentalist arguments for flexible constructions that can be strategically manipulated via social agency. The standpoint advocated here is a social constructionist approach combining elements of both (Cornell and Hartmann 1998; Jenkins 2008; Jones 1997), as this reflects the dynamic and permanent aspects of head shaping practices. Though the characteristics of socially constructed identities have already been outlined, there are some points worth reiterating in relation to ethnicity.

Like all types of identity, ethnicity is a process of social organisation based on the identification of similarities and differences between two collectives. However, ethnic identities stress cultural differentiation over similarities – essentially what makes us different from others (Cornell and Hartmann 1998; Epstein 1978; Eriksen 1993; Jenkins 2008). What differentiates an ethnic group from other types of group identity is the reference to a common origin based on factual or fictional kinship ties (Eriksen 1993; Jenkins 2008; van den Berghe 1981; Verkuyten 2005). To quote Emberling (1997:304): 'ethnicity is fundamentally an extension of kinship'.

Although ethnicity is being discussed here and is often analysed as a group identity, it is in fact simultaneously a collective and individual identity. Its foundation in kinship ties explains why ethnic identity is often among the core concepts established through socialisation in early infancy and may create a powerful sense of belonging.[3] Ethnic identity is among the primary identities that shape the individual outlook on life. Its forms a substantial part of individual identity as well as providing an understanding of where one stands in society (Bentley 1987; Cornell and Hartmann 1998; Emberling 1997; Jenkins 2008).

To reiterate Barth's (1969) key point: the ascription and categorisation required for the establishing of ethnic identity cannot take place in isolation, but rely upon interaction

3 The importance of ethnic ties may vary widely between collectives due to their relational and contextual nature. This explains why ethnicity may matter little to some but so much to others (Jenkins 1997).

and social contact. Ethnicity is created as much by internal self-ascription by individual agents as through external categorisation by others. The situational nature of identity is equally relevant for ethnicity. As individuals move through different contexts, ethnic identities may be more or less relevant and consequently may be accentuated or minimised in social interaction. The social construction and contextual nature of ethnic identity does not imply it is infinitely flexible. Ethnicities in particular must be validated by outsiders to acquire significance, require differences to be culturally significant, and emerge from past and present circumstances beyond the control of the group or individual. In a sense, although concepts like kinship or the past of a group may be manipulated to a certain extent, the result must remain plausible and agents are restricted to a degree by the existing structure (Barth 1969; Cornell and Hartmann 1998; Emberling 1997; Eriksen 1993; Isaacs 1975; Jenkins 2000; Lucy 2005; Wolf 1994).

This social constructionist approach to ethnicity has repercussions for the archaeological study of ethnic groups. Ethnicities may take on many different forms depending on the interactions between agents and circumstances. Therefore, there will be no direct correlation between the entire cultural spectrum of practices and a singular ethnic identity (Clarke 1968; Hodder 1982; Insoll 2007; Jones 1997, 2007; Lucy 2005). What cultural elements are deemed important and relevant in an ethnic context will differ. Consequently, they must be analysed and not taken for granted, while looking at the whole of variation in material culture in its context. Instead of looking for homogeneous bounded units, the mismatched boundaries produced by different categories become of interest as articulations between different socially constructed collectives and identities (Jones 1997; Díaz-Andreu et al. 2005).

Archaeologists should also consider that not all past group identities are necessarily ethnic in nature. In fact, some have argued that we are much more likely to encounter group identities on a smaller scale (Lucy 2005; MacEachern 1998), while others go further and believe ethnicity can only develop in relation to nations or states (Brass 1991; Emberling 1997). The first suggestion seems valid, especially given the view of ethnicity as a social extension of kinship: ethnicity requires a larger scale of social interaction, otherwise existing kinship organisation would be sufficient (Emberling 1997; Lucy 2005; MacEachern 1998). There is no reason to believe that the basic processes that construct ethnicity as outlined above would necessarily be related to the appearance or existence of states although the increasing nationalism since the 19th century and recent globalisation processes may have transformed our current notion of ethnicity and ethnic identities and certain aspects of this may be unique to modern society (Bawden 2005; Eriksen 1993; Hutchinson and Smith 1996; Jenkins 2008; Jones 1997).

Communicating Identities

In the social constructionist view of identity, social interactions between individuals play an important role in how identities are created, maintained, and transformed. Communication of identities is a fundamental part of these processes. After all, categorisation is difficult if not impossible without any knowledge regarding the other. Such information may be directly communicated by actors during social interactions or transmitted through visual cues.

These markers of identity will be discussed in more detail. It is important to note that effective communication through symbolism requires both a mutual understanding of and a general agreement on the underlying meaning. Unlike language, the abstract nature of symbols means they are interpreted differently by each actor based on previous experiences and may be subtly manipulated (Cohen 1986, 1994; Wells 2012). This slight ambiguity allows individuals to accommodate elements of individual and group identities without friction and explains how uniform communities with a shared sense of belonging can be constructed out of countless individuals (Cohen 1986, 1994; Jenkins 2014).

Social Signs

Anything can be a marker of identity, as long as it symbolises those cultural similarities or differences that are considered significant (Barth 1969). These signals can be expressed through behaviour, the human body, or material culture. Each of these will be discussed in turn in conjunction with two other important factors of identity markers: authenticity and visibility. Identities are important building blocks of human society as they represent social relationships and govern interaction between individuals. Authenticity is therefore important to ensure identities are legitimate and not appropriated by others. The visibility of markers increases the effectiveness of social signals and can reveal information on the intended audience (Isaacs 1975; McGuire 1982; Roosens 1989; van den Berghe 1981; Wells 2001).

Behavioural signals of identity, such as language, non-verbal communication, and mannerisms, are often used as they are difficult to imitate. Although a foreign language can be learned and thus linguistic differentiation can be a little more fluid, speaking a language like a native is something altogether different. More specific elements of language, such as stories or phrases, may also be used in this sense instead of language as a whole (Cornell and Hartmann 1998; Lockwood 1981). However, the disadvantage of using behavioural markers of identity is their lack of visibility from a distance (Nash 1996; van den Berghe 1981).

Signalling identity through the human body or material culture has the benefit of enabling a rapid visual identification and helps to streamline social interaction. Flags or military uniforms are excellent examples of such markers (Horowitz 1975; Sørensen 1997; van den Berghe 1981). The drawback is the fact that temporary additions to the body or material culture can easily be copied or appropriated, leaving the identity open to unwanted manipulation unless it is combined with other types of markers (Isaacs 1975; Nash 1996; van den Berghe 1981). Basing group identity on physical characteristics, the most infamous example being skin colour[4], erases this risk. As this is not always an option, societies may practice bodily modification to create permanent and visible distinguishing features that signal identities (Blom 2005b; Isaacs 1975). In this manner, the individual embodies and becomes the identity (Roosens 1989).

3.3 MARKING THE BODY

There is an almost bewildering array of options to decorate and change the appearance of the body that can be used as identity markers. Cranial modification is one possibility in a range of permanent modifications such as tattooing, scarification, piercing, and cosmetic surgery. However, more temporary changes such as make-up, hair styling and colouring, and clothing can also be considered in the same vein. All of these are cultural means of adding the social directly onto to the biological.

The tension between the biological and social within the human body has long held the interest of sociology and anthropology. The social constructionist approaches to the self, the body, and society by the likes of Mauss (1973 [1936]), Douglas (2007 [1973]), and Bourdieu (1977) have impacted anthropological and archaeological thinking on the body and identity.

In her seminal work on the body and symbolism, Douglas describes two bodies: the physical and the social. She summarises her position as follows:

> 'The social body constrains the way the physical body is perceived. The physical experience of the body, always modified by the social categories through which it is known, sustains a particular view of society. There is a continual exchange of meanings between the two kinds of bodily experience so that each reinforces the categories of the other' (Douglas 2007 [1973]:72).

4 Note that skin colour can only be successfully used as a marker of difference if it is considered relevant by society. Accordingly, racism is therefore not natural, but socially determined (Cornell and Hartman 1998).

The emphasis on interaction between the natural and the cultural is interesting, as this echoes ideas that the body is not simply used to display identity markers, or in Turner's terms acting as 'the Social Skin' (Turner 1980), but plays an important part in the construction and embodiment of these identities at the same time (Conklin 1996; Comaroff and Comaroff 1992; Fisher and Loren 2003; Joyce 2005; Shilling 2003). The concept of habitus as posited by Bourdieu (1977) is often used to bridge the gap between signal and construction. Bourdieu's habitus has been interpreted in a multitude of ways, but Ortner provides this clear interpretation:

> 'For Bourdieu the subject internalises the structures of the external world, both culturally defined and objectively real. These internalised structures form a habitus, a system of dispositions that incline actors to act, think, and feel in ways consistent with the limits of the structure' (Ortner 2006:109).

Bourdieu stresses the internalised and unconscious nature of the habitus, but such a view overlooks social agency and the dialectic relation between the individual and society. Culture shapes individuals, yet simultaneously social actors reproduce and transform that culture through practice and their decisions to act in certain ways. Combining Bourdieu's notion of habitus with ideas on agency by Giddens (1979) links individual and society in an active relationship balancing social structure with personal acting based on embodied experience. (Re)created practice thus allows for changes through agency (Bourdieu 1977; De Certeau and Rendall 1984; Entwistle 2000; Moore 1994; Ortner 2006; Shilling 2003).

The pivotal role of the socially constructed body in the formation and expression of social identities results from the fact that 'the human body is the most readily available image of a system' (Douglas 2007:xxxviii). As such, it is echoing Mauss' ideas of a 'natural symbol' of society (Mauss 1973 [1936]). An often repeated example of this is the existence of bodily metaphors such as head of state (Babi´c 2005; Jenkins 2014; Hamilakis et al. 2002).

The body has great interactive and performative potential. It is always present in interactions with others, consider the term face-to-face in this regard, and appearance can play an important role in non-verbal communication (Giddens 1979; Joyce 2005; Sørensen 1997). The work of Goffman on the presentation of the self through the body, an extension of Mauss' earlier *techniques du corps*, also touches on this (Entwistle 2000; Goffman 1958). Goffman views the body as the mediator between the individual and society through interaction, a concept very similar to Bourdieu's habitus (Goffman 1958; Jenkins 1992; Shilling 2003).

In stressing the embodied individual and socially constructed body, some have forgotten its biological basis. Although the social body is of great interpretative interest for archaeologists wishing to understand past individuals and societies, it is important not to forget the fact that the body not only provides potential for social marking but simultaneously limits it (Sofaer 2006). Much like identity itself, human bodies may be malleable, but not infinitely so. In the case of intentional cranial modification, for example, the development of the human skull provides a limited window of opportunity during the first few months of life to redirect cranial growth and achieve an alternative shape of the human head. Head shaping practices started later in life will not be effective, a clear illustration of biological limitations to social alterations of the human body.

Any study of the human body must acknowledge it as the location where biology and culture meet. Attempting to understand complex processes of identity formation and expression through the human body from only one of its components will at best yield a partial picture (Sofaer 2006). This understanding is behind the recent boom in bioarchaeological research using osteological analyses of the actual physical body as a basis for social interpretations. In fact, the position of bioarchaeology at the boundary between the sciences and the humanities, or perhaps more accurately bridging the gap (Buikstra and Scott 2009; Martin et al. 2013; Nillson Stutz and Tarlow 2013; Sofaer 2006), echoes the aforementioned ideas on the body as a nexus of biology and culture.

The discussion on the social body and the concept of habitus has shown the theoretical potential for marking the physical body with social expressions and literally embodying identities. Before we return to the specific opportunities and restrictions for signalling identity through the altered head shapes, the focus of this study, one question that remains is whether there is anything about the skull in particular: is it, as it would seem to be, a privileged part of the social body and how so?

Why the Skull?

The human body as a whole clearly has great potential for expressing and embodying social identities, yet there seems to be a particular emphasis on the human head in many societies. In addition to the widespread occurrence of cranial modification practices, numerous other cultural customs surround the human head and skull before and after death. Special treatment of the head and hair are seen in many past and present societies, ranging from the importance of these elements of physical appearance for dress and ornamentation of the body throughout most of the European Bronze Age (Sørensen 1997) to the veiling of the female head in Islamic societies (Hansen 2004).

After death, human crania can be treated or deposited in various ways that differ from the rest of the body. Evidence of plastering, modelling, and painting of human crania has been found in the Neolithic Middle East (Bonogofsky 2005, 2015) and carving of the cranial vault was seen in Sepik crania from New Guinea (Stodder 2005). The heads of fallen enemies captured during Melanesian head hunting practices, i.e. ritual warfare connected to social and cosmological renewal, were transported back to the village and ceremonially defleshed and decorated (Corbey 2007; Knauft 1990; van Baal 1966). Taking and displaying human body parts, including heads and skulls, is by no means restricted to Melanesia but are an almost universal feature of human societies throughout history (Chacon and Dye 2007; Walker 2000). The ashtray made from the skull of black lynching victim James Irwin in 1930's America (Chacon and Dye 2007:20) or the shrunken head of a nameless Polish man from Nazi concentration camp Buchenwald (Douglas 1998) are pertinent reminders that trophies made of human body parts are not merely a thing of the past or restricted to 'the Other'.

These brief examples are a mere selection of the varied cultural treatments of the human head and skull before and after death found in societies around the world (see Bonogofsky 2015 and Chacon and Dye 2007 for recent overviews). Exact cultural meanings and values attributed to the head vary cross-culturally and through time, yet the shared emphasis on this particular part of the human body leads to considerations on why this element is so important.

The head or skull are 'regarded in many societies as the seat of personhood, ancestorhood, or the soul' (Bonogofsky 2015:3). The head – and in particular the face – is also one of the most powerful social tools available. The unique appearance of each face is used as the primary point of recognition of individuals. Even the faces of unfamiliar individuals immediately provide clues to the gender, age, and ancestry of the person that aid in our assessment of the correct social approach to the individual. Besides social pointers, facial expressions convey emotions and non-verbal feedback. Combined with the visibility of the human face, this explains its predominant position in social interaction and communication known as facial primacy (Knapp and Hall 2002; Grossmann et al. 2008; Wilkinson 2004; Zebrowitz and Montepare 2008).

The importance of the face in social interaction provides an extra dimension to the practice of cranial modification. The altered human skull shape would have been visible in daily face-to-face interactions between social actors and would have functioned as an additional non-verbal message. Wells (2012:8) argued that 'objects played a much greater role in communication and expression in societies that do not have writing than in societies that do'. This reasoning can be extended to the embodied social and cultural values of altered head shapes and the increased significance of such signals in past societies.

3.4 PRACTICING HEAD SHAPING

Identity theory has allowed us to grasp the importance of the altered head shape as an embodied social construct that expresses individual and communal relations. There is, however, an aspect of cranial modification less often highlighted that may provide valuable insights: the physical process of altering the cranial shape. Head shaping requires the investment of time and effort of another individual on behalf of the infant. Furthermore, the practice should not be seen in isolation but is embedded in the early socialisation of the newborn.

The birth of a baby is a momentous occasion both from a personal and social perspective. As a newborn enters the (social) world, the first important step is becoming human. This transformation into a social being is achieved through processes of socialisation, which may be defined broadly as 'the way in which individuals are assisted in becoming members of one or more social groups' (Grusec and Hastings 2007). The moment an infant is considered a social person is significant and varies cross-culturally. These early processes of socialisation and identity formation are dominated by external ascription and agency as a result of the dependence of the infant, but gradually become interactive as the child and its social persona develop (Conklin 1996; Jenkins 2014; Laible and Thompson 2007). The process of cranial modification, starting right after birth, can be considered to be part of this creation of the social person.

An interesting example of using this relation between early socialisation and cranial modification can be found in a discussion on the Maya by Duncan and Hofling (2011). They have used historic sources and ethnographic accounts to investigate the importance of the head in this process of socialisation and embodiment. Historical evidence suggests that shaping of the head among the Maya starts immediately after birth and the child is not named until this process is completed. Among modern communities, head shaping practices have been all but lost[5] and the naming has been combined with the Christian notion of baptism. The process of naming represents an important passage rite for the infant from a liminal being to a social actor. All of the Maya child care practices at this early stage are aimed at protecting the unsettled soul of the infant. Cutting the hair of the infant is not done until at least one year of age, as a way to cover the anterior fontanel as a potential way for the soul to escape. A torch must also be present near the newborn and nothing else may be lit from this source lest the animated essence of the infant is diminished (Duncan and Hofling 2011).

5 Although Sargent and Bascope (1996:221) describe an infant whose head was molded by the midwife immediately after birth.

Emphasising cranial modification as a practice, in the literal sense of a way of doing things, that is inherently part of overall child care may also help solve issues regarding ambiguity and absence. Crania assessed as ambiguous, or in other words those skulls whose shapes fall between the normal cranial variation and modification without enough concrete evidence to place them in either category, are often removed from the sample without further discussion. Archaeologists also occasionally make the mistake of focusing solely on the modified skulls in a population – often their topic of study after all – without adequately explaining the absence of cranial modification in the remainder of the sample. From a social and theoretical point of view, however, both ambiguity and absence may be of interest.

Intentional cranial modification is one of a suite of processes aimed at shaping the social person of the infant in the liminal months after birth and can be considered a *rite de passage* on the road to becoming a person (Conklin 1996; Turner 1969; van Gennep 1909). The presence of ambiguous crania in an assemblage may also imply that undergoing head shaping is equally or perhaps more important than the resulting cranial shape. In this light, ambiguous crania should not be ignored or considered failed attempts at modification, but merely seen as evidence of social construction and practice.

The dialectic relation between the agent and society in practice theory provides space for both absence and ambiguity. Social reproduction is never complete, but may be influenced by individual agency. Social agents are not simply replicating structure through practice, but may choose to influence or change it in the process (De Certeau and Rendall 1984; Giddens 1979; Ortner 2006). This notion is germane to an adequate understanding of data on cranial modification practices retrieved from the archaeological record. Choices made by the practitioner during head shaping, such as the construction and placement of the device, the amount of pressure, and the duration of application, may result in ambiguous shapes. Circumstances may also dictate changes to the practice or the complete abandonment of head shaping, as described in Caribbean colonial sources. The absence of cranial modification in certain individuals in archaeological contexts may also be explained by migration from another community with different child care routines.

3.5 THE SOCIAL SKULL

Social constructionist views of identity have been drawn upon in order to better understand the myriad of social and cultural treatments of human skulls. Certain aspects of intentional cranial modification, including its permanent and highly visible nature, make it ideally suited as a marker of identity and explain its presence in a variety of spatial and temporal settings. Yet other characteristics of altered head shapes limit the flexibility inherent in social identities to a certain degree, as will now be shown.

The practice of cranial modification must be commenced in early infancy in order to create the desired effect. This has several repercussions, as the infant has no effective agency or self-awareness at this stage of development. The identity is ascribed and created by another social agent. Ethnographic studies show that head shaping is almost always performed by a woman: the mother, the midwife, or another female relative (FitzSimmons et al. 1998; Tiesler 2011, 2012, 2013). From the embodied perspective of the individual, the altered head shape has always been an inherent part of who they are and shapes their view of themselves and others. The altered head shape is normal in the world view of the individual and society at large. This also explains the almost ubiquitous relation between cranial modification and beauty reported in historical and ethnographic cases. A shift in aesthetic notions might be considered an inevitable result of the incorporation of cranial modification in the habitus.

This deep embedding of altered head shapes and their associated identities also impacts the flexibility of identity described in the social constructionist approach. The meaning of the altered head shape is established during the early socialisation process and as such forms an important basic or primary identity (Jenkins 2000, 2014), which tends to be much less fluid than other identities. This explains why cranial modification as a cultural practice seems to be stable and conservative in nature, reproducing the altered head shapes and their meanings in each generation with relatively little adjustments. This is evidenced by the longevity of the practice in archaeological samples sometimes stretching over thousands of years, for example in Mexico (Tiesler 2010, 2012) and the Andes (Allison et al. 1981; Torres-Rouf 2003,) and the persistence of the practice up until very recently or even up to the current day in certain communities (FitzSimmons et al. 1998; Tommaseo and Drusini 1984). On the other hand, important social and cultural changes may result in differences in the custom of cranial modification, for example a decline of the practice after intercultural contact (Tiesler 2012; Tiesler and Oliva Arias 2010; van Duijvenbode 2010), the appropriation of the custom by other societies (Chanvalon 1761; Torres-Rouf and Yablonsky 2005), or shifts in the patterns of modification found within societies (Blom 2005a,b; Hoshower et al. 1995; Tiesler 2010; 2012). Primary identities are not necessarily truly permanent, but simply more resilient than other identities and change is more likely to come about in a gradual fashion with small changes accumulating over time (Jenkins 2014; Lucy 2005).

Cranial shape created by head shaping as a marker is visible in direct social interaction and at a small distance, depending on hair style and any additional head gear. This performative aspect helps it function effectively in most social settings. Arguably, the power of cranial alterations does not rest solely on visibility, but is also related to the evocative nature of the head itself. Douglas's (2007 [1973]) argument that the human body is a natural source of symbolism combined with the importance of the face in social interaction and recognition together make the head an obvious choice for displaying social identity markers.

Identity and identification processes function simultaneously on different levels. An altered head shape is likely tied to individual and collective identities at the same time and as such can be approached by a multi-scalar archaeological investigation moving from the individual to the regional (and in some cases perhaps even national) level to investigate these patterns.

The heuristic framework constructed to contextualise and explain head shaping practices in past societies can be used to revisit and elucidate the motivations behind head shaping reported from the historical and ethnographic records at the beginning of this chapter. The notion that altered head shapes are aesthetically pleasing has already been discussed in relation to the incorporation into the habitus of the individual during early socialisation. In this sense, viewing beauty as a motivation may be inaccurate and aesthetic notions are likely to be accompanied by another motivating factor. The social shift in aesthetics will have a minor perpetuating effect in itself. The correlation between the altered head shape and improved health or intelligence is persistent, as witnessed in recent documentation regarding these motivations in a medical study (Fitzsimmons et al. 1998). Head shapes associated with these motivations tend to be mild (Fitzsimmons et al. 1998; Hatt 1915) and may be difficult to distinguish from normal variation in human cranial shape. It seems that recognising these motivations without additional documentary or anecdotal evidence will be difficult.

Gender differentiation through cranial modification may be visible in the archaeological record. This does require a proper investigation into gender identity, as biological sex may be a poor proxy for gender relations depending on the social context (Díaz-Andreu et al. 2005; Joyce 2004; Mays and Cox 2000; Meskell 2007). However, in order to be expressed through the permanent alteration of head shape, gender identity must be established almost immediately after birth and remain relatively fixed implying that it is most likely based on biological sex. Patterns may consist of altered head shapes restricted to a single gender or differences in shapes or degrees of modification per gender.

Group identity is a deliberately wide category encompassing all types of social collectives at a variety of levels. Many of these are based on fictional or factual kinship ties and can include family, clan, lineage, or ethnic group. Religion, mentioned at the beginning of this chapter as a separate motivation, can also be included in this category. Variations in social status within the group can also be expressed through cranial modification practices. The same restrictions as mentioned for gender identities apply: social status must be ascribed at or soon after birth and be relatively stable throughout life. These patterns may also present as differences in presence or shape of altered head shapes.

The pattern of cranial modification representing group identity will manifest as a high percentage of similar cranial shapes in an assemblage, several distinct shapes, or clear spatial differentiation in shapes. However, even in the case of a single overarching group identity, not all crania will be modified. Mild forms of cranial modification may be difficult to recognise and despite best efforts modification attempts may not always be successful. Furthermore, incoming migrants from different communities will not display cranial modification (or may have a different type) even though they might be incorporated into the local group, further obscuring the pattern.

Determining the exact type of group identity will require the multi-scalar approach advocated earlier in this chapter as well as an in-depth investigation of the social context. Here, archaeological data can be augmented with historical or ethnographic information to provide a more accurate understanding. The following chapter will explore the social and cultural history of the Caribbean and provide a comprehensive overview of head shaping practices in the indigenous communities of the region based on such a combination of sources.

4 CARIBBEAN IDENTITIES

To hear the rollers thunder on a shore that isn't mine
Privateering – Mark Knopfler (2012)

The history of the Caribbean is often defined by the pivotal moment of contact in 1492 and the historic aftermath of interaction, conquest, and slavery that shaped our modern world. Even before the arrival of Columbus, however, the region was an intricate cultural kaleidoscope of different peoples and languages in a complex land- and seascape. Insights into the diverse geography and environments that compose the Caribbean, as well as a grasp of the region's long history of human occupation and development are crucial for the investigation of identity practices of past and present Caribbean peoples.

This chapter will sketch the social history of indigenous Caribbean communities from the first explorers to settle in the archipelago to the tumultuous period of intercultural interaction in colonial times. This overview is based on information gained from archaeology, history, and ethnography and will embed head shaping practices in their larger social context, including childcare practices, kinship relations, and socio-political organisation as well as ties between different communities and exchange networks connecting the Caribbean. The discussion will also incorporate information on the physical appearance of the indigenous peoples of the Caribbean, as it is important to reconstruct the full suite of temporary and permanent cultural components that construct a social agent and not view cranial modification in isolation.

4.1 SEAS AND SHORES

Defining the boundaries of the Caribbean can be done in a multitude of ways, but here the area of study is considered as the islands of the West Indies, the coastal areas surrounding the Caribbean Sea, and the Orinoco River Basin in Venezuela following Rouse (1961). This is not in any way a reflection of the extent of past human movement and interaction in the region, as evidence has shown far wider reaching networks of trade and exchange connected ancient Americans (e.g. Hofman and Bright 2010; Mol 2014; Rodríguez Ramos 2010). However, scholarly studies must always draw arbitrary boundaries to demarcate areas of study and the regional boundaries chosen here correspond best with the aim to study cranial modification through a multi-scalar approach ranging from individual experiences to regional patterns.

Figure 6 **Map of the Caribbean (map created by M.L.P. Hoogland).**

The arc of islands forming the Caribbean archipelago extends from the mouth of the Orinoco River on the South American coast to the peninsulas of Florida and Yucatan and consists of three major clusters: the Bahamas, the Greater Antilles, and the Lesser Antilles. The Bahamian archipelago includes the Turks and Caicos Islands and lies between the Greater Antilles and Florida. The Greater Antilles consist of the largest Caribbean islands of Cuba, Hispaniola, Jamaica, and Puerto Rico. In fact, their combined land mass represents almost 90% of the entire region. The Lesser Antilles stretch from Puerto Rico to the coastal islands of Trinidad and Tobago and can be subdivided into three distinct archipelagos: the Virgin Islands, the Windward Islands, and the Leeward Islands. The Virgin Islands lie to the east of Puerto Rico and are separated from the remainder of the Lesser Antilles by the Anegada Passage. The Leeward islands stretch from Anguilla to Guadeloupe and are divided by the Dominica Channel from the Windward islands that range from Dominica to Grenada. Trinidad and Tobago form the final stepping stones towards South America. These islands lie on the continental shelf of South America, resulting in a more continental fauna and flora (Boomert 2014; Rouse 1961, 1964; Keegan et al. 2013; Wilson 2007).

Also part of the Caribbean is a group of islands stretching along the northern coast of Venezuela. These are referred to as the Southern Caribbean Region or occasionally the

Leeward Antilles, the latter not to be confused with the Leeward Islands mentioned previously. They consist of Aruba, Bonaire, and Curaçao (known together as the ABC islands) and several Venezuelan islands and islets. The regions of the South American mainland of importance here include the Western coastal region and Orinoco River Basin of Venezuela as well as French Guiana, Guyana, and Suriname (Boomert 2014; Keegan et al. 2013; Rouse 1961, 1964, 1992; Wilson 2007).

Variety seems to be the key term to successfully describing and understanding the Caribbean. Complex geological formation processes have created a range of different settings, ranging from the flat coral islands of the Bahamas barely rising out of the sea to the sharp peaks of volcanic Saba or the mountain ranges interspersed with fertile valleys of the Greater Antilles. Each environment has created unique ecosystems and micro-climates that host a range of flora and fauna. The terrestrial fauna on the islands is impoverished in comparison to the abundance of the South American mainland, but this is offset by the affluence of the marine ecosystems surrounding the islands. The distribution of certain species of flora and fauna as well as other raw materials, such as flint, is connected to the diverse environments and geological formation processes throughout the region (Boomert 2014; Keegan et al. 2013; Knippenberg 2006; Hofman et al. 2011, 2014; Mol 2014; Rouse 1964, 1992; Wilson 2007).

This diverse and varied Caribbean has profoundly influenced the way its inhabitants acted and interacted. The stepping stone pattern of islands – almost all intervisible – combined with the dominant eastern trade winds and east-to-west sea currents were instrumental in the human migration into the region and the continued mobility of people across the Caribbean seascape. The discontinuous distribution of natural resources required continuous travel, interaction, and exchange between the different Caribbean communities. One could argue that the diversity of the natural Caribbean shaped the complex social dynamics recovered in its archaeological record (Boomert 2014; Keegan et al. 2013; Hofman and Bright 2010; Hofman and Hoogland 2011; Mol 2014; Rouse 1992; Wilson 2007).

4.2 *ANCIENT MARINERS*

The history of humans in the Caribbean is as complex and dynamic as the natural environment of the region and is characterised by the continuous movement of people, goods, and ideas throughout the archipelago (Keegan et al. 2013; Hofman et al. 2007, 2011; Hofman and Bright 2010). Innovations and transformations in material culture and cultural practices are found at the social boundaries created by the encounters between different groups and communities. Though the intercultural contact of the early colonial period is perhaps the best known and documented example in the region, encounters between different peoples and their transformative potential can be traced back to the origins of Caribbean communities (Hofman et al. 2014; Rodríguez Ramos 2010).

The first evidence of human occupation in the Caribbean can be found in the coastal regions of Venezuela and north-eastern South America around 15,000 BC. The first intrepid explorers moved into the insular Caribbean from 6000 BC onwards, likely using dugout canoes. Two distinct migratory waves into the islands can be reconstructed based on the lithic tool assemblages: one from the Yucatán peninsula to Cuba and Hispaniola and one from the South American coast to Puerto Rico and the Leeward Lesser Antilles (Boomert 2014; Pagán-Jiménez et al. 2014; Rodríguez Ramos et al. 2013; Wilson 2007). The frontier of interaction and exchange, created when the two communities met on Puerto Rico around 3000 BC (Boomert 2014), shaped the Archaic age population of the island and is the first documented example of the dynamic processes that occur at social boundaries in the Caribbean.

Recent investigations have overthrown the old notions of these people as simple mobile bands of hunter-gatherers. There is evidence of substantial variation in settlement strategy during this period, with permanent and semi-permanent settlements, special activity sites, and yearly mobility cycles (Boomert 2014; Hofman et al. 2006; Rivera-Collazo 2011; Rodríguez Ramos et al. 2013). The independent development of pottery took place around 2000 BC on the Greater Antilles, dispelling the idea that pottery was first introduced by a later wave of migration from the mainland (Rodríguez Ramos et al. 2008; Ulloa and Valcárcel Rojas 2002). These communities had a broad spectrum diet composed of hunting, fishing, and horticulture which varied depending on the resources available in each biosphere. Palaeobotanical studies have shown that key crops such as maize and manioc were brought to the islands by the first settlers (Pagán-Jiménez 2013; Pagán-Jiménez et al. 2005). These plants became part of the regional exchange systems used to trade raw materials, including flint and chert, as well as intangible ideas (Hofman et al. 2014; Hofman et al. in press). These ties connecting distant insular communities foreshadow the continual importance of dynamic social interaction that characterises Caribbean history (Crock 2000; Hofman et al. 2011; Hofman et al. 2014; Rodríguez Ramos et al. 2013).

Despite these major developments and advancing insights regarding the earliest Caribbean settlers, little is known about the social organisation of these communities. The sparse skeletal material dating to this period has yielded no evidence of intentional cranial modification, with two potential exceptions on the islands of Aruba and Hispaniola. The site of Canashito on Aruba in the Southern Caribbean Region has been attributed to the Archaic Age by the excavators based on a radiocarbon date of 2210±95

BP obtained from the bone collagen of individual C1. The head shape of another burial found at Canashito, individual C2, was described as a possible case of cranial modification (Tacoma 1959).

The second case was recovered from the Cueva de Berna cave in the east of the Dominican Republic. The cave was in use by Archaic people between 1890 and 1255 BC and several human burials belonging to this period were recovered (Veloz Maggiolo et al. 1977). The remains of a young child lying in an extended position were recovered buried underneath a layer of ash. Luna Calderon (1977) describes the head shape of the child as intentionally altered and classifies it as circumferential (*seudocircular*).

4.3 THE CONNECTED CARIBBEAN

A new wave of immigrants moved into the islands from the Venezuelan coast around 500 BC marking the beginning of the Ceramic Age. The traditional idea that these new islanders brought the first pottery into the archipelago has been refuted by recent evidence of independent pottery production long before their arrival (Rodríguez Ramos et al. 2008; Ulloa and Valcárcel Rojas 2002). In fact, the social developments throughout the Ceramic Age are not based on a clear break from the past created by a complete replacement of people and ideas as was previously assumed, but arise from the foundations laid by the first Caribbean peoples and the interaction along the social boundaries between these groups and the new arrivals (Hofman et al. 2014; Rodríguez Ramos 2010; Rodríguez Ramos et al. 2013).

This period is divided into the Early Ceramic Age from 400 BC to AD 600 and the Late Ceramic Age from AD 600 to 1492, corresponding to the major socio-political developments seen in the indigenous societies. These dates are general indications based on the overall trends seen on a regional scale, but there are temporal discrepancies between the different islands created by the ebb and flow of the dynamic interactions in the region reaching shores at different times (Keegan 2004; Hofman 2013; Petersen et al. 2004).

A problem which must briefly be addressed before studying the communities of the Ceramic Age is the issue regarding the dating of human skeletal material in the region. Sketching a social history of head shaping in the Caribbean requires knowledge on the correct temporal association of crania and this has proven a complicated matter for much of the material collected in the early years of Caribbean archaeology. Skeletal material is often attributed to a broad period of Caribbean history (e.g. Ceramic Age) or may lack a temporal ascription all together. Such cases have not been cited in this overview as the gaps in the archaeological context prevent accurate placement, but their presence indicates that head shaping practices were more widespread among prehistoric Caribbean communities than apparent from this overview and underscores the necessity of the current study.

Early Ceramic Age

Communities from the Lower Orinoco carrying Saladoid pottery had reached the Venezuelan coast sometime before 1000 BC (Keegan and Hofman 2017; Rouse and Cruxent 1963). During this crucial period of transformation in Venezuela, agriculture becomes the main subsistence strategy and settlement becomes more permanent. Slightly divergent regional developments take place recognised through distinct ceramic styles, burial practices, and settlement patterns. The Dabajuroid style develops in the west, the Barrancoid series can be found in the central Lake Valencia Basin and on the Lower Orinoco river, and the Saladoid style is present in the coastal regions of Eastern Venezuela used as the gateway into the island chain (Petersen et al. 2004; Rouse and Cruxent 1963). In the coastal regions of Venezuela, evidence of head shaping practices can be found among the Barrancoid communities living on the shores of Lake Valencia (Kidder 1944).

The rapid Saladoid expansion into the archipelago between 500 and 200 BC likely skipped the stepping stone pattern of migration that the Caribbean geography seems so ideally suited to, but instead appears to shows direct settlement of the north-eastern Caribbean (namely Puerto Rico, the Virgin Islands, and the Leeward Islands) followed by a later expansion back down towards the mainland into the Windwards. This direct expansion and the successful transition from riverine to marine seafaring technology are probably due to the interaction and exchange between the Archaic inhabitants of the Venezuelan coast and the newly arrived Saladoid communities (Boomert 2014; Fitzpatrick 2006, 2013; Hofman et al. 2011, 2014; Rodríguez Ramos 2010; Rouse and Cruxent 1963).

A second key encounter that shaped the history of the Caribbean took place between the first Saladoid settlers on the islands and the Archaic peoples already living in the north-eastern Caribbean. The interaction at this new frontier created a new cultural tradition known as Huecoid. Their pottery traditions combined Saladoid decorations with elements reminiscent of Archaic designs and their lithic technology is based on the older traditions found in the insular Caribbean. Huecoid material culture has been found in close association with Saladoid assemblages, although the small number of Huecoid sites and chronometric difficulties with radiocarbon dates hinder our attempts at understanding the exact nature of the relation between the Huecoid and Saladoid (Oliver 1999; Rodríguez Ramos 2010). These two groups share some practices, like a broad spectrum subsistence strategy including cultivation using slash-and-burn techniques, hunting, fishing, and collecting of marine and land resources, yet are clearly different in other instances. There is evidence of interaction and the exchange of raw materials, goods, and ideas in a network that included the Archaic communities of the region as well as ties with the mainland communities (Boomert 2014; Hofman et al. 2011, 2014, in press; Mol 2014; Rodríguez Ramos 2010).

Thus far, archaeological evidence from the Early Ceramic Age sites shows concentric or linear middens surrounding an open area and generally located close to fresh water streams and near the shore. The houses tend to be circular or oval and are large enough to accommodate multiple families. A broad spectrum subsistence pattern combines the cultivation of plants with hunting, fishing, and collecting tailored to the diverse Caribbean environments. Burials of individuals in flexed position with little grave goods are found in the communal plaza in Puerto Rico and the Virgin Islands (Boomert 2000, 2014; Curet and Oliver 1998; Keegan 2000; Hofman et al. 2007; Siegel 1996; Wilson 2007).

These communities are seen as egalitarian societies organised along kinship principles. Egalitarian is often incorrectly equated to a complete lack of inequality, however internal social stratification can occur in such communities with the differentiation either horizontal in nature or based on achieved status and only temporary (Boomert 2000; Curet and Oliver 1998; Hofman and Hoogland 2004; Siegel 2010; Torres 2012). Boomert (2001) has cited the 'Big Man Collectivities' from Melanesia and New Guinea as an excellent ethnographic model of fluctuating leadership in egalitarian societies that enhances our understanding of the Early Ceramic Age communities of the Caribbean.

Throughout the Early Ceramic Age, a tension can be seen between the local and the regional. The orientation towards the local community based on notions of shared kinship is an important feature of these egalitarian societies settling into new territories and strengthening the internal social cohesion. On the other hand, the striking uniformity of Saladoid ceramics across the region, sometimes referred to as the 'Saladoid Veneer' (Keegan 2004), indicate a shared outlook that facilitated interaction. The exchange networks stretching across the Caribbean represent key ties for these communities that help mitigate the risky and adverse aspects of colonisation. As these people became established towards the end of the Early Ceramic Age, the exchange networks became less vital and growing regionalisation is seen (Bérard 2013; Boomert 2014; Hofman et al. 2007, Hofman and Hoogland 2004). At this time, Barrancoid ceramics from the mainland appear on Trinidad and its stylistic influences can be seen in the pottery of the Windward islands (Boomert 2014; Petersen et al. 2004; Rouse 1992). The Barrancoid expansion on the mainland is evidenced by the construction of mounds as far east as Suriname (Versteeg 2008).

The first indisputable evidence of head shaping practices among the indigenous societies of the Caribbean is found in the Early Ceramic Age. The earliest case is reported in a skeleton recovered from Morel on the island of Guadeloupe. The individual was wearing an elaborate necklace executed in the Huecoid style and showed evidence of frontal flattening (Durand and Petitjean Roget 1991). A radiocarbon date of 2410±120 BP places the life and death of this person at the beginning of the Early Ceramic Age (Delpuech et al. 1995), though the taphonomic conditions in which the remains were found indicate that caution should be taken with this radiocarbon date.[1] This supports the hypothesis of Crespo Torres (2000, 2005) that the origin of cranial modification in the Caribbean can be traced back to the Huecoid series. He proposes two potential routes taken by these travellers: the first along the Orinoco River and the second along the north coast of South America.

Cranial modification has also been depicted in Huecoid material culture, in particular in iconic greenstone pendants of a bird of prey carrying a human head. In several cases, the frontal bone of the skull has a flattened appearance (Crespo Torres 2005). It is interesting that the shapes seen in the human remains and material culture match, as both depict frontal flattening, especially given the current lack of other skeletal material securely attributed to the Huecoid.

Intentional cranial modification is also present in the Saladoid communities of the Early Ceramic Age, in particular in the north-eastern Caribbean. Fronto-occipital modification and frontal flattening have been found in Maisabel (Weston and Schats 2010), PO-29 (Espenshade et al. 2014), Punta Candelero (Crespo Torres 2000), and Tibes (Crespo Torres 2010) on Puerto Rico as well as in Hemer's Peninsula (Winter et al. 1991) on the Virgin Islands, Palo Seco on Trinidad (Bullbrook 1953), and in the Saladoid component of Morel on Guadeloupe (Clerc 1968). A single hypothesis on the social motivations behind head shaping in this period has so far been proposed. Crespo Torres (2000) suggests that the altered head shapes among the Saladoid communities on Puerto Rico are used as some type of in-group differentiation.

Late Ceramic Age

The ever changing social landscape of the Caribbean was set for another series of major developments between AD 600 and 1492. Different trends in the numerous social and cultural transformations taking place during the Late Ceramic Age can be seen for the

1 The skeleton was found encased in beach rock, created through a lithification of sand into a cement-like substance under particular conditions (Delpuech et al. ND). The effects of this process on the bone and collagen and its potential implications for the radiocarbon dating method have not been properly investigated.

first few centuries from AD 600 to 1200 and the last period of independent development from AD 1200 to 1492 before the impact of intercultural contact initiated by the arrival of Columbus. These periods will be sketched separately below for more clarity, though such a division does not reflect the reality of continuous cultural developments and transformations.

Local Ties

In the first centuries of the Late Ceramic Age, communities using Dabajuroid pottery spread from the western coast of Venezuela to the islands of the Southern Caribbean region. A simultaneous shift in lithic technology is observed. Urn burials also appear in the archaeological record, another trait associated with the Venezuelan communities. Subsistence strategies are mixed, with a heavy reliance on marine resources supplemented with agriculture and hunting (Du Rhy 1960; Haviser 1987; Rouse and Cruxent 1963; van Heekeren 1960). A potential case of cranial modification was found in the De Savaan site on Curacao (Haviser 1987, Tacoma 1987), but the presence of the practice has not been confirmed by additional evidence from other sources.

Different variations of the Arauquinoid can be found in the Eastern coastal region, spreading from Venezuela towards the Guianas. In Suriname and western Guiana, evidence of this tradition starts with mounds and associated raised fields constructed from AD 700 onwards. Agriculture seems to have been the predominant subsistence strategy. Burials took place within the habitation area and show a wide variety of practices (Rostain 2008; Versteeg 2008). The earliest case of cranial modification associated with Arauquinoid ceramics was found at the Wageningen-1 mound in Suriname (Maat 1985; Versteeg 1985).

Similar transformations in social and cultural practices also occur on the islands by AD 600, in particular on Puerto Rico and the surrounding islands at the crucial social boundaries between different collectives. A clear shift in settlement pattern can be seen, with new smaller settlements founded in previously uninhabited areas of the landscape. At the same time, domestic structures become smaller and burials are found associated with houses and no longer occur underneath the central plaza. These shifts imply fundamental changes in social organisation and indicate an increased importance of nuclear households and kinship identity based on these corporate residential groups (Curet and Oliver 1998; Keegan 2009; Torres 2012). A new ceramic style, Ostionoid, emerges showing clear stylistic influences from Saladoid ceramics and Archaic Casimiroid designs. These Casimiroid influences can also be seen in the Ostionoid lithic technology. Once again, it is the interaction between different peoples that seems to spark these social and cultural changes (Boomert 2014; Curet et al. 2004; Curet and Olivier 1998; Keegan 2000; Keegan and Hofman 2017; Rouse 1992; Wilson 2007).

Despite the regionalisation of identities in this period, these smaller residential kin groups must not be considered isolated. They functioned within a multiscalar network of social ties on local and regional levels. Exogamous marriage practices provided an important impetus for social interaction and competition between groups (Ensor 2013). The appearance of stone-lined plazas, or *bateys*, in this period likely reflects the need for new mechanisms to maintain social cohesion and structure relations between the developing unilineal descent groups. These ritual spaces consolidated and reinforced the local kinship identities and created possibilities for the social negotiation of power and prestige between different communities laying the foundations for further changes in the socio-political organisation after AD 1200 (Torres 2012, 2013).

The practice of cranial modification, which first appeared in the Early Ceramic Age, continues during this period. Fronto-occipital modification and frontal flattening are found in skeletal assemblages associated with Ostionoid. The correlation has been reported extensively, with much evidence coming from Puerto Rico including the assemblages from Luquillo Beach (Roe et al. 1990), Maisabel (Weston and Schats 2010), Paso del Indio (Crespo Torres 2000), PO-29 (Espenshade et al. 2014), Tibes (Crespo Torres 2010), and Yauco (Drew 2003). Crespo Torres (2000) views the cranial modification among these communities as an extension of the Early Ceramic Age practices. This is evident outside Puerto Rico as well, as can be seen in the skeletal material from the Calabash Boom site in the US Virgin Islands. Fronto-occipital cranial modification was found in several individuals dating to the transition from Saladoid to Ostionoid ceramics (Caesar et al. 1991). Crespo Torres (2000) also argues the altered head shape is likely used to emphasise social status differentiation within these communities.

Head shaping practices in communities with Ostionoid ceramics have also been reported for the Dominican Republic. Frontal flattening was reported in crania recovered from Cueva Andres (Morbán Laucer 1979), and a single case of fronto-occipital modification was recovered in a child's skull from the Maria Sosa cave (Luna Calderón 1982). The most interesting case was presented by Luna Calderón (1985), who notes differences between head shapes in the earlier part of the skeletal assemblage from El Soco associated with Ostionoid ceramics and the later phase with Chicoid ceramics. His report details that earlier Ostionoid head shapes were created through wrapping with bandages, whereas the later Chicoid shapes correspond to the fronto-occipital modification using boards reported throughout the region.

Humans carrying Ostionoid pottery spread towards the west into Eastern Cuba and towards the east into the Virgin Islands. Migration into previously uninhabited regions also takes place during this time evidenced by Ostionoid pottery on Jamaica and in the Bahamian archipelago. Cranial modification was found in skeletal material from Preacher's Cave in the Bahamas (Carr et al. 2007; Schaffer et al. 2012), suggesting head shaping was among a suite of cultural practices brought along by the settlers of the archipelago.

Around AD 700, Meillacoid pottery, a separate ceramic tradition resulting from interaction between the Saladoid and Casimiroid in northern Hispaniola, replaced the Ostionoid style on eastern Cuba and Jamaica and spread to the Southern Bahamas and Turks and Caicos (Boomert 2014; Rouse 1992). Cranial modification has also been reported in communities using Meillacoid ceramics. Fronto-occipital modification was found in burials from the Diale 1 site on the northern coast of Haiti (Rainey and Rouse 1941). The practice has also been reported in numerous Jamaican skeletal assemblages (f.e. Duerden 1897; MacCormack 1898; Santos et al. 2002). However, most have been recovered from cave settings complicating the exact dating and cultural affiliation of remains. In other words, though all cranial modification on Jamaica dates to the Ceramic Age as the island was uninhabited before that period, it is difficult to attribute these skeletal remains with certainty to the Ostionoid or Meillacoid communities. The only case which can be linked with some degree of certainty to the later Meillacoid phase is the skeletal material from the Belle Air Cave, with evidence of fronto-occipital parallel modification (Allsworth-Jones et al. 2011).

The Lesser Antilles show similar trends at the beginning of the Late Ceramic Age, including growing regionalisation in material culture and changes in social organisation. By AD 600 to 800, pottery of the Troumassoid style appears and a division develops between the Northern and Southern islands with ceramics from the Leewards showing more evidence of Saladoid traits than those styles favoured in the Windwards (Hofman 2013; Petersen et al. 2004). Population growth and changes in social structure are evidenced by the appearance of more but smaller settlements on the islands and a decrease in household size akin to the trends seen on the Greater Antilles. Human burials are associated with domestic structures and the variety in mortuary practices shows internal differentiation within the group. These trends point towards the growing importance of local communities and kinship groups based on lineage and descent. These communities were organised in an egalitarian manner – i.e. showing internal differentiation and variation in social status that is not institutionalised – with fluctuating leadership (Boomert 2001, 2014; Drewett 2004; Hofman and Hoogland 2004; Siegel 1996).

Intentional cranial modification has been found on several of the Lesser Antillean islands in these opening centuries of the Late Ceramic Age. Head shaping has been reported in the skeletal material recovered from Morel (Clerc 1968) and Anse à la Gourde (Delpuech et al. 1997; Hofman et al. 2001) on Guadeloupe, Bloody Point (Farr 1993, 1996) on St. Kitts, and Pointe de Caille (Fabrizii-Reuer and Reuer 2005) on St. Lucia.

Kinship, Community, and Caciques

In the latter stages of the Late Ceramic Age new socio-political developments swept the Caribbean coasts and islands. Interaction between the Barrancoid and Arauquinoid communities in the Lake Valencia basin results in the development of the Valencoid ceramic series extending from central Venezuela into the coastal region and islands off the coast. These permanent settlements associated with Valencoid pottery are characterised by mounds, used for habitation and as cemeteries. Human mortuary practices show much variation, including primary interments and secondary urn burials. The socio-political organisation of these communities is debated. Some have argued for chiefdoms with institutionalised social stratification and hereditary leadership (Sanoja Obediente and Vargas Arenas 1987), while others suggest the leadership may have been more fluctuating in nature (Antzcak 1998). These communities were tied into regional exchange networks trading raw materials, goods, and ideas with the coast and interior of north-eastern South America (Kidder 1944; Rouse and Cruxent 1963; Antzcak 1998).

Elaborate figurines and personal adornment in the shape of beads and pendants are iconic elements of these communities (Kidder 1944; Antczak 2000). The tradition of head shaping, already found in the preceding Barrancoid communities, is continued. The altered head shapes are found in the human skeletal material associated with Valencioid material culture (Bennett 1937; Kidder 1944) as well as in the ceramics themselves (Antczak 2000; Antczak and Antczak 2006; Requena 1946). Some of the human figurines produced by these communities have broad heads and show either flattened planes on the front and back of the head or head gear consisting of broad flat boards with decorations. The latter have been considered to represent the modification apparatus used to create intentional cranial modification (Antczak 2000; Antczak and Antczak 2006; Requena 1946).

Arauquinoid communities had arrived on the coast of the Guianas at the beginning of the Late Ceramic Age, but settlements become more abundant after AD 1000 suggesting a growth of the population. Settlements occur on man-made mounds or natural sandy ridges and agriculture takes place on artificially raised fields. Local differences in ceramic styles develop during this period, but these communities remain linked together in a network of interaction and exchange. These ties also include trade of raw materials and finished artefacts with populations living in the interior, taking advantage of the rivers flowing from the mountains to the coast (Boomert and Kroonenberg 1977; Rostain 2008; Rostain and Versteeg 2004). Head shaping practices appear part of the socio-cultural repertoire of these communities, as evidence has been found at the site of Hertenrits (Tacoma 1963) and Kwatta Tingiholo (Tacoma et al. 1991; Khudabux 1991; Khudabux et al. 1991).

The increased focus on local communities and restructuration of kinship emphasizing lineage and descent in the Late Ceramic Age created a dynamic social arena where power and prestige could be acquired, negotiated, and maintained. From AD 1000 to 1200 onwards, these processes led to the establishment of chiefdoms in the Greater Antilles. Known in the Caribbean as *cacicazgos*, these polities consist of multiple communities under hereditary leadership of a chief with institutionalised social stratification. Ancestor veneration, reinforcing the importance of kinship, and shamanism were central in the world view of these peoples. Ceremonial centres with monumental architecture are present in the archaeological record as well as smaller settlements with houses suited for nuclear families (Boomert 2014; Curet and Oliver 1998; Siegel 2004; Torres 2012; Wilson 2007).

The population of the Greater Antilles increased in this period, supported by the intensification of agricultural practices. Local developments in ceramic technology in Puerto Rico and Eastern Hispaniola around AD 1200 resulted in the Chicoid pottery. These ceramics spread west to eastern Cuba and as far east as the Leewards Islands where they are found together with local Troumassoid pottery (Hofman 1993, 2013). Other elements of material culture found associated with this ceramic style include stone and wooden artefacts, such as stools (*duhos*), idols of various shapes and sizes (*zemis*), stone collars, three-dimensional stone heads (*macorís* heads), and faces (*guaízas*) (Boomert 2014; Curet et al. 2004; Hofman et al. 2008; Rouse 1992; Oliver 2009; Wilson 2007). It is worth reiterating here that this brief sketch of general trends and developments across the Greater Antilles overemphasises shared traits and obscures the heterogeneity seen in the archaeological record. Individuals and local communities possess social agency that is exerted against the backdrop of shared regional social and ideological notions.

Head shaping practices remain in use throughout the latter stages of the Late Ceramic Age among Greater Antillean communities. Altered head shape were found at El Soco (Luna Calderón 1985), El Atajadizo (Luna Calderón 1976), Juan Dolio (Drusini et al. 1987), La Caleta (Herrera Fritot and Youmans 1946), and La Cucama (Luna Calderón 1986) in the Dominican Republic, which has yielded a particular rich osteological record for this period. Several sites on Cuba (Harrington 1921; Rivero de la Calle 1960) show head shaping was practiced on the island in the Late Ceramic Age. The practice has also been reported for a multitude of Jamaican sites (Allsworth-Jones 2008; Duerden 1897; Santos et al. 2002), but many of these individuals cannot be given a more accurate date than Late Ceramic Age due to issues in dating caused by the palimpsests inherent to their deposition in caves.

Some scholars move beyond mere descriptions of altered crania and progress towards social interpretations of the practice. An early example was the hypothesis by Herrera Fritot that the altered head shapes he observed at La Caleta mimic the cranial shape of a turtle, chosen due to its role as a totemic ancestor (Herrera Fritot and Youmans 1946). Herrera Fritot fails to explain the origin of this theory nor is any supporting evidence provided, making this difficult to credit. Other early insights include the relation between head shaping and aesthetic considerations voiced by Rivero de la Calle (1960) and Pina Peña (1972). Relating head shaping practices to the intricate social developments of the Late Ceramic Age, Crespo Torres (2000) has proposed the practice transformed from indicating internal status differentiation in the Early Ceramic Age into a communal marker of group identity in the Late Ceramic Age on Puerto Rico.

The Huecoid pendants have already demonstrated that altered head shapes in the circum-Caribbean archaeological record are not restricted to the human crania of its inhabitants, but can also be recognised in various elements of the material culture repertoire. Early versions of stone heads, sometimes referred to by the term *macorís*, were found in the Saladoid and Huecoid assemblages (Oliver 2009). These early prototypes are rare, but the three-dimensional sculptures of predominantly anthropomorphic heads with skeletal features are found more often in the Late Ceramic Age assemblages of the Caribbean. They are considered material proxies for the human head, potentially related to notions of kinship, lineage and ancestors. Some of these *macorís* heads show evidence of cranial modification in the form of frontal flattening clearly visible in the lateral aspect (Crespo Torres 2000; Fewkes 1907; Oliver 2009). The flattening of the forehead has also been recognised in *adornos*, decorative heads on the rims of ceramics, in the Bahamian archipelago (De Booy 1912). Depictions of human faces are common in Caribbean iconography and are found throughout the material cultural repertoire of the Ceramic Age (Mol 2007, 2014).

The northern and southern Lesser Antilles show divergent developments in the latter part of the Late Ceramic Age. The Virgin and Leeward Islands become part of the Greater Antillean interaction sphere. Chicoid ceramics and other elements associated with the material culture assemblage from the Greater Antilles, such as *duhos*, *zemís*, and shamanistic paraphernalia, suggest the exchange of goods and ideas (Crock 2000; Hofman 1993; Hofman and Hoogland 2011; Hoogland and Hofman 1999). Human burials in domestic contexts and evidence of the manipulation of bodies after death point towards the continued importance of lineage in social organisation. There is no evidence for institutionalised social stratification of hereditary leadership in these communities, suggesting leadership and social status remain fluctuating and flexible (Boomert 2014; Hofman 2013; Hofman and Hoogland 2004, 2011; Hoogland and Hofman 2013; Petersen et al. 2004).

After AD 1200, a clear demographic shift is present here as population levels decrease. Few settlements are known from this period in the Leeward Islands and an increased inter-settlement distance and preference for defendable locations is clear in those that have been found (Boomert 2014, Hofman and Hoogland 2004, Petersen et al. 2004, Waal 2006). Human skeletal material from this period of Lesser Antillean history is sparse so far, though cranial modification has been reported in the population of the Taíno outpost Kelbey's Ridge 2 on Saba (Hoogland and Hofman 1999; Weston 2010).

Different developments are taking place simultaneously in settlements with Suazoid ceramics in the Windward islands. Altered head shapes were encountered in the skeletal material from the site of Hillcrest on Barbados dating to this period (Drewett 1991). From AD 1250 onwards, settlements with Cayo ceramics appear in these southern islands. This tradition appears to be related to the Koriabo pottery spreading along the Guiana coast at the same time but also shows traits of the Chicoid style from the Greater Antilles suggesting ties with both interaction spheres. This Cayo pottery persisted into colonial times and is associated with the Island Carib societies described in historical sources (Boomert 2011, 2014; Bright 2011; Hofman 2013; Hofman and Hoogland 2004, 2012; Hofman et al. 2014; Petersen et al. 2004).

4.4 CARIBBEAN ENCOUNTERS

The social history of the Caribbean sketched above has principally relied on interpretations of archaeological remains, such as ceramics and skulls, to tell the story of head shaping practices in their social setting. The lack of a written record from the indigenous peoples of the Caribbean means a first person perspective on their own cultural practices is missing. The only descriptions of living individuals with altered head shapes can be found in the historic sources written by outsiders after AD 1492. However, these sources can provide a wealth of information on head shaping and other aspects of indigenous appearance, early socialisation processes, and general aspects of indigenous life after critical assessment for biases and misunderstandings.

The presentation of the information in this section follows a dichotomy found in the original sources between the 'Arawak' and the 'Carib' which demonstrates the issues surrounding historic documents. This division between the peaceful Arawakan speaking Taíno of the Greater Antilles and the ferocious (even cannibalistic) Island Carib of the Lesser Antilles originates from interpretations made by Colombus during his early voyages and continued to be uncritically applied in later sources (Hofman et al. 2008; Hofman and Hoogland 2012; Hulme and Whitehead 1992; Whitehead 1995). Modern studies have questioned these old stereotypes, not in the least because linguistic analysis shows Island Carib is affiliated with the Arawakan language (Hulme and Whitehead 1992; Paquette and Engerman 1996). The structure has only been used here as a convenient way of grouping information as detangling them now is very challenging and beyond the scope of this work. This is not in any way an implicit suggestion that these are legitimate cultural or ethnic identities.

The vastly different historic trajectories of the two regions after 1492 support the use of this division to structure the following section. The Greater Antilles became part of the Spanish empire from the very start resulting in vast social changes from the beginning of the 16th century, whereas the Lesser Antilles were mostly ignored in favour of the promise of the South American mainland. Only after the other European nations started expending their colonisation efforts of the islands from the early 17th century onwards, did culture contact truly begin impacting the indigenous inhabitants in the Lesser Antilles (Hulme and Whitehead 1992; Kiple and Ornelas 1996; Paquette and Engerman 1996).

Remarks on cranial modification disappear from written documents on the insular Caribbean after the 18th century, but the practice continues to be recognised and described on the South American mainland until the 20th century. Information on head shaping among indigenous populations of the tropical lowlands of South America has been reproduced here using accounts of travellers and modern ethnographic studies.

Altered head shapes are formed and function during life and therefore constitute much more than the bare skull seen by archaeologists today. All aspects of appearance, in particular hair styles or head gear, can frame and influence the way the head shape of social actors looks. This facet is very difficult to reconstruct through archaeology alone, in particular in the tropical Caribbean where organic materials suffer from poor preservation, and an excellent example of ways in which historic documents can supplement archaeological investigations. A similar argument can be made for the manner in which cranial modification is embedded in an array of child care practices. Like elements of personal appearance, these leave little or none direct archaeological evidence, but can be carefully reconstructed from the information provided in historic sources and ethnographic accounts. In both cases, the metaphoric ice is perhaps even thinner than in reproducing information on head shaping, as what is recorded by an eighteenth-century French traveller in the Lesser Antilles is unlikely to directly apply to the people migrating into the Caribbean archipelago from the mainland two thousand years earlier. Still, any information gained from these sources may help build a highly hypothetical understanding of the social integration of head shaping and this is considered well worth the risk.

Taíno of the Greater Antilles

The arrival of Columbus in 1492 marks the start of a transformative period for the indigenous communities of the Caribbean. The Greater Antilles became the focal point of the early Spanish colonial strategy and bore the brunt of the destructive consequences of intercultural interaction in the early colonial period. Though the complete demise of the people referred to as Arawak or Taíno a mere five decades after initial contact is erroneous, the demographic collapse brought about by slavery and disease was catastrophic. Yet despite this and the rapid social changes, early colonial sources have documented the languages and lifestyles of these communities.

The late fifteenth and early sixteenth-century chronicles of the Greater Antilles describe large villages of predominantly circular high-pitched houses. On Hispaniola, these communities were organised in five *cacicazgos*, polities ruled by a paramount chief known as *cacique*. Social stratification is described as a three-tiered system led by the *cacique*, followed by the *nitainos* interpreted by the Spanish as nobles who included the *behique* or shaman, and the *naborias* considered labourers or non-elites (Curet 2003; Deagan 2004; Keegan 2013; Oliver 2009; Wilson 2007). This social organisation was based upon exogamous matrilineal kinship principles, allowing for competition and negotiation of power between lineages (Ensor 2013, Keegan and Maclachlan 1989). Large ball courts and ceremonial plazas formed the stage for the brokering of social power (Ensor 2013; Torres 2013).

These historic sources also provide the first evidence of the languages spoken by the indigenous peoples of the Caribbean. Three different languages and several dialects were spoken in the Greater Antilles. Taíno belongs to the Arawakan language family and can be divided into two dialects: Classic and Ciboney Taíno. The first was spoken in Eastern Cuba, most of the Dominican Republic, the Turks and Caicos, Puerto Rico, and the Virgin Islands. Ciboney can be found in western Cuba, Haiti, the Bahamas, and likely Jamaica. Classic Taíno served as the trade language or lingua franca of the Greater Antilles. Two dialects of Macorís, probably with some affiliations to the Waroid language family, were spoken in the north of the Dominican Republic. Finally, Ciguayo is found on the Samaná peninsula in north-eastern Hispaniola and tentatively linked to the Tolan language family (Granberry 2013; Granberry and Vescelius 2004; Hofman and Carlin 2010).

There are several issues that must be addressed when constructing such a general view of Taíno society based on historic sources. Even if purposeful distortion of native customs for political gain are disregarded as a source for bias in the historic descriptions, medieval Spanish authors will still have viewed indigenous societies through their own cultural frame of reference. Their understanding of a three-tiered system of social organisation of Hispaniola, for example, may have been informed by and understood through the lens of Spanish medieval society (Curet 2003; Keegan 2013).

The early colonial sources are a patchwork of information created by various writers in different locations, often without proper reference to the exact source of the information. This data was used to create a model of 'the Taíno' under the assumption that the different communities of the Greater Antilles were culturally and socially uniform. This notion was reinforced by several of the early chroniclers referring to a single people sharing a language and culture, even though this is contradicted by their own information. These interpretations led to descriptions of the socio-political organisation on Hispaniola and in particular the paramount polities of the island being uncritically extended to the entire Greater Antilles and even extrapolated to the Late Ceramic Age communities of the region, despite evidence of local variation in socio-political structures. Archaeological and linguistic data show a great deal of social and cultural diversity obscured by the overemphasis on similarities and counter the notion of a singular Taíno ethnic identity (Curet 2003; Granberry and Vescelius 2004; Keegan 2013; Keegan and Hofman 2017; Wilson 2007).

An integrated approach combining a critical view of the data found in the historic documents and archaeological record shows the Late Ceramic Age and early colonial societies of the Greater Antilles were in a constant interplay between uniformity and diversity. General cultural and social similarities are seen throughout the region, suggesting these communities are tied in a social web of continued interaction and exchange. The linguistic evidence of a trade language supports this notion and would have facilitated the social interactions. Simultaneously, local differences in socio-political organisation, language, and material culture assemblages reflect social choices on a smaller scale. Instead of a single Taíno identity, the communities of the Greater Antilles are best understood as a cultural mosaic of differences and similarities on various scales tied into a social network (Curet 2003, Granberry and Vescelius 2004; Hofman et al. 2008; Keegan 2013; Keegan and Hofman 2017; Oliver 2009; Wilson 2007). As some type of shorthand is required to refer to this complicated 'spectrum of Taínoness' (Rodriguez Ramos 2010) whilst demonstrating awareness of the issues, this dissertation will use Taíno all the while acknowledging the underlying heterogeneity.

Despite these cautionary words on historic documents, the limited information on cranial modification and physical appearance will be reproduced here. A concerted effort has been made to provide the temporal and spatial context of these descriptions wherever possible in an attempt to prevent overgeneralisation. The very first historic notes on cranial modification among the indigenous peoples of the Caribbean can be found in the diary of Christopher Columbus himself. Although the original pages on which he recorded his thoughts have since vanished, his words reach us through the copied phrases and added interpretations of Las Casas. On October the 13th, a mere day after first setting foot ashore in the Bahamas, he wrote of the people he met:

> 'and all of them very wide in the forehead and head, more so than any other race that I have seen so far' (Dunn and Kelley 1991:69).

This could be considered an oblique reference to the broadening of the skull that takes place as a result of fronto-occipital pressure from the modification device. Francisco Thamara (1556:253) also remarks on the wide foreheads of the indigenous inhabitants of Hispaniola, created artificially by pressure on the front and back of the head. Information seems sparse at this point with no mention of any specific information on the execution and duration of head shaping, nor any details on the construction of the modification device.

The initial voyages of Columbus also provide our first clues to the hairstyles of the inhabitants of the Greater Antilles. In his diary of the first voyage he writes of a man from Hispaniola he met on January 13th:

> 'He wore all his hair very long, gathered and tied behind then put in a small net of parrot feathers' (Dunn and Kelley 1991:329).

The broad forehead created by the cranial modification styles of the region and noted by Colombus earlier would be clearly visible in this manner, though any alterations to the occipital would be more difficult to see. Oviedo y Váldes (1851[1535]) depicts several men panning for gold in the early colonial period with a hairstyle similar to that described by Columbus. The image is reproduced in Figure 7 and clearly shows how this hair style would stress the frontal flattening and broadening produced by Caribbean head shaping practices. Another description is found in Dr Chanca's account of an encounter with Amerindians on Hispaniola during the second voyage:

> 'They also shave some parts of their heads, and in other parts of it wear long tufts of matted hair' (Chanca, translated by Fernandez de Ybarra 1907:452).

Rouse repeats this description and adds that during the colonial period this transformed into shoulder length hear tied with a band. On special occasions, the hair was adorned with feathers (Rouse 1948:526). A cap ornamented with coloured stones, gifted to Columbus during his voyages through the region, was supposedly worn into battle by the *cacique* (Fernandez de Ybarra 1907:450).

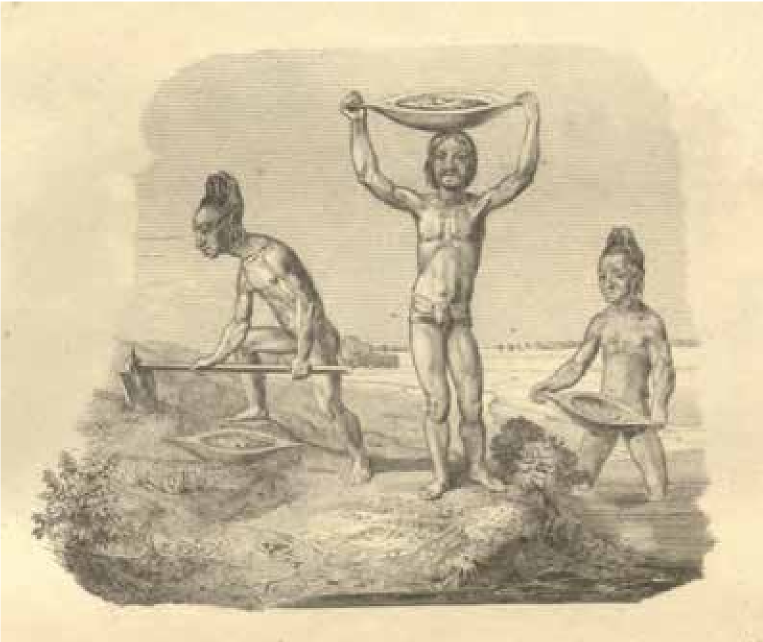


Figure 7 **Depiction of gold panning in the Greater Antilles during the early colonial period showing the gathered hair style (Oviedo y Valdés 1851[1535]:plate 2).**

An iconographic survey of images depicting the indigenous inhabitants of the Greater Antilles in early colonial documents was undertaken to see if this would yield additional information on cranial modification. Unfortunately, most images either contain insufficient detail or are of poor quality hindering the recognition of head shaping practices. An additional problem is the redrawing of images in later publication as is the case for Figure 7. This is a later interpretation of the image originally published in Oviedo y Valdés' manuscript (compare Myers 2007:202 for the original).

Columbus' diaries also mention other intentional changes to the appearance of the human body. He describes the extensive use of body paint, such as this encounter with a male from Hispaniola on January 13th:

> 'He had his face all stained with charcoal, although everywhere they are accustomed to staining themselves with different colors' (Dunn and Kelley 1991:329).

Throughout his writing, Columbus mentions various colours and designs covering the whole or parts of the face and body (Dunn and Kelley 1991:67). Unfortunately, he provides little detail on specific patterns or the meaning behind the different colours and designs. Taken together, these clues paint a picture of the faces of the people who greeted Columbus.

A later account by Charlevoix adds to our knowledge of the practice of intentional cranial modification on Hispaniola. He specifies that the altered head shapes are created by the mothers using their hands or two boards, providing a little more detail on the agent executing the practice and the modification device (Charlevoix 1730:37). He then remarks that the modification must harden the skull, as Spanish swords break while striking these modified crania and that the cranial modification adds to the ferocious appearance of these indigenous groups (Charlevoix 1730:37). None of the changes created by cranial modification would result in a stronger skull capable of shattering a sword, so if anything this is an embellishment by the author or perhaps a reflection of the poor condition of Spanish weaponry. There is no doubt the altered cranial shapes may have appeared more fierce and savage through European eyes, but this should be considered as an interpretation of a cultural practice by outsiders and not, as some have claimed, an indigenous motivation for head shaping.

Edwards (1801) claims there are differences in the cranial shapes created by the inhabitants of the Greater and the Lesser Antilles. He seems to have based most of his work on already published accounts from others, including Oviedo y Valdés and Rochefort. He describes the cranial shape of the Greater Antilles as:

> 'the *sinciput*, or fore-part of the head from the eye-brows to the coronal suture, was depressed, which gave an unnatural thickness and elevation to the *occiput*, or hinder part of the skull' (Edwards 1801:74, italics in original)

Edwards has not cited his specific source for this information nor is the shape he describes markedly different from his later description of Carib modification practices which will be discussed in more detail below.

Guanahatabey

Early historic documents present contentious evidence of another group inhabiting the Greater Antilles, referred to as the Guanahatabey or Ciboney. The latter seems to be an erroneous label resulting from the confusion between these groups and the Taíno dialect spoken in central Cuba and other regions of the Greater Antilles (Granberry and Vescelius 2004; Rouse 1992). Several sources report the presence of these Guanahatabey, described as cave-dwelling hunter gatherers, in the extreme west of Cuba (Keegan 1989; Rodríguez Ramos 2008).

Uncritical acceptation of such reports in turn saw the Guanahatabey represented as a 'relic' population from preceramic times pushed to the fringes by the later Taíno migrations (see for example Rouse 1948). Cuban scholars see a clear division in head shaping practices, with altered cranial shapes reported solely among skeletal material attributed to Taíno communities on the island (Dacal Moure and Rivero de la Calle 1997; Tabío and Rey 1966; Rivero de la Calle 1960). However, both Lovén (1935) and Keegan (1989, 2007) argue that the etnohistorical reports on the Guanahatabey are predominantly based on hearsay and the entire concept should be approached with caution. Archaeological evidence is inconclusive at this point, with evidence of sites corresponding to these descriptions present in the region yet the temporal dimension of such communities are currently ill understood (Wilson 2007).

Caribs of the Lesser Antilles

Colonial developments in the Lesser Antilles follow a different path. The Spanish focused their efforts on the larger islands of the Caribbean and the South American mainland, leaving the Lesser Antillean communities relatively undisturbed in the early colonial period. It is only during the 17th century that other European powers embark on the colonisation of the region. This does not mean that the Lesser Antillean populations escaped the demographic collapse and social decline brought by European colonisers, merely that the delay allowed for the production of more abundant sources on their languages and lifestyles (Kiple and Ornelas 1996; Paquette and Engerman 1996).

The linguistic situation in the Lesser Antilles is equally complex. The Classic Taíno dialect is spoken in the Virgin Islands. This corresponds roughly to the extent of the pre-Columbian exchange network in the region, which would have been greatly facilitated by a communal language. Another Arawaken language, Eyeri or Kaliphuna is found in the Windward Islands and Guadeloupe and has been associated with the Island Carib (Granberry 2013; Granberry and Vescelius 2004; Taylor and Hoff 1980).

Villages consisted of several smaller huts inhabited by nuclear families all related through kinship bonds surrounding a central larger house known as a *taboui* (Hofman et al. 2014). The Island Carib societies were essentially egalitarian, with fluctuating leadership by chiefs of captains depending on the circumstances. There was a division in tasks, with women producing and cooking food and men tasked with trade (Cooper 1997). Communities gather during feasts, which act as essential stages for social interaction and negotiation (Allaire 2013; Verrand 2001). However, the arguments against a single Taíno identity also hold true for the Island Carib, where historic sources have similarly created a veil of homogeneity that masks underlying cultural and social plurality (Davis and Goodwin 1990; Hulme and Whitehead 1992; Lenik 2012).

Cranial modification is also mentioned in the descriptions of the Carib populations of the Lesser Antilles. Du Tertre (1654) and the Anonymous of Carpentras (Moreau

1990) speak of females flattening the forehead and nose of the newborn children, without providing much additional detail on the practice. Similarly, Oviedo y Valdés (1851:68) mentions wide foreheads created by pressure on the front and back of the skull after birth while Labat (1742:72) adds to our knowledge on the modification device by describing a small board pressed to the frontal of the newborn's head. De La Borde also speaks of flattening of the forehead and nose undertaken with an aesthetic motivation. Mothers pressure these areas from birth until the age of weaning (De La Borde 1674:29).

Breton adds some interesting details in his description of frontal flattening among the Carib of Dominica. He does not describe a modification device, but clearly states the modification is executed by a female and the resulting cranial shape is considered beautiful. Breton implies that the practice was not undertaken if the infant was ill when the skull was still malleable (Breton 1999 [1665]:49). He adds that mothers will continue the process by holding the child on their lap every day for the next two years of life and compression the skull with their hands in order to ensure the cranial shape remains altered. Breton also mentions a bulging of the eyes, likely a side effect of the frontal pressure (Breton 1999 [1665]:75).

Head shaping is also mentioned in the description of the St. Vincent Caribs in the works of Charles de Rochefort and John Davies. These works have an interesting history as Davies' The History of the Caribby-Islands (1666) is in fact an English translation of the *Histoire Naturelle et Morale des Iles Antilles de l'Amérique* published by Rochefort in 1658. Interest in the recently discovered New World and the appearance and customs of its indigenous inhabitants was high all over Europe, yet original information was limited. Davies therefore produced a translation of Rocheforts work for the Anglophone community and stayed relatively true to the original, at least where cranial modification is concerned.

Returning to the Carib of St. Vincent, Rochefort remarks on the flatness of the forehead and nose, caused by continual pressure exerted by the mothers starting after birth and continuing until the child is weaned (Rochefort 1667:353; Davies 1666:251). Although Rochefort does not describe the modification device itself, he does mention that the altered skull shape is considered beautiful. In a later section he adds more details on the social motivation, here in the faithful translation by Davies:

> 'As soon as the Children are born, the Mothers make their foreheads flat, and press them so that there is a descent backwards, for besides that that form of the forehead is accounted one of the principal pieces of beauty among them, they affirm, that is facilitates their shooting up to the top of a tree standing at the foot of it, wherein they are extreamely expert as being brought up to it from their child-hood' (Davies 1666:338).[2]

The tie between beauty and cranial modification is common in historic sources on the practice from around the world, but the explanation that the flattened forehead would facilitate shooting arrows is rather original. This assertion is not repeated in any of the other chronicles on the Caribbean that discuss the matter and is difficult to judge. In the words of Dingwall discussing this assertion using Davies as a source: 'As regards the latter explanation we have nothing to say except that it is very improbable and that little value can be attached to it' (Dingwall 1931:159).

Another example of the issues which may arise when authors copy and interpret data by others is the report of Edwards (1801) on cranial modification practices among the Carib of St. Vincent. Basing himself on the previously cited sources of Oviedo y Valdés and Rochefort, he describes how two boards were tied to the front and back of the infant skull to create an altered head shape (Edwards 1801:54). I have not been able to find any mention of boards in Rochefort (1667) or Oviedo y Valdés (1851). Both discuss pressure is placed on the skull but neither specifies the exact manner or materials used. This is not to say Edwards is necessarily incorrect, but shows the complications than can arise when authors copy and interpret other sources.

The most detailed description of the execution of cranial modification in the region comes from Leblond (1813), who travelled in the Lesser Antilles in the last decades of the 18th century. At this time, European expansion into the Lesser Antillean islands was in full swing and major social changes had occurred, in particular on the island of St. Vincent where two distinct groups had formed referred to in the historic documents as the Red or Yellow and Black Carib. Despite the extraordinary level of detail in Leblond's account of modification, it is unclear whether these events took place in a Red or Black Carib village. Leblond's evidence is presented here and a more detailed look at the Black Carib will follow in the next section.

2 Rochefort's original description states: 'Dés que les enfants font nez, les Meres leur applatissent le front, & le present en telle frote, qu'il panche un peu en arriere, car outré que cette forme est l'un des principaus traits de la beauté qui est estimée parmy eus, ils dissent qu'elle sert pur pouvoir mieus décocher leurs fléches au dessus d'un arbre, en se tenant au pied, à quoy ils sont extremement adroits, y êtans façonnez dés leur jeunesse.' (Rochefort 1667:610).

Upon arrival, Leblond was shown a newly born infant with a modification device in place. The device consisted of two light but firm boards tied together with cords made from *Mahot*.[3] Pads of cotton were used to ensure the device did not injure the infant. An opening in the back board ensured the occipital bone was not compressed (Leblond 1813:198). Leblond does not specify the size of the hole, but it is likely he means the occipital protuberance and not the entire occipital.

The device is worn for nine days on end, after which it is temporarily removed and replaced until the head has acquired the desired shape. Many children aged three to four months were still wearing the modification device, suggesting the process will have lasted some time. Leblond also noticed a side effect of the process: a bulging appearance of the eyes created by the pressure exerted on the frontal bone (Leblond 1813:198).

Leblond offers little in terms of social motivation for the practice. The wording of his account shows a distinctly negative attitude towards head shaping, in particular his reference to the infant as 'the little unfortunate one' (Leblond 1813:198).[4] Still, his account of the practice itself is factual and does not seem to be unduly influenced by his views on the matter.

In addition to these descriptions of head shaping practices, illustrations accompanying these colonial documents as well as paintings of the indigenous peoples of the Lesser Antilles were investigated for additional clues to intentional cranial modification. Unfortunately, these lacked the detail necessary to reveal alterations in head shape.

Besides the insights into the process of modification provided by the descriptions in colonial sources, these writers also discussed the overall appearance of the inhabitants of the Lesser Antilles. De La Borde describes the hair style of the early colonial Carib communities as cut in a fringe across the forehead with the rest of the hair worn long. Two small locks are left on each side of the head and the rest of the hair is pulled back using cotton cords adorned with small ornaments such as shells or thimbles. The hair is then wrapped and adorned with feathers (De La Borde 1674:29-30). A somewhat similar account is provided by Rochefort, who describes long straight hair tied at the back of the head. Rochefort notes a difference between males and females, stating females wear a centre part, whereas men cut the front locks in a fringe (Rochefort 1667; Davies 1666). Breton describes head bands and caps decorated with coloured feathers worn atop the head (Breton 1978:60).

3 *Mahot* is an Arawak word used for the Sterculia caribaea. The inner bark of these trees was used to create straps.

4 'le petit malheureux' (Leblond 1813:198).

The historic documents and ethnographic accounts also discuss the use of temporary body painting and more permanent tattoos. The Carib of the Lesser Antilles use *roucou* – a type of red dye – all over the body. De la Borde (1674:30,32) describes a painted design on the forehead resembling a head band coming down into a point above the nose. Such markings would draw attention to the forehead and may serve to emphasise the alterations created by head shaping. Dr. Chanca describes Amerindians encountered in the Lesser Antilles during the second voyage:

> 'The difference between these Caribbees and the other Indians, with respect to dress, consists in wearing their hair very long, while the others have it clipt irregularly; also because they engrave on their heads innumerable cross-like marks and different devices, each according to his fancy; and they make these lasting marks with sharpened bamboo sticks' (Chanca, translated by Fernandez de Ybarra 1907:443).

The implied permanence of the symbols seems to indicate that this is a description of tattoos and not marks created through body paint.

In addition to these various aspects of physical appearance, social practices related to the birth and early socialisation of an infant are recounted. Du Tertre describes a key event in the Carib process of becoming human. Six weeks to two months after birth, a family friend is invited by the father to name the child. The ears, lower lip, and septum of the infant are pierced, unless the infant is perceived as too weak to endure this pain. In that case, the procedure is postponed until about a year in age (DuTerte 1654).

Rochefort (1667:611) gives a rather similar account with minor variations. He remarks that the naming of the children takes place twelve to fifteen days after birth, so somewhat sooner than indicated by DuTertre. De La Borde confirms the relation between the piercing and naming of the child and indicates this is done in the first month of life (De La Borde 1674:30). Regardless of the exact timing of these events, it is clear that naming and piercing represent important steps towards becoming a social person for the Carib newborn. The process of cranial modification would still be ongoing at this time and can be considered a part of the early socialisation processes of the Carib.

Black Carib

By the end of the seventeenth century, the island of St. Vincent was inhabited by two distinct communities: the Red and Black Carib. The addition of Red – or occasionally

Yellow – to the Carib name was introduced in the written documents to distinguish the Amerindian groups discussed in the previous section from the Black Carib. The origin of this community of African descendants is both intriguing and enigmatic. Several sources claim a European vessel carrying slaves from Africa to the West Indies shipwrecked near the island of St. Vincent during a storm. Survivors who made it to the shores of St. Vincent or neighbouring Bequia were the alleged start of the Black Carib community. Although the details of this story – the year of the event, the amount and nationality of ships, and the location of the wreck – vary considerably between different writers, the consistent reference to a shipwreck in most early sources lend this theory credence (Kerns 1977, 1983; C. Taylor 2012; D. Taylor 1951).

However, it is likely that Africans were already present on St. Vincent before this shipwreck and the origin of this community is more diverse. Historic documents tell of raids carried out by the Carib of the Lesser Antilles on European colonial settlements which resulted in the capture of European settlers and African slaves. The prevailing sea currents ensured that slaves escaping by boat or raft from the English colony of Barbados washed ashore on the island of St. Vincent. The expanding free African population on the island attracted other runaway slaves (Gullick 1976; Kerns 1977, 1983; D. Taylor 1951; C. Taylor 2012).

There is no reliable information on the reception of the shipwreck survivors and growing number of free Africans by the local Amerindian community. Young ([1795] 1971) describes an almost biblical story where after enslaving the Africans and finding it difficult to control them, the Carib prepared to kill all male infants. This resulted in a rebellion that led to the separation of the Red and Black Carib, the former also known as Kalinago. Young's account was not only written a century after the events he describes, but is also an extremely politically motivated work written at a time when the Black Carib were at war with the British Crown. In fact, there is evidence to suggest that the two groups were engaged in intense interaction, certainly in the beginning. The Black Carib adopted the Kalinago language and many of their customs and practices. However, by the end of the seventeenth century the community had split in two clearly distinct groups living in different areas of the island (Kerns 1977, 1983; C. Taylor 2012; D. Taylor 1951).

Among the customs adopted from the indigenous Carib was the practice of cranial modification. Numerous sources report the altered head shapes of the Black Carib, but fewer provide any details. Chanvalon's description of his voyages in the Lesser Antilles around the middle of the eighteenth century includes the assertion that the Black Carib compressed the heads of their children between two boards (Chanvalon 1761:39-40).

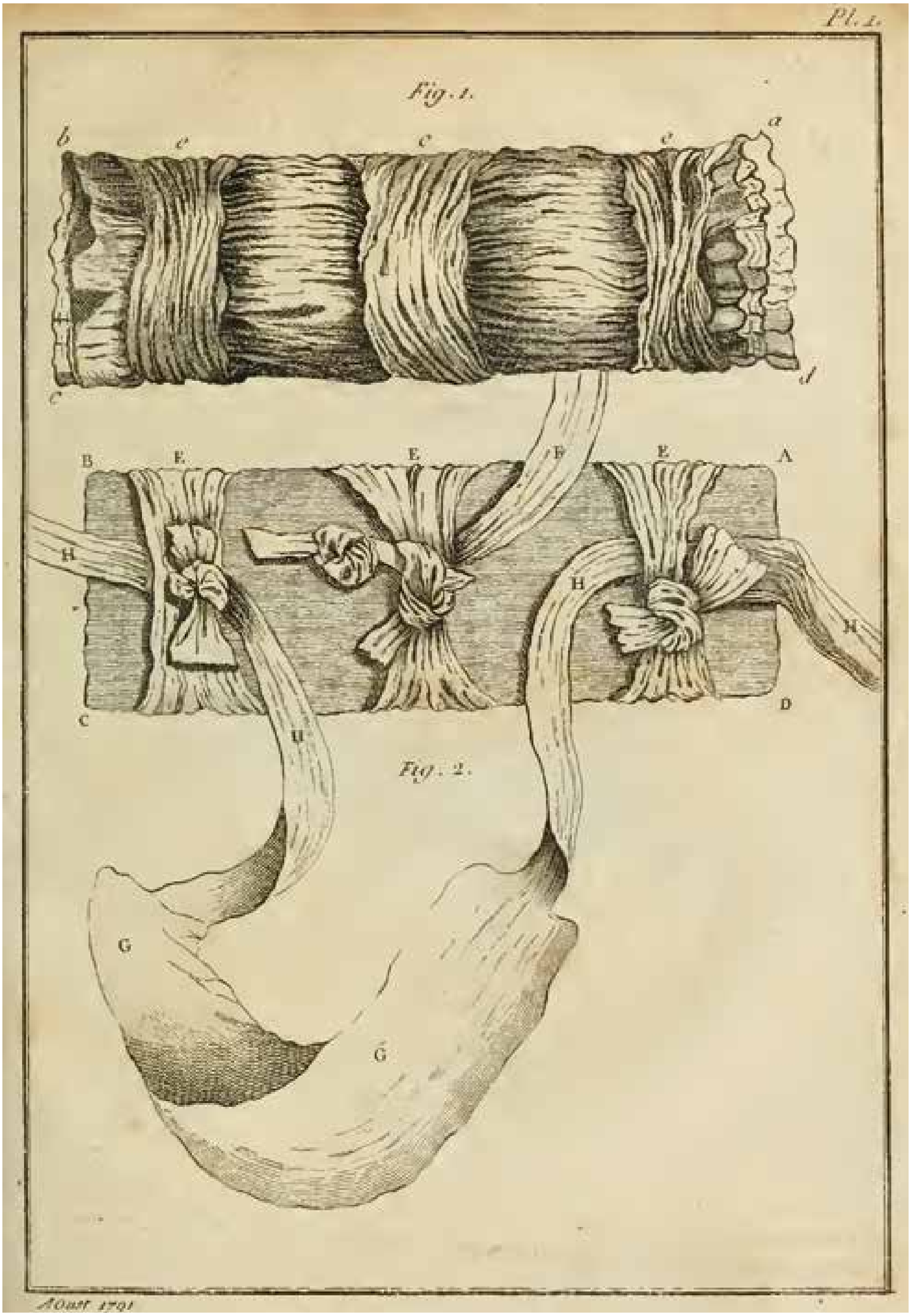


Figure 8 **Black Carib modification device produced for Amic consisting of a single padded board and textile band (Amic 1791:plate 1).**

A slightly more detailed account can be found in Davidson (1787). His description of the modification device is a little different from Chanvalon: he describes a single board wrapped in cotton pressed to the forehead by ties fastened at the back of the head (Davidson 1787:10). He also adds information regarding the execution of the practice, stating that it starts directly after birth and is continued for two to three months. Male infants are subjected to pressure longer than females. Sickly children or twins are exempt from the custom (Davidson 1787:10).

This description of the modification device is confirmed by the account of M. Amic. In a letter from 1791, he speaks of an encounter with a canoe containing nine Black Carib, one Red Carib female, and two Red Carib children. Intrigued by their 'flattened frontals and lopsided occipitals', Amic proceeded to question the Black Carib about their head shape. He was informed a board wrapped in cotton was worn until the altered cranial shape was permanent. Upon further inquiries, the Black Carib recreated a simple version of the modification device for Amic, depicted in Figure 8 (Amic 1791). They informed Amic that the two bands wrapping around the head were important and that the third band tied to the middle of the board was rarely used. Sometime later, Amic encountered a second canoe of Black Carib who confirmed the shape of the modification device, though they found it crudely made (Amic 1791).

The documentary sources also contain information on the social motivations behind the practice. Most cite a single reason for the adoption of the practice from the Red Carib: to avoid being confused for escaped African slaves. Chanvalon (1793:40) poetically refers to the altered head shape, which he has just described as deformed and monstrous, as a sign of their freedom.[5] Davidson (1787:10), Leblond (1813:154), and an anonymous writer in 1773 (cited in Kerns 1983:29), all confirm this notion. Shephard (1831:24) concurs, but simultaneously refers to it as 'a token of their independence'. This may seem a minor difference, but in fact it takes the rather prosaic and functional explanation to a new level by tying it to the developing group identity of the Black Carib. In this light, information provided by Amic is also interesting. When talking about the practice, the Black Carib tell Amic (1791:133) that the modification is 'the character of their nation'.[6] This is an interesting phrase which may point to the practice being considered an important part of their group identity at that stage, having surpassed the mere functional.

Amic's letter also records details that may be considered evidence of the waning of the practice. He noted the normal bulging frontal of one of the Black Carib he encountered and was informed that the young man's mother had refused to submit him to the

5 '(…)la rend difforme & monstrueuse. (…) cette marque distinctive, qui est le signe de leur liberte' (Chanvalon 1793:40).
6 'la caractère de leur nation' (Amic 1791:133).

tradition (Amic 1791:133). Similarly, the second group of Black Caribs tells Amic that head shaping might soon disappear as several families have already stopped practicing the custom (Amic 1791:133). The only other source that points to a decline of the practice towards the end of the eighteenth century is Anderson (in Taylor 2012:104).

Increasing hostility between the Black Carib and the British Crown led to several violent clashes between the parties. The conflict was decided in favour of the British in 1796, who proceeded to deport the entire Black Carib population to the island of Roatan near the Honduran coast. From there, Black Carib communities spread along the nearby Central American coast where descendant communities can still be found today (Gullick 1976; Kerns 1977; Taylor 2012). There may be some doubt as to whether a decline of head shaping was already occurring on St. Vincent, but the practice was in any case abandoned relatively quickly after their deportation. Reports as early as the 1820's already mention its absence (Roberts 1827:275) and modern ethnographic accounts of the Garifuna – as the community prefers to be known - confirm this (Conzemius 1928; D. Taylor 1951).

These Garifuna communities along the Central American coast can also provide insight into practices surrounding birth and infant care. From the moment a women realises her pregnancy, she must refrain from certain foods whereas her partner is expected to restrict his activities to prevent harming the infant. The newborn is in a dangerous position because its *áfurugu* or spirit double can only be passed from the father to child after the umbilical cord falls off. A fire must be present in the house for the first eight days after the birth of an infant. Removal or extinction of the fire would result in the death of the newborn. This critical nine day period is followed by a ritual bath for mother and child (Coelho 1949; Taylor 1951).

Baptism among the Garifuna may take place directly after the critical nine day period, but may also be postponed to several weeks or months after birth. The christening involves two godparents and a small private feast (Kerns 1977; Taylor 1951). Although it is almost impossible to separate the Carib, African, and Christian elements that have all contributed to Garifuna practices, this does seem to echo some of the sixteenth-century Lesser Antillean Carib customs described by Rochefort (1667) and Du Tertre (1654).

The nine day period and presence of fire also create an interesting parallel with the rituals surrounding the death of an adult among the Garifuna (Kerns 1977; Taylor 2012). The death of an infant is mourned by its parents and close kin and the body is buried, but the passing of an infant is not accompanied by the extensive rituals that mark the death and burial of adult individuals (Kerns 1977). This may indicate that young infants are not yet considered fully formed social persons at this stage.

Contemporary Caribbean Communities

The remarks by eighteenth-century travellers on the altered head shapes of both the Island and Black Carib of the Lesser Antilles constitute the last evidence of cranial modification in living individuals from the Caribbean. After the deportation of the Black Carib and the continued European expansion and interest in the region, the practice seems to have ceased at some point as the current descendant communities in the region no longer practice head shaping in the same manner.

This is not to say that the practice has disappeared completely, as remnants of it surfaced in an anthropological study on child care practices by FitzSimmons and colleagues (1998). Interviews with adults of different cultural backgrounds residing in the United States revealed the presence of infant skull moulding in several groups, including women originally from Jamaica. The practice is believed to contribute to the general health and beauty of the infant, with women aiming to create a round skull because 'a broad, flat head is considered stupid' (FitzSimmons et al. 1998:89). This cranial shape was created through massaging of the skull and aided with tight caps, carrying on until the infant was about a year old. Knowledge regarding the practice was passed on between women after the birth of the first infant, with men having little to no knowledge of the custom (FitzSimmons et al. 1998).

Cranial moulding has also been reported among child care practices in an ethnographic study of Haitian community life in the valley of Mirebalais by Herskovits (1964). Moulding is begun soon after birth, but details surrounding the practice vary. Some claim pressure is exerted once a day for the first three days whereas others report every eight days for two months (Herskovits 1964).

An ethnographic study of the Toco community in Trinidad did not report any lingering cranial modification practices, but does give an insight into other child care customs analogous to those described in historic sources. A fire is kept burning in the house for the first nine days after birth. On the ninth day, mother and infant step out of the house and the infant is introduced to the living and dead members of the family. Baptism and naming take place after this event but before the child reaches three months of age (Herskovits and Herskovits 1947).

Apart from this fascinating insight into the transformative potential and longevity of certain social practices, no other evidence of cranial modification or remnants of head shaping practices currently exist in the Caribbean, although such information may simply not be recognised or reported.

Caribbean Mainland

Given that the Americas are often referred to as the heartland of cranial modification (Virchow 1892), it is not surprising that evidence of the practice can also be found in accounts from both continents. This section has restricted itself predominantly to the coastal region of the South American mainland traditionally seen as part of the circum-Caribbean region, as a complete overview of American modification practices is far beyond the scope of this work.

Stedman's narrative of his travels in Suriname between 1772 and 1777 contains encounters with several indigenous peoples, including the following remark on cranial modification:

> 'Most of these people esteeming a flat forehead a mark of beauty, they compress the heads of their children, it is said, immediately after their birth' (Stedman 1813:414).

This rather general reference does not contain information on the method of compression, the resulting cranial shapes, or even the name or location of the Amerindian community practicing head shaping. By the time Everard im Thurn travelled through the Guyana (then British Guiana) in the last decades of the 19th century, the practice of cranial modification was a mere memory among the Carib of the coastal region. Im Thurn does mention a remote group living in the interior near the source of the Essequibo River that still uses boards to create cranial flattening, but is unable to provide any details or even the name of the community (Im Thurn 1967).

Gillin (1948) found occasional references to cranial modification among the coastal Carib, Taruma, and Maopityan communities of Suriname and French Guiana. Gillin is unsure whether these modifications are intentional and mentions a difference in shape: frontal flattening on the coast and fronto-occipital and side-to-side modification in the interior. This side-to-side modification is explained in more detail by Brown (in Roth 1924:412-3) based on his experiences with the Maopityan living along the Upper Essequibo in the interior of Guyana. Brown describes a long, narrow, and high head shape created by the compression of the sides of the skull by two small wooden boards (Roth 1924:412-3). This lateral compression forces cranial growth in a superior direction, creating a high skull. This is likely the unnamed tribe mentioned by Im Thurn (1967). Barrère (1743:239) also reports fronto-occipital modification created by small boards among the Fapouyranas of French Guiana.

Cranial modification can also be found among the communities of eastern Venezuela living between the Gulf of Paria and the Orinoco River. Fronto-occipital modification was practiced using of two 'cushions made of cotton' to create a flattening of the front and back of the head (Kirchhoff 1948:485). It is possible that these cushions were in fact small boards wrapped completely in cotton, as has been reported in other regions.

The ethnographic accounts of the Carib population in Suriname give some interesting insight into social practices surrounding birth and early child care. Immediately after the birth of the newborn, the father retreats to his hammock and avoids strenuous activities, hunting, and certain foods. The spirit of the little infant comes from the father and enters the body through the open anterior fontanel of the skull. While this remains open, the father and infant are directly connected and any misstep by the father may result in the serious harm or death of the infant through this spiritual link (Roth 1924:695-6).

These notions may be directly tied to the concept of what it means to be human. Among the Carib of the Maroni River in Suriname, an infant is only considered a person after it is 'a few months or even weeks old' (Kloos 1971:147). The difference is clearly marked in the funerary rites, with a baby dying in childbirth or soon after buried without the customary funeral feasts which are apparently solely reserved for social actors. This notion is supported by the fact that the naming of a child takes place an undisclosed time after birth (Kloos 1971).

As is the case with the evidence on cranial modification, care must be taken in the data on physical appearance that can be extrapolated from ethnographic accounts. Information on hairstyles in the tropical lowlands, for example, show much variation and cannot be relied upon to provide an accurate picture of prehistoric practices. However, an interesting similarity with the Greater Antilles is observed by Humboldt among the Carib of the Lower Orinoco where the head is shaved save a circular tuft on the crown of the head making the forehead appear elongated (Humboldt in Roth 1924:426).

Ethnographic data from the mainland communities in the Guianas indicates the presence of tall caps, wicker hats, and feather head dresses among several tribes. The elaborate feather crowns seem to be restricted to ceremonial occasions. Little detail is provided on the remainder of the hats besides the notion that the chief's hat was different from the others. Roth also reports on the use of forehead bands or fillets among several mainland groups. Males of the Arawak communities wore a band with cotton tassels across the forehead and the Carib males had a similar cotton fillet. Woven or cotton head bands are also worn by the Makusi, Waiwai and Taruma females (Roth 1924:431-2).

Body paint is also a very common occurrence among the indigenous peoples of the Guianas. A mixture of oil and *annatto* – a red pigment obtained from Bixa orellana – is used on the whole body on a daily basis. Different colours and designs may be added if dictated by the circumstances. The pigments can be applied with the fingers, brushes, or even engraved stamps or rollers (Roth 1924:422-3).

The presence of facial tattoos in Dr. Chanca's account of Columbus's voyages to the Greater Antilles is echoed in ethnographic accounts on the mainland Awarak, Warao and some Carib groups from the beginning of the 20th century. Roth (1924) and Gillin (1948) provide a number of examples among these groups and indicate the tattooing 'took place soon after birth or in early childhood, the parts usually chosen being in proximity to the mouth and over the eyebrows' (Roth 1924:419). The potential link between facial tattoos and early socialisation practices is intriguing, but unfortunately too little is known regarding Caribbean practices to make any clear connections.

Piercing of the skin and decoration of these perforations with various artefacts or natural materials can also be found among the Carib speakers of the Guianas. Lower lip perforation was common among males and females and pins, bones, or thorns were worn in the opening (Roth 1924:414). The Arawakan speaking Wapishana also practiced piercing and bone or shell bells were worn (Roth 1924:414). Feathers worn through perforations of the cheeks also occur, if much more infrequently, in Guyana, Suriname, and French Guiana (Roth 1924; Stedman 1813). Piercing of the nasal septum is relatively common and can be decorated with hanging ornaments or wooden sticks (Roth 1924).

The Case of the Shipibo

Outside of the tropical lowlands of direct interest to this investigation, cranial modification is mentioned often for communities living along the rivers draining the eastern side of the Andean mountain chain. This particular case study has been selected based on the level of detail available on early child care practices, including head shaping, and the interesting and well described effects of cultural contact on the practice.

The Shipibo live along the banks of the Ucayali River in central Peru and have long been the focus of ethnographic research. Karsten provides several interesting details on the practices surrounding the birth of an infant he observed during his stay in 1952. The baby is bathed after the delivery and its face, body, and hair painted with genipa. This dark body paint is one of several protective measures, including a restricted diet by the mother and a couvade observed by the father (Karsten 1964).

Cranial modification is commenced directly after birth using a so-called *vuitánete*. Karsten describes two boards – one at the front and one at the back of the head –

being tightened by ligatures (Karsten 1964). Others describe a device consisting of a single frontal board secured by a band passing around the head (Farabee 1922). It can be seen in this drawing from Farabee (1922:98) reproduced in Figure 9. This device is very similar to the descriptions and drawings of the Lesser Antillean Carib apparatus by Leblond (1813) and Amic (1791).

Figure 9 **Shipibo mother holding her infant undergoing cranial modification through application of a *vuitánete* (Farabee 1922:98).**

The modification device is kept in place for about three (Karsten 1964) or six months (Farabee 1922). Head shaping is referred to as an ancient custom that results in an aesthetically pleasing shape of the skull. Karsten theorises that this is among a suite of practices meant to ensure the safety of the infant. He considers the fact that the head is considered especially susceptible to evil spirits, perhaps due to the presence of the open fontanelles in the first months after birth. Karsten cites several other adornments which may also assist in this protection, such as hair styles and the piercing of the ear, nasal septum, and lips.

A mere three decades later, fieldwork among the Shipibo of Yarinacocha and Huarayos of Tambopata by Tommaseo and Drusini (1984) documented the decline of cranial modification among these groups. No trace of the custom could be found among the Huarayos, even though earlier studies had mentioned cranial modification was practiced. Despite Karsten's detailed description of Shipibo head shaping in the fifties, by the eighties only several adult Shipibo had altered head shapes that reminded the population of the practice.

Karsten's work already showed the impending signs of the demise of the practice. He wrote that 'many Indian fathers, who were more influenced by modern ideas, were disposed to abandon this old custom, the Indian mothers, on the other hand, were more conservative and most anxious to keep it up' (Karsten 1964:195). Tommaseo and Drusini only observed altered head shapes in five adults males all over the age of 40, suggesting the practice had gone out of use not long after Karsten's observations. Informants would not even discuss the practice with the investigators, as cranial modification was forbidden by the government and 'considered a sign of backwardness' (Tommaseo and Drusini 1984:326). These negative connotations must be linked to the rapid decline of the practice among the indigenous communities.

4.5 BRIDGING BOUNDARIES

This brief social history of Caribbean communities from the first intrepid explorers of its coasts to its present day inhabitants has shown that the region has a rich past characterised by transformations and developments occurring at the social boundaries between groups. Far from isolated island communities, Caribbean peoples thrive on interaction and have been tied into multiscalar networks of exchange from the very start. As a part of early socialisation processes and inherently tied to identity formation and expression, head shaping practices were tied into this dynamic social setting.

Despite the fact that intentional cranial modification was first reported by Columbus and has received scholarly attention ever since, little has been done to explore the social connections and motivations behind head shaping. The work by Crespo Torres (2000, 2005) demonstrates the potential and value of such an approach and it is this void the current study hopes to fill by taking a multiscalar approach to contextualise intentional cranial modification from its meaning for an individual to its entanglement in regional social developments.

5 METHODOLOGY

Many physical anthropologists seem to believe unconsciously that cranial deformity exists solely to thwart their studies
T. Dale Stewart (1937:170)

The previous chapters have shown the complexities that surround the study of intentional cranial modification. The accurate documentation of the resulting changes to the shape of the human cranium provides the necessary basic information for studying both the physical consequences for the development of the skull as well as the wider social implications of head shaping practices in society.

This chapter provides information on the methods used throughout this study and will start by discussing several relevant archaeological factors, followed by the osteological standards used in this study. A separate section will discuss cranial modification, including a discussion on various classification systems for head shaping and a detailed look at the changes to cranial morphology resulting from cranial modification practices. This is followed by a brief discussion on the manner of data documentation in forms, photographs and the Access database. Finally, a short section will cover the statistics used to analyse the data produced in this investigation.

5.1 ARCHAEOLOGY

Sample Selection Criteria

The sampling strategy of this study has attempted to optimise the overall sample size, while taking into account the temporal and geographical distribution of the skeletal assemblages as well as the state of preservation, since the latter has a marked impact on the amount of data that can be gathered. Secondarily, skeletal collections with known archaeological contexts on an individual level were preferred.

Selection of Assemblages

The selection of skeletal assemblages or sites was predominantly aimed towards obtaining a representative sample of prehistoric Caribbean populations, with regards to both geography and chronology. Numerous Caribbean skeletal assemblages have little to no contextual information on specific individuals, either because this information was not recorded during the excavation or because data gathered by the excavator was never published or made accessible in another manner. Excluding such collections from this study would have resulted in a marked reduction of the overall sample size and a severe decline in the geographic and temporal representability.

All regions of the Caribbean are represented in this sample, except the Southern Caribbean Region. Not all islands or countries in the research area have yielded skeletal material, but a concerted effort was made to include as many locations as possible. This means that certain islands are only represented by a single skull or a small numbers of individuals. Even though social motivations cannot be determined for these assemblages due to the limited data available, these skulls do provide information on larger scales of analysis.

The temporal range of this sample starts at the beginning of the Ceramic Age and continues into the early colonial period, spanning from approximately 500 BC to AD 1800. This period of Caribbean history encompasses important social, political, and cultural developments in the indigenous societies as well as the tumultuous events and upheaval brought about through intercultural contact with European settlers and African slaves. As such, this period forms a dynamic backdrop against which cranial modification and identity formation and expression can be investigated in indigenous Caribbean communities.

Selection of Individuals

Several factors influence whether an individual skull was selected for study. First and foremost among these was the state of preservation. Cranial material from the circum-Caribbean region varies widely in this regard, depending among other factors on the geological conditions in which the skeleton was buried, taphonomical processes, excavation methods, and conservation and curation practices after excavation.

Best practice would be to exclude any incomplete or fragmented crania from this analysis to ensure better accuracy in the determination of cranial modification. However, this would have resulted in a skewed sample as skeletal material from the Lesser Antilles is generally poorly preserved and much more fragmentary than materials from the Greater Antilles and the South American mainland. In order to enhance the geographical spread of the sample, the reconstruction of fragmented crania was undertaken in a temporary manner using tape. This method was chosen as it does not alter the skeletal material in a permanent fashion and care was taken to ensure the cranial fragments were not damaged during the reconstruction. A full cranial midline, running from glabella to opisthion, was preferred but otherwise the majority of either the frontal or the occipital had to be present in order for the skull to be included in this study. All crania that did not meet these criteria, and therefore could not be assessed with any degree of certainty, were removed from the sample.

Pathological crania were not excluded from the analysis, since few bony responses to disease impede the recognition of head shaping practices. However, great care was taken to ensure that the cranial modifications recorded were not the result of pathological conditions, such as craniosynostosis or positional plagiocephaly. If pathology was considered to be a potential factor in the observed skull shape, this was clearly noted and recorded.

Multi-scalar Approach

Studying an issue as complex as identity in a region defined by interaction and exchange between different communities cannot take place solely at the level of the individual. This investigation has opted for a multi-scalar approach in order to uncover the intricate and dynamic relationship between cranial modification and identity.

This approach starts at the level of the individual and the community, looking at altered head shapes and their social implications on a micro level. Moving up to the level of the assemblage will allow the study of local patterns. Patterns found in the different locations will be compared to determine whether the traditional regional boundaries defined within the Caribbean through previous investigations – in this case the Greater Antilles, the Lesser Antilles, and the Mainland – are of importance within this investigation. The patterns within each of these regions will be investigated to look at wider social contexts and compared to one another to determine if regional differences exist and, perhaps more importantly, are pertinent in relation to cranial modification and identity. After all, it is the boundaries between groups at each of these scales of study where identity is negotiated, (re)defined, and confirmed.

Chronology

This investigation aims to study the motivations behind the practice of intentional cranial modification on multiple scales and in different time periods of Caribbean prehistory and early history. Two issues must be dealt with to successfully achieve these aims: the complex and varied chronological and cultural classification systems developed during the course of Caribbean archaeology and the disparity in the available contextual data for each of the skeletal assemblages in the sample. This was overcome by a dual approach, assigning individuals and sites to the regional developmental scheme of different ages and the more detailed classifications of material culture.

Placing skeletal assemblages into the broader regional chronology permits the examination of head shaping practices against the backdrop of the larger scale social and material developments on which the scheme is based. These classifications are supported by radiocarbon dates wherever available, obtained directly from the skeletal material itself or from associated archaeological materials. However, it is important to keep in mind the dynamic and shifting nature of Caribbean history. As people move through the region, they arrive on different islands at different times creating temporal shifts for the same period between locations. Radiocarbon dates may thus provide general indications, but must preferably be combined with proper knowledge of the material context.

Wherever possible, individuals and sites were also related to the more detailed classification based on diagnostic traits of material culture and particularly ceramics proposed by Rouse (1992). Despite the shortcomings of this chronology, this is still the most convenient way to correlate and contextualise this disparate dataset stretching across different islands and periods.

5.2 OSTEOLOGY

Age-at-Death and Sex Determination

The determination of the age-at-death and biological sex of an individual represent the basic biological information provided by physical anthropology and are important for the assessment of cultural patterns related to intentional cranial modification in the different populations investigated in this dissertation.

The data on age and sex used in this study come from a variety of sources. A number of larger skeletal assemblages in the insular Caribbean have recently been reinvestigated by physical anthropologist Dr. Darlene A. Weston[1] and her skeletal reports have provided much of the data on sexing and ageing used in this study. In other cases, this data has come from collection inventories and databases, where the data from previous investigations of the material is stored. In all cases, a concise study of age and sex was executed by the author to ensure the reliability and compatibility of all previous data. The different methods used for the establishment of age-at-death and biological sex are discussed in the following paragraphs for each of the archaeological sites in the sample. Table 2 provides an overview of the sources of the data for each site.

Table 2 **Overview of source data for the sites in the sample. Abbreviations stand for: B:Bahamas; C:Cuba; DR:Dominican Republic; GR:Grenada; G:Guadeloupe; H:Haiti; J:Jamaica; PR:Puerto Rico; SA:Saba; SK:St. Kitts; SJ: St. John (USVI); SU:Suriname; T:Trinidad; V:Venezuela.**

Researcher	Sites (Location)	Source
Edwin Crespo Torres	Duey Bajo (PR), Hacienda Grande (PR), Monserate (PR), Punta Candelero (PR), Rio Arriba (PR), Sorce, Vieques (PR), Tecla, Guayanilla (PR), Trujillo Alto (PR), UPR US1 (PR)	Crespo Torres (2000), personal communication (2011)
Jouke Tacoma	Hertenrits (Su), Kwatta Tingiholo (Su), Okrodam (Su), Saramacca (Su), Waterkant/de Mirandastraat (Su)	Tacoma (1963, 1991)
Anne van Duijvenbode	Abingdon (J), Anse Bertrand (G), Watling Island (B), Barbados US1, Barrio Camas (PR), Barrio Viva Bayo (PR), Bloody Point (SK), Cabeza de Muerto (DR), Camburito (V), Caneel Bay Plantation (SJ), Carache (V), Constanza (DR), Cuba US1, Cueva Andres (DR), DR US1, Cueva de los Indios (C), Cueva de los Muertos (PR), El Atajadizo (DR), El Cabo (DR), El Soco (DR), El Zamuro (V), Folle Anse (G), Great Exuma Cay (B), Guadeloupe US1, Halberstadt (J), Jamaica US1, Jamaica US2, Juan Dolio (DR), La Cabrera (V), La Cabrera 1 (V), La Caleta (DR), La Gonave Island 1 (H), La Gonave Island 2 (H), La Hoyada (V), LA US1, Lago Valencia (V), Limestone Caves (J), Maisi (C), Mayaguez (PR), Morne des Mammelles (H), Norman's Pond Cay (B), Pedro Bluff Cave (J), Petit Canal (G), Pinas (PR), Pointe Canot (G), Portland Hills (J), Punta Macao (DR), Reference Collection (DR), San Mateo (V), San Pedro (J), Santo Domingo (DR), Savanne Suazey (GR)	-
Darlene Weston	Anse à la Gourde (G), El Chorro de Maíta (C), Kelbey's Ridge 2 (Sa), Morel (G), Manzanilla (T), Spring Bay 1c (Sa),	Weston (2010, 2011, 2012, 2013)

Age

The determination of the approximate age of an individual at the time of his or her death uses a variety of different methods to study the developmental age of the skeleton.

1 These studies were carried out as part of the NWO VICI project 'Communicating Communities' (NWO-277.62.00) led by Prof. Dr. Corinne L. Hofman.

As the human skeleton grows and develops in a predictable and sequential manner, osteologists try to connect the developmental stage to the chronological age of an individual at death (Buikstra and Ubelaker 1994; Scheuer and Black 2004; White and Folkens 2005). However, age-at-death is not a variable that can exert any influence on the presence or absence of intentional cranial modification. The practice must be started during the first months of life and thereafter cannot be affected in a substantial manner. Therefore, the age at which an individual dies is not directly relevant to the study of the social motivations behind head shaping practices in past societies.

The age category to which an individual skull belongs may, however, affect the applicability of other methods used in this investigation. For example, the observation of cranial non-metric traits in infants and children is of little use as these traits develop and mature during the cranial development and therefore may not yet be present in younger age groups (Saunders and Rainey 2007). Therefore, this study has chosen to place individuals into broad age categories following Buikstra and Ubelaker (1994:9), which can be seen in Table 3. This has the additional benefit of eliminating the different age categories produced by the different methods described below and substituting these for a single uniform manner of recording.

Table 3 **The age categories used in this study and their correlation to chronological age (Buikstra and Ubelaker 1994:9).**

Age Category	Chronological Age
Foetus	<38 weeks
Perinate	38 - 42 weeks
Infant	42 weeks - 3 years
Child	4 - 12 years
Adolescent	13 - 18 years
Adult	>18 years

Crespo Torres

Non-adult age was estimated using dental development, epiphyseal fusion, and long bone length (Crespo Torres 2000:93). Adult age-at-death was determined using ectocranial suture closure (Meindl and Lovejoy 1985) and the auricular surfaces of the os coxae (Lovejoy et al. 1985).

Tacoma

Age-at-death estimations were based predominantly on the degree of ectocranial suture closure and the degree of dental attrition, and occasionally augmented with the stage of epiphyseal fusion in case of adolescents and young adults (Tacoma 1963:67, 1991:50). Tacoma himself questions the accuracy of these methods and suggests that the results should be 'looked upon as mere arbitrary approximations'(Tacoma 1963:67).

Again, since this research translates these age-at-death assessments into very broad categories, Tacoma's findings could easily be incorporated into the current study.

Van Duijvenbode

Adulthood was determined by an assessment of cranial suture closure[2] (Meindl and Lovejoy 1985), the fusion of the basooccipital-basosphenoid synchondrosis, the eruption of the 3rd molar, and if necessary the degree of dental wear (Brothwell 1981). Again, these methods were chosen only to assess whether the cranium had reached maturity, not to determine a more precise skeletal or chronological age. An additional advantage was the fact that these methods can be used if only cranial remains are present, which was the case for several large assemblages in this study. The age of infants, children, and adolescents was established by assessing the dental eruption (Ubelaker 1989), determining the stage of epiphyseal fusion (Scheuer and Black 2000, 2004), and measuring long bone length (Schaefer et al. 2009).

Weston

Adult ageing was achieved using anthroposcopic changes seen in the pubic symphyses (Katz and Suchey 1986; Todd 1921a,b), the auricular surfaces of the os coxae (Lovejoy et al. 1985), and the sternal ends of the ribs (Işcan and Loth 1986a,b). Dental attrition (Brothwell 1981) and ectocranial suture closure (Meindl and Lovejoy 1985) was also used. Juvenile or sub adult ages were estimated using epiphyseal fusion (Scheuer and Black 2000), long bone length (Sundick 1978; Ubelaker 1989), and dental development (Smith 1991).

Biological Sex Estimation

Human sexual dimorphism is more readily apparent in soft tissues than it is in skeletal remains, yet sufficient morphological differences exist to differentiate males from females in the majority of cases. These anatomical variations are present most clearly in the pelvic area and the skull of the adult human skeleton. Generally, males will be more robust and larger than females, however, one must take into account that normal individual variation may produce smaller males and larger females (Buikstra and Ubelaker 1994; White and Folkens 2005). The morphological differences between the sexes only develop after sexual maturity is reached. Consequently, the estimation of sex in individuals under 19 is generally considered extremely problematic. Although several methods have been developed in recent years, the accuracy of these methods is much

2 Despite the unresolved debate regarding the influence of intentional cranial modification on the timing and pattern of cranial suture closure, this remains one of the few relatively reliable methods to produce an age-at-death estimate in those cases where only cranial remains are present. Furthermore, as this study only looks at extremely broad age categories and tries to combine multiple methods of ageing wherever possible, the potential impact of intentional cranial modification on the cranial sutures can be considered negligible.

lower and there are significant issues with both intra- and inter-observer error (Cardoso and Saunders 2008; Scheuer 2002). Therefore, this study will only estimate the sex of adult individuals.

The highest accuracy is achieved if multiple skeletal elements and methods are used to determine biological sex (Buikstra and Ubelaker 1994; White and Folkens 2005). However, this process may be hampered by several factors. Firstly, the loss of the sexually dimorphic features due to poor preservation of the skeletal material may influence the estimation of sex. The morphological features of a single individual may also be ambiguous or conflicting, resulting in different assessments of sex based on the observed skeletal element. In such situations, the features of the pelvis are usually considered the most accurate for sex estimation (Buikstra and Ubelaker 1994; Mays and Cox 2000; White and Folkens 2005). However, many museum collections consist solely of crania, as it was common practice in the early days of archaeology to save predominantly skulls and any bones with interesting pathologies or deviations. Furthermore, comingling of skeletal remains due to burial practices, archaeological excavation methods, or conservation practices in museums means that it is not always possible to assess multiple skeletal elements of a single individual. In all of these cases, this research has taken the skull as the proxy for the individual, and assessment of other skeletal elements was only executed if these clearly belonged to the same individual.

Before the methods of assessing sex in this sample are discussed, it should be noted that the terms sex and gender, despite their occasional analogous use in anthropological literature, are in fact two very separate issues. The term sex, as used here, refers to the biological differences between males and females visible in both the reproductive organs and the genetic sequence. Gender, on the other hand, is a social construct (Díaz-Andreu et al. 2005; Gowland and Thompson 2013; Joyce 2004; Mays and Cox 2000; Meskell 2007; Moore 1994). Thus, it should be stressed that the methods presented here only aid osteologists in determining the biological sex of an individual but do not shed light on gender roles and gender-based identities in the past.

Crespo Torres

This assessment was based on sexually dimorphic features found in the skeleton, with particular emphasis on the pelvis traits (Crespo Torres 2000:94).

Tacoma

The estimations were based on the overall degree of robustness of the crania (and the pelvis if present), including features such as the orbital rim, development of glabella and supraorbital ridges, and the muscular insertions (Tacoma 1963:66-67, 1991:50).

Van Duijvenbode

These estimations were produced by studying the sexually dimorphic features of the skull and pelvis, following the method outlined in Buikstra and Ubelaker (1994).

Weston

Sex was determined through analysis of the anthroposcopic traits of the skull (Ascádi and Nemeskéri 1970; Buikstra and Ubelaker 1994) and pelvis (Buikstra and Ubelaker 1994; Phenice 1969), as well as measurements of the clavicle (Jit and Singh 1966), scapula (Iordanidis 1961), humerus (Stewart 1979), and femur (Pearson and Bell 1917/1919; Stewart 1979). Due to the issues indicated earlier, juvenile skeletons were not assessed.

Ancestry Assessment

The concept of race is intertwined with the earliest development of physical anthropology as a discipline and has a long and infamous history within the field. Early work attributed biological variation in humans to racial distinctions, even though the minor and often inconsistent differences between human populations do not match the technical definition of race as a genetically distinct subset of a species. Modern studies view race as a social construct, which is based on actual or perceived biological differences between groups that are deemed important within specific social settings. In this sense, race can be viewed as just another socially constructed group identity, although such a view does not do justice to the detrimental consequences of racism in many settings. From the 1960's onwards, a concerted effort was made in academia to move towards more neutral theory and terminology, in the case of physical anthropology terms like geographic ancestry were favoured (Brues 1992; Byers 2008; Caspari 2003; Cornell and Hartmann 1998; Hagen 1996).

This is obviously an extremely simplified account of a complex matter and those wishing to read more are encouraged to start with the AAPA Statement on the Biological Aspects of Race (Hagen 1996). This study expressly does not take into account geographic ancestry in the study of prehistoric identities. However, during the analysis of the skeletal material it became apparent that in a handful of cases an approximation of geographic ancestry was necessary. Not all skeletal material stored in museums comes with proper contextual information: several cases were only identified by (rough) geographic provenience such as 'Limestone Cave, Jamaica', 'Cuba', or even the broader 'Lesser Antilles'. Sometimes, crania were identified as Amerindian or African, but in other cases any context was lacking. These provenance issues are problematic in the current study, as such matters are important to produce correct patterns of cranial modification in indigenous Caribbean societies. In these dubious cases, an assessment of ancestry was undertaken and if any doubts were raised, crania were marked as of suspected non-Amerindian ancestry.

Methodological advances in the determination of ancestry from human bone were made despite the increased awareness of the socially unacceptable issues surrounding racial bias, as those working in forensic anthropology found ancestry characteristics useful when identifying human remains of unknown origin (Brues 1992; Byers 2008; Bass 1987; Gill 1998; Gill and Rhine 1990). However, it should be noted that ancestry determination methods, particularly when applied to archaeological remains, only provide an approximation of geographic ancestry, which should be used in a cautionary and conservative manner (Elliot and Collard 2009).

This study chose a combination of cranial metrics and morphological features of the skull to determine ancestry. If contextual information was inconclusive and morphological features indicated a potential non-Amerindian ancestry, Forsdisc 3.0 was used. This is a computer program developed to provide an indication of ancestry based on a standardised series of cranial measurements (Jantz and Ousley 2005). Fordisc 3.0 cannot be used on modified crania, so this option was only available if cranial modification was absent. If the combination of cranial metrics and morphology gave any reason for doubt, the skull was classed as suspected Non-Amerindian in the database and excluded from analyses of head shaping practices.

Cranial Metrics

A standard suite of cranial measurements was recorded for each skull in order to allow an investigation into the quantifiable differences produced by cranial modification. These measurements are described in Buikstra and Ubelaker (1994) and were initially developed by Moore-Jansen and Jantz (1990) based on earlier work on metrics and landmarks by Martin (1928), Bass (1987), and White and Folkens (1991). These cranial measurements are considered as the minimum of documentation necessary in physical anthropology. They were selected for this study as the widespread use of these particular measurements and the additional capability to calculate common cranial indices facilitate potential comparisons with skeletal assemblages studied by other physical anthropologists.

The suite of measurements is shown in Table 4. A full description of the measurements and cranial landmarks can be found in Buikstra and Ubelaker (1994:71-77). Measurements were taken to the nearest millimetre using a tape measure and sliding and spreading calipers. Bilateral measurements are indicated in bold in the table and should be taken on the left side. If the left side is absent or damaged, the right side may be substituted and indicated with an R. Distorted or warped crania, including crania with reconstructive errors that could not be corrected, were not measured.

Table 4 **The standard suite of cranial measurements used in this study.**

Cranial measurements (mm)	
Maximum Cranial Length (G – Op)	Nasal Height (N – Ns)
Maximum Cranial Breath (Eu – Eu)	Nasal Breadth (Al – Al)
Bizygomatic Diameter (Zy – Zy)	Orbital Breadth* (D – Ec)
Basion – Bregma Height (Ba – B)	Orbital Height*
Cranial Base Length (Ba – N)	Biorbital Breadth (Ec – Ec)
Basion – Prosthion Length (Ba – Pr)	Interorbital Breadth (D – D)
Maxillo – Alveolar Breadth (Ecm – Ecm)	Frontal Chord (N – B)
Maxillo - Alveolar Length (Pr – Alv)	Parietal Chord (B – L)
Biauricular Breadth (Au – Au)	Occipital Chord (L – O)
Upper Facial Height (N – Pr)	Foramen Magnum Length (Ba – O)
Minimum Frontal Breadth (Ft – Ft)	Foramen Magnum Breadth
Upper Facial Breadth (Fmt – Fmt)	Mastoid Length*

The problems regarding the varying degrees of modification and the occasional difficulties in accurately establishing the presence of cranial modification have already been indicated. Several researchers have attempted to solve this classification issue using metric analysis and discriminant functions. This study will test two recently developed methods, the first by Clark and colleagues (2007) and the second by O'Brien and Stanley (2013) on the Caribbean sample.

The method developed by Clark and colleagues (2007) relies on six cranial measurements on the median sagittal plane of the skull: the frontal arc and chord, parietal arc and chord, and occipital arc and chord. The extremely conservative discriminant function uses these measurements to determine whether crania are modified or normal. The conservative nature of the function means that crania with mild degrees of modification are likely to be classed as normal, but should never result in normal crania being considered modified (Clark et al. 2007).

The method by O'Brien and Stanley (2013) establishes whether a cranium is modified and what type of modification it has undergone using four measurements, maximal cranial length, breadth, height, and the frontal chord. This method takes into account the longitudinal and lateral dimensions of the skull, as opposed to the method by Clark that looks only at the cranial midline. The cranial measurements are put into two discriminant functions and the results can be plotted on a territorial map to show the presence and type of modification.

Cranial Non-Metrics

Cranial non-metric traits are epigenetic in nature and may thus be influenced by pathological variations in cranial shape or head shaping practices. The continued scholarly debate regarding the potential influence of cranial modification and natural cranial deformations on the expression of cranial non-metric traits has already briefly been touched upon.

Cranial and mandibular non-metric traits have been scored during this study. The scoring system is based on Buikstra and Ubelaker (1994) and Hauser and Destefano (1989). The cranial traits recorded during this study and the standardised manner in which they were scored can be seen in Table 5. Similarly, the mandibular non-metric traits and their scoring system can be found in Table 6. Most traits are bilateral in nature and these were scored separately for the left and right side. In all cases, traits will be scored Absent if they are not present and Unobservable if damage to the cranium made assessment of the trait impossible or unreliable.

Wormian bones are scored separately and in more detail, as previous studies have already indicated the probable influence of cranial modification on this trait. The system for scoring wormian bones can be seen in Table 7.

Table 5 **The scoring system for cranial non-metric traits used in this study. All sizes in mm.**

Non-Metric Trait		Score
Metopic Suture		Present
Supraorbital Notch	Number	#
	Position	Medial / Lateral
	Size	Small (0.3) / Medium (1) / Large (1.2) / Excessive (>2.0)
	Shape	Blurred / Acute
Supraorbital Foramen	Number	#
	Position	Medial / Lateral
	Size	Small (0.3) / Medium (1) / Large (1.2) / Excessive (>2.0)
Infraorbital Suture		Partial / Complete
Accessory Infraorbital Foramina		Present
Zygomatico-facial Foramina	Number	#
	Size	Small / Large
Parietal Foramen	Number	#
	Position	Parietal / Sutural
	Size	Small (0.3) / Medium (1.0) / Large (1.2) / Excessive (>2.0)
Inca Bone		Complete / Bipartite / Tripartite / Partial
Condylar Canal	Patent	Patent / Not Patent
	Number	#
	Size	Small (0.3) / Medium (1) / Large (1.2) / Excessive (>2.0)
Divided Hypoglossal Canal		Trace / Incomplete/ Partial / Total
Flexure of Superior Sagittal Sulcus		Left / Right / Bifurcate
Foramen Ovale Incomplete		Trace / Partial / Complete=Vesalius
Foramen Spinosum Incomplete		Trace / Partial / Confluent Spinosum and Ovale
Pterygo-spinous Bridge		Trace / Incomplete / Complete
Pterygo-alar Bridge		Trace / Incomplete / Complete
Tympanic Dihiscence/ Huschke		Foramen only / Full defect
Auditory Exostosis		<1/3 occluded / 1/3-2/3 occluded / >2/3 occluded
Mastoid Foramen	Number	#
	Position	Temporal / Sutural / Occipital / Multiple
	Size	Small (1) / Medium (2) / Large 2.6) / Excessive (>2.6)

Table 6 **The scoring system for the mandibular non-metric traits employed in this study. All sizes in mm.**

Trait		Score
Mental Foramen	Number	#
	Size	Small (1) / Medium (2) / Large (2.6) / Excessive (>2.6)
Mandibular Torus		Trace / Moderate (2-5) / Marked (>5)
Mylohyoid Bridge	Location	Superior / Inferior / Superior and Inferior
	Degree	Incomplete / Complete Partial / Complete Total

Table 7 **Scoring system for ossicles following Hauser and DeStefano (1989:212).**

Trait		Score
Epipteric Ossicle	Number	#
	Position	A / B / C / D / E / F / G / H / I *
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Coronal Ossicle	Number	#
	Position	Equal / Frontal / Parietal
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Bregmatic Ossicle	Number	#
	Position	Bregma / Frontal / Sagittal suture / Left Coronal suture / Right Coronal suture
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Saggital Ossicle	Number	#
	Position	Equal / Left Parietal / right Parietal / Connected to Bregmatic ossicle
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Apical Ossicle	Number	#
	Position	Lambda / Sagittal Suture / Left Lambdoid suture / Right Lambdoid suture / occipital squama / connected with Lambdoid ossicles
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Lambdoid Ossicle	Number	#
	Position	Equal / Left Parietal/ Right Parietal / Occipital
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Asterionic Ossicle	Number	#
	Position	Central / Occipito-Mastoid suture / Parietal / Occipital / Temporal
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Occipito Mastoid WB	Number	#
	Position	Central / Occipito-Mastoid suture / Parietal / Occipital / Temporal
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)
Parietal Notch Bone	Number	#
	Position	Mastoid process / parietal / Posterior margin temporal squama / occipital (asterion)
	Size	Small (<1 cm, < 0.5 cm^2) / Large (>1 cm, > 0.5 cm^2)

5.3 *CRANIAL MODIFICATION*

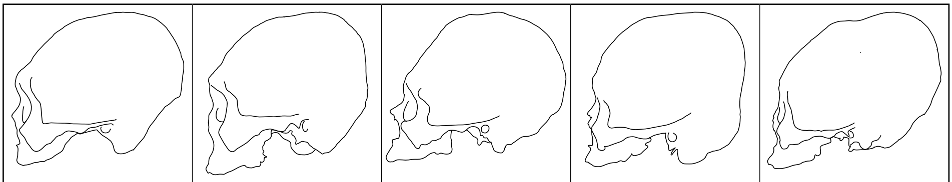
Classification

Despite the existence of numerous classification systems to describe the cranial alteration created through head shaping practices, the terminology proposed by Hrdlička (1919) and Imbelloni (1930) is most prevalent in modern studies. The earlier discussion of these typologies in Chapter 2 has already proven that despite differences in terminology, these systems are compatible as the underlying cranial shapes are the same. Both systems have been used in the previous Caribbean investigations, but this research prefers the more descriptive nature of Hrdlička's terms.

An important addition in any classification system are subtypes representing minor differences in the direction of occipital flattening which in fact result in distinctly different cranial shapes. Neumann (1942) has taken these differences into account in his expansion of Hrdlička's classification and they are also present in Dembo and Imbelloni's typology (1938). These additions on the direction of occipital flattening are considered essential in this research, based on earlier studies signalling the importance of such differences in Mesoamerica (Tiesler 2010, 2012), the Andes (Torres-Rouff 2003, 2009; Hoshower et al. 1995) and the Caribbean (van Duijvenbode 2010).

Therefore, the terms proposed by Neumann, parallel and vertical, are added to the original scheme by Hrdlička to allow for a better understanding of these variations in cranial shape which may indicate different modification devices or cultural traditions. Table 8 shows these additions in an overview of the classification system supplemented with visual representations of each shape.

Table 8 **Classification system for cranial modification used in this study.**



Fronto-Occipital		Frontal Flattening	Occipital Flattening	Circumferential
Parallel	Vertical			

Assessment

A visual inspection of cranial shape will be the main manner of determining the presence or absence of intentional cranial modification. The assessment of the cranial vault will focus on any alterations in contour corresponding to the main shapes in the classification system, described in more detail for each type below. Particular attention will be paid to the presence of flattened planes, including the exact location, size, and direction.

In addition, the visual inspection will also take note of any asymmetry in the overall shape of the skull or in the flattened planes. Other features which may indicate the presence of intentional cranial modification are the post-bregmatic depression, a depression along the sagittal suture, or sagittal keeling. The presence of absence of these traits will be noted, as well as the degree of expression.

Fronto-Occipital Modification

Fronto-Occipital modification is created, as the name implies, by pressure placed on the front and back of the skull through a solid material. These pressure points will be marked by flattened planes. Fronto-occipital modification results in a shortening and compensatory broadening of the cranium, the latter marked by parietal bulging, and a wider and shallower cranial base. There are two subtypes distinguishable through the angle of occipital flattening. Fronto-occipital parallel modification has a direction of occipital flattening (roughly) parallel to frontal plane of flattening, whereas the vertical subtype has an occipital plane of flattening (roughly) at a 90 degree angle to the frontal plane (Cheverud et al. 1992; Dembo and Imbelloni 1938; Hrdlička 1919; Oetteking 1930).

Frontal Flattening

Frontal flattening is created by a tablet or board pressed to the frontal. This would leave a frontal plane of flattening, but have little to no impact on the occipital depending on the construction of the device. If the board is placed on the forehead using a band tied at the back of the skull, minor occipital changes or band impressions may be visible (Rivero de la Calle 1966).

Occipital Flattening

Occipital flattening can be caused by a cradleboard, cradle with a hard surface, or freestanding occipital board. The extent and placement of the occipital plane of flattening are directly correlated with the modification device. The flattening can be asymmetrical, in which case compensatory changes may be present similar to those seen in positional plagiocephaly (Kohn et al. 1995).

Circumferential Modification

Circumferential modification is created by compressing the skull in a circular manner. This can be achieved by tight wrapping of textiles, bandages, string, or traditional headgear. This restricts the cranial growth in a lateral direction and creates compensatory longitudinal growth, resulting in a narrow and long skull and base (Dembo and Imbelloni 1938; Hrdlička 1919; Kohn et al. 1993; Oetteking 1930).

5.4 DOCUMENTATION

Each skull was given a unique identification code, used to identify it on the recording form, in photographs, and in the database. This code was created based on the site name and the burial, find, or catalogue number of the individual. A recording form was filled out for each individual and photographs were taken of all skeletal material studied.

Forms

A standard cranial recording form was designed specifically for this project. Different forms were created for infants, children, and adolescents/adults to ensure the best possible documentation for each category. These can be seen in the appendices. Each form consisted of several sections: cranial inventory, age and sex determination, cranial modification, cranial metrics, and cranial non-metric traits.

The cranial inventory depicted a cranium from the six standard perspectives (frontal, lateral, occipital, vertical, and basilar), which was used to document the areas of each skull that were present and available for study. In addition, the general state of preservation and any reconstructive techniques and materials were recorded. The burial context and contextual information sections were used to describe any archaeological information present on the burial position, grave goods, period, and cultural affiliation of the individual. Any indications of pathology were also described.

The sex and age determination sections were used to record basic impressions of these two factors using the limited methodology previously described. This information was later compared to the sex and age determinations from reports or collection databases wherever present. The age determination for infants and children was more extensive than for adult skulls, whereas sex was omitted for these age categories as it cannot be established with any degree of certainty before puberty.

The section on cranial modification recorded the presence or absence of cranial modification established through a visual inspection. This analysis determined whether cranial modification was present or absent by observing the cranial vault outline and the potential presence features related to cranial modification and described previously. The determination of cranial modification in this study was relatively conservative in nature. Crania were only considered modified if substantial evidence – in the form of flattened planes, cord impressions or a distinctly different cranial outline – was present. Crania were scored as ambiguous if the cranial outline varied from the expected norm within the population, but no clear planes of flattening or cord impressions could be determined.

This conservatism in scoring is important, as several factors may influence the determination and recognition of cranial modification in archaeological assemblages. A key factor that must be taken into account is the state of preservation of cranial remains, though even complete crania may not be assessed accurately due to various reasons. Firstly, mild forms of cranial modification are difficult to detect within the archaeological record. Moulding or massaging of the skull in the weeks after birth is employed in various cultures yet these types of practices result in minor changes to cranial skull shape, which cannot be conclusively differentiated from normal cranial variation within a population. Furthermore, the inherent plasticity of the human skull means that the same cranial modification practice may have different results depending on the individual (Hughes 1968:42; Oetteking 1930). Variations in the construction of the modification device, the pressure applied to the skull, the moment of initiation of this pressure, and the duration of application may all lead to considerable differences in the degree of modification, ranging from mild forms almost indistinguishable from normal cranial variation to marked cranial alterations immediately apparent to the general public (Littlefield et al. 2005; Oetteking 1930:15-16). All of these factors combine to create a continuous range in the degree of modification, which creates an intrinsic difficulty in any attempt to simple divide a sample of crania into only two categories.

If an altered head shape is present, cranial deformations with a pathological aetiology must be ruled out. To determine this, the sutures were evaluated to determine the degree of suture closure and rule out craniosynostosis. These abnormal patterns of premature suture closure produce different cranial shapes depending on the synostosed suture, as discussed previously. Any asymmetry in the skull is studied to rule out taphonomic warping of the skull, although this is usually immediately detectable. Occipital asymmetry may also point to deformational plagiocephaly as a side-effect of other child care practices.

Once it had been established that the observed cranial modification was likely produced intentionally, types and subtypes were determined through the classification system described above. A drawing of the lateral cranial vault contour was produced through observation, indicating the points of pressure and any features associated with cranial modification. Occasionally, additional drawings were made to clarify features which did not photograph clearly, such as mild asymmetry of the skull. A brief description of the cranium is provided, again focusing on the overall shapes, location of flattened planes, and any related features.

The remaining sections were only present on the adolescent/adult forms, as these were not relevant for juvenile remains. The section on metrics used the standard cranial metrics derived from Buikstra and Ubelaker (1994) and several cranial indices (Bass 1987). The measurements necessary for the discriminant function by Clark et al. (2007) were recorded separately as they are not all part of the standard suite. Non-metrics traits were separated into cranial and mandibular categories and recorded in a table following the classification of these traits as previously described. Wormian bones were reported in more detail in a separate table due to the well-known influence of cranial modification on this specific trait. Finally, post-bregmatic and sagittal depressions were scored as they are also often associated with cranial modification.

Database

A database was constructed in Microsoft Access 2010 to organise and analyse the data produced by the standard recording form. The arrangement of the database followed the organisation of the cranial recording form, using separate sub-tables linked to the main table, which contained general information on the individual specimen. Tables were linked using the unique identification code given to each skull during the analysis. Data from these different tables could be combined in a single query within Microsoft Access 2010 to allow statistical analysis of all information within the database.

Photography

In addition to the documentation of the cranial shape on the recording form, each cranium was photographed by placing it in the Frankfort plane wherever possible and photographing it from the six standard planes: norma frontalis, norma lateralis (left and right), norma occipitalis, norma verticalis, and norma basilaris. Close-up photographs were taken of any abnormal features, whether they were the (potential) result of cranial modification or pathological in nature. Occasionally, crania were photographed from different angles in order to capture features not clearly visible in the standard perspectives. Abnormalities on the postcranial skeleton were also photographed, as well as artefacts found in association with the skeletal remains in storage.

The photographs in this project were produced by a succession of cameras: a Canon Ixus 70, a Panasonic TZ8, and a Panasonic TZ25. The photo numbers assigned by the respective cameras were noted on the recording form of each cranium. Additionally, a card displaying the ID code of each skull was visible in every image.

The photographs in this dissertation have undergone only limited alteration, such as conversion to black and white, removal of the original background, or an alteration to the angle of the photograph in cases where preservation hindered the proper positioning of the skull in the Frankfort plane. None of these digital alterations affected the shape of the crania in the image in any way.

5.5 *STATISTICS*

Statistical methods have been used to analyse the data on altered cranial shapes gathered during this study. All tests were run using the computer program IBM SPSS Statistics version 23 and the level of statistical significance for all tests is $p < 0.05$. The selection of the correct statistical test depends on the type of variable under investigation. The major distinction is between continuous or categorical data.

Quantitative or continuous variables are values on a measurement scale, such as the cranial metrics taken for each skull in this study. These data can be analysed using parametric or non-parametric tests. The first requires a normal distribution of the data, whereas the latter should be used if the data is not normally distributed or if sample sizes are small. The drawback of the latter is that the non-parametric analyses are generally less powerful and produce more conservative results (Field 2013; Fletcher and Lock 2005; McDonald 2014; Sokal and Rohlf 2012).

Two parametric tests were used to assess the metric data: the Independent Samples t-test and one-way Anova. The Independent Samples or Student's t-test compares the means of a measurement variable between two different groups, whereas the one-way Anova does the same for two or more groups. From a mathematical perspective, a one-way Anova with two groups is identical to an Independent Samples t-test, but since many people are familiar with the latter term it will be used here (Field 2013; McDonald 2014).

The second type of data are categorical variables – also known as qualitative or discrete – that consist of assigned categories with no inherent mathematical potential (Fletcher and Lock 2005; McDonald 2014; Sokal and Rohlf 2012). The majority of the social traits under investigation here consist of categorical variables, like the determined sex of an individual (female, male, undetermined) or the presence of cranial modification (yes, ambiguous, no).

Categorical data are generally analysed using the Chi-Square test or Fisher's exact test. The first is not very accurate in small samples (i.e. below 1000). Expected frequencies must be above 5 for every cell in 2×2 contingency tables and in larger tables all counts should be above 1 and less than 20% of counts below 5 (Field 2013; McDonald 2014). These assumptions were violated in almost all cases in this dataset, resulting in an unacceptable reduction of test power and reliability. Most categorical variables were therefore analysed using a Fisher's exact test, a more exact manner of calculating chi-square in small samples. This test can is defined for 2×2 contingency tables and in the case of three or more categories the Fisher-Freeman-Halton test must be applied. Both are referred to as a Fisher's exact test in IMB SPSS v23 and this terminology is followed throughout the dissertation for the sake of clarity, but any cases with three or more variables have been done using the Fisher-Freeman-Halton extension. The Fisher's exact test requires a lot of intense calculation and occasionally insufficient memory was present in SPSS to compute a Fisher's exact test. In these cases, a Monte Carlo Simulation was run to estimate the p-value (Field 2013; McDonald 2014).

6 MATERIALS

The interest in the prehistoric populations of the Caribbean, which started with collections of objects made by travellers and continues to this day with excavations by professional archaeologists, has resulted in numerous collections of Caribbean materials spread across the globe. Expeditions exploring the Caribbean in the early 20th century were often funded by museums in the United States and Europe and as a result, collections ended up stored at these institutions. Currently, many collections, and particularly skeletal remains, are stored in local institutions in the country of excavation. As a result of this long and checkered history of collecting, numerous collections of Caribbean skeletal material with widely varying numbers of individuals, states of preservation, and contextual information are available for study.

This chapter will start by presenting an overview of the total sample, including a geographical and temporal overview. Then, brief descriptions of the archaeological context of each site will be presented. These are organised per country of origin in alphabetical order, as this avoids any pre-established ideas regarding (sub)regional variation and is therefore the most neutral manner of presenting the collections.

6.1 SAMPLE OVERVIEW

The total sample for this project includes 556 individuals from 76 different sites in 15 countries from the Caribbean archipelago and mainland. The geographical distribution of the sites within the region will first be visualised and discussed, followed by an overview of the temporal attributions of the different skeletal assemblages.

Geographical Distribution of the Sample

The location of each of the 76 sites that comprise the total sample of this project can be seen in Figure 10. A concerted effort was made to select skeletal assemblages representative of the entire Caribbean area.

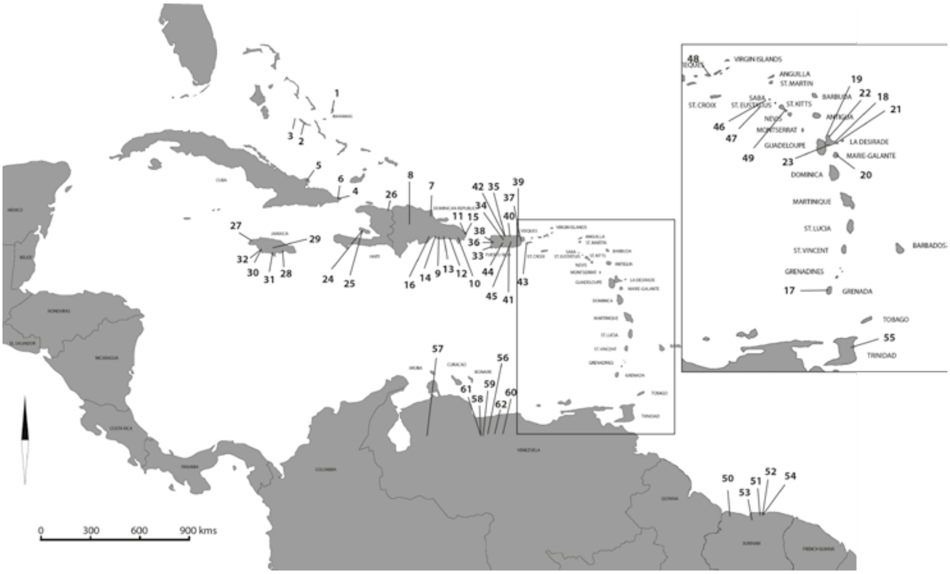


Figure 10 Map of the Caribbean region showing the geographic distribution of the sites investigated in this project:

1) Watling Island,
2) Great Exuma Cay,
3) Norman's Pond Cay,
4) Cueva de los Indios,
5) El Chorro de Maíta,
6) Maisi,
7) Cabeza de Muerto,
8) Constanza,
9) Cueva Andres,
10) El Atajadizo,
11) El Cabo,
12) El Soco,
13) Juan Dolio,
14) La Caleta,
15) Punta Macao,
16) Santo Domingo,
17) Savanne Suazey,
18) Anse à la Gourde,
19) Anse Bertrand,
20) Folle Anse,
21) Morel,
22) Petit Canal,
23) Pointe Canot,
24) La Gonave Island 1,
25) La Gonave Island 2,
26) Morne des Mammelles,
27) Abingdon,
28) Halberstadt,
29) Limestone Caves,
30) Pedro Bluff Cave,
31) Portland Hills,
32) San Pedro,
33) Barrio Camas,
34) Barrio Viva Bayo,
35) Cueva de los Muertos,
36) Duey Bajo,
37) Hacienda Grande,
38) Mayaguez,
39) Monserate,
40) Pinas,
41) Punta Candelero,
42) Rio Arriba,
43) Sorce,
44) Tecla,
45) Trujillo Alto,
46) Kelbey's Ridge 2,
47) Spring Bay 1c,
48) Caneel Bay Plantation,
49) Bloody Point,
50) Hertenrits,
51) Kwatta Tingiholo,
52) Okrodam,
53) Saramacca,
54) Waterkant/de Mirandastraat,
55) San-1, Manzanilla,
56) Camburito,
57) Carache,
58) El Zamuro,
59) La Cabrera,
60) La Hoyada,
61) Lago Valencia,
62) San Mateo.

Figure 10 shows that despite achieving the overall aim of a geographical spread of sites throughout the archipelago, the islands of the Lesser Antilles are underrepresented in the sample. This disparity may be explained by a number of factors, primarily the relatively poor preservation of skeletal material from the region. Bone preservation is heavily dependent on environmental factors; such as water, soil, temperature, and air (Gordon and Buikstra 1981; Henderson 1987). Humidity, high temperatures, and acidic soils – conditions often encountered in the Caribbean in general and the latter specifically on islands of volcanic origin – can all lead to poor preservation of skeletal remains (Henderson 1987; Waldron 1987). Exposure of the corpse during mortuary practices (Henderson 1987), as has been identified in the burial record of the Lesser Antilles by Hoogland (1996; Hoogland and Hofman 2013), also severely affects the state of preservation of the remains.

Given the geology and climate of the Lesser Antilles, moderate to poorly preserved skeletal material is expected. This is consistent with the reported condition of skeletal assemblages from the area (Hofman et al. 2012; Hoogland 1996; van den Bel and Romon 2010; Weston 2010, 2011), as well as my personal observations when working with the materials from the Lesser Antilles. Aside from poor preservation, other factors that may have resulted in the reduced availability of skeletal assemblages and smaller numbers of individuals from the Lesser Antilles include a lower population rate in prehistoric times, the current day occupation of the limited preferred habitation sites on small islands, which hinders archaeological excavation, and perhaps less investigative attention by archaeologists during the earlier period of Caribbean archaeology. Despite these limitations, data was gathered from as many skeletal collections and individuals from this region as possible to enhance our understanding of cranial modification in the Lesser Antilles.

A closer look at the number of individuals from each country demonstrates a number of peculiarities in the sample, which require some brief discussion. A sizable number of individuals in the sample (45.1%) come from the Dominican Republic. This is a direct result of the long history of archaeological excavation in this country, both by foreign investigators and the local *Museo del Hombre Dominicano*, and might also be indicative of the overall good preservation of skeletal remains along its southern coast, where the majority of sites is located. As a result, the Dominican Republic provides an excellent case study, which allows for the investigation of head shaping in several geographically close communities in the Late Ceramic Age.

Temporal Dimensions of the Sample

Temporal attributions for the sites in this sample are quite complex, owing to the varied availability of contextual information and the convoluted history of Caribbean chronologies in general. An overview of the temporal ascription of the sites for which broad date ranges were available can be seen in Figure 11 following the regional developmental system proposed by Rouse.

<table>
<tr><th></th><th>Early Ceramic Age</th><th>Late Ceramic Age</th><th>Early Colonial Period</th></tr>
<tr><td>Bahamas</td><td colspan="2">Bahamas US1</td><td></td></tr>
<tr><td>Barbados</td><td></td><td></td><td>Barbados US1</td></tr>
<tr><td rowspan="2">Cuba</td><td></td><td colspan="2">El Chorro de Maita</td></tr>
<tr><td colspan="2">Maisi</td><td></td></tr>
<tr><td rowspan="11">Dominican Republic</td><td colspan="2">Cabeza de Muerto</td><td></td></tr>
<tr><td colspan="2">Constanza</td><td></td></tr>
<tr><td></td><td>Cueva Andres</td><td></td></tr>
<tr><td colspan="2">DR US1</td><td></td></tr>
<tr><td></td><td>El Atajadizo</td><td></td></tr>
<tr><td></td><td>El Cabo</td><td></td></tr>
<tr><td></td><td>El Soco</td><td></td></tr>
<tr><td></td><td>Juan Dolio</td><td></td></tr>
<tr><td></td><td>La Caleta</td><td></td></tr>
<tr><td></td><td>Punta Macao</td><td></td></tr>
<tr><td colspan="2">Santo Domingo</td><td></td></tr>
<tr><td>Grenada</td><td colspan="2">Savanne Suazey</td><td></td></tr>
<tr><td rowspan="6">Guadeloupe</td><td></td><td>Anse à la Gourde</td><td></td></tr>
<tr><td colspan="2">Anse Bertrand</td><td></td></tr>
<tr><td></td><td>Folle Anse</td><td></td></tr>
<tr><td colspan="2">Guadeloupe US1</td><td></td></tr>
<tr><td colspan="2">Morel</td><td></td></tr>
<tr><td colspan="2">Pointe Canot</td><td></td></tr>
<tr><td rowspan="3">Haiti</td><td colspan="2">La Gonave Island 1</td><td></td></tr>
<tr><td colspan="2">La Gonave Island 2</td><td></td></tr>
<tr><td colspan="2">Morne des Mammelles</td><td></td></tr>
<tr><td rowspan="4">Jamaica</td><td colspan="2">Halberstadt</td><td></td></tr>
<tr><td colspan="2">Halberstadt?</td><td></td></tr>
<tr><td colspan="2">Limestone Caves</td><td></td></tr>
<tr><td colspan="2">Pedro Bluff Cave</td><td></td></tr>
<tr><td rowspan="9">Puerto Rico</td><td></td><td>Duey Bajo</td><td></td></tr>
<tr><td colspan="2">Hacienda Grande</td><td></td></tr>
<tr><td colspan="2">Monserate</td><td></td></tr>
<tr><td>Punta Candelero</td><td></td><td></td></tr>
<tr><td colspan="2">Rio Arriba</td><td></td></tr>
<tr><td>Sorce, Vieques</td><td></td><td></td></tr>
<tr><td>Tecla, Guayanilla</td><td></td><td></td></tr>
<tr><td colspan="2">Trujillo Alto</td><td></td></tr>
<tr><td colspan="2">UPR US1</td><td></td></tr>
<tr><td rowspan="2">Saba</td><td></td><td>Kelbey's Ridge 2</td><td></td></tr>
<tr><td></td><td>Spring Bay 1c</td><td></td></tr>
<tr><td>St. John (VI)</td><td></td><td></td><td>Caneel Bay Plantation</td></tr>
<tr><td>St. Kitts</td><td></td><td>Bloody Point</td><td></td></tr>
<tr><td rowspan="5">Suriname</td><td></td><td>Hertenrits</td><td></td></tr>
<tr><td></td><td>Kwatta Tingiholo</td><td></td></tr>
<tr><td colspan="2">Okrodam</td><td></td></tr>
<tr><td colspan="2">Saramacca</td><td></td></tr>
<tr><td colspan="2">Waterkant/de Mirandastraat</td><td></td></tr>
<tr><td>Trinidad</td><td colspan="2">Manzanilla</td><td></td></tr>
<tr><td rowspan="6">Venezuela</td><td colspan="2">Camburito</td><td></td></tr>
<tr><td colspan="2">El Zamuro</td><td></td></tr>
<tr><td colspan="2">La Cabrera</td><td></td></tr>
<tr><td colspan="2">La Cabrera/Los Tamarindos</td><td></td></tr>
<tr><td></td><td>La Cabrera/West Trench</td><td></td></tr>
<tr><td colspan="2">San Mateo</td><td></td></tr>
</table>

Figure 11 **The temporal overview of the total sample.**

6.2 COLLECTIONS BACKGROUND

Each site will now be presented in more detail, organised per country in alphabetical order. The amount and quality of contextual information available for the sites varies widely. As a result, the site descriptions in this chapter range from very minimal summaries to more substantial accounts. These discrepancies create an imbalance between the different site descriptions, but it was considered important to provide as much contextual information as was available to best represent these sites and their histories. In a limited number of cases, no site name was available for one or more crania. In these cases, the site was assigned the designation [Country] Unknown Site [Number] (e.g. Jamaica Unknown Site 1).

Bahamas

Norman's Pond Cay	
Site Name	Norman's Pond Cay
Abbreviation	NPC
Sampled Individuals	1
Excavator/Collector	Lady E. Blake
Period	Ceramic Age

A skull with catalogue number 377996 from the osteological collection of the Department of Anthropology, Smithsonian Institution in Washington DC, was given ID code NPC996. It was found in a cave near Norman's Pond Cay in the Exuma district of the Bahamas by W. Pond. NPC996 may simply be an incidental find by a private individual that was included in the Smithsonian collections, as the skull is not mentioned in the extensive overview of the archaeological materials from the Bahamas in museum and private collections (Granberry 1980). Granberry's overview does mention a group of artefacts and skeletons amassed by Lady Edith Blake in the late 19th century which was sent to the Museum of the American Indian (Granberry 1980:89). Since other materials from Lady Blake's Jamaican assemblage have made it into the Smithsonian collections (see the section on San Pedro, Jamaica), it is a possibility the skull was also originally collected by Lady Blake. Unfortunately, no published records exist of the archaeological context of the Lady Blake material.

Great Exuma Cay	
Site Name	Great Exuma Cay
Abbreviation	GEC
Sampled Individuals	1
Excavator/Collector	H.W. Krieger
Period	Ceramic Age

Skull GEC747, catalogue number 381747 from the collections of the Department of Anthropology, Smithsonian Institution, was marked Krieger, Exuma 1, Bahamas. The Smithsonian database provides the following geographic context: Great Exuma Cay (not certain), Lucayan, Bahamas, Exuma District, and confirmed the skull was collected by Herbert W. Krieger.

Herbert Krieger spent several months in 1936-1937 undertaking an archaeological reconnaissance of the Bahamian archipelago. In his report, Krieger does not mention any sites by name, nor does he specify finding human remains (Krieger 1937). However, the Annual Report of the Board of Regents of the Smithsonian Institution comments that Krieger excavated midden deposits and burials on Long Island (Inagua) and New Providence Island (Smithsonian Institution 1938:28). Krieger's second Smithsonian expedition to the Bahamas took place in 1947, but details on the explored sites and excavated materials are lacking (Smithsonian Institution 1948:16-17). The skull in the Smithsonian collection must have been collected during one of Krieger's expeditions to the Bahamas, but sadly no further contextual information was available.

Watling Island	
Site Name	Cave, Watling Island
Abbreviation	BPM
Sampled Individuals	1
Excavator/Collector	D.N. Bryant (?)
Period	Ceramic Age

BPM01, an adult cranium of undetermined sex, was collected in a cave on Watling Island in the Bahamas and is currently in the osteological collection of the Peabody Museum of Archaeology and Ethnology at Harvard University, as 16-8-10/59686.0. The skull is accompanied by a note indicating it was part of the White collection and was a gift of the Boston Society of Natural History to the Peabody Museum of Archaeology and Ethnology in 1916.

Barbados

Barbados US1	
Site Name	Unknown
Abbreviation	DCAB
Sampled Individuals	2
Excavator/Collector	Unknown
Period	Colonial period

Two crania from the island of Barbados were studied at the Duckworth Laboratory, Leverhulme Centre for Human Evolutionary Studies, Cambridge University. Both crania were accompanied by a note; 'Said to be "Arawak" Indian' and marked with Barbadoes 1 and 2 respectively. Furthermore, the mandible belonging to DCAB001 was marked 'aug. 1938' providing an approximate date for either collection or entry in the osteological collection.

Cuba

CUBA US1	
Site Name	Unknown
Abbreviation	CUBA
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age – Colonial period

The skull of an adult male with ID code CUBA1 is in the collection of the *Museo Indocubano Bani* in Banes, Cuba. The skeleton is claimed to have been found at the site of El Chorro de Maíta, which will be described in more detail below. There are descriptions of bones exposed at the site due to erosion before the excavations of the 1980's as well as reports of illegally obtained objects, including human remains, being sold to private collectors (Harrington 1921; Rouse 1942). It is therefore very likely that the skeleton did indeed come from the site of El Chorro de Maíta, although the exact location and context have unfortunately been lost.

Cueva de los Indios (Nueva Cueva)	
Site Name	Cueva de los Indios
Abbreviation	CINC
Sampled Individuals	4
Excavator/Collector	Unknown
Period	Ceramic Age

Four crania (ID codes CINC 060-063 and catalogue numbers 363060-363063) from the osteological collection of the Department of Anthropology, Smithsonian Institution, have a reported provenance of Cueva de los Indios, Nueva Cueva (not certain), Cuba. The database shows no documented collector for these remains. The listed name of Cueva de los Indios is a label commonly attributed to caves with Amerindian remains on Spanish speaking islands of the Caribbean, and is therefore rather difficult to trace. The skeletal remains must have been transported to the USA before the Cuban revolution and its aftermath of isolation, limiting the search to archaeological investigations prior to 1959. Two viable options were uncovered and are discussed briefly below.

Harrington worked at a site called Cueva de los Indios which did indeed produce human remains (Harrington 1921). At this time, he was undertaking an archaeological expedition of Cuba for the Museum of the American Indian (Heye Foundation) (Harrington 1921). Harrington describes the discovery of three Amerindian burials in some detail, mentioning a lack of cranial modification which he interprets as evidence of the 'Ciboney' affiliations of these remains (Harrington 1921). There are, however, four crania in the Smithsonian collection, which does not correspond to the account provided by Harrington although the normal cranial outline of the specimens does correspond to his description.

Finally, Harrington mentions that several skeletons were found by Dr. Carlos de la Torre in a cave very close to the Cueva de los Indios. It is known that Dr. De la Torre y la

Huerta, a well-known Cuban naturalist with an interest in the archaeological past of the island, donated many specimens and objects to the collections of the US National Museum (later the Smithsonian Institute) during his life (Smithsonian Institution Archives 2014).

The exact attribution of these Cuban skeletons from the Cueva de los Indios can therefore not be distinguished with certainty, as the crania could have been donated by either Harrington or De la Torre y la Huerta.

El Chorro de Maíta	
Site Name	El Chorro de Maíta
Abbreviation	CDM
Sampled Individuals	73
Excavator/Collector	J.M. Guarch Delmonte
Period	Late Ceramic Age – Colonial period

The site of El Chorro de Maíta is located on the eastern slope of the Cerro de Yaguajay, approximately 5 km from the northern coast of Cuba in the province of Holguín. During an archaeological exploration of this region of the island, Rouse (1942) remarked the site was already known in the first half of the 20th century and was visited by archaeology enthusiasts as well as locals who obtained and sold items from the site. Exploration of the site started in 1979 by a team from the *Sección de Arqueología of the Instituto de Ciencias Sociales* (ACC) led by Dr. J.M. Guarch Delmonte. This led to site excavations by the same team from 1986 to 1988, uncovering a central cemetery area surrounded by areas of habitation. The site was initially dated to the Late Ceramic Age occupation of Cuba based on the Meillacoid ceramics (Guarch Delmonte 1990; Valcárcel Rojas 2002).

A multidisciplinary team, led by Cuban researcher Roberto Valcárcel Rojas, was assembled to reinvestigate the material culture and human burials housed at the Cisat's *Departamento de Arqueología* in Holguín between 2006 and 2010. The combined efforts resulted in a radical shift in the interpretation of El Chorro de Maíta. Analysis of the material culture and grave goods encountered at the site showed increasing evidence of European origins, including the identification of European brass aglets, a variety of European ceramic styles, the presence of pig bones, and a piece of coral with a potential Mediterranean origin (Martinón-Torres et al. 2007; Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011). Further radiocarbon dating and a critical look at the calibration of these dates also point towards a more likely sixteenth or early seventeenth century date for the cemetery component of El Chorro de Maíta (Bayliss et al. 2012). Finally, the extended burial position encountered in certain burials combined with the use of European objects as grave goods point to syncretic social developments as a result of intercultural contact. The reinvestigation of the site has led to an interpretation of El Chorro de Maíta as an early colonial *encomienda* settlement where indigenous peoples, both from Cuba and other regions of the Americas, interacted with Europeans and likely also slaves of African descent. This represents a continuation of prehistoric habitation at the site, as evidence in the areas surrounding the central cemetery suggests that this area was used by indigenous peoples as early as AD 1200 coinciding with the start of the Late Ceramic Age (Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011).

A total of 133 individuals were excavated from the central cemetery of El Chorro de Maíta (Weston 2012). Due to the limited stratigraphy of the site, a prehistoric date cannot be ruled out for those burials that lack evidence of syncretic burial practices. Therefore, all individuals examined for cranial modification at the site that do not show an extended burial position or European material culture have cautiously been dated to Late Ceramic Age/early colonial period in the database. Seventy-three individuals were considered sufficiently preserved to be included in the sample for this investigation.

Maisi	
Site Name	Maisi
Abbreviation	CuPM
Sampled Individuals	6
Excavator/Collector	C. de La Torre y la Huerta (?)
Period	Ceramic Age

Crania 18-1-30/58718.0, 18-1-30/59717.0, 12-1-30/58739.0, 18-1-30/59720.0, 12-1-30/58737.0, 12-1-30/58735.0 from the collection of the Peabody Museum of Archaeology and Ethnology at Harvard University, referred to by ID codes CuPM01-06 respectively in this study, come from the region of Maisi in Eastern Cuba. These were collected by Dr. Carlos de la Torre y la Huerta , a leading Cuban naturalist whose interests extended beyond the study of molluscs into the prehistoric past of Cuba. He reportedly collected several crania in the eastern part of Cuba, and more specifically in caves around Maisi, during a trip in 1890 (Encaribe 2014; Harrington 1921).

Dominican Republic

Cabeza de Muerto	
Site Name	Cabeza de Muerto
Abbreviation	AAL
Sampled Individuals	1
Excavator/Collector	A. Llenas
Period	Ceramic Age

The Cabeza de Muerto cave was explored by Dr. Alejandro Llenas in 1890. The cave is located in the northern province of Puerto Plata near a town formerly named Tres Amarras but now known as Cabrera. Several skeletons were found on the floor of the cave, most severely fragmented due to the exposure of the remains to taphonomic processes. Llenas collected a single, well preserved adolescent cranium and donated this to the *Museo del Hombre Dominicano*. This skull is described in Llenas' 1891 article "Decouverte d'un crane d'indien Ciguayo a Saint-Domingue". In it, Llenas describes the intentional cranial modification of the skull and provides two photographs of the cranium, which allows us to assess the damage to the facial area which has occurred sometime after 1891.[1]

Constanza	
Site Name	Constanza
Abbreviation	LGC
Sampled Individuals	45
Excavator/Collector	H.W. Krieger
Period	Ceramic Age

Herbert W. Krieger undertook several seasons of archaeological survey and fieldwork for the Smithsonian Institution and the U.S. National Museum on Hispaniola. In 1930, he undertook an extensive survey of the Constanza valley in the interior of the Dominican Republic. This valley, which is approximately 30 km^2 and 1100 meter above sea level, was first brought to the attention of archaeologists after a description of the indigenous earthworks in the valley was published by Schomburgk in 1851 (Krieger 1930). These mounds were known locally as Indian burial mounds, yet testing by Krieger showed they were shallow and did not yield bone or substantial amounts of archaeological material.

During his visit, Krieger employed locals to survey the caves and rock ledges in the surrounding mountains for human remains and burial goods. In addition to a substantial collection of human remains currently curated in the osteological collection of the Department of Anthropology, Smithsonian Institution, Krieger reports 'a few stone beads, pendants, zemis, fragments of burial pottery, also a small number of intact earthenware vessels were discovered in juxtaposition to the skeletal remains' (Krieger 1930:152). The method of collection clearly indicates that the skeletal assemblage does not represent a single prehistoric population but is likely a composite of different periods in the habitation history of the valley. The geographic spread of the collection was limited to the immediate surroundings of the valley, and consequently this collection will be able to shed light on the different types of cranial modification practiced in the interior of the Dominican Republic.[2]

The skeletal assemblage collected from the Constanza valley is generally in good condition and consists of a relatively large number of individuals, representing all age groups. Unfortunately, the remains have not been stored per individual but per skeletal element (i.e. tibia with tibia, fibula with fibula, etc.). Therefore, this study used the skull

1 The frontal and lateral (left) photographs in Llenas (1891) show a complete cranium, whereas the skull currently lacks both maxillae, zygomatic bones, and the ethmoid. Additionally, there is substantial damage to the nasal bones, lacrimals, and sphenoid. Unfortunately, the maxillary teeth are also lacking, but Llenas's description clearly states that the third molars have not erupted.

2 This is of great importance since the vast majority of skeletal material recovered from the Dominican Republic comes from coastal sites, and in particular the stretch of the south coast between Santo Domingo and San Pedro de Macoris (a distance of about 60 km as the crow flies).

as the direct proxy for an individual and 45 crania with catalogue numbers 349407-349429, 349431-349445, and 349447-349453 were suitable for analysis.

Cueva Andres	
Site Name	Cueva Andres
Abbreviation	CA
Sampled Individuals	15
Excavator/Collector	F. Morbán Laucer
Period	Late Ceramic Age

This funerary cave, close to the village of Andres on the southern coast of the Dominican Republic, was investigated in 1972 by Fernando Morbán Laucer. This examination of the cave revealed human remains, Ostionoid ceramics, lithic artefacts, and lumps of burned red clay. The Ostionoid ceramics can be used to provide an approximate date for the funerary use of the cave between AD 700 to 900 (Morbán Laucer 1979; Ortega 2005).

The human remains recovered from the cave, currently housed in the osteological collection of the *Museo del Hombre Dominicano*, were in a moderate state of conservation, showing much fragmentation as may be expected from remains which have spent a considerable period on the floor of a cave and have been exposed to a variety of taphonomic processes. Fifteen crania could be assessed for this research, the vast majority of which were adults.

DR US1	
Site Name	Unknown
Abbreviation	MDH
Sampled Individuals	1
Excavator/Collector	Museo Del Hombre Dominicano
Period	Ceramic Age

Individual MDHI is a child between 2 and 7 years old, an age at death based on the skeletal development of the cranium. No contextual information is known about the skull from the osteological collection of the *Museo del Hombre Dominicano*, which was therefore designated Dominican Republic Unknown Site 1 (DR US1). The cranium appears similar to X-ray images of the so-called Cueva de Berna infant (Luna Calderon 1977) but no definitive identification can be made based due to the total lack of contextual information.

El Atajadizo	
Site Name	El Atajadizo
Abbreviation	AT
Sampled Individuals	7
Excavator/Collector	Museo del Hombre Dominicano
Period	Late Ceramic Age

The site of El Atajadizo can be found on the eastern bank of the river Duey, approximately 3 kilometres inland from the south-eastern coast of the Dominican Republic. It is a settlement with a central plaza measuring about 600 m^2 delineated with stones surrounded by middens which were used for habitation, farming, and as cemeteries. The site was excavated in 1974 and 1975 by a team from the *Museo del Hombre Dominicano* led by Elpidio Ortega. Two distinct habitation phases were defined based on the ceramic typology: the Atajadizo and Guayabal phases (Luna Calderón 1976; Veloz Maggiolo et al. 1976; Ortega 2005).

The Atajadizo phase has been dated to approximately AD 800 and is typified by the Ostionoid ceramic tradition. Houses were found on ground level and human burial took place within the confines of these houses. Subsistence seems to have been mainly terrestrial, with a small component of fish and seashells (Luna Calderón 1976; Veloz Maggiolo et al. 1976; Ortega 2005). After a period of abandonment, the site was settled again during the Guayabal phase. This phase, dated between AD 900 to 1200, is characterised by Chicoid ceramics. Habitation mounds appear and the subsistence economy shifted to include a higher proportion of marine shell and fish. During the latter part of the Guayabal phase, the central plaza and several walkways appeared and some mounds were turned into formal cemetery areas (Luna Calderón 1976; Veloz Maggiolo et al. 1976).

A total of 51 burials were encountered at El Atajadizo which are curated at the *Departamento de Antropología Fysica* of the *Museo del Hombre Dominicano*. The majority of these came from mounds 4 and 5 and the preservation of the skeletal material is varied. The condition of seven crania was sufficient for assessment. All of these individuals were found in mound 4 or 5, which are attributed to the Chicoid phase of habitation and thus date to AD 900-1200 (Luna Calderón 1976; Veloz Maggiolo et al. 1976).

El Cabo	
Site Name	El Cabo
Abbreviation	ECA
Sampled Individuals	1
Excavator/Collector	Leiden University
Period	Late Ceramic Age

The site of El Cabo is located on the eastern coast of the Dominican Republic. The human remains examined during this study were recovered during the archaeological investigation of the site by Leiden University from 2005 to 2008 and are currently curated by the *Museo del Hombre Dominicano*. El Cabo is a settlement site with several house trajectories which was inhabited from AD 850 until the beginning of the colonial period (Samson 2010).

Three human burials were excavated from El Cabo. However, due to the relatively poor preservation only a single skull could be studied for this project. This adult male was found in a flexed position without any grave goods, making a relative dating impossible. Based on the midden material found in the grave fill, the burial was dug during or after the Ostionoid occupation of the site. Thus, the burial can be given the rather broad attribution of Late Ceramic Age (Samson 2010).

El Soco	
Site Name	El Soco
Abbreviation	ES
Sampled Individuals	26
Excavator/Collector	Museo del Hombre Dominicano
Period	Ceramic Age

The site of El Soco, occasionally referred to as Boca del Soco, is located in the province of San Pedro de Macorís, Dominican Republic. The first excavation was done by a team from the *Museo del Hombre Dominicano* in 1975 and yielded a total of 98 burials currently part of the osteological collections of the museum. Thirty-four of the burials can be attributed to the Fase Margarita, which was associated with ceramics of the Ostionoid style. The remaining 64 individuals belong to the later Chicoid habitation, referred to as the Fase Soco. After looting of the site became an issue, a second excavation campaign was undertaken in 1980. This uncovered a further 29 burials, all of which belonged to the Ostionoid occupation of the site (Luna Calderón 1985).

The skeletal material from El Soco is in a relatively poor state of conservation and extensive reconstruction was undertaken in order to create a sufficient sample for this study.[3] In all, 26 crania could be assessed for cranial modification. The information on period and burial context were lost for most individuals.

Juan Dolio	
Site Name	Juan Dolio
Abbreviation	JD
Sampled Individuals	47
Excavator/Collector	Museo del Hombre Dominicano
Period	Ceramic Age – Colonial period

The site of Juan Dolio, located on the southern coast of the Dominican Republic, was investigated by numerous different archaeologists. A first exploration took place in the 1920's by Franco Bido, followed by a survey in 1947 by Boyrie Moya and Herrera Fritot. Excavations were undertaken in 1954 and 1955 by Boyrie Moya, Chanlatte, and Cruxent. After these initial investigations, looters managed to obtain ceramic vessels and ornaments, which can be found in private collections. This period of illicit explorations was followed by excavations in 1971 by Morbán Laucer and Manuel García. Finally, excavations in 1974 by a team from the *Museo del Hombre Dominicano* composed of Veloz Maggiolo, Luna Calderón, Rimoli, and Ortega uncovered over 50 skeletons (Ortega 2002:17).

Several occupation phases can be distinguished at the site of Juan Dolio. The first evidence of habitation is provided by ceramics of the Saladoid series, but no radiocarbon dating of these layers has been obtained. The subsequent Ostionoid phase has provided three radiocarbon dates: AD 625, 820, and 825.[4] The final prehistoric phase of indigenous

3 This reconstruction was of a temporary nature using tape, which was easily removed ensuring no further damage was done to the cranial remains.

4 Ortega (2002) does not provide the original radiocarbon results, but only these median dates.

habitation is characterised by the Chicoid ceramic style. Two radiocarbon dates were obtained for this phase, with median dates of AD 1130 and 1300 (Ortega 2002).

A report by physical anthropologist Luna Calderón discussing the 1974 excavations provides us with information that extends the temporal range of the cemetery even further. Unfortunately, I have not been able to access this original report and thus must rely on Ortega's (2002:18) description of its contents. According to Ortega, several primary extended burials of indigenous individuals were encountered at the site, some of which contained Spanish ceramics and a brass buckle. Luna Calderón also considers one of these extended individuals to be of African origin (although regrettably Ortega does not mention what Luna Calderón based this opinion on). Regardless of this, the extended position and more importantly the use of European material culture as grave goods is evidence of a colonial period component to the cemetery.

The skeletal material excavated at Juan Dolio was stored at the *Departamento de Antropología Fysica* in the *Museo del Hombre Dominicano* in Santo Domingo. Previous investigations of the site have produced two slightly different MNI estimates: 78 individuals (Drusini et al. 1987) and 97 individuals (Coppa et al. 1995). Of these, 47 crania were studied for this research.

La Caleta	
Site Name	La Caleta
Abbreviation	LC
Sampled Individuals	92
Excavator/Collector	Museo del Hombre Dominicano
Period	Ceramic Age

The site of La Caleta is located on the southern coast of the Dominican Republic, close to the current capital of Santo Domingo. The site shows evidence of habitation by different groups, starting with evidence of Archaic Age groups without a ceramic assemblage which has been radiocarbon dated to 2495±80 BP (Ortega 2005:51). This is followed by an Early Ceramic Age group with Saladoid ceramics dated to approximately AD 250[5] (Ortega 2005; Veloz Maggiolo 1972). The subsequent Ostionoid occupation of the site has a series of radiocarbon dates ranging from 1220±85 BP to 740±30 BP or approximately AD 700 to 1200 (Ortega 2005:51). Finally, the last phase of habitation is characterised by Chicoid ceramics. This phase is dated to 670±70 BP (Ortega 2005:51).

The site of La Caleta was well-known among early investigators after a visit from Krieger in 1936. This led to a visit and some preliminary excavations by Herrera Fritot and Youmans in 1944 and 1945 that discovered of 12 sets of human remains and abundant

5 Unfortunately, Ortega (2005:50) only provides this estimation and does not provide any radiocarbon dates for this period nor does he discuss on which evidence he based this date.

Taíno material culture (Hererra Fritot and Youmans 1946). They describe finding several adult individuals in flexed position with an upturned ceramic vessel covering the skull. The site was further investigated by de Boyrie Moya in 1960. Large scale excavations took place between 1970 and 1973 led by Chanlatte Baik, Morbán Laucer, Mañón y Ortega, and García Arévalo. The skeletal remains investigated at the *Museo del Hombre Dominicano* during this project predominantly come from this final investigative effort, although it cannot be ruled out that some crania were discovered during earlier reconnaissance or excavations of the site.

Unfortunately, no concise overview of the results of the 1970's excavations was ever published, although some of the data produced was used by various authors in later works. Based on this diffuse information, some trends can be established. Morbán Laucer mentions two different figures for the total number of burials excavated: 375 (Morbán Laucer et al. 1976:304) or 373 (Morbán Laucer 1979:70). Approximately 200 boxes of skeletal remains marked La Caleta are curated in the physical anthropological department of *Museo del Hombre Dominicano* and several boxes contain the comingled remains of multiple individuals. Overall, Morbán Laucer's assessment of the total number of individual therefore seems reasonable.

Furthermore, several published photographs of in-situ individuals confirm the use of ceramic vessels as covers for primary and secondary interments as reported earlier by Herrera Fritot and Youmans (1946). Additionally, both Ostionoid and Chicoid burials have been discussed in various articles (Morbán Laucer 1979; Morbán Laucer et al. 1976; Ortega 2005). This suggests that without further contextual information, the most secure date which can be assumed for all La Caleta material is the Late Ceramic Age. A total of 92 crania were sufficiently preserved to be analysed.

Punta Macao	
Site Name	Punta Macao
Abbreviation	PM
Sampled Individuals	8
Excavator/Collector	Museo del Hombre Dominicano
Period	Late Ceramic Age – Colonial period

The site of Punta Macao was excavated by the *Museo del Hombre Dominicano* in 2004. Saladoid, Ostionoid, and Chicoid ceramics were recovered from the site, suggesting a long history of habitation by indigenous peoples from the Early to the Late Ceramic Age (Atiles 2004). Spanish ceramics, plain Maiolica dating from the 15th and 16th centuries, were found in association with one of the burials (Atiles 2004). This suggests that the cemetery was still in use in the early colonial period. Twenty-six human burials were encountered during the excavations (Tavarez Maria ND) and these remains are currently curated at the *Departamento de Antropología Fysica* of the *Museo del Hombre Dominicano*. The cranial remains of eight individuals were sufficiently preserved to be studied.

Reference Collection Museo del Hombre Dominicano	
Site Name	Unknown
Abbreviation	MDH
Sampled Individuals	3
Excavator/Collector	Museo del Hombre Dominicano
Period	Ceramic Age

Three crania are part of the reference collection of the Departamento de Antropologia Fysica at the *Museo del Hombre Dominicano* in Santo Domingo, Dominican Republic. These three skulls have reportedly come from sites in the Dominican Republic whose context has unfortunately been lost (Glenis Tavarez, personal communication 2011). Two crania belong to potential female adults (MDHA and MDHB) and the third skull belongs to an adult individual of undetermined sex.

Santo Domingo	
Site Name	Santo Domingo
Abbreviation	LGC/ASD/MAH
Sampled Individuals	5
Excavator/Collector	H.W. Krieger and W.L. Abbott
Period	Ceramic Age

Five crania from the osteological collection of the Department of Anthropology, Smithsonian Institution are reportedly from Santo Domingo, National District, Dominican Republic. Two of the crania – LGC679 (345679) and LGC680 (345680) – were obtained by H.W. Krieger. The remaining three crania – ASD457 (316457), ASD458 (316458), and MAH388 (326388) – were collected by W.L. Abbott.

In the descriptions of his fieldwork on the island of Hispaniola, Krieger does not mention collecting any crania from the city of Santo Domingo itself. He does, however, describe a small-scale excavation in the village of Andres, approximately 30 km from Santo Domingo. Krieger reports 'making a representative collection of anteriorly deformed Arawak crania through excavating in front of the sugar warehouse' (Krieger 1930:147). Many of the expeditions by the Smithsonian Institution to Hispaniola, including this trip by Krieger, were financed and supported by W.L. Abbott. This may be why Abbott is listed as the collector of the material. Abbott's name is mentioned in a similar manner for the skeletal material of Constanza collected by Krieger later in the same expedition. Therefore, it is likely that these five crania represent part of the collection made at Andres by Krieger, but this cannot be confirmed with more certainty.

The skeletal remains consist of the cranium of a child (LGC 680) and four adults: a male (LGC679), two possible females (ASD457 and ASD458) and an individual of undetermined sex (MAH388).

Grenada

Savanne Suazey	
Site Name	Savanne Suazey
Abbreviation	SS
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age

The archaeological site of Savanne Suazey is located on the northeast coast of Grenada. Its position on the Atlantic coast of the island resulted in severe erosion of the archaeological deposits. The site was excavated in the 1960's by Ripley and Adelaide K. Bullen. It has been dated to the Late Ceramic Age and some colonial materials encountered at the site suggest it was still inhabited during the colonial period. The 1962 excavation campaign yielded five human burials, all found in a flexed burial position. In two cases, stone beads were encountered in the neck region of individuals. The report on these burials does not discuss the presence or absence of intentional cranial modification. However, the report does indicate that all skulls are extremely fragmentary and poorly preserved (Bullen 1964).

Individual SS856, the skull which is curated in the *Musée Edgar Clerc* on Guadeloupe, was in relatively poor condition, with only fragments of the frontal and parietal sections of the cranium of an adult female being present. The *Musée Edgar Clerc* does not have any contextual information regarding the acquisition of the skull. However, it is unlikely the cranium comes from the Bullen excavation. The potential date of 1980 recorded in the museum archives suggests it was collected later and may have been found during a visit to the site. This notion is enhanced by Cody Holdren's (1998:210) description of a cranium being removed from Savanne Suazey after it was exposed due to erosion.

Guadeloupe

Anse à la Gourde	
Site Name	Anse à la Gourde
Abbreviation	AAG
Sampled Individuals	24
Excavator/Collector	C.L. Hofman, M.L.P. Hoogland, and A. Delpuech
Period	Late Ceramic Age

The site of Anse à la Gourde is located on the eastern coast of Grande-Terre, Guadeloupe. The Late Ceramic Age habitation of the site between AD 900 to 1350 can be divided into three distinct occupation phases: AD 900 to 1100, AD 1100 to 1250, and AD 1250 to 1350 (Delpuech et al. 1997; Hofman and Hoogland 2011). Archaeological excavations led by Hofman and Hoogland from Leiden University revealed a number of round and oval houses surrounding an open space. Human remains were recovered from 86 burials within the habitation area, i.e. underneath house floors or near house structures. The total burial population consists of 99 individuals, since several burials contained multiple individuals (Hofman and Hoogland 2011; Weston 2011). The skeletal preservation of the collection, housed at the *Musée Edgar Clerc*, is considered fair, as the remains are relatively fragmentary and often incomplete (Weston 2011). Twenty-four crania were preserved to such a degree that they could be analysed for this project.

Anse Bertrand	
Site Name	Anse Bertrand
Abbreviation	AB
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age (?)

AB274 is an adult skull of indeterminate sex housed in the *Musée Edgar Clerc*, Le Moule, Guadeloupe. The skeletal remains were collected by Edgar Clerc himself at the site of Anse Bertrand in the northern part of Grande-Terre. No further contextual information is known.

Folle Anse	
Site Name	Folle Anse
Abbreviation	FAA
Sampled Individuals	1
Excavator/Collector	M. Barbotin
Period	Late Ceramic Age

FAA261 was recovered from the site of Folle Anse by Barbotin (1969) and is currently in the osteological collections of the *Musée Edgar Clerc*, Le Moule, Guadeloupe. The skull most likely dates to the Late Ceramic Age (AD 1000-1492), as it was found in the fifth horizon of the site. The skull belongs to an adult male.

Guadeloupe US1	
Site Name	Unknown
Abbreviation	EC
Sampled Individuals	9
Excavator/Collector	Unknown
Period	Ceramic Age – Colonial period

The depot of the *Musée Edgar Clerc*, Le Moule, Guadeloupe, also contains six crania which were collected by Edgar Clerc and marked as pre-Columbian in origin (EC250, EC251, EC253, EC257, EC273, and EC2161). However, the exact archaeological context(s) of the skulls is not known.

Morel	
Site Name	Morel
Abbreviation	MO
Sampled Individuals	15
Excavator/Collector	Various
Period	Ceramic Age

The site of Morel is located on the Atlantic coast of Grande-Terre, Guadeloupe. The site became well known when several skeletons encased in beachrock[6] were discovered here in the 19th century (Konig 1814). After these brief explorations,

6 Beachrock is often found on 'carbonate beaches of coral islands where the sandy or gravel-sised beach sediments are of local marine origin. Its development is the results of lithification of these sediments by precipitation of CaCO3 interparticle cement. Beachrock occurs as discontinuous lenses up to hundreds of meters long parallel to the coast with thicknesses of individual cemented layers between 5 and 100 cm' (Molenaar and de Boer 1992:8-9, in Delpuech et al. ND).

several excavation campaigns were executed at the site, starting with fieldwork by Edgar Clerc in the 1960's and 1970's, continuing with work by Jacques and Henry Petitjean-Roget in the 1980's, and culminating in work by a team of French and Dutch archaeologists in the 1990's (Delpuech et al. 1995). These archaeological investigations revealed the long history of human occupation at Morel, starting in the Early Ceramic Age, characterised by Huecoid and Saladoid material culture assemblages, and culminating in the Late Ceramic Age Suazoid habitation phase of the site (Delpuech et al. 1995; Hofman and Hoogland 2004).

Each of the archaeological investigations mentioned previously have yielded human remains, which have been stored at the *Musée Edgar Clerc*, Le Moule, Guadeloupe. In addition, amateur archaeology enthusiasts and local inhabitants of the current village of Morel have collected materials and donated these to the *Musée Edgar Clerc*. Information on the human remains recovered from the site, including information on the excavation or individual who retrieved the remains, can be seen in Table 9.

Table 9 **Overview of Morel skeletal material and origin.**

ID Code	Excavation	Sex	Age
M0204	DHH 1993	Female	Adult
M0338	DHH 1995	Female	Adult
M0245	DHH 1995	Male	Adult
M007	DHH 1999	Male	Adult
M00901	DHH 1999	Possible female	Adult
M0015	DHH 1999	Female	Adult
M012	DHH 1999	Male	Adult
M001	Clerc	Possible male	Adult
M0255	Clerc	Male	Adult
M0259A	Clerc	Female	Adult
M0263	Clerc	Male	Adult
M0252	Clerc	Possible female	Adult
M075	Prompte	Male	Adult
M0262	Prompte	Male	Adult
M002	Toesca	Female	Adult

The mixed origins of the skeletal remains from Morel and the taphonomic processes at the site have several implications for the investigation of this skeletal assemblage. Firstly, dating of the skeletons is complicated. The long habitation history and the lack of contextual information for some of the skeletons mean that not all individuals can be assigned to the correct habitation phase. Thus, the skeletal assemblage of Morel represents an amalgamation of individuals from different time periods, an issue that should be kept in mind when studying social or cultural factors. Secondly, the condition of the skeletal material is relatively poor. Many of the skeletons have been partially or completely encased in beachrock, which has resulted in very fragmented remains upon extraction. Many crania were incomplete, resulting in a large number of ambiguous cases of cranial modification. The influence of the beachrock on the radiocarbon dating of the skeletal material is also unclear.

Petit Canal	
Site Name	Petit Canal
Abbreviation	PEC
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Colonial period (?)

PEC275 is an almost complete skull in excellent condition, which is marked with the words Petit Canal. There is no contextual information available for this skull from the *Musée Edgar Clerc*, Le Moule, Guadeloupe.

Pointe Canot	
Site Name	Pointe Canot
Abbreviation	PCA
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age

PCA01, housed at the *Musée Edgar Clerc*, Le Moule, Guadeloupe, is represented by fragments of occipital and parietal bones. This cranium belongs to an adult of indeterminate sex and was recovered along with ceramic fragments on the beach at Pointe Canot after erosion exposed the remains.

Haiti

La Gonave Island – 1	
Site Name	La Gonave Island
Abbreviation	LGI
Sampled Individuals	1
Excavator/Collector	F.R. Crumbie, Jr.
Period	Ceramic Age

Specimen 39-71-10/N3445.0 from the osteological collection of the Peabody Museum of Archaeology and Ethnology at Harvard University is an adult skull of undetermined sex identified as LGI01 in this investigation. The remains were collected on La Gonave Island in the Republic of Haiti by Mr. F.R. Crumbie, Jr.

La Gonave Island – 2	
Site Name	La Gonave Island
Abbreviation	GON
Sampled Individuals	2
Excavator/Collector	W.L. Abbott, A.J. Poole, and W.M. Perrygo
Period	Ceramic Age

The skeletal material from La Gonave Island present in the collection of the Department of Anthropology, Smithsonian Institution, were collected by W.L. Abbott, A.J. Poole, and W.M. Perrygo. Poole and Perrygo undertook an expedition to Haiti in the winter of 1928-1929 with the goal of obtaining extinct faunal remains from caves as well as collecting biological specimens. In a cave near the Haitian village of En Café on La Gonave Island, located on the west side of Haiti, they 'obtained a small amount of extinct animal bones, and a considerable amount of human remains' (Poole 1930:73). Unfortunately, Poole (1930) does not mention any additional material culture that may aid in the dating of these skeletal remains. The collection consists of two non-adult crania with catalogue numbers 342226 and 342227, several adult mandibles, and a number of fragmented post-cranial remains.

Morne des Mammelles	
Site Name	Morne des Mammelles
Abbreviation	MMH
Sampled Individuals	2
Excavator/Collector	H.W. Krieger and W.L. Abbott
Period	Ceramic Age

A small sample of skeletal material was collected by Herbert W. Krieger and William I. Abbott at Morne des Mammelles (alternatively spelled Morne Deux Mamelles), Les Cayes, Sud Province, Haiti and added to the osteological collections of the Department of Anthropology, Smithsonian Institution. Krieger undertook an archaeological survey of the country in 1931 under the auspices of the Smithsonian Institution and funded by W.L. Abbott (Krieger 1932:113). Although Krieger mentions working in the vicinity of Les Cayes, he does not specifically mention a site near Morne des Mammelles in his expedition report (Krieger 1932). Alexander Wetmore, in his description of the Smithsonian biological survey of Hispaniola in 1931, mentions the company of S.W. Parish, M.W. Stirling, and H.W. Krieger 'who were engaged in archaeological work' (Wetmore 1932:45). Wetmore discusses collecting biological specimens in the area surrounding Morne des Mammelles, which makes a compelling argument for Krieger's archaeological collection from the region being executed in 1931.

However, since Krieger does not specifically mention the collection of this material, it cannot be ruled out that the material was collected earlier by W. L. Abbott himself during his extensive travels in Haiti in 1917-1918 and 1919-1923 (Boruchoff 1986). However, Abbott's personal correspondence held in the archives of the Smithsonian Institute shows he appears not to have visited the Sud Province during his travels in Haiti (Smithsonian Institution Archives, Record Unit 7117). The skeletal material consists of two adult crania in moderate condition: one male with catalogue number 364731 and ID Code MMH731 and one probable female with catalogue number 364732 and ID code MMH732.

Jamaica

Abingdon	
Site Name	Abingdon
Abbreviation	CHA
Sampled Individuals	1
Excavator/Collector	C.R. Orcutt
Period	Ceramic Age

Abingdon cave (Hanover, Cornwall, Jamaica) yielded several sets of human remains that had undergone a peculiar taphonomic process and are currently curated at the Department of Anthropology, Smithsonian Institution. The conditions in the burial cave resulted in dripping deposits that accumulated on top of the remains and in some cases fused together several bones and other materials. Lee (in Allsworth-Jones 2008:89) describes his observations in Abingdon cave as follows: 'Portions of bowls at this site had become cemented in place by dripstone, and that one still contained human bones'. This taphonomic process meant that only skull CHA680 (341680), a probable male adult, could be studied, as the dripstone accretion obscured too much of the other crania.

The Smithsonian database indicates the material was donated by C.R. Orcutt, who was on an expedition collecting materials in Jamaica and Haiti for the United States National Museum from 1927 until his untimely death in Port-au-Prince in 1929. Although Orcutt's notes have been saved in the Smithsonian archives and may reveal some contextual information on these burials, this information was never published.

Halberstadt	
Site Name	Halberstadt
Abbreviation	DCAJ
Sampled Individuals	19
Excavator/Collector	J.E. Duerden
Period	Ceramic Age

The Halberstadt Cave was discovered by Reverend W.W. Rumsey in 1895. The mouth of the cave was sealed with blocks, suggesting the archaeological remains inside were relatively undisturbed. Inside, a cedar-wood canoe was discovered lying on top of human remains, described in one account as human skulls arranged in a row underneath the canoe (Duerden 1897). Additionally, ceramic vessels and fragments, a tree trunk potentially used as a mortar, rodent skeletons, marine shells and a flint implement were found (Duerden 1895, 1897; Flower 1895).

Reports differ regarding the number of individuals discovered in the cave. Flower (1895) received only part of the entire collection and counted a minimum of 14 individuals. Duerden's preliminary report mentions at least 24 individuals were present (Duerden 1895). However, the most reliable minimum number of individuals present comes from Haddon (1897). He provides the following count of post-cranial elements: 'Of lower-jaws, however, there are 28: right Femora 32, left 34; right Tibae 29, left 26; Humeri 27 right and 27 left'. Based on this information, the minimum number of individuals present in the Halberstadt cave is 34.

Two major studies of the crania from the Halberstadt collection have been undertaken. Flower (1895) studied the complete and fragmented crania of 14 individuals shipped to him in London in 1895. Most of these skulls showed evidence of intentional cranial modification, varying from mild to marked alterations. Haddon studied 'a collection of some sixteen crania and numerous fragments of skulls and lower jaws' obtained from Duerden (Haddon 1897:23). He concludes that all of them were likely to have been subjected to head shaping, although like Flower he acknowledged that the degree of modification varied from mild to marked.

The remains from Halberstadt are currently being curated at the Duckworth Laboratory Leverhulme Centre for Human Evolutionary Studies, Cambridge University. However, several of the crania have lost their archaeological context in the century they have spent in transit between various curators and locations. Four crania are marked with the words 'Halberstadt Cave'. However, 21 crania from the island of Jamaica in the osteological collection of the Duckworth Laboratory lack site provenience. Some are marked 'Institute of Jamaica', while others display the residue of stickers similar to those found on the Halberstadt crania. The most likely provenance of these crania is the Halberstadt Cave, as no other substantial Jamaican skeletal collections are known to have been shipped to the United Kingdom and the current location of most excavated Jamaican skeletal material is accounted for. Furthermore, several skulls show taphonomic damage which could have resulted from burial in a cave context. Therefore, this study assumes the majority of these crania are from the Halberstadt Cave. Individuals CA026 and CA027 are excluded for reasons explained in the section Jamaica US2 below.

Jamaica US1	
Site Name	Unknown
Abbreviation	JPM
Sampled Individuals	1
Excavator/Collector	Lady E. Blake
Period	Ceramic Age

The cranial remains of an adult male housed in the Peabody Museum of Archaeology and Ethnology at Harvard University as 96-8-30/48016.0 are identified with ID code JPM01. The cranium was collected at an unknown location in Jamaica. No note was found with the skull to identify the geographic origin or collector, but a note was found with postcranial remains from Jamaica found in the same box and with a sequential original object number (cranium 48016, post-cranial remains 48017). The note contains the following information: 'Jamaica, Limestone Cave. Arm and leg bone fragments. Encrusted with lime. [?] of Lady Blake, 1896'.

This note indicates the post-cranial remains and the cranium are from the collection of Lady Edith Blake (see also Jamaica, San Pedro). Unfortunately, no further context for these remains can be established.

Jamaica US2	
Site Name	Unknown
Abbreviation	DCAJ
Sampled Individuals	2
Excavator/Collector	Unknown
Period	Unknown

Cranium DCAJ026 was marked 'Mus. Anat. Cant.', most likely indicating this skull was at one point part of the anatomical collection of Cambridge University before becoming part of the osteological collections at the Duckworth Laboratory, Leverhulme Centre for Human Evolutionary Studies, Cambridge University. The skull is a probable male adult with an unusually high amount of wormian bones and an Inca bone. These latter features would explain why it would be entered into the anatomical collection. Individual DCAJ027 was marked with the words 'Uncle Ben'. Unfortunately, no information was available in the museum records to indicate the origin of this phrase.

Limestone caves	
Site Name	Limestone Caves
Abbreviation	DCAJ
Sampled Individuals	1
Excavator/Collector	G.A.H. Thomson
Period	Ceramic Age

The archaeological context of individual CA025 is described in a tag attached to the cranium: 'Skull from Aboriginal Jamaican from Limestone Caves. Presented by Dr G.A.H. Thomson'. This cranium is currently curated at the Duckworth Laboratory, Leverhulme Centre for Human Evolutionary Studies, at Cambridge University. So far, no publications regarding this find have been found, so no other context can be established. It should be noted that two-thirds of Jamaica is composed of limestone (Allsworth Jones 2008:51), hence the designation Limestone Caves is not very helpful in determining a more specific location.

Pedro Bluff Cave	
Site Name	Pedro Bluff Cave
Abbreviation	DCAJ
Sampled Individuals	2
Excavator/Collector	H. Shirley
Period	Ceramic Age

A skull from Pedro Bluff Cave, Jamaica, is part of the skeletal collection at the Duckworth Laboratory, Leverhulme Centre for Human Evolutionary Studies, Cambridge University. The history of this skull can be found in an article by Flower (1891), which describes the examination of two crania found by Henry Shirley in Pedro Bluff Cave. The first cranium belongs to an adult Amerindian male with marked intentional cranial modification of the fronto-occipital type (Flower 1891:111). The second skull is characterised by Flower as a young adult African female without indications of head shaping (Flower 1891:111-112). The detailed descriptions by Flower include comments on the appearance of the skulls, morphological landmarks, and cranial measurements.

Individual DCAJ017 is marked 'Aboriginal Jamaican. Presented by Hon. H. Shirley. Pedro Bluff Cave, Jamaica'. The cranium belongs to an adult, probably a male, and has a marked modification of the fronto-occipital parallel type. The physical appearance and morphological features correspond to the first skull described by Flower (1891).

None of the other crania in the Duckworth Laboratory are marked as originating from Pedro Bluff Cave. However, as noted before, some of the contextual archaeological information from the Jamaica collection is no longer available. Cranium DCAJ012 is the most likely candidate for the second skull described by Flower. This individual is a young adult, most likely female, without signs of intentional cranial modification. The cranial traits match the description provided by Flower (1891).

Portland Hills	
Site Name	Portland Hills
Abbreviation	PPP
Sampled Individuals	8
Excavator/Collector	R.C. MacCormack
Period	Ceramic Age

The MacCormack collection of crania curated in osteological collection of the Department of Anthropology, Smithsonian Institution, was recovered during excavations along the Portland Ridge in the Clarendon province of Jamaica by Robert C. MacCormack in 1897 and 1898. MacCormack lists 13 skulls and an assortment of other bones in his original publication (MacCormack 1898:444). Of these, eight crania with catalogue numbers 205810-205815 and 205818-205819 were in sufficient condition to be included in this study. The crania were found in several limestone caves located in the Portland Hills, accompanied by ceramic vessels and fragments, shells, lithics, and wood fragments (MacCormack 1898:447). The pottery suggests these crania are associated with the Ceramic Age occupation of the island, but no more accurate date can be established. Furthermore, MacCormack encountered the human remains scattered over the surface of the caves, and consequently no information on the burial position could be gathered.

San Pedro	
Site Name	San Pedro
Abbreviation	SEP
Sampled Individuals	2
Excavator/Collector	Lady E. Blake
Period	Ceramic Age

Two crania in the osteological collection of the Department of Anthropology, Smithsonian Institution, had the words 'Jamaica, W.I., Lady Edith Blake' written across the forehead. SEP491 (227491) is the skull of a pr,obable female adult, whereas the sex of adult skull SEP522 (227522) could not be determined. These skulls were found in a cave in a cliff face in the vicinity of San Pedro, St. Elizabeth Parish, Jamaica. Lady Blake, whose husband was the Governor General of the island between 1889 and 1897, was an enthusiastic amateur archaeologist. Her collection of prehistoric Jamaican materials was purchased by the Museum of the American Indian. Unfortunately, no published account on the context of these crania exists.

Lesser Antilles

LA US1	
Site Name	Unknown
Abbreviation	DCA
Sampled Individuals	1
Excavator/Collector	A. Deck (?)
Period	Ceramic Age – Colonial period (?)

Cranium DCA010, an adult of indeterminate sex, from the Duckworth Laboratory, Leverhulme Centre for Human Evolutionary Studies, Cambridge University, is supposed to originate from the Lesser Antilles. The cranium is marked 'Alleged to be a Carib. From Alderman Deck'. No specific geographic origin is known for this individual.

Puerto Rico

Barrio Canas	
Site Name	Barrio Canas
Abbreviation	BCPM
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Unknown

The skull of an adult, likely a male, identified as 53-35-20/N7571.0. in the collection of the Peabody Museum for Archaeology and Ethnology at Harvard University and BCPM01 in the current study, is from Barra Canas. This site consists of several middens, two of which were excavated by Froelich Rainey resulting in the discovery of 15 and 9 skeletons respectively (Rainey 1940:7-14). The skull in the collection of the PMAE was donated by Ricardo Alegría from the University of Puerto Rico and may have come from the site described by Rainey.

Barrio Viva Bayo	
Site Name	Barrio Viva Bayo
Abbreviation	PRU
Sampled Individuals	2
Excavator/Collector	J.W. Fewkes
Period	Ceramic Age

The Barrio Viva Bayo site was investigated by Fewkes during his archaeological exploration of Puerto Rico in 1902 and 1903. The Smithsonian database provides the following geographical contextual information: 'Barrio Viva Bayo, Juegas de Bola, Utuado'. *Juegas de Bola* is the term used by Fewkes to indicate enclosures surrounded by stones, which can have pictographs, and were believed to have been used for the Amerindian ball game (Fewkes 1903a, 1907). Fewkes excavated an unnamed enclosure near Utuado in 1903 which yielded human skeletal remains of ten adults and infants – and two relatively well preserved crania – as well as ceramics and tools (Fewkes 1903a:113, 1903b:457). Despite the relatively poor overall condition of the skeletal remains, Fewkes was able to establish that some were found in a seated position and that grave goods were present (Fewkes 1903a:113, 1903b:457).

Crania PRU495 (226495) and PRU111 (221111) in the osteological collection of the Department of Anthropology, Smithsonian Institution, are almost certainly from this particular site, and may even represent the two better preserved crania mentioned by Fewkes (1903a,b).

Cueva de los Muertos	
Site Name	Cueva de Muertos
Abbreviation	PRCM
Sampled Individuals	1
Excavator/Collector	J.W. Fewkes
Period	Ceramic Age

A note was found with cranium and skeletal material of individual PRCM112 (221112) in the osteological collection of the Department of Anthropology, Smithsonian Institution, detailing the following contextual information:

> 'Dr. J.W. Fewkes, Cueva de los Muertos, Jobo. Near road from Arecibo to Utuado. Found by Dr Cabello and presented by him to the Smithsonian. These bones found slightly buried and on the surface of the cave floor'.

This is confirmed by Fewkes (1907:83), who reports receiving this material from Dr Cabello in his book. Only one cranium was considered sufficiently preserved to be included in this sample, but the presence of an infant mandible indicates at least two individuals were present.

Duey Bajo	
Site Name	Duey Bajo
Abbreviation	SG
Sampled Individuals	1
Excavator/Collector	L.A. Chanlatte Baik
Period	Late Ceramic Age

Skull SG01, an adult male housed in the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico*, was recovered during archaeological investigations of the Hacienda Luisa Josefa site in Duey Bajo, San German, Puerto Rico. The excavation was carried out in 1977 by Louis A. Chanlatte Baik (Narganes Storde 2007:275-276). The individual was found in pit 1 at a depth of 80 cm. The site was interpreted as an Ostionoid site. Radiocarbon dating was executed on three shells recovered from varying depths. These samples date the Ostionoid occupation of the site between 785±80 and 515±75 BP or AD 1165 to 1435 (Chanlatte Baik 1990:309; Narganes Storde 2007:280).

Hacienda Grande	
Site Name	Hacienda Grande
Abbreviation	HG
Sampled Individuals	2
Excavator/Collector	Unknown
Period	Ceramic Age

Two crania in the collection of the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico*, adult Female HG23 and adult male HG30, come from the site of Hacienda Grande. This site, located on the north coast of Puerto Rico, was investigated by several well-known archaeologists, including Irving Rouse, Ricardo Alegría, and Peter Roe (Roe 1985:151). These campaigns yielded a wealth of archaeological materials, which indicate that the site of Hacienda Grande was inhabited by successive populations of Amerindians from the Early to the Late Ceramic Age. Unfortunately, the reputation of Hacienda Grande as a prominent Puerto Rican site also attracted the attention of looters, resulting in damage to the site and irrecoverable loss of data and archaeological context (Roe 1985). Human skeletal material was reported during several archaeological campaigns, including 16 skeletons during the campaign by Rouse and Alegría (1990), two individuals encountered by Alegría and Nicholson (in Roe 1985:165-166), and four human burials recovered by Roe (1985; Walker 1985).

Unfortunately, the two crania designated Hacienda Grande that were studied during this project did not have any further indications regarding the temporal or cultural context. Therefore, the only temporal distinction that can be attributed to them is the overarching label of Ceramic Age.

Mayaguez	
Site Name	Mayaguez
Abbreviation	PRM
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age (?)

A single skull, with catalogue number 326202 and ID code PRM202, in the osteological collection of the Department of Anthropology, Smithsonian Institution, is reported as originating from Mayaguez, Puerto Rico. No other contextual information is present in the database. The exact provenance of this skull cannot be established, other than that it comes from the municipality of Mayaguez on the West coast of Puerto Rico.

Monserate	
Site Name	Monserate
Abbreviation	MSR
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age

Skull MSR109, an adult female from the collection of the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico*, reportedly comes from Monserate in Puerto Rico. No other contextual information was recorded for this individual. The site of Luquillo Beach, Monserate, has long been frequented by archaeologist and amateur collectors and enthusiasts and has yielded numerous collections of archaeological material (Roe et al. 1990). Excavations at the site in 1947 by Alegria uncovered a large number of human burials, of which Alegría reportedly saved 19 crania. The current whereabouts of this material are unknown and it is possible this cranium was originally part of this larger group, especially when considering Alegría played an important role in the expansion of the archaeological collection of the *Universidad de Puerto Rico* (Mendez Bonilla 2006). Without further contextual information, little can be said of the skull's temporal context as the site was inhabited throughout the Ceramic Age as evidenced by the wide range of ceramic styles encountered by Roe et al. (1990).

Pinas	
Site Name	Pinas
Abbreviation	PPM
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Ceramic Age

The remains of several individuals from Pinas, Puerto Rico, are present in the osteological collections of the Peabody Museum for Archaeology and Ethnology at Harvard University. Due to the fragmentary nature of the remains, only skull 89-47-20/61459.0 was deemed suitable for analysis. This individual was given ID code PPM01 and is an adult of undetermined sex. The skeletal remains from Pinas were brought to the museum in 1889, likely purchased from private collectors or obtained through excavations executed by different institutions (Guzman 2011:71-74).

Punta Candelero	
Site Name	Punta Candelero
Abbreviation	PC
Sampled Individuals	8
Excavator/Collector	M. Rodriguez López
Period	Early Ceramic Age

The site of Punta Candelero was excavated in 1988 and 1989 and yielded 106 human burials housed at the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico* (Crespo Torres 2000; Rodriguez López 1991). There is evidence of two distinct habitation phases at the site, the Huecoid phase between 200 BC and AD 200 and a later Cuevas (Saladoid) phase between AD 400 and 1000 (Pestle 2010; Rodriguez López 1991). The human burials are all related to the Saladoid occupation of the site, only the six dog burials can be connected to the Huecoid complex (Crespo Torres 2000, 2010; Pestle 2010; Rodriguez López 1991). Eight individuals were sufficiently well preserved to include in this research.

Rio Arriba	
Site Name	Rio Arriba
Abbreviation	RA
Sampled Individuals	1
Excavator/Collector	J. Limon de Arce
Period	Ceramic Age

Adult male skull RA85 from the collection of the in the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico* has a likely provenance of Cueva Bayaney. This archaeological site consists of a cave and an open plaza or ball court near Rio Ariva in Arecibo. The skull was likely donated to the university by José Limón de Arce (Crespo Torres, personal communication 2011). A ball court located in the district called Rio Arriba de Arecibo was investigated by Haerberlin in 1915 (Haeberlin 1917), but whether this was the same site can no longer be established.

Sorce, Vieques	
Site Name	Sorce
Abbreviation	SV
Sampled Individuals	2
Excavator/Collector	L.A. Chanlatte Baik
Period	Early Ceramic Age

Two individuals from the collection of the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico* are from the site of La Hueca, Sorce on the island of Vieques, located south east of Puerto Rico. The investigators have determined the site consists of two habitation phases, which they refer to as Agro 1 Huecoid and Agro II Saladoid (Chanlatte Baik and Narganes Storde 2005).

Individual SV02, a probable male adult, is designated as coming from SV-YTA(2). SVH6, a child aged between 4 and 6 years old, has been marked with SV-YTA(3). The abbreviations YTA(2) and YTA(3) refer to specific mounds within the La Hueca site which are attributed to the Saladoid phase of occupation. Several radiocarbon samples from YTA(2) returned dates of in a range between AD 200 and 800 (Narganes Storde 1991). YTA(3) produced a single early date ranging from AD 260 to 650 and two later dates between AD 650 and 1000 (Narganes Storde 1991).

Tecla	
Site Name	Tecla
Abbreviation	TG
Sampled Individuals	1
Excavator/Collector	Centro de Investigaciones Arqueologicas (UPR)
Period	Ceramic Age

The skull of a four to five year old child was designated ID code TG01 in the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico*. This skeletal material originated from the site of Tecla 1, Guayanilla. The site of Tecla was excavated in the 1970's by the *Centro de Investigaciones Arqueologicas* of the *Universidad de Puerto Rico* (Chanlatte Baik and Narganes Storde 2005).

The site was divided into several components, numbered Tecla 1 to 6. Tecla 1 consists of a Saladoid and Ostionoid component (Narganes Storde 1991). The Saladoid habitation has been dated between 2380±80 and 1460±80 BP or 430 BC to AD 490, whereas the Ostionoid phase was dated between 1490±80 and 1055±80 BP or AD 460 to 895 (Chanlatte Baik and Narganes Storde 1986; Narganes Storde 1991). Unfortunately, it is unknown whether this burial belongs to the Saladoid or Ostionoid occupation of the site and has therefore been given the rather broad date of 400 BC to AD 900.

Trujillo Alto	
Site Name	Trujillo Alto
Abbreviation	TA
Sampled Individuals	1
Excavator/Collector	I. Rouse (?)
Period	Ceramic Age

Individual TA01, a child of approximately 7 to 8 years old, comes from the site of Trujillo Alto, Puerto Rico. The following contextual information is provided for these skeletal remains: Pozo L13, L13-E1, B° Las Cuevas, Fca Matienzo, 0.25-0.50 cm, Abril 1968.

This suggests that the skeleton was encountered at a depth of 0.25-0.50 cm in pit L13. E1 likely stands for *entierro 1* ('burial 1'). The site is located in the Barrio Cuevas on the Finca Matienzo. This information is corroborated by Rouse who discusses an archaeological site named Trujillo Alto 4, which is 'situated little more than a kilometre southwest of the town of Trujillo Alto, this site forms part of the Finca Matiensa of the Central Victoria in Barrio Cuevas of the municipality of Trujillo Alto' (Rouse 1952:413). The date of April 1968 may refer to the date of recovery of the skeleton in the field or the date of donation to the collections of the *Universidad de Puerto Rico*. Rouse describes the excavation of a child's skeleton in Section A2, which is a likely source for this material. Although the site of Trujillo Alto was investigated more extensively by Miguel Rodriguez López between 1978 and 1985, this does not seem to fit with the date of April 1968 (Rodriguez López 1995).

UPR US1	
Site Name	Unknown
Abbreviation	UPR
Sampled Individuals	4
Excavator/Collector	Unknown
Period	Unknown

Four crania in the collection of in the *Laboratório de Antropología Forense y Bioarqueología* of the *Universidad de Puerto Rico* had no contextual information. They were given the designation *Universidad de Puerto Rico* Unknown Site 1 (UPR US1). Three crania belong to adult males (UPR118, UPR 119, UPR121) and one cranium belongs to a possible male adult (UPR03).

Saba

Kelbey's Ridge 2	
Site Name	Kelbey's Ridge 2
Abbreviation	KR
Sampled Individuals	4
Excavator/Collector	C.L. Hofman and M.L.P. Hoogland
Period	Late Ceramic Age

The settlement of Kelbey's Ridge 2 dates to AD 1250-1400 and is located on the northeast coast of Saba. The remains of consecutive phases of a round house and associated hearths were uncovered by a Leiden archaeology team under the direction of Hofman and Hoogland during the 1980's. The material culture encountered at the site indicates that the site of Kelbey's Ridge 2 was an outpost of the Taíno chiefdoms of the Greater Antilles (Hoogland and Hofman 1993, 1999; Hofman and Hoogland 2011).

Human burials were encountered under or near house structures and represent the remains of 11 individuals (Weston 2010) currently curated at the Laboratory for Human Osteoarchaeology, Faculty of Archaeology, Leiden University. The relatively fragmentary nature of the remains meant only four crania were sufficiently well preserved to be analysed.

Spring Bay 1c	
Site Name	Spring Bay 1C
Abbreviation	SB
Sampled Individuals	1
Excavator/Collector	C.L. Hofman and M.L.P. Hoogland
Period	Late Ceramic Age

The site of Spring Bay 1 is a component of a Ceramic Age village located close to the site of Kelbey's Ridge 2. There are some indications the site was occupied and abandoned several times during its occupation span. The main part of the site consists of a large midden deposit, which revealed the burial of a single child, aged between 2 and 4 years old. The skeletal material is in the collection of the Laboratory for Human Osteoarchaeology, Faculty of Archaeology, Leiden University. This burial was dated to the same period as the nearby habitation at Kelbey's Ridge 2, i.e. the Late Ceramic Age (Hoogland 1996; Weston 2010).

St. John (VI)

Caneel Bay Plantation	
Site Name	Caneel Bay Plantation
Abbreviation	CBV
Sampled Individuals	1
Excavator/Collector	Unknown
Period	Colonial period

Individual CBV691 is an adult female found at the Caneel Bay Plantation on St John, United States Virgin Islands. The remains are currently housed in the osteological collections of the Department of Anthropology, Smithsonian Institution under catalogue number 385691. She is listed as an individual of unknown ancestral origin, although the contextual information is suggestive of non-Amerindian and likely African ancestry.

St. Kitts

Bloody Point	
Site Name	Bloody Point
Abbreviation	BP
Sampled Individuals	2
Excavator/Collector	S. Farr and J. Robb
Period	Ceramic Age

The site of Bloody Point is located on the leeward coast of the island of St Kitts. The site was visited at the beginning of the 20th century by renowned American archaeologists Branch and Fewkes. Excavations of the site in 1993 and 1994 by S. Farr and J. Robb produced evidence of Saladoid (< 800 AD) and Ostionoid (AD 800-1500) ceramics, as well as artifacts of European origin in the uppermost layers (Farr 1993, 1996). Ten burials were found during the 1994 campaign and are currently curated by the St. Christopher National Trust. Of these, two crania were preserved sufficiently to be studied as part of this research. These crania are indicated with ID codes BP25 and BP26, and belong to a probable adult male and an adult male respectively.

Suriname

The Geijkes collection of human remains was collected during excavations in Suriname during the 1950's and 1960's by Dutch archaeologist D.C. Geijskes and comprises multiple sites: Kwatta Tingiholo, Hertenrits, Okrodam, Saramacca, and Waterkant/de Mirandastraat. The skeletal material collected during the excavation at Kwatta Tingiholo was turned over by Geijskes to the Department of Anthropology of the Royal Tropical Institute in Amsterdam, where the director entrusted the material to Tacoma. At some point, skeletal material from Hertenrits and 'two batches of skeletal remains originating from a burial-place, putatively Indian, in a shell-ridge named 'Okrodam' in Kwatta' (Tacoma 1963:14) were added to the collection. All skeletal material was transferred into the custody of Menno L.P. Hoogland of the Faculty of Archaeology of Leiden University in 2007. Reanalysis of the material in the spring of 2011 encountered undocumented additions: a fragmented skull marked 'Aruba', two sets of remains from the site Paramaribo, Waterkant/de Mirandastraat, and four skeletons marked 'Saramacca'.

The sites which compose the Geijskes Collection of human remains mostly date to the so-called Arauquinoid period. The eponymous pottery tradition originated in Venezuela and consists of several related styles: (Early and Late) Hertenrits, Kwatta, Barbakoeba, and Thémire. These ceramics can be found in archaeological assemblages from Suriname dating from AD 700 onwards (Versteeg 2008:316).

Hertenrits	
Site Name	Hertenrits
Abbreviation	HE
Sampled Individuals	4
Excavator/Collector	Unknown
Period	Ceramic Age

The Hertenrits site, located on the northwestern coast of Suriname, is a habitation mound with two phases of use. Radiocarbon dates from the site show an early component between AD 700 and 1000 and a later phase between AD 1000 and 1250. Ten primary burials, two secondary urn burials, and a single combined primary and secondary inhumation have been encountered at Hertenrits (Boomert 1980). There is variation in burial positions, with both flexed and extended styles encountered. Most of the human burials are associated with the later habitation phase. The only grave goods are an occasional ceramic bowl or vessel covering the skull of the individual (Boomert 1980:85).

The skeletal remains from the site consist of eight individuals, but only four crania were preserved such that they could be analysed. These four individuals are all adult males.

Kwatta Tingiholo	
Site Name	Kwatta Tingiholo
Abbreviation	TH
Sampled Individuals	14
Excavator/Collector	D.C. Geijskes
Period	Ceramic Age

Kwatta Tingiholo is located on a natural shell ridge in coastal region of central Suriname. The mound of Kwatta Tingiholo was excavated on three separate occasions between 1961 and 1986 by different teams affiliated with the Suriname Museum in Paramaribo. Each of these campaigns has yielded a significant amount of human skeletal material, however, only the burials excavated by Geijskes during the first field campaign were analysed for this project.

The excavation by Geijskes was undertaken between November 1961 and January 1962. A total of 18 human burials were found in a great variety of burial positions ranging from primary flexed positions to fully extended individuals. A primary urn burial was also encountered and a single case of a skull covered by an upturned bowl was reported. Analysis by Tacoma proved at least 23 individuals were present (Tacoma et al. 1991). During the reanalysis of the sample in 2011, two human infants were recovered in a bag marked animal remains.

The Kwatta Tingiholo Geijskes collection contains the remains of 25 individuals, including the newly discovered infants. Fourteen of these were included in the sample for reanalysis, whereas the rest either had poor preservation or a complete lack of cranial remains.

Okrodam	
Site Name	Okrodam
Abbreviation	0
Sampled Individuals	1
Excavator/Collector	D.C. Geijskes
Period	Ceramic Age

The Okrodam skeletal material consists of three individuals. Skull O-1 was discovered by accident whereas the skeletal remains of individuals O-2-1 and O-2-2 were excavated by Geijskes in 1959. Both were buried with the arms crossed over the chest and flexed legs in typical Amerindian fashion (Tacoma 1963:64). Okrodam is located in the Kwatta region of Suriname, close to the site of Kwatta Tingiholo.

The reanalysis was limited to a study of cranium O-1, a male adult, since the poor preservation of the other crania prevented successful analysis.

Saramacca	
Site Name	Saramacca
Abbreviation	SA
Sampled Individuals	4
Excavator/Collector	D.C. Geijskes
Period	Ceramic Age

Four sets of human remains, consisting of crania and post-cranial elements from the Geijskes collection are marked Sa 1 to 4. A handwritten note was found in the box of skeletal remains with the following contextual information:

> 'Suriname
> Saramacca at km 62
> Road to Coppename, point Boskamp
> February 1960, D.C. Geijskes
> District Saramacca in shell ridge near Tambaredjo
> Depth 60 cm, legs flexed, head east'

The inventory of archaeological sites in Suriname by Boomert (1975) indicates these skeletons may have been recovered from the Tambaredjo site in the Saramacca district. Material found at Tambaredjo-2, also known as Sidodadi, was potentially shipped to the Netherlands (A. Boomert, personal communication 2008). The four crania belong to adult individuals. Unfortunately, the relatively poor condition of the remains prevented an accurate establishment of sex.

Waterkant/de Mirandastraat	
Site Name	Waterkant/De Miranastraat
Abbreviation	Pa
Sampled Individuals	2
Excavator/Collector	D.C. Geijskes (?)
Period	Ceramic Age – Colonial period

In the Geijskes Collection of skeletal material two crania were found marked with the numbers Pa-1 and Pa-2. The accompanying note indicates that this skeletal material was recovered during the excavation of Waterkant/de Mirandastraat in the Surinamese capital of Paramaribo. This site was excavated on twice, first by de Groot in 1941 and later by Geijskes in 1960-1961 and is considered a Kwatta-affiliated settlement site (Boomert 1975:43). The boxes of skeletal material labelled Pa-1 and Pa-2 also contain indigenous ceramics, colonial materials and shells. Their provenance and relation to the human remains is unknown.

The two crania PA1 and PA 2 both belong to adult individuals. The poor condition of the material prevented a reliable determination of biological sex.

Trinidad

Manzanilla	
Site Name	Manzanilla
Abbreviation	SaM
Sampled Individuals	11
Excavator/Collector	M.C. Dorst
Period	Ceramic Age

The site of Manzanilla on the island of Trinidad was excavated between 2001 and 2007 by a team from Leiden University. The archaeological remains recovered date to two distinct periods: the Saladoid (Late Palo Seco) phase dated between AD 350 and 650, and the subsequent Arauquinoid stage dated between AD 650 and 1400. Indications of habitation and human burials from both periods were recovered (Dorst 2008).

Eleven crania, curated at the Laboratory for Human Osteoarchaeology, Faculty of Archaeology, Leiden University, were suitable for analysis within this research project. Two of the crania belong to the earlier Saladoid (Early Ceramic Age) phase and eight crania could be dated to the later Arauquinoid phase (Late Ceramic Age). One of the individuals could not be securely attributed and has thus been dated to the broader Ceramic Age.

Venezuela

Camburito	
Site Name	Camburito
Abbreviation	CBV
Sampled Individuals	2
Excavator/Collector	A. Jahn
Period	Ceramic Age

Commissioned by the *Museum für Völkerkunde* in Berlin, Alfred Jahn undertook systematic survey and archaeological excavations of the Lago Valencia basin in Venezuela in 1903. His explorations of the sites of El Zamuro (see below) and Camburito yielded abundant material culture and human remains, which were shipped to Berlin and are currently curated in the anthropological collection of the *Museum für Vor- und Frühgeschichte*.

Camburito, located on the left bank of the Rio Turmero about three kilometres east of Lago Valencia, consists of 50 to 60 mounds between 10 and 25 meters in diameter. After inspecting 13 mounds, Jahn selected two for excavation. Burial urns were encountered towards the centre of the mounds, sometimes containing human remains (Jahn 1903, 1932; von Steinen 1904). Crania were also found without urns or covering suggesting a wide range of burial practices that have also been noted for other cemeteries in the Lago Valencia (see Kidder 1944 for an overview). In addition to human remains, Jahn encountered several elaborated necklaces and beads made of stone and shell as well as ceramics. Hearthstones and hearths indicate these mounds were likely used for habitation (Jahn 1903; von Steinen 1904).

Two crania from Camburito were studied during this project. Unfortunately, the original field numbers of the crania seem to have been lost, meaning these individuals cannot be traced back to the particular contexts described in Jahn's report (Jahn 1903). However, cranium CBV4933 belongs to a child and Jahn mentions only one child burial in his report, so a tentative correlation can be made. The burial is described as a child's urn with skull and necklace, accompanied by a water bottle filled with black sand and a ceramic figurine. The context of the other cranium from Camburito, a likely female adult with ID code CBV4935A, cannot be determined based on the available information.

Carache	
Site Name	Carache
Abbreviation	CAR
Sampled Individuals	1
Excavator/Collector	A. Kidder II
Period	Unknown

Individual CAR01, an adult female, curated in the osteological collection of the Peabody Museum of Archaeology and Ethnology at Harvard University as 34-159-30/N3761.0, was collected by Alfred Kidder II during his 1934 expedition to Venezuela. The remains were excavated during explorations of Carache, a district in the northeast of the State of Trujillo.

El Zamuro	
Site Name	El Zamuro (La Mata)
Abbreviation	EZA
Sampled Individuals	19
Excavator/Collector	A. Jahn
Period	Ceramic Age

The expedition undertaken by Jahn in 1903 at the behest of the *Museum für Völkerkunde* in Berlin resulted in excavations at the sites of El Zamuro and Camburito (described above) in Venezuela. El Zamuro[7] is located on the

7 The group of mounds which Jahn refers to as El Zamuro is better known as La Mata. This important site was investigated by many archaeologists, including Marcano, Bennett, Castillo, and Kidder (see Kidder 1944) as well as Osgood (Osgood and Howard 1943). This dissertation uses the name El Zamuro with regards to the skeletal collection excavated by Jahn, to avoid any confusion with other skeletal remains from this site.

right bank of the Rio Aragua, about 2.5 to 3 km eastwards of the shore of Lago Valencia. Jahn reports 22 mounds, with no apparent spatial patterning, most between 20 and 40 meters in diameter. The largest mound is substantially greater with a length of 130 meters and a width of 63 meters (Jahn 1903; von Steinen 1904).

Jahn dug trenches in several of the mounds at El Zamuro. In the centre of mound 2, Jahn found approximately 50 urns at a relatively shallow depth placed together in groups of 8 to 10. The largest mound, number 4, had an estimated 200 to 300 urns. Jahn (1903) opened only 18 urns finding many contained exquisite necklaces made of stone and shell in addition to skeletal material. Although Jahn does not provide full descriptions of each urn, he discusses several exceptional cases. The first is the urn burial of a skull with strong flattening, which was found with one of the most elaborate necklaces consisting of frog figurines and nephrite plates, as well as a clay pipe. Another interesting find is the urn burial of a monkey skeleton complete with a perforated shell necklace (Jahn 1903; von Steinen 1904). The mounds were inhabited, as is shown by Jahn's discovery of hearths and food remains.

Jahn (1932) mentions the shipping a total of 32 crania from El Zamuro and Camburito to Berlin. Two crania from Camburito (see above) and nineteen crania from El Zamuro were available for analysis in the anthropological collection of the *Museum für Vor- und Frühgeschichte*.

La Cabrera	
Site Name	La Cabrera
Abbreviation	CAV
Sampled Individuals	14
Excavator/Collector	A. Kidder II
Period	Ceramic Age

In 1933 and 1934, Alfred Kidder II carried out an expedition to Venezuela with the aim of excavating archaeological sites in the Aragua Valley. Kidder (1944) focused on the Cabrera Peninsula, located on the north side of Lago Valencia, excavating several trenches close together at the tip of the peninsula.

Before discussing the burials and material culture found at the site, it is important to have a brief look at Kidder's different trenches. The main trench, which yielded most of the material culture and a good stratigraphy, is the Los Tamarindos Trench. Kidder also produced smaller trenches and test pits: the La Ceiba Trench, the West Trench, the Northwest Pit, and the East Pit. Unfortunately, the full contextual information of a number of individuals was lost at some point after the excavation of the skeletons by Kidder. This means that despite Kidder's extremely detailed descriptions, not all skeletons can be placed in their proper context (which has implications for the relative dating of these individuals). Table 10 shows a reconstruction of which crania from the collection of the Peabody Museum of Archaeology and Ethnology at Harvard University belong to which excavation. Sadly, three crania could not be correlated to their original trench and are simply marked La Cabrera.

Table 10 **Overview of the La Cabrera skeletal material excavated by Kidder (1944) currently curated at the Peabody Museum of Archaeology and Ethnology at Harvard University.**

La Cabrera	La Cabrera/ Los Tamarindos	La Cabrera/ West Trench
CAV01 – 34-159-30/N3756.0	CAV05 – 33-100-30/N905.0	CAV04 – 33-100-30/N906.0
CAV02 – 34-159-30/N3758.0	CAV07 – 33-100-30/N891.0	CAV06 – 33-100-30/N908.0
CAV03 – 33-100-30/N902.0	CAV08 – 33-100-30/N886.0	
	CAV09 – 33-100-30/N892.0	
	CAV10 – 33-100-30/N896.0	
	CAV11 – 33-100-30/N895.0	
	CAV12 – 33-100-30/N894.0	
	CAV13 – 33-100-30/N897.0	
	CAV14 – 33-100-30/N893.0	

Kidder discovered evidence of two distinct habitation phases in the Los Tamarindos Trench based on ceramic typology: the La Cabrera phase and the Valencia phase. No radiocarbon dates have resulted from the La Cabrera material, but using the relative chronology of these styles as proposed by Cruxent and Rouse (1958/59) leads to an approximate date of 550 BC to AD 1000 for La Cabrera and AD 1000-1500 for Valencia. The West Trench only yielded material from the Valencia style and can thus be considered Late Ceramic Age (AD 1000-1500).

The indigenous inhabitants of the La Cabrera Peninsula had a wide variety of mortuary practices. In the La Cabrera phase, primary burial was the norm. However, the body was sometimes covered with a ceramic vessel or stone slab and burial positions ranged from flexed to extended. Secondary urn burials become the norm during the Valencia phase, although primary burials and a single cremation are also found. A total of 14 burials from the excavations by Kidder at the la Cabrera Peninsula could be investigated.

La Cabrera 1	
Site Name	La Cabrera
Abbreviation	LCS
Sampled Individuals	2
Excavator/Collector	A.H. Schultz and E.W. Berry/ B.R. Lewis
Period	Ceramic Age

Two crania in the osteological collection of the Department of Anthropology, Smithsonian Institution are reported to have come from the La Cabrera Peninsula in Venezuela, although they were obtained from two different collectors. Given the notoriety of the area surrounding Lago Valencia as an excellent place to obtain archaeological specimens among early researchers (see Kidder 1944), this is to be expected. These two crania have been grouped here under the heading La Cabrera 1 to differentiate them from the previously discussed Kidder collection from the same location.

Cranium LCS621 belongs to an adult of undetermined sex collected by A.H. Schultz and E.W. Berry. The latter was actually present during the Kidder expedition to Venezuela and in fact oversaw some of the excavation work on the La Cabrera Peninsula himself (Kidder 1944). Hence, this skull might have been obtained by Berry during his work for Kidder or at a different time during his travels in Venezuela, but no further contextual information is known.

The second skull, an adult male with ID code LCS636, was collected by Berkeley R. Lewis from a cemetery on the La Cabrera Peninsula in Venezuela.

Lago Valencia	
Site Name	Lago Valencia
Abbreviation	LVV
Sampled Individuals	1
Excavator/Collector	R. Requena
Period	Ceramic Age (?)

An adult male cranium with catalogue number 378586 and ID Code LVV586 was donated to the osteological collection of the Department of Anthropology, Smithsonian Institution, by Raphael Requena. The skull came from Lake Tacarigua (more commonly known as Lago Valencia), near Maracay in the state of Aragua, Venezuela. The skull is used as an illustration in a well-known article by T.D. Stewart and M.T. Newman in the Handbook of South American Indians (Stewart and Newman 1950:35).

La Hoyada	
Site Name	La Hoyada
Abbreviation	LHV
Sampled Individuals	9
Excavator/Collector	E. Plumacher
Period	Colonial period

Nine crania (208045-208053) with a reported provenance of La Hoyada in Venezuela from the osteological collection, Department of Anthropology, Smithsonian Institution, were analysed during this project. These skulls can be traced back to the List of Accessions of 1901: 'Skulls, bows, arrows and spears used by the Motilon Indians, and a collection of skulls and pottery from La Hoyada. Received from Mr. Edward Plumacher, United States Consul, Maracaibo, Venezuela. 36732,37331' (Annual Report 1903:129). The original accession numbers provided in the document indicate that the nine crania marked La Hoyada in the current osteological collection are in fact the latter 'collection of skulls and pottery' acquired by Plumachter.

San Mateo	
Site Name	San Mateo
Abbreviation	SMV
Sampled Individuals	2
Excavator/Collector	A. Kidder II
Period	Ceramic Age

During his 1934 expedition to Venezuela on behalf of Harvard University, Kidder made test pits at the site of San Mateo. This site is located on the northern bank of the Rio Aragua, one of the main tributaries of Lake Valencia. Kidder's trenches produced very little material, despite his description of the large extent of the site. All materials encountered were classified as of the La Valencia ceramic style, and the site can thus be dated relatively to the Late Ceramic Age, approximately AD 1000 to 1500 in this region (Kidder 1944).

Four burial urns were found, two of which contained human remains currently in the collection of the Peabody Museum of Archaeology and Ethnology at Harvard University. Both burials are secondary in nature. Kidder describes the two skulls in the following manner: 'Two skulls from burials so near together and in ware of exactly the same style, one undeformed and the other strongly so' (Kidder 1944:87). These two crania, ID Codes SMV01 34-159-30/N3760.0 and SMV02 34-159-30/N3759.0, belong to an adult male and an adolescent of undetermined sex, respectively.

7 RESULTS

The previous chapters of this dissertation discussed various ways in which intentional cranial modification may serve as an expression of identity, hypothesised what traces and patterns this process may leave in archaeological skeletal populations, and provided information on Caribbean skeletal assemblages and our previous knowledge regarding head shaping practices among the indigenous populations of the region.

The results have been divided into four separate sections discussing the demographic composition of the sample, the cranial metrics, the social variables, and the chronological patterns. The first section will discuss aspects of the demographic composition of the overall sample, including sex, age, and ancestry. The second portion will focus on analysing the practice using the cranial metrics gathered from the crania. This section will explore differences in the measurements between the modified and normal subset of the sample, different types and subtypes of modification, and variation in cranial metrics between those of Amerindian and suspected non-Amerindian ancestry. This section will also evaluate the methods proposed by Clark and colleagues (2007) and O'Brien and Stanley (2013) for determining modification status and type based on measurements.

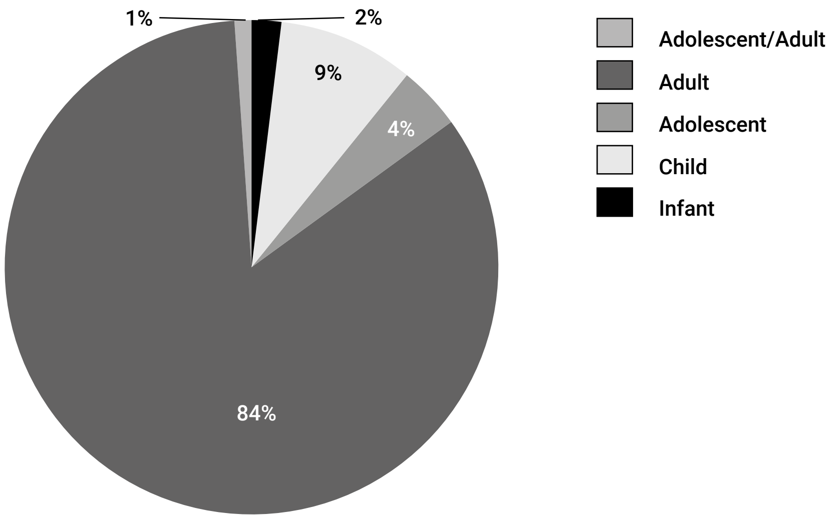
The third segment of this chapter is aimed at discovering potential patterns which may explain the social motivations behind head shaping. Head shaping practices will be correlated to a suite of social variables that will be investigated from a multiscalar perspective starting with individual life histories and moving towards local patterns and regional trends. The fourth and final section will undertake a temporal exploration of patterns seen in the data on cranial modification in the Caribbean in order to examine the rise and decline of the practice among the indigenous communities as well as any temporal shifts that may have occurred.

7.1 DEMOGRAPHIC OVERVIEW OF SAMPLE

Several demographic aspects of the combined sample consisting of 556 individuals from a variety of sites and locations in the Caribbean require further consideration before an analysis of cranial modification patterns can be executed. These include the representation of different age groups and the distribution of males and females in the total sample as well as questions on the ancestry of particular individuals.

Age Distribution of Total Sample

The age distribution of the overall sample used in this research shows a peculiar picture that requires further discussion. An overview of the distribution of the different age categories has been visualised in Graph 1. The overview shows that the vast majority of the sample (84.1%) consists of adult individuals and that the remainder of the age categories is greatly underrepresented.



Graph 1 **The percentages of each age category in the total sample.**

This pattern of relatively low numbers of infants and children in skeletal assemblages has previously been noted both globally (Lewis 2007:20-23) and in the Caribbean (Curet 2005), in particular for a number of Puerto Rican collections. Several explanations have been provided for the underrepresentation of non-adult skeletal remains, which will be discussed briefly here (see Lewis 2007:20-37 for an overview of the matter).

However, before the dissemination of these arguments one crucial factor should be noted: the sample presented here only represents those individuals with a relatively complete cranial vault that were selected for study, and thus the distribution of age presented here is not reflective of the actual age distribution within specific sites. In fact, this factor may lead to a marked bias, as infant and child crania tend to be more fragile and are therefore more likely to be excluded from study. However, despite this, it is important to consider the factors that may have contributed to the significant skewing of the distribution seen in Graph 1.

Firstly, the absence of non-adult individuals in assemblages is often considered a result of the inherently poor preservation of these fragile remains. As a rule of thumb good adult preservation indicates a similar state for children and enhances the recovery rate of non-adult remains (Lewis 2007). Morbán Laucer (1979) specifically discusses the poor state of preservation of foetal remains from the site of La Caleta, so this factor should not be ruled out for the Caribbean assemblages even though most adult remains from the site were in excellent condition.

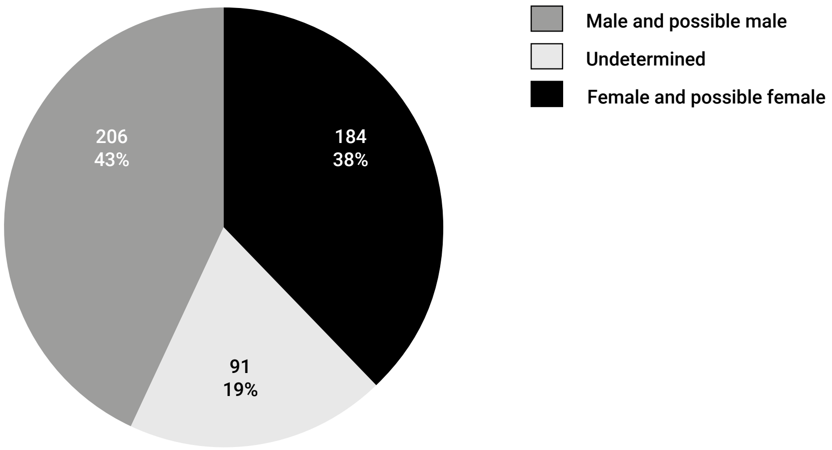
The second explanation for a lack of non-adults in a skeletal assemblage is misidentification of the remains, due to a lack of experience with these complex and small remains by excavators (Lewis 2007). The misidentification of human foetal remains as animal bones at the site of Kwatta Tingiholo in Suriname is an excellent Caribbean example of this problem (van Duijvenbode 2012).

Thirdly, special mortuary treatment of certain age categories in past societies may bias our sample (Lewis 2007). Burial of infants and children in different locations or in specified locales within the communal burial area may mean they are not recovered during excavation. Furthermore, different burial practices, for example cremation, for non-adult remains may hinder the recognition of these remains and the potential for data recovery (Lewis 2007).

Any combination of the factors mentioned above may be responsible for the skewed age categorisation in the overall sample. However, since age-at-death is not a relevant explanatory tool in determining the social motivations behind the practice of intentional cranial modification (see the section on Age in Chapter 5), the clear bias of the sample towards adult individuals does not have a negative impact on the usability of this sample to answer the research questions.

Sex Distribution of Total Sample

The distribution of sex of the adult individuals per country can be seen in Graph 2. The relatively large number of individuals for which the sex could not be determined with accuracy is due to the poor preservation of skeletal remains and comingling of individuals in certain assemblages. The categories of female and possible female and male and possible male were pooled for this analysis to provide a larger sample size.



Graph 2 **The distribution of biological sex in the total sample.**

The expected overall ratio of males to females in a normal population is 1:1. A Chi-square goodness-of-fit test was executed to determine whether the observed distribution of sex differed from the expected ratio. The results of the Chi-square goodness-of-fit test were chi-square=1.241, 1 d.f., p=0.265. This indicates that the null hypothesis cannot be rejected and that there is no statistically significant difference between the observed frequencies of male and females in the sample and the expected 1:1 ratio.

Ancestry

Several of the crania encountered in skeletal collections originating from the Caribbean were potentially non-Amerindian origin, based either on contextual information or observations of cranial morphology. Determination of geographic ancestry based solely on skeletal material is complicated from a methodological and social point of view. These analyses have only been undertaken here due to the importance of restricting the sample to the Amerindian inhabitants of the Caribbean in order to study indigenous head shaping practices. All crania mentioned in Table 11 and described in this section are registered as suspected non-Amerindian in this study and any indications to a particular geographic ancestry should be considered speculative. Further testing of the cranial measurement means of this group will take place in the following section on cranial metrics.

In several cases, a combination of cranial morphological traits and contextual information suggesting a colonial period date were used to label individuals as suspected non-Amerindian in origin. CBV691 was found on the colonial Caneel Bay plantation on St John in the US Virgin Islands. The dentition of DCAB001 has a bilateral pipe notch created by pipe smoking, a practice which was only introduced in the Caribbean after the arrival of Europeans in AD 1492. DCAB002, obtained at the same time from the same source, is therefore probably also colonial in date. Three crania from the early colonial site of El Chorro de Maíta, where interaction between Amerindians, Europeans, and Africans took place (Valcárcel Rojas 2012), have morphological traits that suggest they may represent individuals of non-Amerindian descent.

Cranium DCAJ012 from Jamaica is the most likely match for an African skull described in Flower's 1891 analysis of the Jamaican skeletal material. Unfortunately, the Fordisc 3.0 analysis of the cranial measurements is inconclusive, indicating an almost equal distance to Amerindian and African groups. The skull of DCAJ027, also from Jamaica, was marked 'Uncle Ben'. The missing facial portion of the cranium prevented a reliable ancestry determination using Fordisc 3.0. In both cases, the crania have conservatively been considered of non-Amerindian ancestry. DCAJ026 from Jamaica and a number of crania from the island of Guadeloupe, EC250, EC254, EC260, EC270, and PEC275, lacked all contextual information. Here, ancestry determination was based solely on cranial morphology and assessment of cranial metrics using Foredisc 3.0.

Table 11 **Overview of individuals with suspected non-Amerindian ancestry. S= significant result, NS= non-significant result.**

ID Code	Island	Site	Fordisc 3.0	Source
CBV691	St John (VI)	Caneel Bay Plantation	–	
CDM22	Cuba	El Chorro de Maíta	–	Weston 2012
CDM45	Cuba	El Chorro de Maíta	–	Weston 2012
CDM81	Cuba	El Chorro de Maíta	–	Weston 2012
DCAB001	Barbados	Barbados US1	Black Males (S) Distance 19.4, PP 0.812, TF 0.382, TC 0.189, TR 0.292	
DCAB002	Barbados	Barbados US1	White (NS) Distance 28.1, PP 0.633, TF 0.015, TC 0.005, TR 0.006	
DCAJ012	Jamaica	Pedro Bluff Cave	Inconclusive	Flower 1891
DCAJ026	Jamaica	Jamaica US2	–	
DCAJ027	Jamaica	Jamaica US2	Inconclusive	
EC250	Guadeloupe	Guadeloupe US1	Black Females (S) Distance 13.4, PP 0.783, TF 0.511, TC 0.343, TR 0.278	
EC254	Guadeloupe	Guadeloupe US1	White (NS) Distance 28.0, PP 0.724, TF 0.293, TC 0.176, TR 0.288	
EC260	Guadeloupe	Guadeloupe US1	Black (NS) Distance 37.8, PP 0.797, TF 0.015, TC 0.001, TR 0,010	
EC270	Guadeloupe	Guadeloupe US1	Black (S) Distance 20.7, PP 0.989, TF 0.250, TC 0.078, TR 0.147	
PEC275	Guadeloupe	Petit Canal	Black Females (S) Distance 28.0, PP 0.995, TF 0.794, TC 0.215, TR 0.351	

This section will investigate the data gathered from the cranial measurements collected during the study. The standard suite based on Buikstra and Ubelaker (1994) consists of 24 cranial measurements, but the collection is severely influenced by the state of preservation of the cranium. A complete skull will yield all measurements, but this is rarely the case with archaeological specimens. In this study, the overall mediocre preservation of the Caribbean skeletal material and relatively high degree of fragmentation has resulted in significant amounts of unobtainable measurements.

The high degree of missing data impacts the choice of statistical methods as well as the reliability of the results. Pooling the data for large scale analysis, predominantly Caribbean comparisons between different groups, was successful and these tests are presented below. Unfortunately, the data did not allow for a reliable exploration of smaller scales of analysis such as region, country, or site.

Comparisons between the means of different groups on a regional level will be presented first. Statistical methods by Clark and colleagues (2007) and O'Brien and Stanley (2013) to recognise modification status and shape through cranial metrics will then be tested on this Caribbean skeletal dataset.

Comparing Means

Comparing the means between different groups is a simple and efficient way to analyse the cranial measurements without issues due to the large amount of missing data in this dataset. This section will test whether significant differences exist in relation to ancestry, modification status, and cranial shape.

Ancestry

Normal cranial shape variation exists within and between different populations, so the crania belonging to individuals of suspected non-Amerindian ancestry are likely to differ from the non-modified Amerindian crania in the sample. This was tested with an Independent Samples t-test.

Table 12 **Results of Independent Samples t-test comparing the cranial measurement means between Amerindians and those of suspected non-Amerindian origin.**

Measurement	Ancestry	N	Mean	SD	SE	T	DF	Sig	Mean Difference	SE Difference
Maximum Cranial Length	Amerindian	84	171.476	8.6198	0.9405	−2.949	95	0.004	−7.5238	2.5516
	Suspected Non-Amerindian	13	179	8.1445	2.2589					
Biauricular Breath	Amerindian	66	124.833	6.475	0.797	2.169	76	0.033	4.4167	2.0364
	Suspected non-Amerindian	12	120.417	6.5707	1.8968					
Minimum Frontal Breath	Amerindian	86	94.221	4.6511	0.5015	−2.172	98	0.032	−2.9219	1.345
	Suspected non-Amerindian	14	97.143	4.7694	1.2747					
Biorbital Breath	Amerindian	32	95.031	3.9225	0.6934	−2.456	37	0.019	−4.1116	1.6744
	Suspected non-Amerindian	7	99.143	4.4508	1.6822					
Interorbital Breath	Amerindian	38	23.026	2.1622	0.3507	−4.329	44	0.000	−3.8487	0.8891
	Suspected non-Amerindian	8	26.875	2.8504	1.0078					
Frontal Chord	Amerindian	90	105.867	4.7291	0.4985	−2.41	100	0.018	−3.55	1.473
	Suspected non-Amerindian	12	109.417	5.2822	1.5248					
Frontal Arc	Amerindian	59	117.237	6.1176	0.7964	−2.844	65	0.006	−6.6377	2.3336
	Suspected non-Amerindian	8	123.875	6.7915	2.4012					
Parietal Chord	Amerindian	81	104.457	6.5289	0.7254	−2.659	92	0.009	−5.3124	1.9976
	Suspected non-Amerindian	13	109.769	7.6502	2.1218					
Occipital Arc	Amerindian	53	110.491	8.1727	1.1226	−1.885	62	0.064	−5.1458	2.7295
	Suspected non-Amerindian	11	115.636	8.5706	2.5841					
Mastoid Length	Amerindian	32	25.219	3.8247	0.6761	−2.677	36	0.011	−4.6146	1.7235
	Suspected non-Amerindian	6	29.833	4.1673	1.7013					

The analysis shows that several measurements have significantly different means, indicating cranial shape differences between the two groups as was expected. This supports the exclusion of these individuals from the remainder of all following analyses unless expressly otherwise indicated.

Modification Status

The measurement means are compared between the modified and non-modified subsets of the population. Any crania of suspected non-Amerindian ancestry were excluded from the analysis to ensure differences in normal cranial variation did not impact on the results. A one-way Independent Samples t-test showed significant differences existed between the two groups for the maximum cranial length, maximum cranial breath, minimum frontal breath, upper facial breath, orbital height, interorbital breath, frontal arc, parietal chord, and the parietal arc, as can be seen in Table 13.

Table 13 **Results of Independent Samples t-test comparing the cranial measurement means between modified and non-modified crania.**

Measurement	ICM	N	Mean	SD	SE	T	DF	Sig	Mean Difference	SE Difference
Maximum Cranial Length	Yes	165	164.679	79.095	0.6158	6.219	247	<0.001	6.7974	1.0931
	No	84	171.476	8.6198	0.9405					
Maximum Cranial Breath	Yes	158	148.924	6.8334	0.5436	−8.095	234	<0.001	−7.5138	0.9282
	No	78	141.41	6.4434	0.7296					
Minimum Frontal Breath	Yes	155	96.465	6.3146	0.5072	−2.88778099	239	0.00423546	−2.2435859	0.77692384
	No	86	94.221	4.6511	0.5015					
Upper Facial Breath	Yes	138	106.232	5.0128	0.4267	−2.75228616	217	0.00641891	−1.84916801	0.67186619
	No	81	104.383	4.4118	0.4902					
Orbital Height	Yes	93	36.022	4.4842	0.4650	−2.02643084	128	0.04479843	−1.56204592	0.77083604
	No	37	34.459	2.1291	0.3500					
Interorbital Breath	Yes	73	24.932	3.7688	0.4411	−2.87570876	109	0.0048494	−1.90519106	0.66251183
	No	38	23.026	2.1622	0.3507					
Frontal Arc	Yes	96	110.448	7.1875	0.7336	6.033967558	153	1.158E−08	6.789371469	1.12519191
	No	59	117.237	6.1176	0.7964					
Parietal Chord	Yes	158	97.133	5.7585	0.4581	8.888	237	0.000	7.3239	0.8240
	No	81	104.457	6.5289	0.7254					
Parietal Arc	Yes	117	108.795	8.1055	0.7494	5.853514867	176	2.3049E−08	7.319882303	1.25051059
	No	61	116.115	7.5434	0.9658					

The mean differences in the maximum cranial length, frontal arc, parietal chord, and parietal arc show that modified crania are shorter than their normal counterparts, whereas the maximum cranial breath, minimum frontal breath, and upper facial breath means indicate they are broader. The significant difference in orbital height and interorbital breath shows that these changes are not restricted to the vault but also impact the upper half of the facial area, which is confirmed by the minimum frontal breath and upper facial breath.

Modification Types

An Anova test was executed to see if different modification types result in different metric patterns. Three types of modification were compared: frontal flattening, fronto-occipital modification, and occipital flattening. The number of measurements available for the other cranial shapes recognised in this investigation was too small.

Table 14 **Results of an Anova comparing the cranial measurement means of different modification types.**

Measurement	Type	N	Mean	SD	SE	F	DFm	DFr	P	Posthoc
Maximum Cranial Length	Frontal Flattening	26	168	7.642	1.4987	3.535	2	185	0.031	Yes
	Fronto-Occipital	151	164.629	8.0138	0.6522					
	Occipital Flattening	11	160.727	8.6034	2.594					
Parietal Chord	Frontal Flattening	26	98.5	6.2498	1.2257	3.885	2	179	0.022	Yes
	Fronto-Occipital	144	96.931	5.4832	0.4569					
	Occipital Flattening	12	101.417	7.5614	2.1828					

Two measurements show statistically significant differences between the means of different modification types: the maximum cranial length and the parietal chord. A post hoc Tukey HSD test was executed on these two measurements.

Table 15 **Results of a post hoc Tukey HSD test of significant differences between modification types. * indicates the mean difference is significant at the 0.05 level.**

Measurement	(I) Type	(J) Type	Mean Difference (I-J)	Std. Error	Sig.
Maximum Cranial Length	Fronto-Occipital	Frontal Flattening	−3.3709	1.6982	0.119
		Occipital Flattening	3.9019	2.4977	0.265
	Occipital Flattening	Frontal Flattening	−7.2727*	2.8766	0.033
Parietal Chord	Fronto-Occipital	Frontal Flattening	−1.5694	1.2239	0.407
		Occipital Flattening	−4.4861*	1.7257	0.027
	Occipital Flattening	Frontal Flattening	2.9167	2.0044	0.315

This post hoc test shows that difference in maximum cranial length is only significant between frontal and occipital flattening. Fronto-occipital modification, a combination of frontal and occipital flattening, falls between the two.

The parietal chord changes are significant only for occipital and fronto-occipital flattening. This seems to indicate that the positional change of lambda created by occipital flattening and fronto-occipital modification is more important than the shift in bregma created by frontal flattening and fronto-occipital modification.

Modification Subtypes

An Anova analysis was executed to determine if the subtype of modification impacts the cranial measurement means. Three subtypes were tested: parallel, parallel-vertical, and vertical modification.

Table 16 **Results of an Anova test comparing the cranial measurement means of different modification subtypes.**

Measurement	Subtype	N	Mean	SD	SE	F	DFm	DFr	P	Posthoc
Maximum Cranial Length	Parallel	116	166.457	7.5773	0.7035	18.154	2	144	<0.001	Yes
	Parallel-Vertical	6	156.667	10.3473	4.2243					
	Vertical	25	157.64	5.5818	1.1164					

Only the maximum cranial length showed significant differences between the three subtypes. A post hoc Tukey HSD test was executed to study the results further.

Table 17 **Results of a post hoc Tukey HSD test of significant differences between modification subtypes. * indicates the mean difference is significant at the 0.05 level.**

Tukey HSD					
Dependent Variable	(I) Subtype	(J) Subtype	Mean Difference (I-J)	Std. Error	Sig.
Maximum Cranial Length	Parallel	Parallel-Vertical	9.7902*	3.0983	0.005
		Vertical	8.8169*	1.6318	0.000
	Vertical	Parallel-Vertical	0.9733	3.3642	0.955

The Anova test and Post Hoc analysis both show that the parallel subtype clearly differs from parallel-vertical and vertical modification but the latter two are very similar and cannot be differentiated based on the measurement means.

Testing for Cranial Modification

The recognition of cranial modification solely by visual inspection is subjective and creates variation between different investigators, adding to the analytical issues created by different standards and classifications for altered head shapes and the difficulty in distinguishing mild modifications from normal cranial shape variation. Recent studies by Clark and colleagues (2007) and O'Brien and Stanley (2013) have attempted to overcome this issue by creating methods for identifying modified crania based on cranial metrics. Both methods have been tested on the Caribbean skeletal assemblage and will be assessed and compared with the visual inspection and each other.

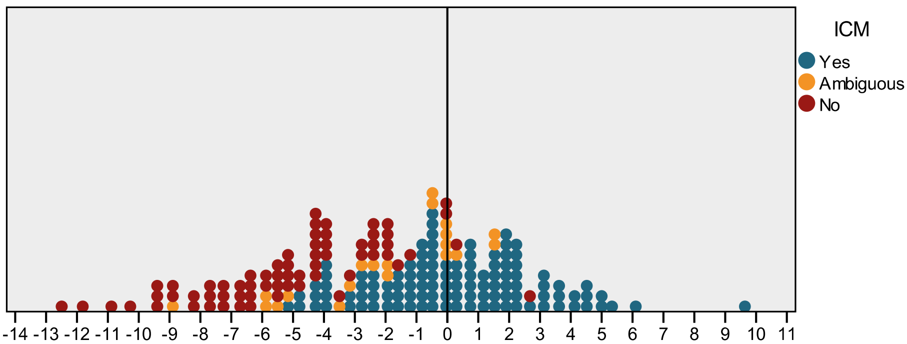
Clark et al. (2007)

The method developed by Clark and colleagues (2007) requires six cranial measurements using four landmarks along the mid-sagittal plane. These measurements were only available for 30% of the total sample. The outcome of Clark's method in comparison to the visual inspection by the author can be seen in Table 18. There is a 68% correspondence rate between the two assessments. There are two factors that influence the difference in assessment: the conservative regression formula and the cranial shape.

Table 18 Comparison of classification by Clark et al. (2007) and the visual assessment by the author.

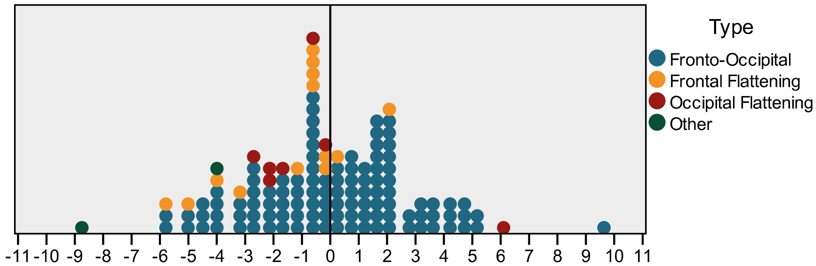
		Visual Assessment		
		Yes	No	Total
Clark	Yes	56	3	59
	No	52	61	113
	Total	108	64	172

The regression formula used by Clark et al. (2007) is conservative in nature, meaning that normal skulls should never score as modified. The down side is that mild modification will likely be scored as unmodified and this is partially responsible for the gap between the visual assessment and regression score. Caribbean cranial modification is often relatively mild and this creates difficulties for the Clark method. This can also be seen in Graph 3, which shows the score produced by the function (where everything above 0 is considered modified) and the visual assessment. Clearly, the majority of disagreements consist of crania that show signs of modification in the visual classification yet produce a score below 0.



Graph 3 Visual representation of the comparison between the method by Clark et al. (2007) and the visual assessment by the author.

The type of cranial modification also plays a role in the effectiveness of the method by Clark et al. (2007). A test by the authors suggested the method was less likely to correctly identify frontal flattening and this is clearly supported by Graph 4 showing cranial type in relation to the Clark score. All but two cases of frontal flattening are classified as unmodified and a similar pattern can be seen in cases of occipital flattening.



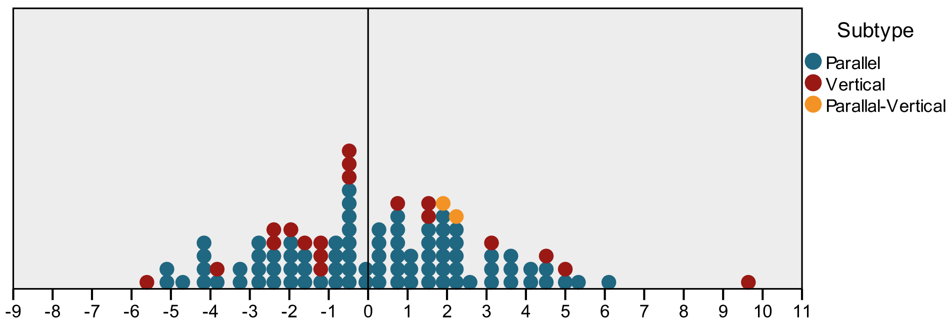
Graph 4 **Visual representation of the comparison between the method by Clark et al. (2007) and the visual assessment by the author for each modification type.**

The correspondence rates between the visual classification of type and the Clark score, based on the data in Table 19 which excludes cases classed as ambiguous in the visual classification, confirms this picture. There is 58% agreement for crania with fronto-occipital modification, but this drops to 20% for both frontal and occipital flattening.

Table 19 **Comparison of classification by Clark et al. (2007) and the visual assessment by the author for each modification type.**

Clarke	Fronto-Occipital	Frontal Flattening	Occipital Flattening
Yes	53	2	1
No	39	8	4
Total	92	10	5

Looking at the relationship between subtype and score provides a different picture. Graph 5 does not show a clear patterning.



Graph 5 **Visual representation of the comparison between the method by Clark et al. (2007) and the visual assessment by the author for each modification subtype.**

Table 20 shows the same relationship without the crania marked ambiguous in the visual classification. The correspondence rates between the Clark method and the visual inspection are 57% for the parallel subtype, 41% for the vertical subtype, and 100% for the parallel-vertical subtype.

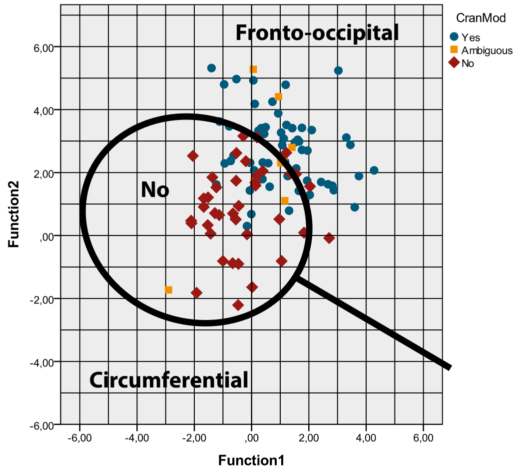
Table 20 Comparison of classification by Clark et al. (2007) and the visual assessment by the author for each modification subtype.

	Subtype		
Clarke	**Parallel**	**Vertical**	**Parallel-Vertical**
Yes	43	7	2
No	32	10	0
Total	75	17	2

O'Brien and Stanley (2013)

O' Brien and Stanley (2013) present a method for assessing cranial modification using a discriminant function analysis looking at the mid-sagittal and coronal plane based on four measurements and seven cranial landmarks. The advantage of this function is that it looks at both modification status and shape: it will indicate whether a skull is modified and whether the shape is more consistent with circumferential or fronto-occipital modification (O'Brien and Stanley 2013). The disadvantage is that the necessity of considering more landmarks requires better cranial preservation and this effect can be seen in the current sample where these four measurements are only present in 104 Amerindian skulls and an additional 10 crania of disputed ancestry out of a total of 571 crania or a mere 20% of the total sample.

The results of the two discriminant functions are plotted in Graph 6, showing the classification by O'Brien and Stanley alongside the results of the visual classification.



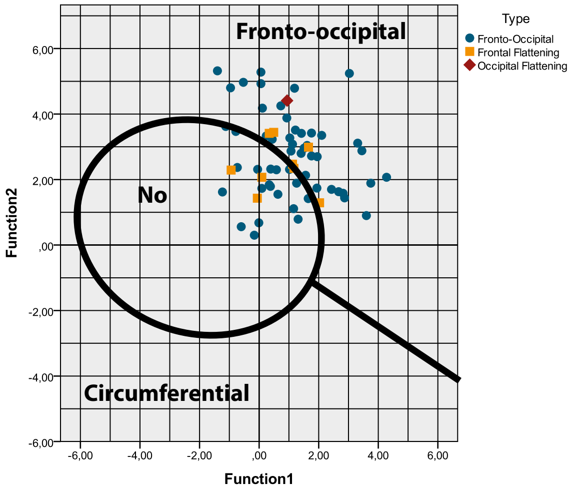
Graph 6 Visual representation of the comparison between the method by O'Brien and Stanley (2013) and the visual assessment by the author.

Table 21 shows the outcome of the O'Brien and Stanley function in relation to the visual classification by the author. The correspondence rate between the two methods is 73%.

Table 21 **Comparison of classification by O'Brien and Stanley (2013) and the visual assessment by the author.**

		Visual Assessment		
		Yes	**No**	**Total**
O'Brien and Stanley	Yes	39	6	45
	No	20	33	53
	Total	59	39	98

The results of O'Brien and Stanley were also plotted in relation to the type of modification in Graph 7 to determine if shape designated by the function corresponds to the visual assessment and whether the method is influenced by different cranial shapes. The method developed by O'Brien and Stanley (2013) distinguishes between fronto-occipital and circumferential modification. Frontal and occipital flattening are not given a separate category according to this method, but would likely produce similar, if less marked, results as fronto-occipital modification. The single cranium with circumferential modification in the sample did not produce all necessary measurements required for this method.



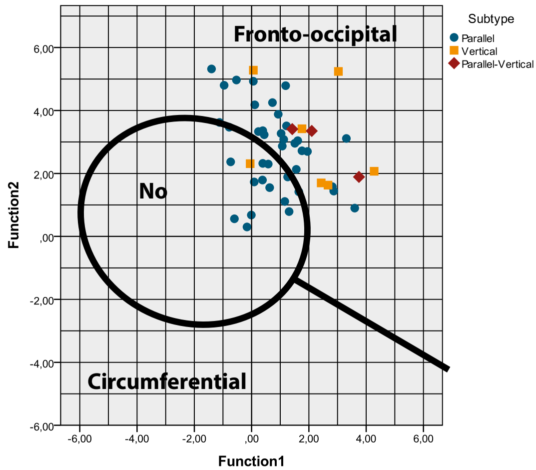
Graph 7 **Visual representation of the comparison between the method by O'Brien and Stanley (2013) and the visual assessment by the author for each modification type.**

The results of O'Brien and Stanley in relation to the visual classification of types are represented in Table 22. Any crania with ambiguous status have been removed from the analysis. The correspondence rates between fronto-occipital modification and frontal flattening are very similar at 68% and 63%, respectively. This similarity seems to indicate that the O'Brien and Stanley method is not influenced by differences in type. No definite cases of occipital modification provided all necessary landmarks for measurement, the single individual depicted in Graph 7 was classed as ambiguous during the visual inspection.

Table 22 **Comparison of classification by O'Brien and Stanley (2013) and the visual assessment by the author for each modification type.**

		Visual Assessment	
		Fronto-occipital	**Frontal Flattening**
O'Brien and Stanley	Fronto-occipital	34	5
	No	16	3
	Total	50	8

The results of the discriminant function have been plotted in Graph 8 for each subtype, in order to see if the subtype impacts the results of the method.



Graph 8 **Visual representation of the comparison between the method by O'Brien and Stanley (2013) and the visual assessment by the author for each modification subtype.**

The same relationship is shown in Table 23 without the inclusion of ambiguous crania. The correspondence rates are 65% for parallel, 83% for vertical, and 100% for parallel-vertical. Although there is some variation in rates, the overall agreement is relatively high and subtype appears to have no impact on the results of the method.

Table 23 **Comparison of classification by O'Brien and Stanley (2013) and the visual assessment by the author for each modification subtype.**

		Visual Assessment		
		Parallel	Vertical	Parallel-Vertical
O'Brien Stanley	Yes	24	5	3
	No	13	1	0
	Total	37	6	3

Comparison

The previous sections have looked more closely at each method, but here they are contrasted to determine the agreement between the methods. Table 24 shows the correspondence between the results of the Clark and O' Brien-Stanley methods.

Table 24 **Comparison of the results of Clark et al. (2007) and O'Brien and Stanley (2013).**

		Clark		
		Yes	No	Total
O'Brien and Stanley	Yes	20	21	41
	No	7	45	52
	Total	27	66	93

The correspondence rate is 70%, indicating a relatively high agreement between the results. The conservative nature of the Clark method is demonstrated by the relatively low number of skulls considered modified by Clark, but normal according to O'Brien and Stanley.

Table 25 shows the agreement between both methods and the visual inspection executed by the author. The correspondence rate – those cases in which all three methods agree – is 56%. It is interesting to notice that all crania that score as modified in Clark and O'Brien and Stanley are also considered modified in the visual inspection. Total disagreement – in other words where both methods indicate normal but the visual inspection has seen evidence of modification – only occurs in 15% of cases. Just over three-quarters of these crania (77%) showed mild degrees of head shaping.

Table 25 **Comparison of the results of Clark et al. (2007), O'Brien and Stanley (2013), and the visual assessment by the author.**

		Visual Assessment	
Clarke	O'Brien and Stanley	Yes	No
Yes	Yes	20	0
Yes	No	5	2
No	Yes	12	6
No	No	13	28

This section will present the results of analyses looking at the relation between social variables and intentional cranial modification on the individual, local, and regional level. The identities expressed through intentional cranial modification can vary substantially and lacking living individuals to question, archaeologists must use bodily and material proxies to approach such social issues. Five different themes have been selected here in order to evaluate these social variables in relation to head shaping: prevalence, shape, sex, burial practices, and isotopes.

The prevalence of cranial modification can provide insight into the extent of the expressed identity within the group and provides a useful tool for comparing different communities. The same can be said of variations in type and subtype: different shapes may represent different identities within communities. The resulting cranial shapes also allow the reconstruction of head shaping practices. The relation between head shaping and biological sex is investigated through the ratio of females and males with and without modification as well as a more detailed look at variation in type and subtype between men and women.

The relation between cranial modification and burial practices will also be investigated in order to determine whether the identity expressed by head shaping affected the manner of burial. In particular, this study looks at the nature of the burial (primary or secondary), the amount of individuals buried in the grave (single or collective), the position (flexed or extended) and orientation (lateral, supine, prone) of the body in the grave, and the presence or absence of grave goods. Finally, the results of strontium isotope analyses to determine ancient mobility patterns will be correlated to the data on cranial modification to investigate whether head shaping practices are local or brought in from elsewhere.

The data are structured according to these five themes at each level of analysis, beginning at the individual life histories and ending with the larger regional trends. If data was not present or insufficient for analysis, the topic has been skipped.

Individual Life Histories

Exploring the social connections of cranial modification in the Caribbean will start at the most detailed and intimate level discussing the life and death of two particular individuals. Individual KR377 from Kelbey's Ridge 2 on Saba and CDM72B from El Chorro de Maíta on Cuba have been selected based on the detailed contextual information available, but more importantly because of the interesting stories they tell about cranial modification in the pre- and post-Columbian Caribbean. The data on the sites of Kelbey's Ridge 2 and El Chorro de Maíta are presented here to provide the background for the life histories presented in the discussion.

Kelbey's Ridge 2

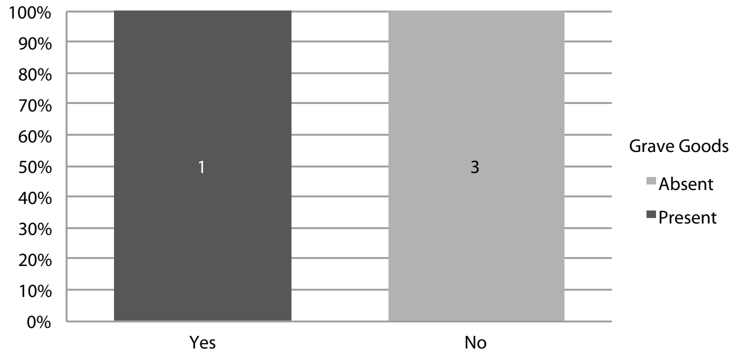
Only a single individual in the skeletal assemblage from Kelbey's Ridge 2 exhibits cranial modification, but the poor shape of the remainder of the cranial material may have hindered recognition. This is evidenced by the fact that only four of the ten crania were considered sufficiently preserved to assess the shape, as can be seen in Table 26.

Table 26 **Prevalence of intentional cranial modification at Kelbey's Ridge 2.**

	Yes	Ambiguous	No	Total
Kelbey's Ridge 2	1	0	3	4
Prevalence (%)	25	0	75	

The singular case of cranial modification, found in infant KR337, is of the fronto-occipital parallel type. Though the cranium was very fragmented, it showed minor planes of flattening on the frontal and occipital, combined with bulging parietals

Burial practices at Kelbey's Ridge 2 are complex and varied, but the number of individuals in this sample – i.e. only those that could be properly assessed for cranial modification – is relatively small. Even so, an analysis of the burial practices at Kelbey's Ridge 2 shows no significant differences in the type of inhumation or the position and orientation of the body within the grave with the exception of grave goods. The only individual buried with grave goods of the four that could be assessed for cranial modification was KR377, as can be seen in Graph 9. A Fisher's exact test provides a non-significant outcome of p=0.25, indicating that the two variables are independent. This result is likely due to the small sample size. In the overall assemblage, only children were found accompanied by grave goods at Kelbey's Ridge 2 (Hoogland 1996; Hoogland and Hofman 1993).



Graph 9 **Distribution of grave goods in relation to cranial modification at Kelbey's Ridge 2.**

Strontium isotope analysis was carried out in order to determine ancient patterns of mobility. All individuals from Kelbey's Ridge 2 have strontium signatures that correspond to the local range. However, this range was unexpectedly large and has a significant overlap with other Caribbean signatures. This makes interpreting the strontium results from Kelbey's Ridge difficult (Laffoon and Hoogland 2012).

El Chorro de Maíta

The majority of individuals found at El Chorro de Maíta had undergone intentional cranial modification. Table 27 presents three different prevalence calculations of head shaping at the site. The first provides the percentages of each category in the overall sample. The second set of percentages has been adjusted for the presence of ambiguous cases of modification by removing these from the sample. Finally, three individuals without cranial modification have a suspected non-Amerindian ancestry. In the final prevalence calculations these have been removed from the sample to provide the true prevalence among the Amerindian subset of the sample. The latter is considered most important when discussing the Amerindian social motivations for the practice.

Table 27 **Prevalence of intentional cranial modification at El Chorro de Maíta.
* Indicates suspected non-Amerindian ancestry.**

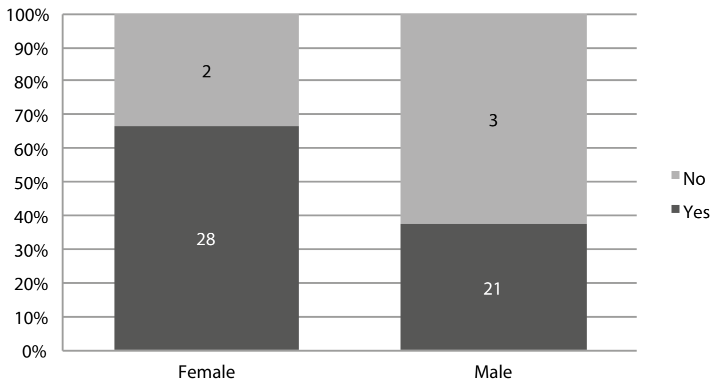
ICM	Number of Individuals	Prevalence (%)	Adjusted Prevalence (%)	Adjusted Amerindian Prevalence (%)
Yes	58	79.45	85.29	89.23
Ambiguous	5	6.85		
No	7 + 3*	13.70	14.71	10.77
Total	73	100	100	100

An outright majority of individuals – 86 percent – of the cranial shapes encountered at El Chorro de Maíta can be classified as fronto-occipital modification. The predominant subtype, found in more than half of the total modified population, is parallel modification with a low plane of occipital flattening. Two exceptions, a case of parallel-vertical and vertical occipital orientation respectively, were found in the collection. Damage to the crania hindered the assessment of the subtype of modification in a quarter of cases. A handful of crania were classified as solely frontal or occipital flattening. In most cases, damage to the cranium hindered full assessment and too little evidence of fronto-occipital modification was present to classify them as such.

Table 28 **Overview of modification types and subtypes at El Chorro de Maíta.**

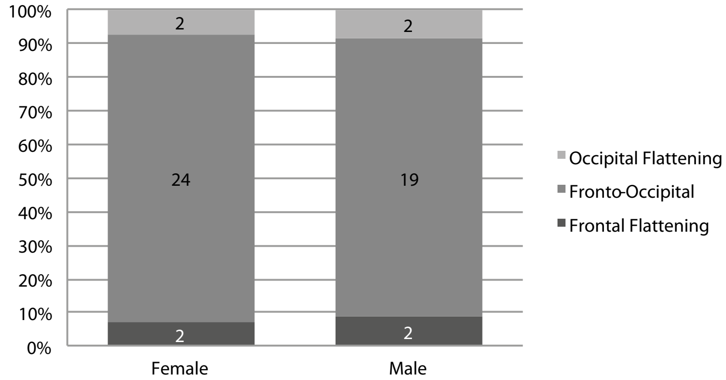
Type	Subtype	Number of Individuals	Percentage
Fronto-Occipital	Parallel	33	56.90
	Parallel-Vertical	1	1.72
	Vertical	1	1.72
	Undetermined	15	25.86
Frontal Flattening		4	6.90
Occipital Flattening	Parallel	1	1.72
	Undetermined	3	5.17
Total		58	100.00

Several analyses were carried out to determine if modification practices are related to sex at El Chorro de Maíta. Graph 10 shows the ratio of females to males in relation to the presence or absence of modification. A Fisher's exact test was executed to determine whether the proportion of males and females differed substantially between the modified and non-modified subset of the population. The result is p=0.646, indicating that the null hypothesis cannot be rejected and that there is thus no significant difference in the ratio of males to females between the two groups.



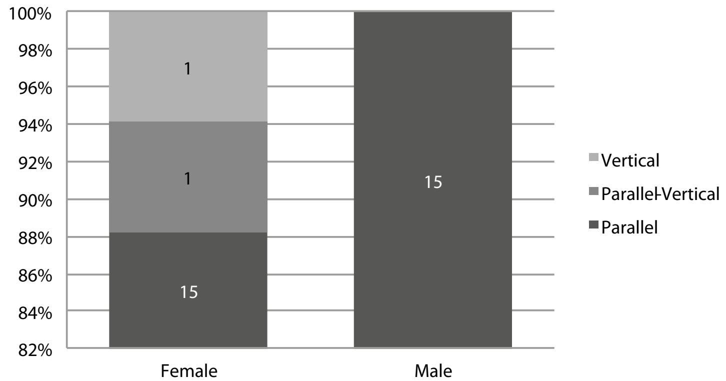
Graph 10 **Relation between biological sex and cranial modification at El Chorro de Maíta.**

The relationship between the sex of the individual and the main type of modification can be seen in Graph 11. The ratios of females and males look relatively similar in each category and this is confirmed by the non-significant p=1.000 of produced by a Fisher's exact test.



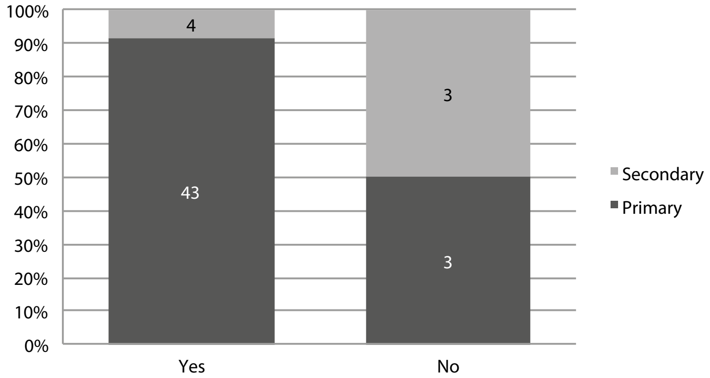
Graph 11 **Relation between biological sex and type of modification at El Chorro de Maíta.**

The relation between sex and subtype seen in Graph 12 does show an interesting result. The two individuals with vertical and parallel-vertical modification at the site are both female. The ratio of females to males in the parallel category is exactly 1:1. A Fisher's exact test produced a non-significant p=1.000 value, likely due to the very small number of individuals in the parallel-vertical and vertical sub-categories.



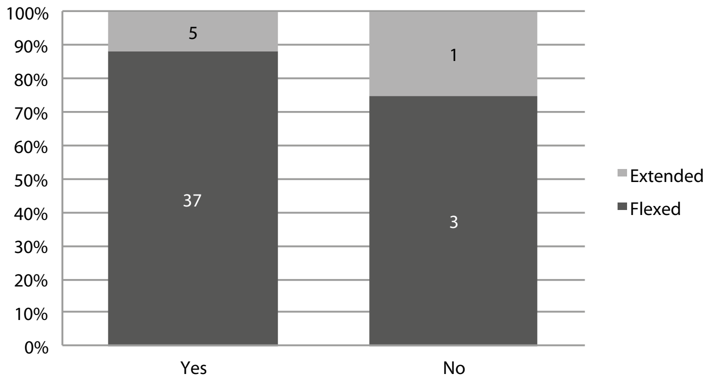
Graph 12 **Relation between biological sex and subtype of modification at El Chorro de Maíta.**

The majority of burials were primary in nature with minor indications of secondary burial practices as can be seen in Graph 13. The high proportion of secondary burial practices among the non-modified individuals is remarkable. A Fisher's exact test produced a p=0.025, which indicates that there is a statistically significant difference between the proportions observed among the different groups. However, the small sample size in certain categories should be taken into account when interpreting this result.



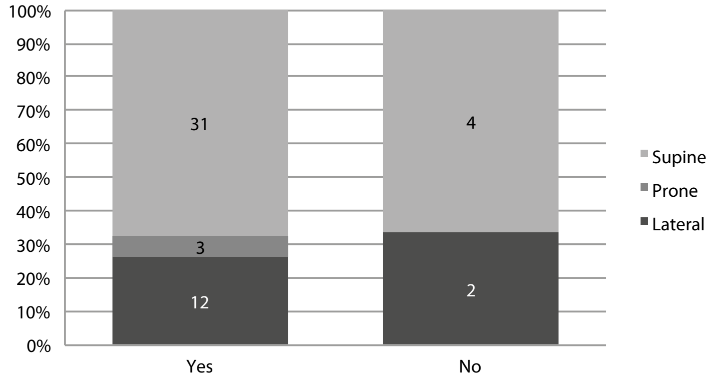
Graph 13 **Relation between type of burial and cranial modification at El Chorro de Maíta.**

When studying the burial position in more detail, most individuals have been buried in a flexed position considered traditional for the indigenous inhabitants of the region during the Late Ceramic Age, as can be seen in Graph 14. A Fisher's exact test was executed to determine whether the ratio of the different burial positions was significantly different between groups. The outcome of p=0.440 is not significant.



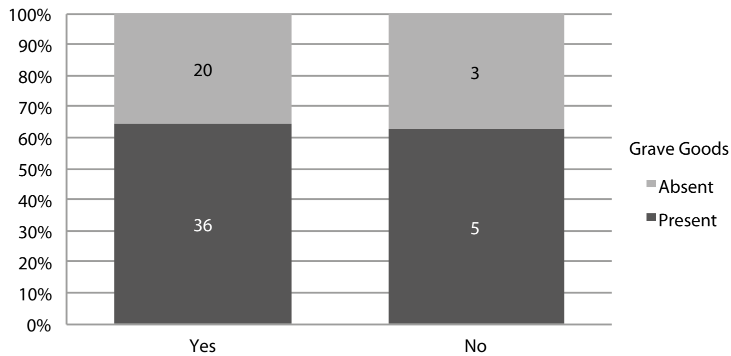
Graph 14 **Relation between burial position and cranial modification at El Chorro de Maíta.**

Graph 15 shows the different positions of the body in the grave per modification category, again varying widely among the population although a majority was placed supine. Three individuals were found in a prone position and all have cranial modification. A Fisher's exact test yielded a p= 1.000. This means the results are not statistically significant and the null hypothesis cannot be rejected. There is thus no difference in the proportions of the burial manner among the categories of modification.



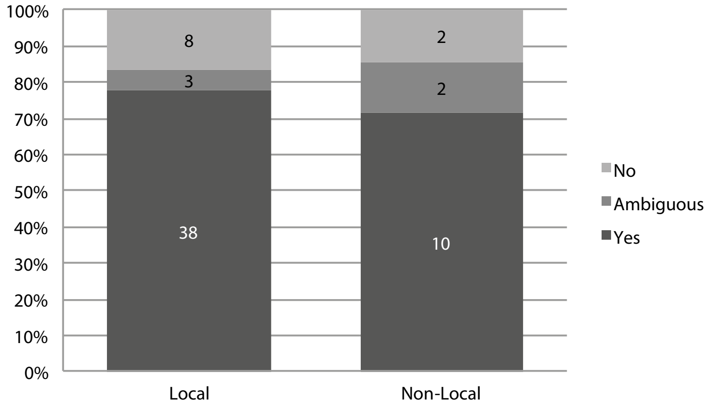
Graph 15 **Relation between body orientation and cranial modification at El Chorro de Maíta.**

The presence and absence of grave goods in relation to cranial modification is displayed in Graph 16. A substantial minority of the assemblage was found without grave goods. A Fisher's exact test gave a non-significant outcome of p=1.000. This means that the presence or absence of grave goods is not related to intentional cranial modification at El Chorro de Maíta.



Graph 16 **Distribution of grave goods in relation to cranial modification at El Chorro de Maíta.**

The prevalence of cranial modification among the local and non-local subsets of the population is shown in Graph 17. A Fisher's exact test was executed to determine whether intentional cranial modification and strontium signature were independent. The outcome of p=0.582 suggests that the null hypothesis cannot be rejected and that there is no statistically significant difference in proportion between the two groups.



Graph 17 **Relation between isotopic signature and cranial modification at El Chorro de Maíta**

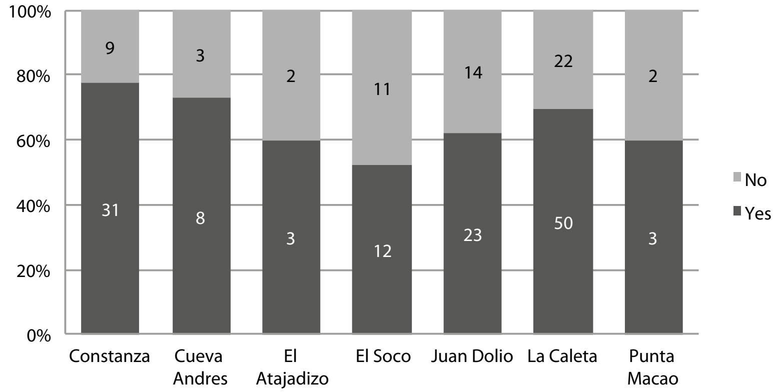
Dominican Republic

Moving on from the individual scale, head shaping practices at different sites in the Dominican Republic will be described and compared. The Dominican Republic has been chosen because it has proven the richest source for skeletal material in the region, providing 43% of the entire sample. Furthermore, historic sources have provided detailed information on the indigenous societies of the island of Hispaniola –shared by modern nations Haiti and the Dominican Republic – in the early colonial period, including the presence of different dialects, making this an excellent location for studying potential differences in head shaping practices between communities on a single island.

The results presented here will start by contrasting the different sites to see if there is a significant differences between assemblages. Sites with less than five individuals were removed from this comparative analysis to prevent issues with skewing and outliers. If similar patterns are found at each site, the data will be combined to show the wider trends occurring across the country.

Prevalence

The prevalence of cranial modification in the Dominican Republic is shown in Graph 18. A glance at the graph shows comparable modification rates for all sites with only minor differences. This is confirmed by the non-significant p=0.471 outcome of the Fisher's exact test. Modification rates are thus comparable in all sites and form a trend across the Dominican Republic.



Graph 18 **The prevalence of cranial modification for each examined site from the Dominican Republic.**

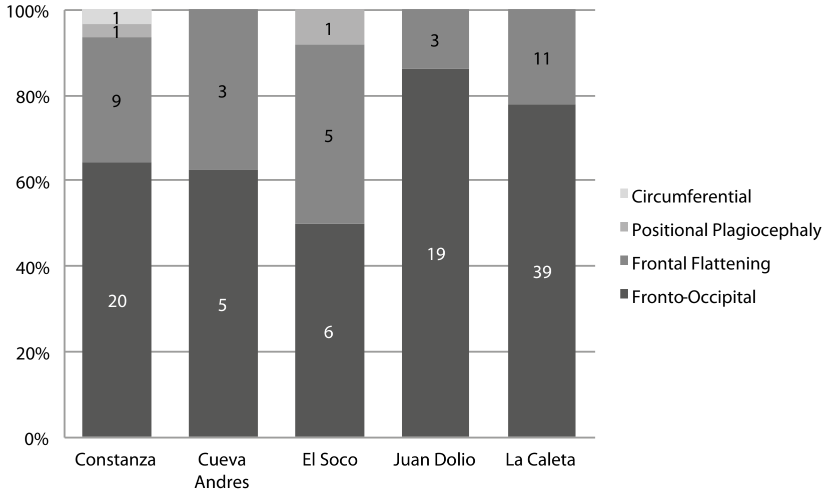
Table 29 provides an overview of cranial modification in the skeletal assemblages from the Dominican Republic. The overall prevalence suggests just over half of all individuals were subjected to intentional cranial modification. The adjusted prevalence – calculated by removing the ambiguous cases – is higher at 69%.

Table 29 **Prevalence of cranial modification in the Dominican Republic.**

Prevalence % (N)			Adjusted Prevalence % (N)	
Yes	Ambiguous	No	Yes	No
54.80 (137)	20.00 (50)	25.20 (63)	68.50 (137)	31.50 (63)

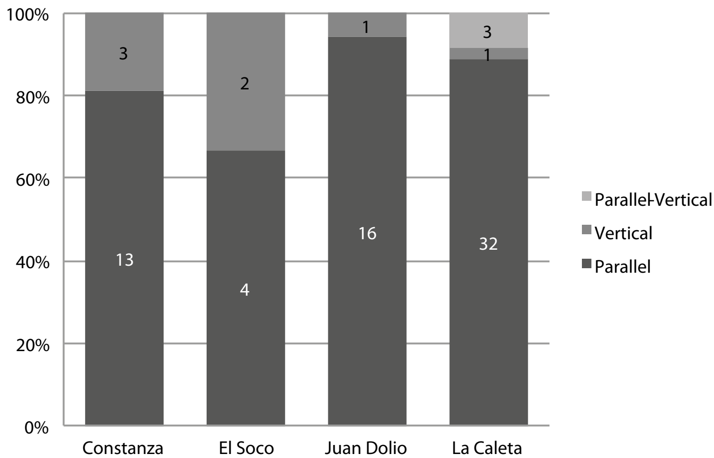
Shape

Graph 19 shows the main types of modification encountered within each site assemblage on the Dominican Republic. It is clear that fronto-occipital modification and frontal flattening make up the majority of cases encountered, but there is some mild variation in the rates between different sites. A Fisher's exact test was carried out to determine if significant different patterns exist. The outcome of p=0.183 is not statistically significant and indicates there is no substantial difference between these sites based on the main type of modification.



Graph 19 **Types of cranial modification found per site in the Dominican Republic.**

The different subtypes encountered in each assemblage are displayed in Graph 20. The outright majority of cases in the Dominican Republic have been classified as parallel modification. A Fisher's exact test produced an outcome of p=0.093, indicting there is no statistically significant difference in the subtypes encountered at the different sites.



Graph 20 **Subtypes of cranial modification found per site from the Dominican Republic.**

An overview of the different modification types encountered in the skeletal material from the Dominican Republic can be seen in Table 30. The predominant type of modification, fronto-occipital, is present in 73% of all modified crania when only the main type is taken into account. This is followed by frontal flattening, seen in approximately a quarter of this sample. The remaining types are only represented by single cases in the data set. The predominance of fronto-occipital and frontal flattening points towards the importance of the flattened forehead, a feature shared by these two types of modification.

Of great interest is the sole case of circumferential modification encountered in this assemblage. The cranium has a very long sloping forehead – in line with the fronto-occipital modification and frontal flattening seen at the site – but the remainder of the vault is narrow and elongated as opposed to broad and short. Unfortunately, there is some damage to the lower occipital region.

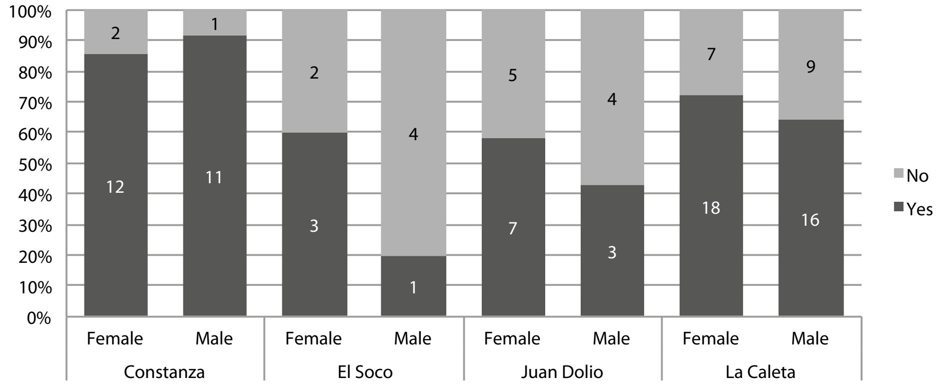
Table 30 **Overview of modification types and subtypes found in the Dominican Republic.**

Type	Subtype	Number of Individuals	Percentage
Fronto-Occipital	Parallel	77	56.20
	Parallel-Vertical	4	2.92
	Vertical	8	5.84
	Undetermined	11	8.03
Frontal Flattening		33	24.09
Circumferential	Parallel	1	0.73
Positional Plagiocephaly		2	1.46
Undetermined	Undetermined	1	0.73
Total		137	100.00

When looking at the subtypes of cranial modification in more detail, it becomes apparent that the parallel position of the occipital board is by far the most common. This subtype is seen in 56% of the overall modified subset of the population and present in 77% of individuals with fronto-occipital modification. Other positions of the occipital board, parallel-vertical and vertical, are only represented by a handful of individuals from the sites of Juan Dolio, El Soco, La Caleta, and Constanza.

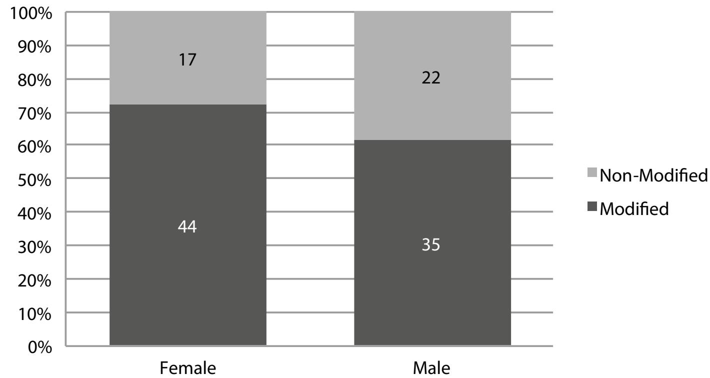
Sex Division

The rate of cranial modification among males and females for the four largest sites on the island is shown in Graph 21. A comparison of male and female proportions per site shows roughly similar rates of modification. This is confirmed by separate Fisher's exact tests looking at the intra-site variation, producing non-significant values of p=1.000 for Constanza, p=0.524 for El Soco, p=0.650 for Juan Dolio, and p=0.762 for La Caleta. There do appear to be minor variations in rates between the different locations. Two Fisher's exact tests were executed to compare the ratios of females and males respectively between the different sites. The female modification rates show no significant difference between the sites with a p=0.404. There is a significant difference between the males with p=0.018, likely due to the low amount of male modification found at El Soco.



Graph 21 **Rates of modification among males and females at the different sites in the Dominican Republic.**

Graph 22 shows the relation between cranial modification and sex for the entire population of the Dominican Republic. A Fisher's exact test was executed to determine whether a relationship is present. The outcome of $p = 0.244$ is statistically not significant and means that the null hypothesis cannot be rejected. In other words, no relation was found between the biological sex and head shape of an individual in the skeletal material from the Dominican Republic.

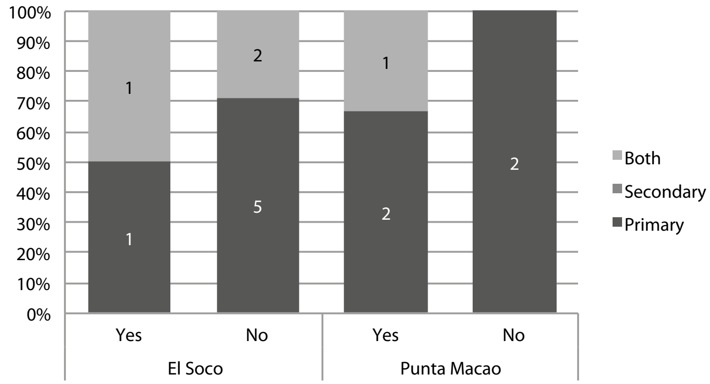


Graph 22 **Rates of modification among males and females in the pooled sample from the Dominican Republic.**

Burial Practices

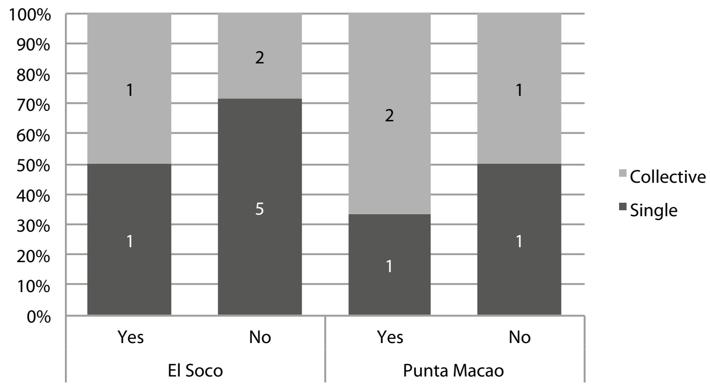
Unfortunately, very limited contextual information of individual burials has survived for the majority of the skeletal material from the Dominican Republic. The comparative analyses on the potential relation between cranial modification and burial type, position, or grave goods are therefore rather limited.

Graph 23 shows the burial types per site and cranial modification category. It is immediately clear that the number of individuals per category is very low and there are no clear patterns. Separate Fisher's exact tests were executed to determine whether differences exist within the sites or between the modified and non-modified subsets of the sample. The resulting p=1.000 for all four analyses supports the fact that there are no significant differences in the burial types encountered within or between each site.



Graph 23 **Burial types in relation to cranial modification at El Soco and Punta Macao.**

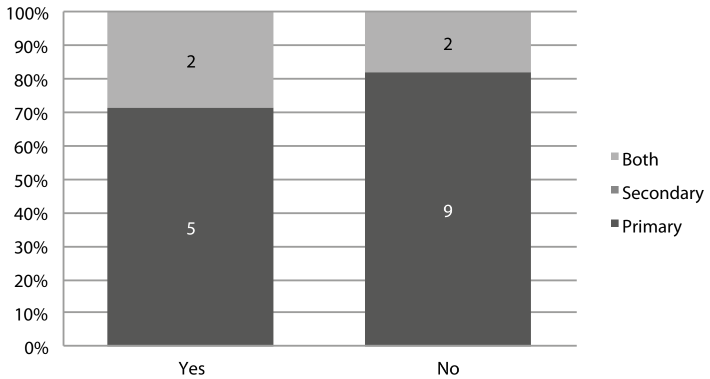
The situation is rather similar in the comparison between single or collective burials. Again, only a small amount of data is available and no clear pattern can be seen in Graph 24. This was confirmed by the results of a Fisher's exact test run for each site which produced a p-value of 1.000 in both cases as well as a comparison between the modified and non-modified subset of each site which also resulted in two p-values of 1.000.



Graph 24 **Nature of burial in relation to cranial modification at El Soco and Punta Macao.**

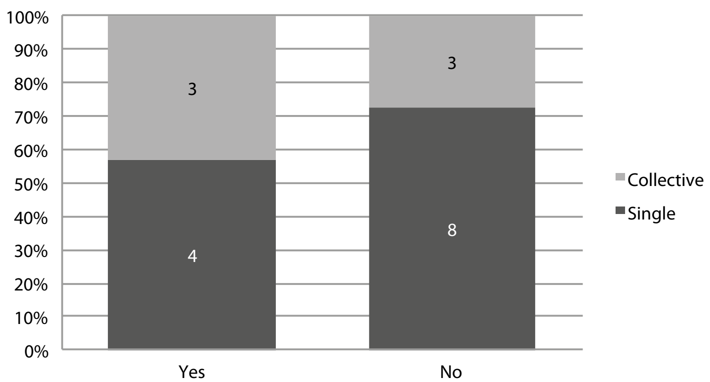
All individuals in the Dominican Republic for whom burial information was available were found in a flexed position and not enough data was present to analyse burial orientation or grave goods in relation to cranial modification for each of the different sites. Combining the data for all sites on the island gives a better result.

A distribution of different burial types among the various cranial modification categories can be seen in Graphs 25 and 26. Clearly, the limited number of individuals represented in these graphs – 18 out of 251 individuals from the Dominican Republic or 7% – is very low and unlikely to be representative. The limited information points towards varied mortuary rites and does not show a relation between burial type and cranial modification depicted in Graph 25, as evidenced by the outcome of the Fisher's exact test of p=1.000.



Graph 25 **Rates of modification for each burial types in the Dominican Republic.**

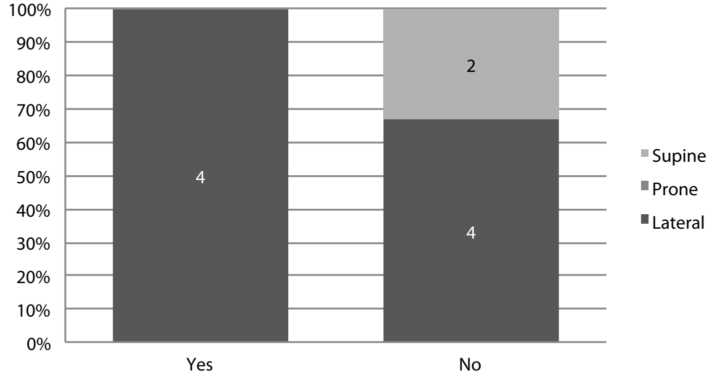
Graph 26 depicts the relationship between cranial modification and the amount of individuals encountered in a grave for the entire Dominican sample. Again, the ratios appear similar and this is confirmed by a non-significant result of p=0.627 produced by a Fisher's exact test.



Graph 26 **Rates of modification for single and collective burials in the Dominican Republic.**

Information on burial position is similarly limited. All eighteen individuals with a known burial position were flexed, although Graph 27 shows there is some variation in the orientation. A Fisher's exact test produced a non-significant outcome of p=0.467.

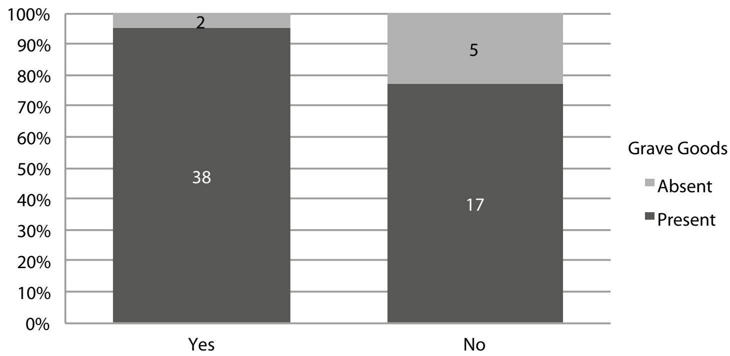
However, the small sample size again hinders any reliable extrapolation of this data to the prehistoric population at-large.



Graph 27 **Relation between body orientation and cranial modification in the Dominican Republic.**

The lack of information on individual burial contexts has hindered analysis of the relation between burial practices and cranial modification, as has been discussed in the previous paragraphs. The presence of objects of material culture in a substantial number of boxes of human remains in the *Museo del Hombre Dominicano* led to a secondary manner of gathering information on grave goods. Such items were assumed to have been found in direct relation to the skeletal remains and recorded as such. Although this is clearly a tenuous assumption at best, it was considered the only potential proxy to retrieve the lost contextual information. A downside of this method is that only presence was recorded, as absence of material culture in a box with skeletal material could not be equated with absence of grave goods. The individuals without grave goods in Graph 28 are those few for which reliable contextual information was found in reports.

This makes it abundantly clear that Graph 28 does not constitute a reliable representation of prehistoric burial goods in these populations and should be used only with extreme caution. Based on this very limited data, a Fisher's exact test yielded a statistically not significant p=0.086 which indicates that there is no significant difference in the present/absent ratio among modified and non-modified individuals.



Graph 28 **Distribution of grave goods in relation to cranial modification in the Dominican Republic.**

Local Patterns

This section shows, contrasts, and discusses the patterns found at each location for the five main themes of prevalence, shape, sex, burial practices, and isotopes set out at the beginning of this chapter.

Prevalence

The prevalence of cranial modification in each location can be seen in Table 31 and the adjusted prevalences have been visualised in Figure 12 and Graph 29.

Table 31 **Prevalence of intentional cranial modification for each location in the sample.**

Location	Prevalence % (N)			Adjusted Prevalence % (N)	
	Yes	Ambiguous	No	Yes	No
Bahamas	100.00 (3)	0.00 (0)	0.00 (0)	100.00 (3)	0.00 (0)
Cuba	77.78 (63)	6.17 (5)	16.05 (13)	82.89 (63)	17.11 (13)
Dominican Republic	54.80 (137)	20.00 (50)	25.20 (63)	68.50 (137)	31.50 (63)
Grenada	0.00 (0)	0.00 (0)	100.00 (1)	0.00 (0)	100.00 (1)
Guadeloupe	46.81 (22)	36.17 (17)	17.02 (8)	73.33 (22)	26.67 (8)
Haiti	60.00 (3)	20.00 (1)	20.00 (1)	75.00 (3)	25.00 (1)
Jamaica	66.67 (22)	18.18 (6)	15.15 (5)	81.48 (22)	18.52 (5)
Puerto Rico	48.15 (13)	18.52 (5)	33.33 (9)	59.09 (13)	40.91 (9)
Saba	20.00 (1)	0.00 (0)	80.00 (4)	20.00 (1)	80.00 (4)
St. Kitts	50.00 (1)	50.00 (1)	0.00 (0)	100.00 (1)	0.00 (0)
Suriname	20.00 (5)	8.00 (2)	72.00 (18)	21.74 (5)	78.26 (18)
Trinidad	0.00 (0)	9.09 (1)	90.91 (10)	0.00 (0)	100.00 (10)
Venezuela	26.00 (13)	8.00 (4)	66.00 (33)	28.26 (13)	71.74 (33)

Several locations are represented by only a handful of individuals and these prevalences are not representative of the whole indigenous population. The larger samples show some interesting patterns. The mainland samples of Suriname and Venezuela have prevalence rates between 20 and 30%, lower than most Caribbean islands that show rates between 60 and 85%. Trinidad, close to the mainland, is an exception with no evidence of head shaping in the skeletal population.

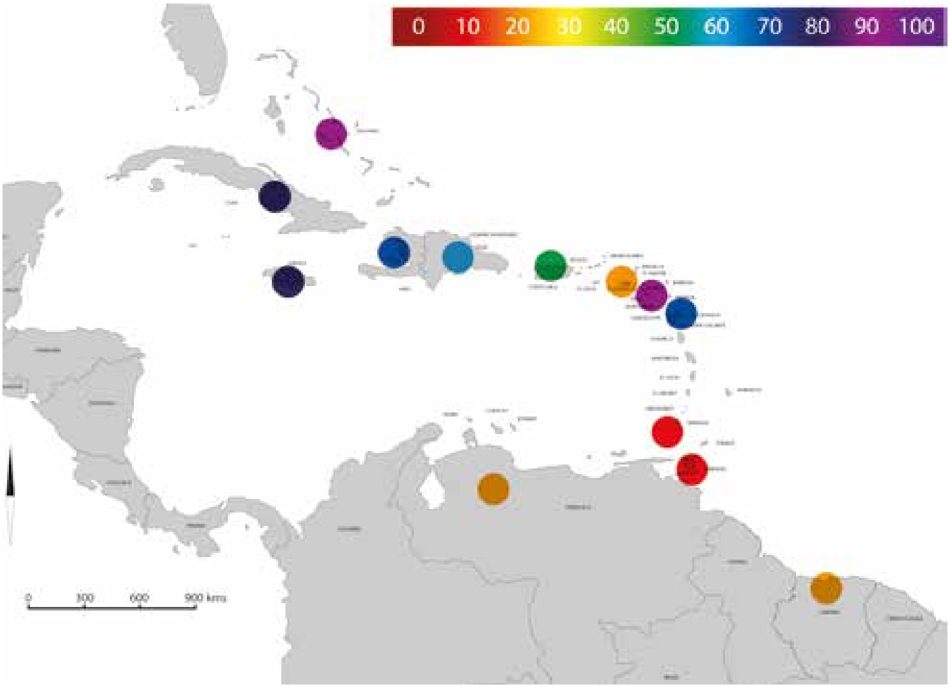
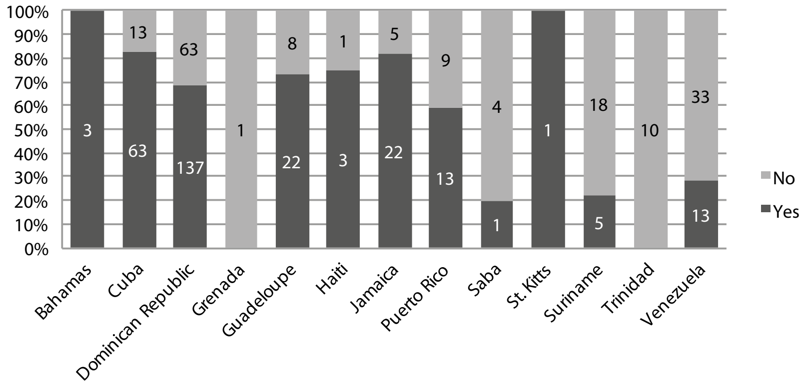


Figure 12 **Visualisation of the distribution of head shaping prevalence in the Caribbean.**

The clear differences in modification rates across these locations are confirmed by the $p<0.001$ value produced by the Monte Carlo method. These results suggest there is a significant difference in the ratios of cranial modification on different islands of the Caribbean and there is merit in investigating regional trends.

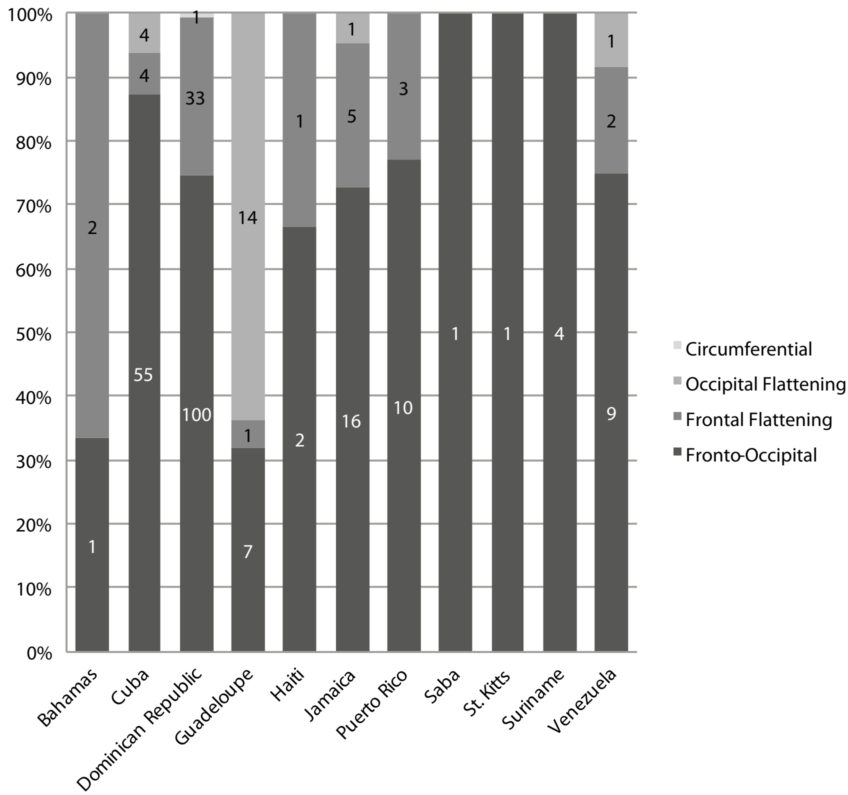


Graph 29 **Adjusted prevalence rates for each location in the sample.**

Shape

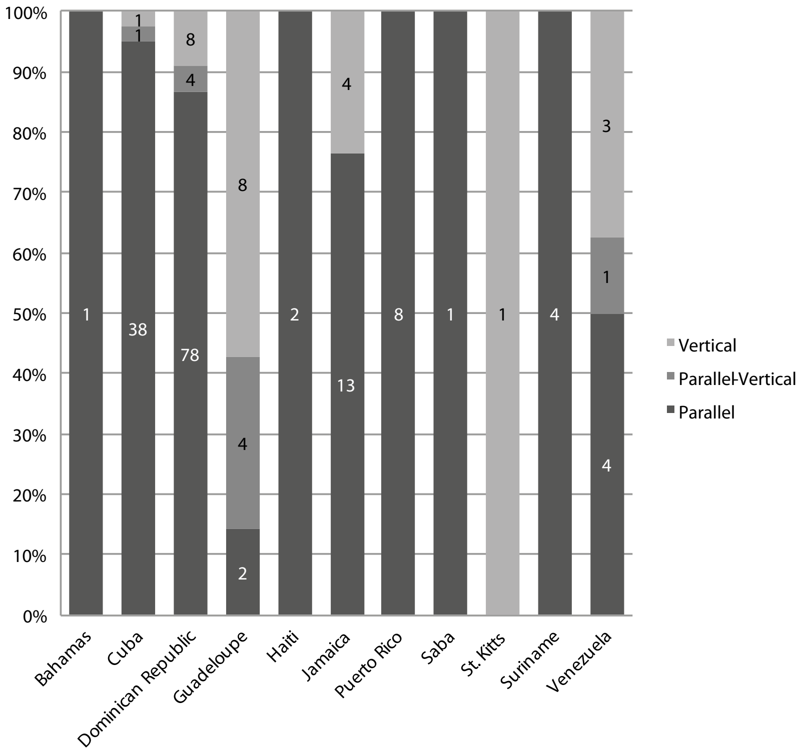
The different shapes created by intentional cranial modification can be categorised in main types and subtypes. There is some variation in the patterns of modification types found at different locations, as can be seen in Graph 30. The difference in sample size must be taken into account once more, with several sites represented by a single skull skewing the picture. Regardless, fronto-occipital modification is clearly the predominant form of cranial modification, followed by frontal flattening. These two types share a sloping frontal and are indistinguishable when viewed from the front during life. Occipital flattening is also present in lower numbers and a single case of circumferential modification is reported on the Dominican Republic. The Monte Carlo method produced a $p<0.001$ indicating significant differences are present between the locations.

A clear deviation from the overall pattern is the island of Guadeloupe, were occipital flattening is the dominant type of modification. Care should be taken when interpreting this pattern due to inherent issues with the skeletal material used in the sample. The crania from Guadeloupe were poorly preserved and are highly fragmented, creating issues for the conservative determinations of modification status and type. Many cases categorised here as occipital flattening represent crania which lacked frontal and sometimes even parietal portions due to poor preservation. The different pattern seen for Guadeloupe in Graph 30 may be a direct result of these issues.



Graph 30 **Types of cranial modification found per location in the Caribbean.**

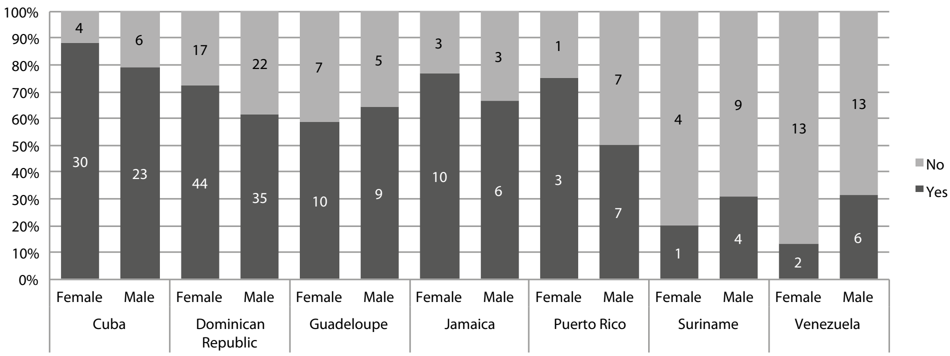
The different subtypes encountered in the sample for this study are shown per location in Graph 31. The dominant subtype in almost all locations is parallel modification. Two clear exceptions are present in the graph: Guadeloupe and St. Kitts. The difficulties regarding the skeletal material from Guadeloupe are apparent and it should be added here that a significant number of the crania was marked as modification of an undetermined subtype, indicating the actual pattern may have been substantially different. The single case of vertical modification on St. Kitts is interesting, but care must be taken not to extrapolate a single individual into a trend without additional evidence. A Fisher's exact test was executed and the outcome of $p<0.001$ confirms there are significant differences between the locations based on the subtypes. The differences in main types and subtypes of modification seen here warrant investigation of regional trends.



Graph 31 **Subtypes of cranial modification found per location in the Caribbean.**

Sex

The distribution of head shaping among the sexes can be seen for each location in Graph 32. The patterns for each location appear relatively similar, although differences between locations are apparent.



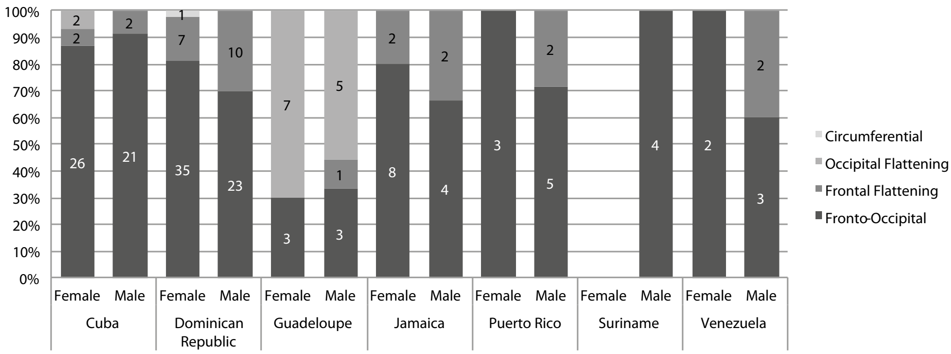
Graph 32 **Rates of modification among males and females per location in the Caribbean.**

This pattern is confirmed by the statistical tests. Several Fisher's exact tests were carried out to determine whether differences existed between males and females within in each assemblage and when comparing female and male rates between the locations. The results can be seen in Table 32. The ratios seem to be very similar for males and females within each assemblage, as is confirmed by the non-significant *p*-values for all within group comparisons. The results do indicate substantial differences in the modification rates seen for each sex at different locations, but this is due to the variation between the locations and not a causal relation between cranial modification and sex.

Table 32 **Results of comparative analysis of sex and modification rates using Fisher's exact tests.**

Cuba	Dominican Republic	Guadeloupe	Jamaica	Puerto Rico	Suriname	Venezuela	Females	Males
p=0.492	p=0.244	p=1.00	p=0.655	p=0.588	p=1.000	p=0.257	p<0.001	p=0.013

Graph 33 shows the distribution of the main types of modification across the sexes for each location. Once more, the patterns for each location are relatively similar between men and women, suggesting that they are subjected to the same type of modification.



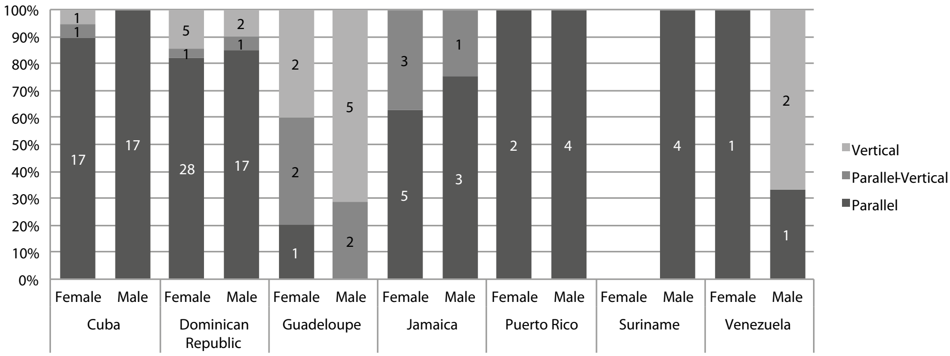
Graph 33 **Comparison of the relation between modification type and biological sex per location.**

This is confirmed by the non-significant results of Fisher's exact tests executed for each location seen in Table 33. The significant differences between male and female patterns from different locations show the variation in the pattern is due to local differences in practice, not the sex of an individual.

Table 33 **Results of comparative analysis of sex and modification type using Fisher's exact tests.**

Cuba	Dominican Republic	Guadeloupe	Jamaica	Puerto Rico	Suriname	Venezuela	Females	Males
p=0.651	p=0.218	p=0.800	p=0.604	p=1.000	X	p=1.000	p<0.001	p=0.001

A relationship between subtype and sex for each location can be seen in Graph 34. The local patterns are once again very similar, although there is some variation particularly on Guadeloupe.



Graph 34 **Comparison of the relation between modification subtype and biological sex per location.**

The separate Fisher's exact tests have produced non-significant results for the locations as can be seen in Table 34. No tests could be executed for Puerto Rico and Suriname, as the first only has one subtype and the second sample doesn't contain females. Comparing all female and male patterns with one another does produce significant results, suggestion regional variation in type although this is not related to the sex of the individual.

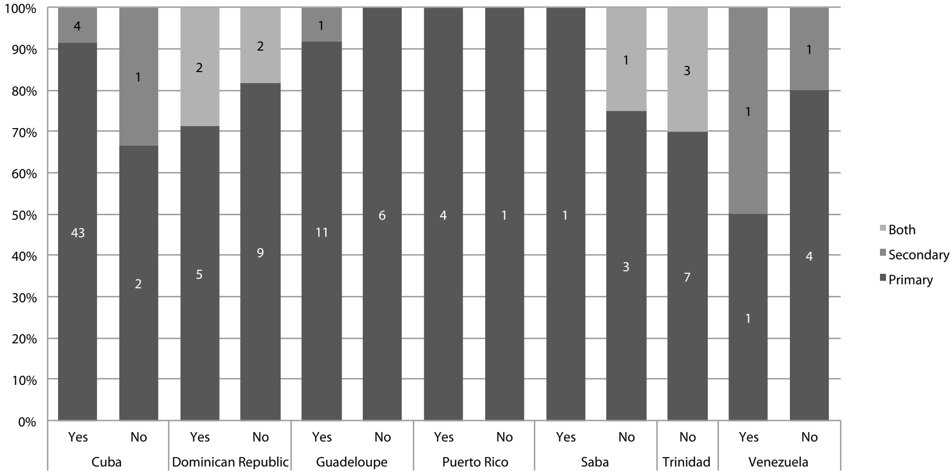
Table 34 **Results of comparative analysis of sex and modification subtype using Fisher's exact tests.**

Cuba	Dominican Republic	Guadeloupe	Jamaica	Puerto Rico	Suriname	Venezuela	Females	Males
p=1.000	p=1.000	p=0.381	p=0.580	X	X	p=1.000	p=0.035	p<0.001

Burial Practices

This section will look at different burial practices, including burial type, the position and orientation of the body in the grave, grave goods and, if available, strontium isotope data.

An overview of the different burial types encountered, split per location and modification status, is shown in Graph 35. Burial practices in the Caribbean region are varied with different patterns seen on each location, although primary inhumation seems to be the predominant manner of burial throughout the region.



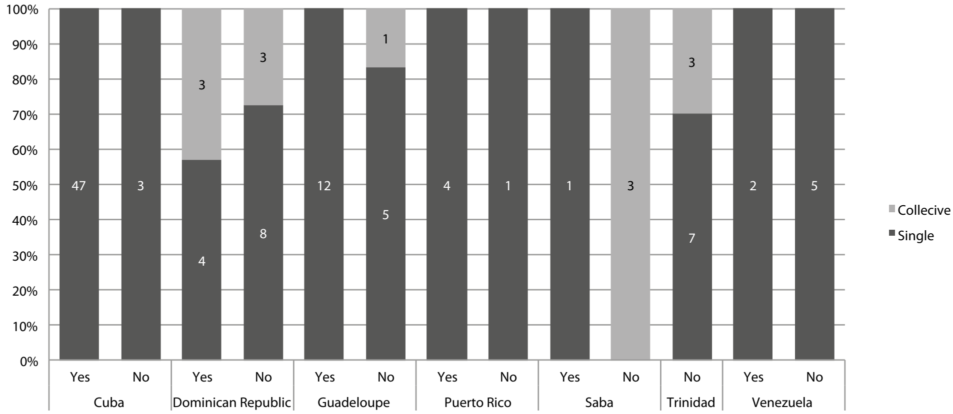
Graph 35 **Relation between the type of burial and cranial modification per location.**

All Fisher's exact tests show an insignificant result, with the exception of the comparison of all modified individuals, as can be seen in Table 35. Puerto Rico and Trinidad could not be analysed, because the former only had primary inhumations and the latter had no modified individuals. The significant result for the modified subset of the population is likely due to regional variation in burial practices not related to cranial modification.

Table 35 **Results of comparative analysis of burial type and modification using Fisher's exact tests.**

Cuba	Dominican Republic	Guadeloupe	Puerto Rico	Saba	Trinidad	Venezuela	Modified	Non-Modified
p=0.276	p=1.000	p=1.000	X	p=1.000	X	p=1.000	p=0.070	p=0.432

The amount of single and collective burials is shown per modification category for each location in Graph 36. The majority of the sample has been buried in an individual grave, but some locations show evidence of collective burial practices.



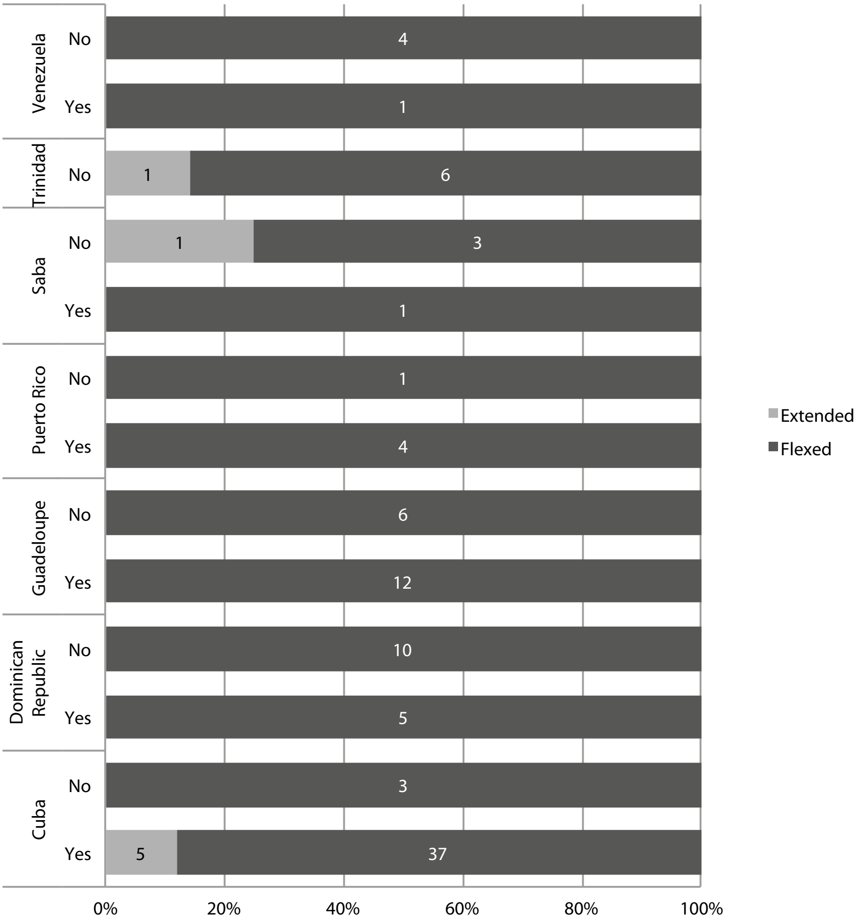
Graph 36 **Relation between the amount of individuals in a grave and cranial modification per location.**

Fisher's exact tests were carried out to determine if intra-location differences exist in these ratios and to compare the ratios of the modified and non-modified groups between the locations. Cuba, Puerto Rico, and Venezuela could not be analysed for variation within these locations as only a single burials were found and Trinidad could not be tested as only non-modified individuals are present. The results can be seen in Table 36. There are no significant differences within each site, but there is a significant variation between the modified individuals. This is likely due to the fact that collective burials with modified individuals were only found on the Dominican Republic.

Table 36 **Results of comparative analysis of modification and collective or single burial using Fisher's exact tests.**

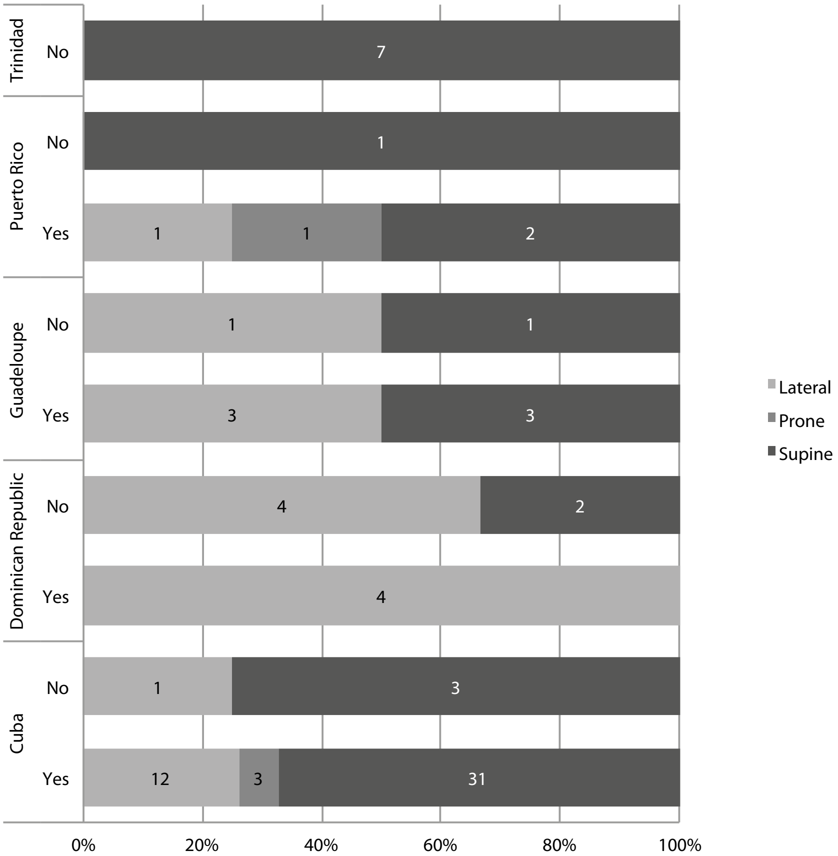
Cuba	Dominican Republic	Guadeloupe	Puerto Rico	Saba	Trinidad	Venezuela	Modified	Non-Modified
X	p=0.627	p=0.333	X	p=0.250	X	X	p=0.003	p=0.090

The burial position within the grave has been shown in Graph 37 for each location and modification status. It is immediately apparent that the majority of individuals were buried in a flexed position, regardless of location. Fisher's exact tests were executed to determine whether there were differences in burial patterns between the different islands in the modified and non-modified subset. The respective results, p=0.894 and p=0.275, are not statistically significant, meaning there are no observed differences in burial pattern related to cranial modification and location.



Graph 37 **Relation between body position and cranial modification per location.**

The relation between cranial modification, location, and the orientation of the body in the grave can be seen in Graph 38. Supine and lateral seem to be two frequent orientations, whereas prone burial is relatively rare.



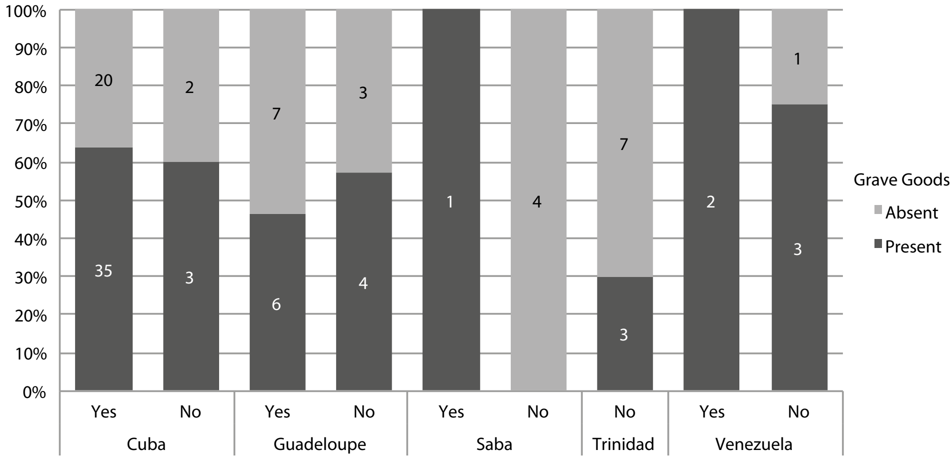
Graph 38 **Relation between body orientation and cranial modification per location.**

Fisher's exact tests were carried out to determine if different patterns exist between cranial modification categories on each island or when comparing the body orientation on different locations for modified and non-modified populations. The results can be seen in Table 37. The non-significant values for all intra-island comparisons suggest no differences exist in the patterns of body orientation on each island. The barely significant *p*-value for modified and just short of significant *p*-value for non-modified individuals indicate there are regional differences in body orientation, although these do not appear to be related to cranial modification.

Table 37 **Results of comparative analysis of body orientation and modification using Fisher's exact tests.**

Cuba	Dominican Republic	Guadeloupe	Puerto Rico	Trinidad	Modified	Non-Modified
p=1.000	p=0.467	p=1.000	p=1.000	X	p=0.046	p=0.053

The relation between cranial modification status and grave goods has been depicted in Graph 39 for each island. Two Fisher's exact tests were executed: one comparing the ratio of grave goods in the modified and the second in the non-modified subset of the population with results of p=0.397 and p=0.184, respectively. Both results are not statistically significant, indicating no substantial differences exist between the patterns seen on different islands in relation to head shaping.

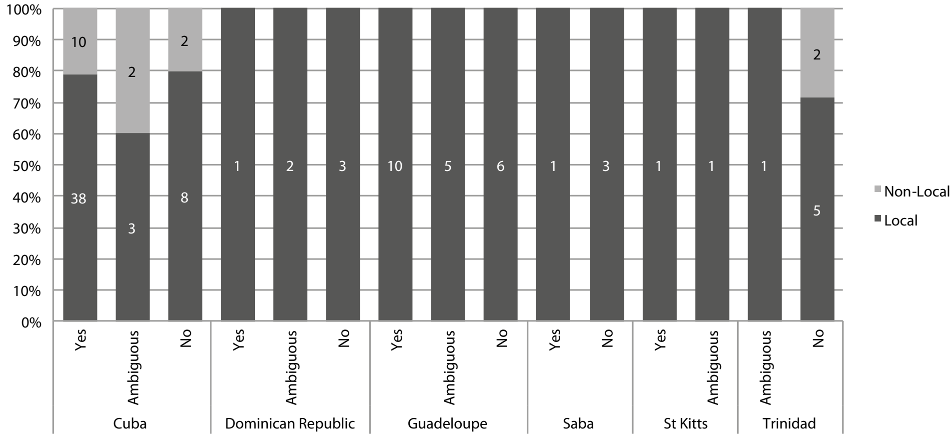


Graph 39 **Distribution of grave goods in relation to cranial modification per location.**

Isotopes

Strontium isotope data was available for part of the sample from a study into migration and mobility in the Caribbean through stable isotope analysis by Jason Laffoon (2012). The strontium ratio extracted from tooth enamel was compared to the local range, based on environmental and faunal data to determine whether an individual fit the local range or was of non-local origin. The former is not necessarily an indication of local birth, as ranges of different locations in the Caribbean overlap. Please refer to Laffoon (2012) for the original data and full procedure.

The relationship between the outcome of the strontium isotope analyses and the data on cranial modification can be seen for each island in Graph 40. The vast majority of individuals for whom isotope data is available have a signature within the local range. There are no apparent patterns in the absence or presence of cranial modification related to origin of individuals.



Graph 40 **Relation between isotopic signature and intentional cranial modification per location.**

Regional Trends

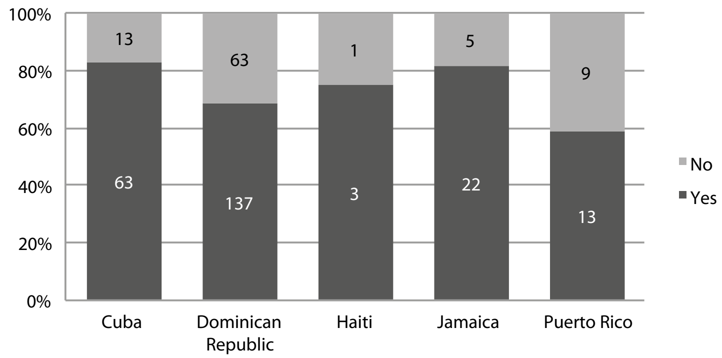
Contrasting the data from each location in the sample has shown that different patterns of prevalence, type, subtype, sex, and several burial practices exist and that this variety may have a spatial component. To evaluate these divisions, the sample will combine locations into three distinct regions. Previous archaeological and historical work has indicated differences between the Greater and Lesser Antilles. Furthermore, despite connections with the archipelago, mainland communities can also be considered as a separate region. This section will look for patterns within and between the different regions to gain a better understanding of where potential boundaries lie, although such boundaries should never be conceived to be static or impermeable in a region as dynamic and connected as the Caribbean.

Greater Antilles

This section looks at the Greater Antilles, composed of Cuba, the Dominican Republic, Haiti, Jamaica, and Puerto Rico. Each theme will start with an intra-regional comparison of different locations to determine whether the patterns seen are similar and will then combine the data from different locations to present general trends for the region.

Prevalence

The adjusted prevalence for each of the Great Antillean islands is displayed in Graph 41. The graph shows that the prevalence rates for modification are relatively high and range between 60 and 85 percent. A Fisher's exact test was executed to determine whether these rates were substantially different between the islands. The resulting $p=0.052$ is almost significant indicating that the minor differences in the rates, particularly the difference between Cuba and Puerto Rico, are important but that the overall pattern of cranial modification is not significantly different within the Great Antilles.



Graph 41 **The prevalence of cranial modification for each location in the Greater Antilles.**

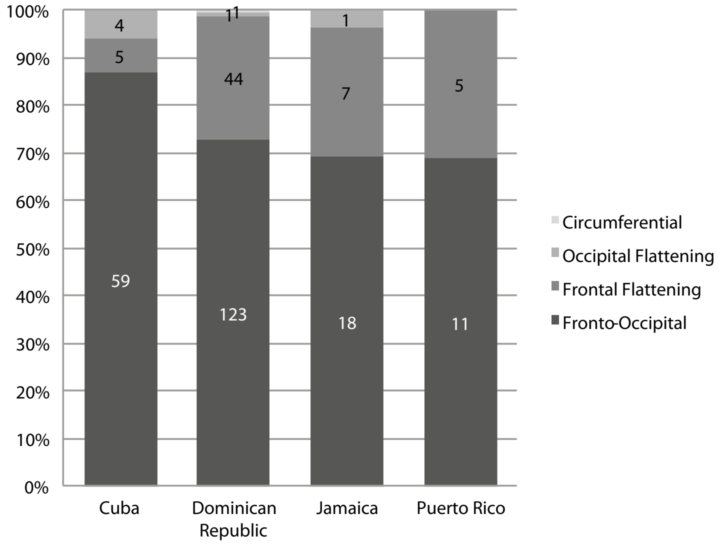
The overall prevalence of cranial modification in the Greater Antilles as a whole can be seen in Table 38. The adjusted prevalence shows that the vast majority of individuals in the Greater Antilles were subjected to the practice of cranial modification. Approximately a quarter of individuals did not show any signs of alteration to the cranial shape.

Table 38 **Prevalence of intentional cranial modification in the Greater Antilles.**

ICM	Number	Prevalence (%)	Adjusted Prevalence (%)
Yes	238	60.10	72.34
Ambiguous	67	16.92	
No	91	22.98	27.66

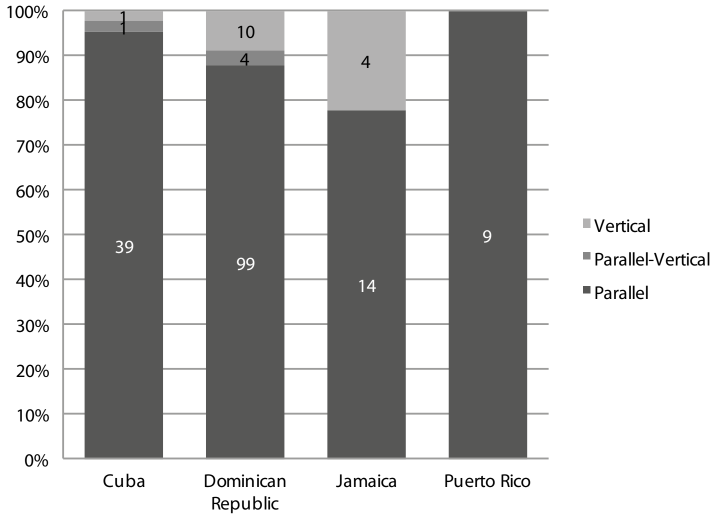
Shape

The cranial shapes encountered in the Greater Antillean population are shown for each island in Graph 42. The main form in every location is fronto-occipital modification, followed by a minor share of frontal flattening. A Fisher's exact test produced a $p=0.005$, indicating substantial differences exist.



Graph 42 **Types of cranial modification found per location in the Greater Antilles.**

Graph 43 shows the subtypes of modification for each island in the Greater Antilles. The majority of cases are classified as parallel. A Fisher's exact test produced a *p*=0.284, indicating no significant differences between the islands.



Graph 43 **Subtypes of cranial modification found per location in the Greater Antilles.**

An overview of the cranial shapes encountered in the Greater Antilles can be seen in Table 39. An outright majority of 77% of all individuals have cranial shapes of the fronto-occipital type. Of these, about three-quarters (74%) are of the parallel subtype. In the overall count, the fronto-occipital parallel crania account for 57% of all modification encountered in the Greater Antilles. Clearly, the fronto-occipital parallel type is the predominant type found in the region. Parallel-vertical and vertical subtypes of fronto-occipital modification are also present but in much lower numbers.

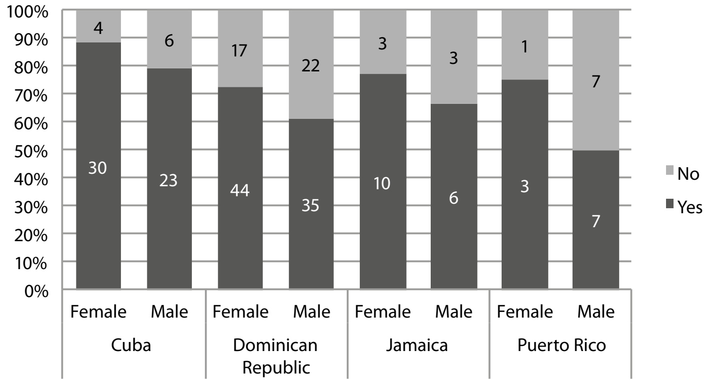
The second most common main type is frontal flattening, which accounts for just under 20% of all modified crania. Fronto-occipital modification and frontal flattening share a plane of pressure on the frontal bone which creates a sloping forehead. Viewed from the front, these types cannot be distinguished and during life they would have looked rather similar. It is clear from the overview in Table 39 that the remainder of modification types is only present in very small numbers of individuals, in some cases below a single percentage point, on this regional level.

Table 39 **Overview of modification types and subtypes found in the Greater Antilles.**

Type	Subtype	Number of Individuals	Percentage
Fronto-Occipital	Parallel	136	57.14
	Parallel-Vertical	5	2.10
	Vertical	13	5.46
	Undetermined	29	12.18
Frontal Flattening		46	19.33
Occipital Flattening	Parallel	2	0.84
	Vertical	0	0.00
	Parallel-Vertical	0	0.00
	Undetermined	3	1.26
Circumferential	Parallel	1	0.42
Positional Plagiocephaly		2	0.84
Undetermined	Undetermined	1	0.42
Total		238	100.00

Sex

The prevalence rates of males and females are shown in Graph 44 for each location in the Greater Antilles. Rates seem relatively similar within each location, although there is minor variation between different locations within the region.



Graph 44 **Cranial modification and biological sex for each location in the Greater Antilles.**

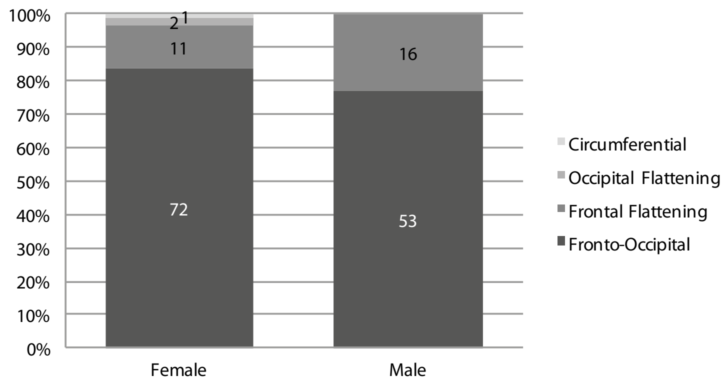
Several Fisher's exact tests were executed to determine whether there was a significant difference between the proportion of cranial modification among males and females on each island and to compare the ratios of females and males on different islands. The results can be seen in Table 40. None of the results are statistically significant, meaning there are no differences within or between the islands of the Greater Antilles.

Table 40 **Results of comparative analysis of sex and modification rates using Fisher's exact tests.**

Cuba	Dominican Republic	Jamaica	Puerto Rico	Females	Males
p=0.492	p=0.244	p=0.655	p=0.588	p=0.275	p=0.212

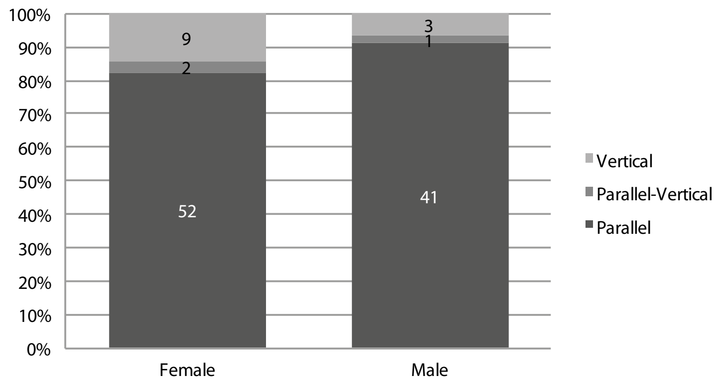
Graph 45 shows the distribution of different types of modification among the male and female inhabitants of the Greater Antilles. There are two dominant types, fronto-occipital modification and to a lesser degree frontal flattening. Females seem to have a little more variety in modification type, with occipital and circumferential modification also present.

A Fisher's exact test was executed to determine whether there was a significant relation between the main type of modification and sex of an individual. The resulting p=0.116 indicates this is not the case.



Graph 45 Comparison of the relation between modification type and biological sex in the Greater Antilles.

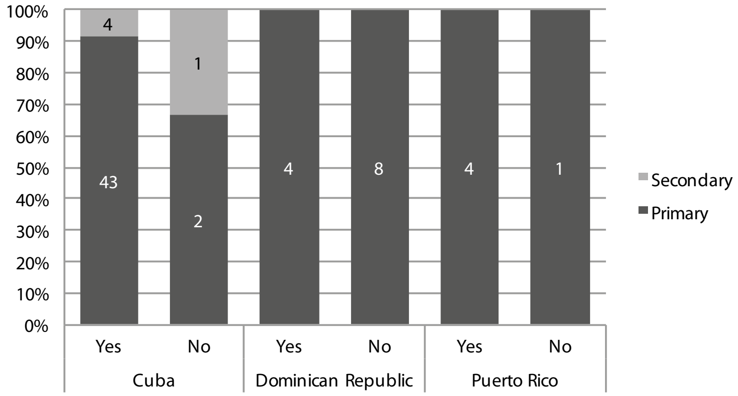
The relationship between subtype of modification and the sex of an individual is depicted in Graph 46. The predominant orientation of occipital flattening is parallel and the patterns seen among males and females look very similar. This is confirmed by the non-significant p=0.523 result produced by the Fisher's exact test.



Graph 46 Comparison of the relation between modification subtype and biological sex in the Greater Antilles.

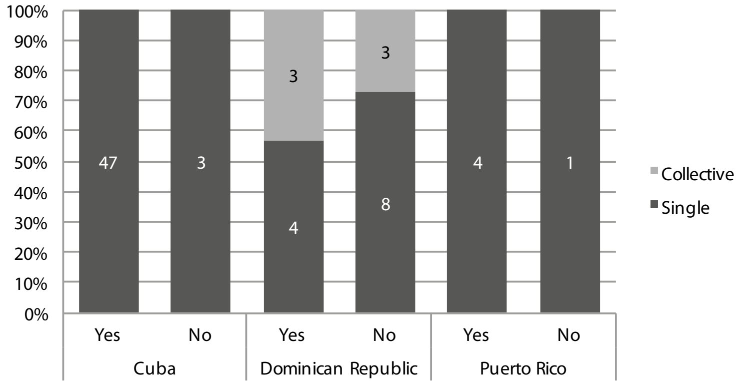
Burial Practices

A variety of burial practices was encountered in the Greater Antilles. Graph 47 shows the burial types per island and modification category. Jamaica is not represented in this section, as all individuals with known provenance from the island in this sample were found in cave contexts. The nature of caves deposits hinders the recognition of burial practices and reports often do not provide detailed information on the type of burial or the position of the body. Cave burials are part of the repertoire on each of the Greater Antilles, although nowhere as ubiquitous as on Jamaica. The dominant form of burial is primary inhumation. A Fisher's exact test provided a p=0.546, indicating no significant differences exist between the islands.



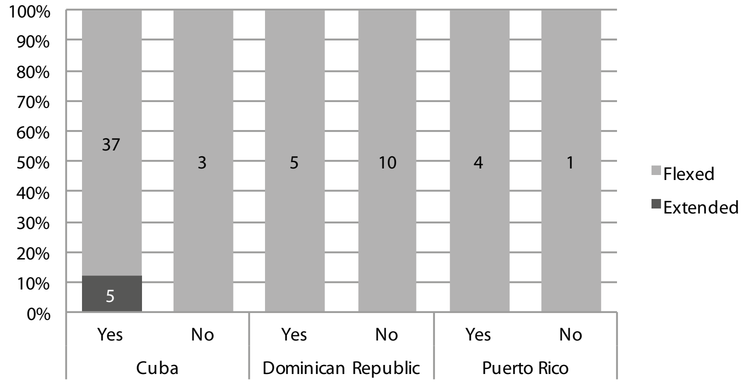
Graph 47 **Relation between the type of burial and cranial modification per location in the Greater Antilles.**

Most burials in the Greater Antilles contain a single individual, as can be seen in Graph 48. Collective burials have been found in the Dominican Republic and contain both modified and non-modified individuals. A Fisher's exact test provides a p=0.001, indicating significant differences exist. This is likely due to the fact that collective burials were found solely in the Dominican Republic in this sample and not related to a trend between the burial practice and cranial modification.



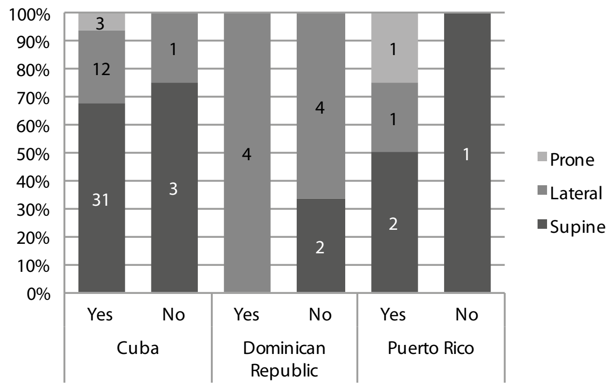
Graph 48 **Relation between cranial modification and single or collective burial per location in the Greater Antilles.**

Almost all individuals in the Greater Antilles have been found in a flexed position as can be seen in Graph 49, with the exception of five extended burials in early-colonial Cuba. A Fisher's exact test confirmed the lack of pattern with a non-significant p=0.864.



Graph 49 **Relation between body position and cranial modification per location in the Greater Antilles.**

The orientation of the body within the grave, on the other hand, shows substantial variation both within and between islands, as can be seen in Graph 50.



Graph 50 **Relation between body orientation and cranial modification per location.**

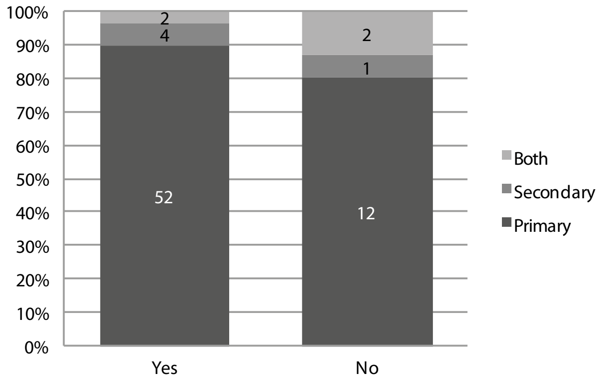
Several Fisher's exact tests were run to determine if a significant relation exists between the two factors within each region and between the different locations. The results can be seen in Table 41. No significant differences were found within each region or when comparing all non-modified individuals. The significant result for the modified subset is likely due to regional variation in the position of the body that is unrelated to cranial modification.

Table 41 **Results of comparative analysis of body orientation and modification using Fisher's exact tests.**

Cuba	Dominican Republic	Puerto Rico	Modified	Non-Modified
p=1.000	p=0.467	p=1.000	p=0.022	p=0.372

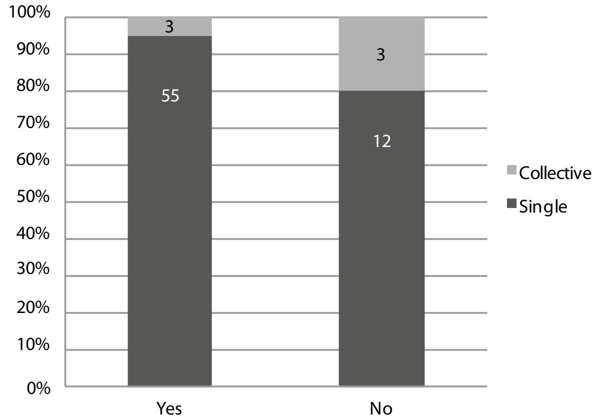
Contrasting the burial patterns from the islands of the Greater Antilles has shown both differences and similarities. The data is now grouped together to present and evaluate trends from the region as a whole.

The relation between the type of burial and the modification status of an individual is displayed in Graph 51. At first glance, the proportion seems to be quite similar regardless of cranial modification. A Fisher's exact test was carried out to determine whether there were any statistically significant differences in the ratios. The outcome of p=0.233 is not statistically significant, indicating that the null hypothesis cannot be rejected and that there are no differences in burial types between the groups.



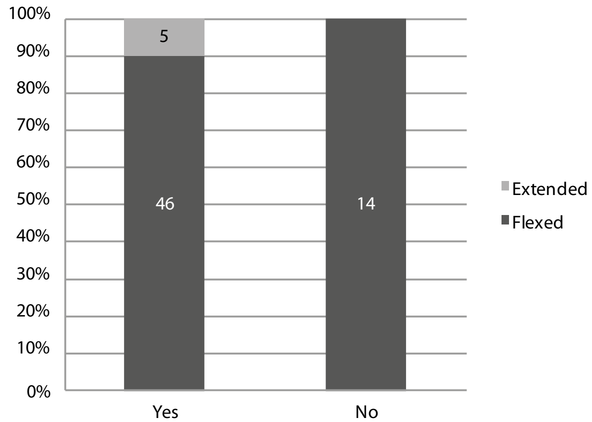
Graph 51 **Relation between the type of burial and cranial modification in the Greater Antilles.**

Graph 52 shows that the vast majority of individuals in the Greater Antilles were found in an individual grave and only a handful of collective burial contexts are present. A Fisher's exact test produced a p=0.097, indicating that no significant relation exists between the amount of individuals in the grave and cranial modification.



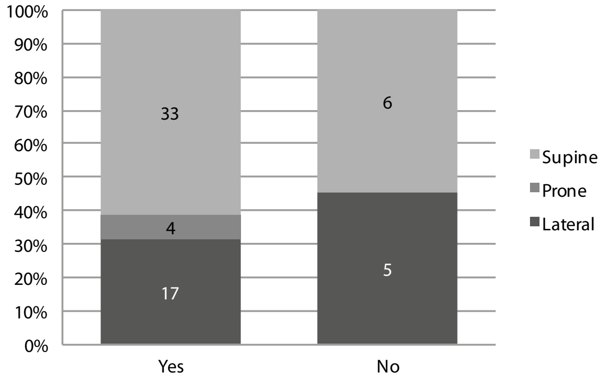
Graph 52 **Relation between cranial modification and single or collective burials in the Greater Antilles.**

Graph 53 displays the burial position in relation to the modification status. It shows that the overall majority of individuals were found in a flexed position regardless of their cranial shape. A Fisher's exact test confirmed the absence of a trend in burial position with a statistically non-significant outcome of p=0.576.



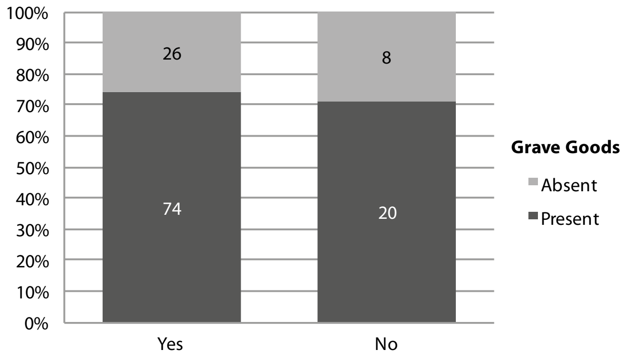
Graph 53 **Relation between body position and cranial modification in the Greater Antilles.**

The orientation of the body within the grave shows much more variety, as can be seen in Graph 54. Supine and lateral positions seem to dominate the Greater Antillean burial record. A Fisher's exact test was run to determine whether there was a relation between cranial modification and burial orientation. The outcome of p=0.556 is not statistically significant, indicating no relationship was encountered.



Graph 54 **Relation between body orientation and cranial modification in the Greater Antilles.**

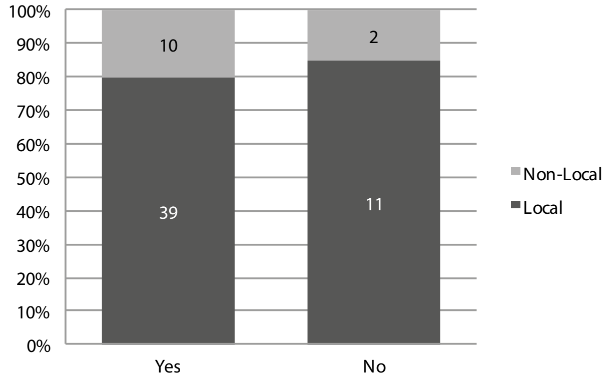
The distribution of grave goods and cranial modification in the Greater Antillean sample can be seen in Graph 55. A first glance indicates ratios are very similar in both modification categories. This is confirmed by a Fisher's exact test, with an outcome of p=0.811 clearly confirming the lack of a relation between grave goods and cranial modification.



Graph 55 **Distribution of grave goods in relation to cranial modification in the Greater Antilles.**

Isotopes

The outcome of the strontium isotope analysis of dental enamel is compared to the information gathered on intentional cranial modification in Graph 56. It shows that the provenience produced by strontium isotope analysis is relatively similar across all modification categories. This is confirmed by the non-significant p=1.000 value produced by a Fisher's exact test.



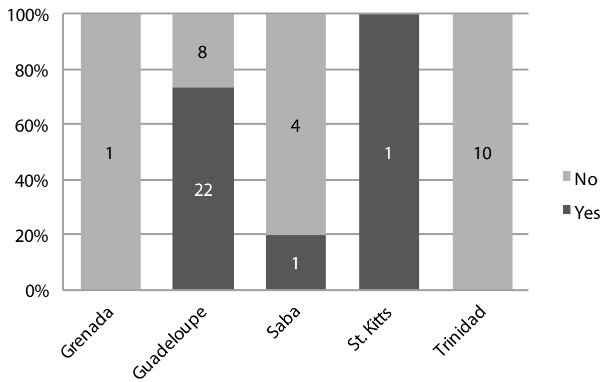
Graph 56 Relation between isotopic signature and cranial modification in the Greater Antilles.

Lesser Antilles

The Lesser Antillean island chain consists of a large number of small islands and is underrepresented in this sample for reasons previously discussed. This section discusses the combined results of the skeletal assemblages from the region which were available for study originating from the islands of Grenada, Guadeloupe, Saba, St. Kitts, and Trinidad.

Prevalence

The adjusted prevalence rates of cranial modification per island in the Lesser Antillean arc are shown in Graph 57. The adjusted prevalence, which is calculated by removing the ambiguous cases, is a better representation of the situation in the Lesser Antilles due to the poor preservation of crania that has resulted in a relatively high number of ambiguous cases. Unfortunately, this does reduce the sample size even further.

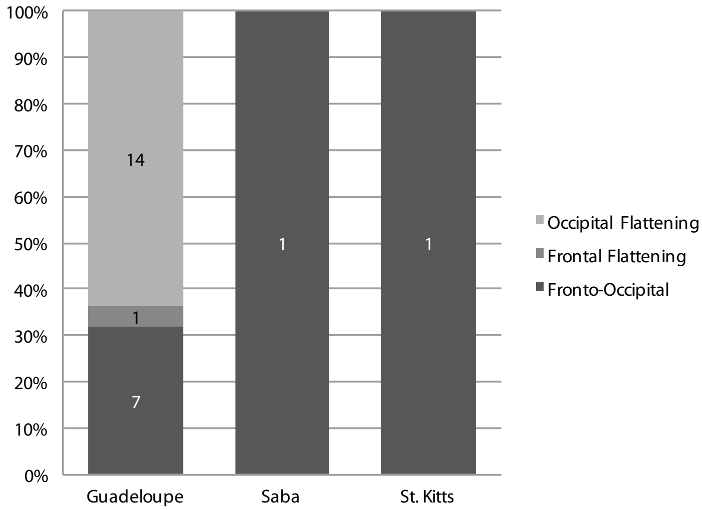


Graph 57 The prevalence of cranial modification for each location in the Lesser Antilles.

A Fisher's exact test produced a significant result of $p<0.001$. This suggests that there are significant differences between the rates of modification observed on the different islands, which is supported visually by the graph. This combined with the great variation in prevalence rates ranging from 0% up to 67% for different sites in the region, suggests combining these sites into a single regional unit is inappropriate.

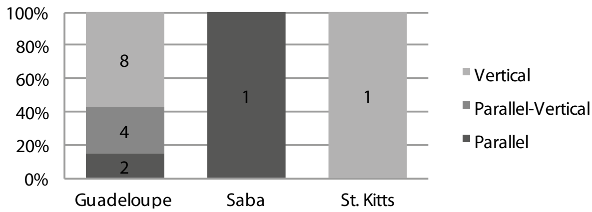
Shape

The main types of cranial modification encountered on the islands of the Lesser Antilles can be seen in Graph 58. The small sample size of three out of four available assemblages make statistical analysis unreliable. Still, Graph 58 shows fronto-occipital modification is present on all Lesser Antillean islands, but there is also some variation in shape, particularly on Guadeloupe.



Graph 58 **Types of cranial modification found per location in the Lesser Antilles.**

The distribution of the different subtypes in each location can be seen in Graph 59. The same issues regarding sample size hinder successful statistical analysis of the subtype, but the graph shows a relatively large diversity in subtypes given the small sample size.



Graph 59 **Subtypes of cranial modification found per location in the Lesser Antilles.**

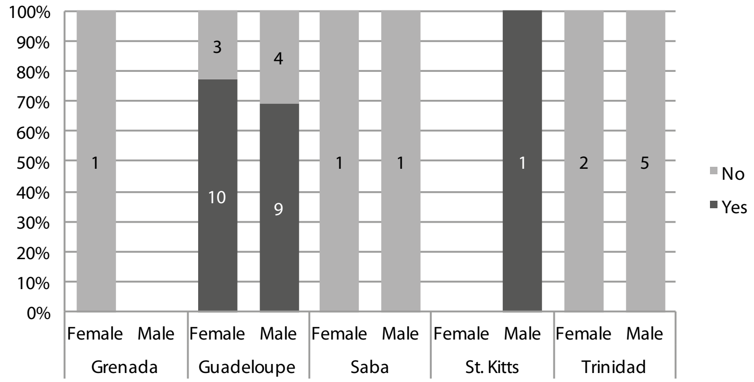
An overview of the cranial modification types and subtypes encountered in the skeletal assemblages from the Lesser Antilles can be seen in Table 42. This shows the variety in cranial shapes present in the region, each represented by relatively low numbers and percentages. The small sample size, resulting from a limited number of assemblages available and poor preservation in some Lesser Antillean samples, should be taken into account. Despite this, it is clear that modification styles seem to be more varied in the Lesser Antilles.

Table 42 **Overview of modification types and subtypes found in the Lesser Antilles.**

Type	Subtype	Number of Individuals	Percentage
Fronto-Occipital	Parallel	1	4.17
	Parallel-Vertical	3	12.50
	Vertical	4	16.67
	Undetermined	1	4.17
Frontal Flattening		1	4.17
Occipital Flattening	Parallel	2	8.33
	Parallel-Vertical	1	4.17
	Vertical	5	20.83
	Undetermined	6	25.00
Total		24	100.00

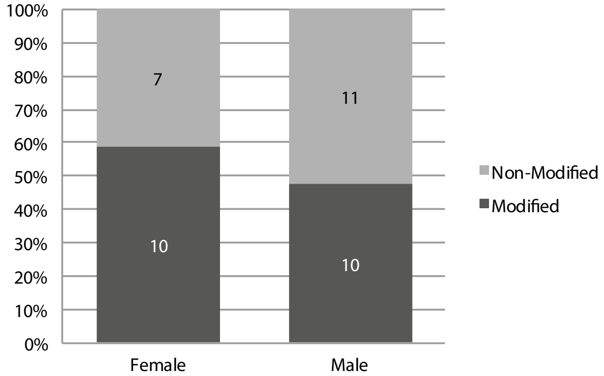
Sex

The potential relation between biological sex and modification practices was investigated for the Lesser Antillean sample. Graph 60 shows the division for each location and the problems with small sample size are immediately apparent. The ratios were statistically tested for Guadeloupe, the only island with a representative sample. The Fisher's exact test returned a p=1.000, indicating no relationship exists between sex and cranial modification in that sample.



Graph 60 **Cranial modification and biological sex for each location in the Lesser Antilles.**

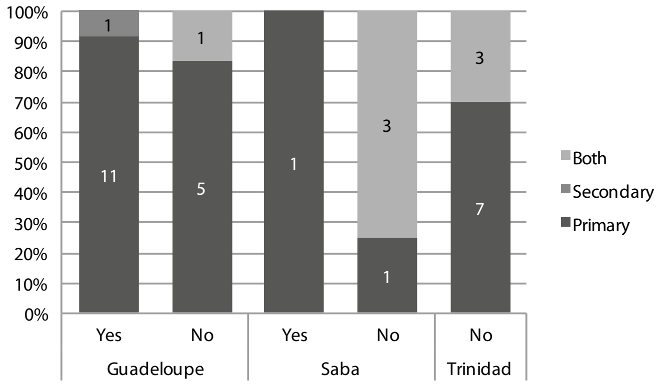
Combining all data for the Lesser Antilles provides a better sample size as can be seen in Graph 61. A Fisher's exact test was executed to determine if there was a significant difference between males and females. The outcome of p=0.532 indicates that there is no statistically significant difference in the presence or absence of modification in relation to biological sex.



Graph 61 **Cranial modification and biological sex in the Lesser Antilles.**

Burial Practices

Graph 62 shows the type of burial found in relation to the modification status of the individual and the island of origin. Primary burial seems to be the main type, with a handful of collective burials and a single case of secondary burial.



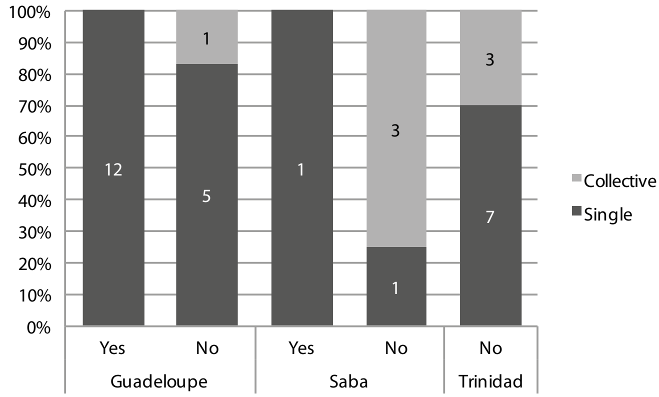
Graph 62 **Relation between the type of burial and cranial modification per location in the Lesser Antilles.**

Several Fisher's exact tests were executed to determine if a significant relationship exists between location, modification, and the type of burial. The results can be seen in Table 43. Trinidad could not be analysed separately, as only non-modified individuals compose the dataset. All results are non-significant, indicating no meaningful relation was found.

Table 43 Results of comparative analysis of burial type and modification using Fisher's exact tests.

Guadeloupe	Saba	Trinidad	Modified	Non-Modified
p=0.569	p=0.400	X	p=1.000	p=-0.226

Graph 63 shows the relation between cranial modification and the amount of individuals in a grave for each location. All cases of collective burial involve individuals without cranial modification.



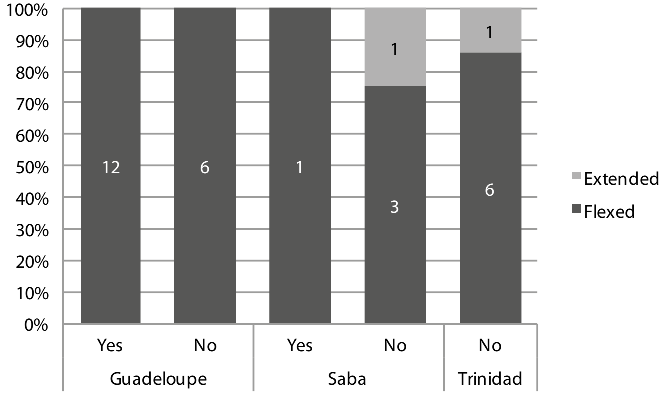
Graph 63 Relation between cranial modification and single or collective burials per location in the Lesser Antilles.

Several Fisher's exact tests were executed to see if statistically significant patterns exist. The result can be seen in Table 44. Analysis could not be executed for Trinidad and the modified subset of the population, since only one category is present. The missing data severely hampers the analysis of this interesting trend, but this may be resolved by pooling the data.

Table 44 Results of comparative analysis of modification and collective or single burial using Fisher's exact tests.

Guadeloupe	Saba	Trinidad	Modified	Non-Modified
p=0.333	p=0.400	X	X	p=0.226

Graph 64 shows the position of the body in the grave in relation to modification status for three Lesser Antillean islands. The flexed position is dominant, with only two cases of extended burial recorded.



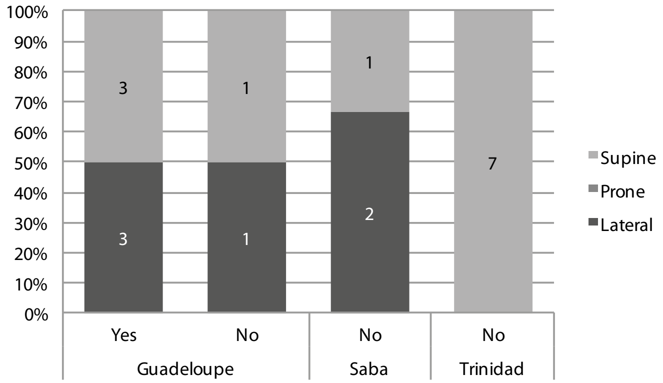
Graph 64 **Relation between body position and cranial modification per location in the Lesser Antilles.**

Fisher's exact tests were carried out to analyse the potential relations and the results can be seen in Table 45. Again, the tests are hampered by the fact that only non-modified individuals are present in Trinidad. None of the resulting *p*-values are significant, indicating no relation can be made between burial position and cranial modification.

Table 45 **Results of comparative analysis of body position and modification using Fisher's exact tests.**

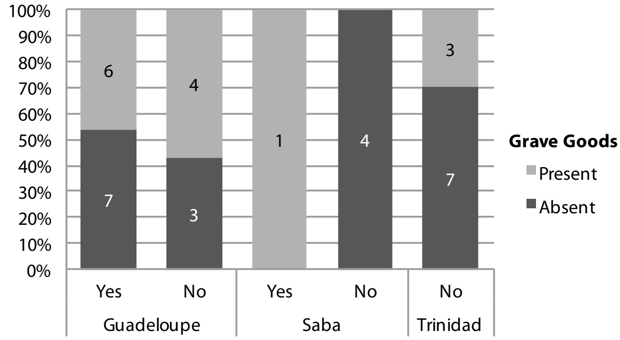
Guadeloupe	Saba	Trinidad	Modified	Non-Modified
p=1.000	p=1.000	X	p=1.000	p=0.691

The orientation of the body in the grave is related to cranial modification and shown for each location in Graph 65. The only data available for modified individuals comes from Guadeloupe, meaning no comparative analysis can be executed. Visually, the data from Guadeloupe and Saba look very similar, whereas the absence of lateral burials on Trinidad is interesting.



Graph 65 **Relation between body orientation and cranial modification per location in the Lesser Antilles.**

The relation between grave goods and cranial modification for the three Lesser Antillean islands is depicted in Graph 66. This patterns shows some variation, but is based on relatively small sample sizes.



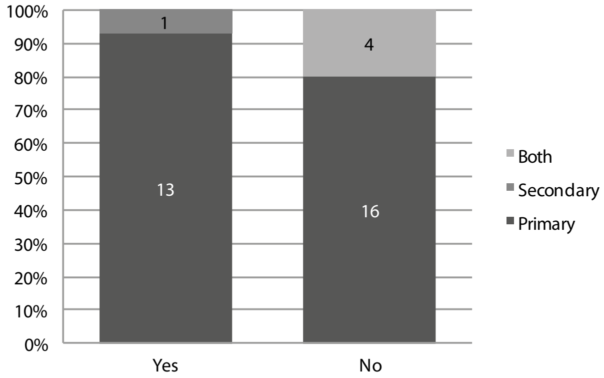
Graph 66 **Distribution of grave goods in relation to cranial modification per location in the Lesser Antilles.**

Several Fisher's exact tests were executed to determine differences within and between the islands, the results of which can be seen in Table 46. None of the p-values are significant, indicating no relationships exist between cranial modification and grave goods.

Table 46 **Results of comparative analysis of grave goods and modification using Fisher's exact tests.**

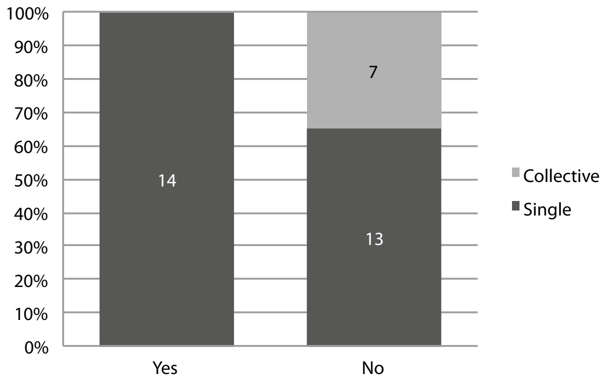
Guadeloupe	Saba	Modified	Non-Modified
p=1.000	p=0.200	p=1.00	p=0.193

The majority of individuals from the Lesser Antilles in this sample were found in a primary burial context, as can be seen in Graph 67. A Fisher's exact test was executed to determine whether there is a relationship between burial type and cranial modification. The outcome of p=0.044 is barely statistically significant, indicating a significant difference in the proportion of burial contexts among the modification groups. The high number of graves with primary and secondary inhumations in the non-modified subset of the population warrants discussion in this regard.



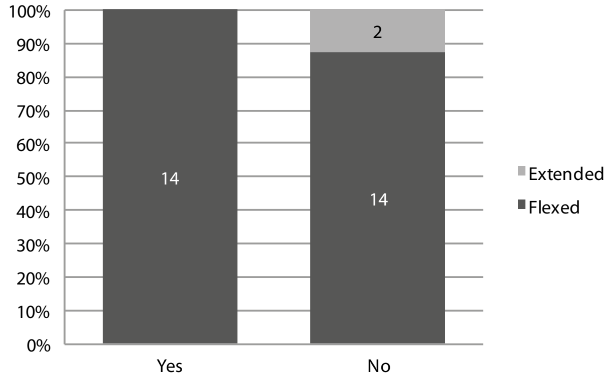
Graph 67 **Relation between type of burial and cranial modification in the Lesser Antilles.**

Most of the individuals from the Lesser Antilles were found buried in an individual grave. A handful of collective burials were encountered, all containing individuals without cranial modification. A Fisher's exact test was executed to determine whether a significant relationship was present. The resulting p=0.026 is statistically significant.



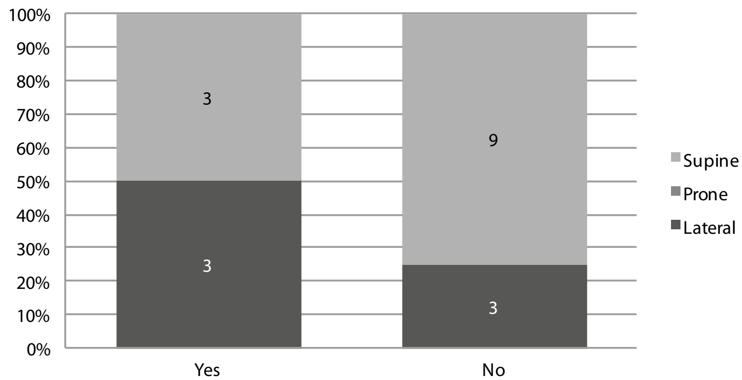
Graph 68 **Relation between cranial modification and single or collective burials in the Lesser Antilles.**

In almost all cases, individuals were found in a flexed position in the grave as can be seen in Graph 69. Only two exceptions of individuals found in extended position were recorded. A Fisher's exact test provided a p=0.485, indicating that the relation between the burial position and cranial modification is not significant.



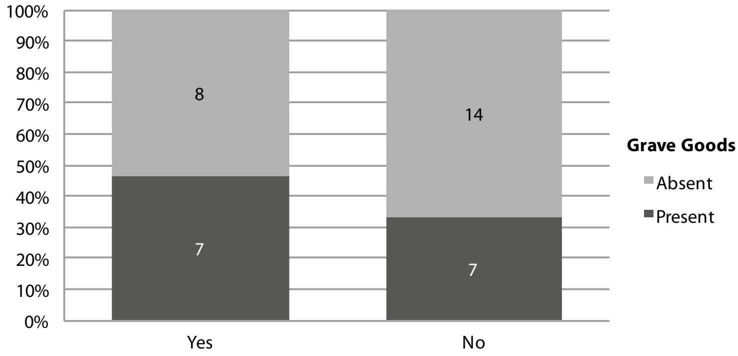
Graph 69 **Relation between body position and cranial modification in the Lesser Antilles.**

Graph 70 shows the orientation of the body within the grave, which shows lateral and supine positions were encountered in the burial record. Individuals without modification are buried more often in a supine position, but this difference is not significant as is confirmed by the outcome of p=0.344 of the Fisher's exact test.



Graph 70 **Relation between body orientation and cranial modification in the Lesser Antilles.**

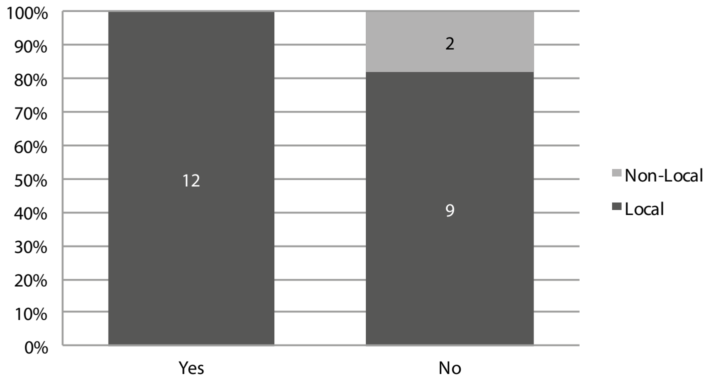
A potential relationship between grave goods within the burial context and cranial modification was investigated. Graph 71 displays the presence or absence of grave goods in relation to modification status. A Fisher's exact test was executed to determine whether a significant relationship was present. The outcome of p= 0.499 does not reach statistical significance and indicates the null hypothesis cannot be rejected.



Graph 71 Distribution of grave goods in relation to cranial modification in the Lesser Antilles.

Isotopes

Strontium isotope data from a study into migration and mobility in the Caribbean by Jason Laffoon (2012) were contrasted to the information in head shaping in the Lesser Antilles in Graph 72. The only two individuals with a non-local strontium signature had no indications of an altered head shape.



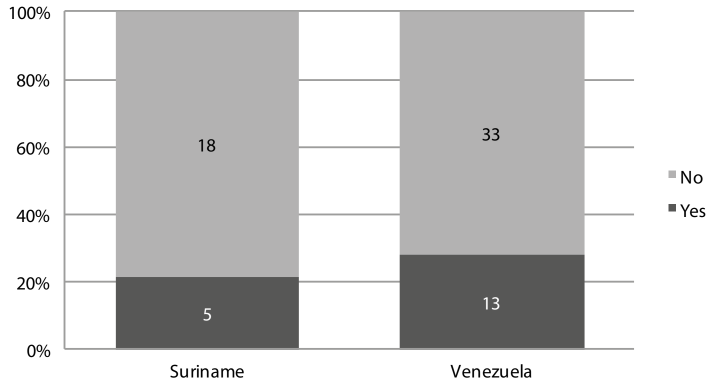
Graph 72 Relation between isotopic signature and cranial modification in the Lesser Antilles.

Mainland

The inhabitants of the adjacent areas of the South American mainland were involved in interactions with the island populations throughout the pre-Columbian period. Several skeletal collections from Suriname and the Lake Valencia Basin in Venezuela were analysed and are grouped here under the mainland region. The scarcity of contextual information for these mainland sites means that burial practices could not be analysed.

Prevalence

Despite being from different locations and cultural traditions, the prevalence rate of Suriname and Venezuela depicted in Graph 73 seems rather similar. A Fisher's exact test provided a non-significant result p=0.772, confirming there is no difference in modification rate between these countries.



Graph 73 **The prevalence of cranial modification for each location on the Caribbean mainland.**

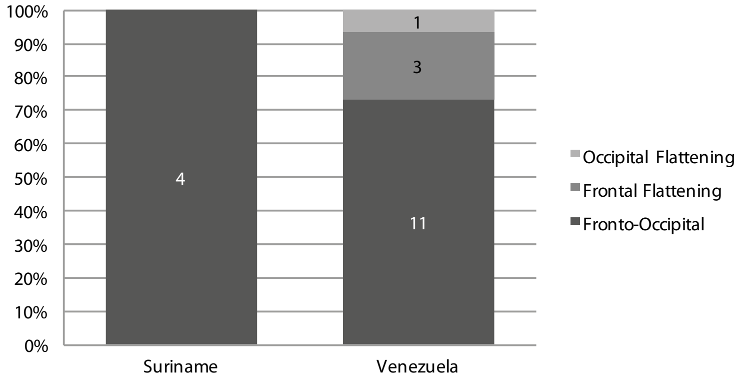
The overall prevalence of cranial modification from the mainland assemblages is provided in Table 47. Notable is the relatively low percentage of modification present.

Table 47 **Prevalence of intentional cranial modification on the Caribbean mainland.**

ICM	Number of Individuals	Prevalence (%)	Adjusted Prevalence (%)
Yes	18	24.00	26.09
Ambiguous	6	8.00	
No	51	68.00	73.91
Total	75	100.00	100.00

Shape

The types of cranial modification found on the mainland are shown per country of origin in Graph 74. Venezuela displays some variation, whilst only fronto-occipital modification was found in Suriname. A Fisher's exact test reports no significant differences with a p=1.000.



Graph 74 **Types of cranial modification found per location on the Caribbean mainland.**

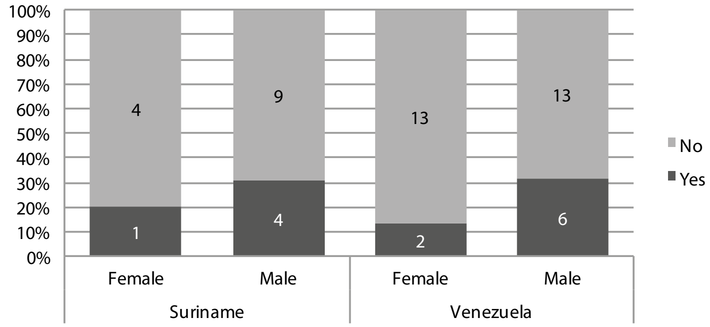
The shapes encountered in the mainland assemblages can be seen in Table 48. The majority of crania can be classified as fronto-occipital modification. There is a clear preference for parallel modification within this group. The remainder of types and subtypes are present in similar low numbers.

Table 48 **Overview of modification types and subtypes found on the Caribbean mainland.**

Type	Subtype	Number of Individuals	Percentage
Fronto-Occipital	Parallel	8	44.44
	Parallel-Vertical	1	5.56
	Vertical	2	11.11
	Undetermined	2	11.11
Frontal Flattening		2	11.11
Occipital Flattening	Vertical	1	5.56
Positional Plagiocephaly		2	11.11
Total		18	100.00

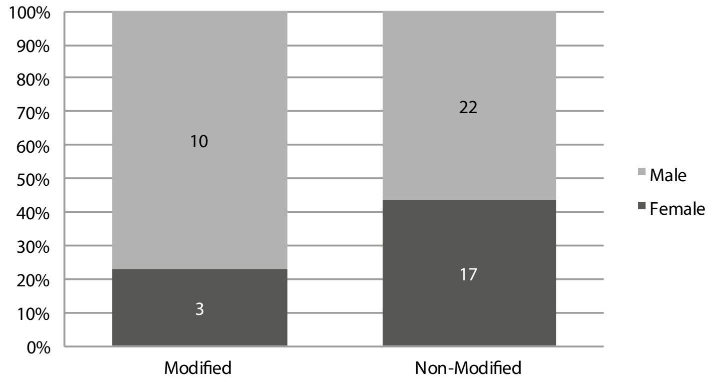
Sex

The relation between sex and cranial modification status is displayed for Suriname and Venezuela in Graph 75. The Fisher's exact tests comparing the intra-location ratios show no significant difference, with a p=1.000 for Suriname and a p=0.257 for Venezuela, respectively. A comparison of the sex distribution between the different locations also yielded a non-significant value of p=1.000 for both females and males. This indicates no differences exist between the within or between the two locations.



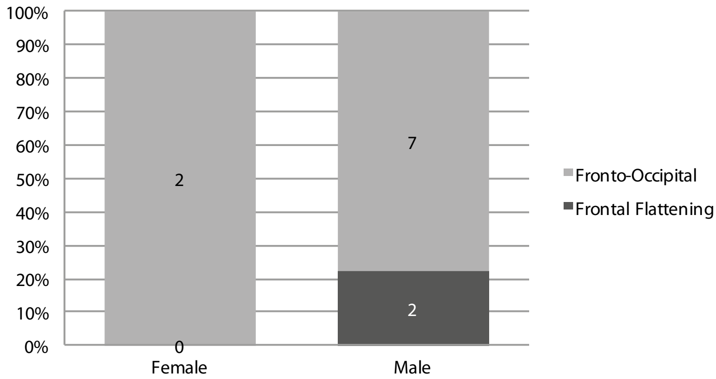
Graph 75 **Cranial modification and biological sex for each location on the Caribbean mainland.**

The relation between modification status and biological sex among mainland populations can be seen in Graph 76. A Fisher's exact test was carried out to determine whether there was a relationship between the two variables. The outcome of p=0.324 indicates there are no significant differences between males and females.



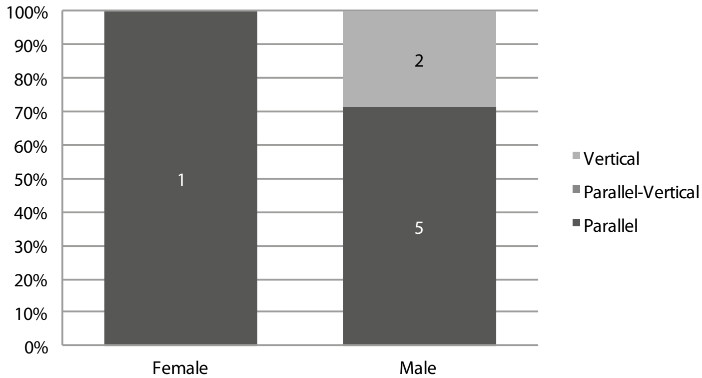
Graph 76 **Cranial modification and biological sex on the Caribbean mainland.**

Graph 77 shows the distribution of different main types of modification between the sexes. Cases of frontal flattening are only found in males, but it should be noted that the number of females in the sample is very limited.



Graph 77 **Type of modification and biological sex on the Caribbean mainland.**

The distribution of the subtypes across the sexes can be seen in Graph 78. Once again, the variation in subtype is only seen in the males, but the female category exists of a single individual.



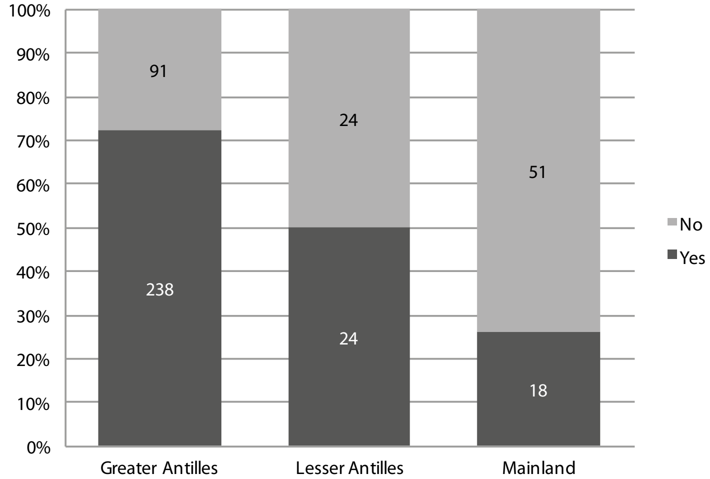
Graph 78 **Subtype of modification and biological sex on the Caribbean mainland.**

Regional Comparisons

The previous sections have shown that the patterns of cranial modification present in the Greater Antilles and on the mainland are fairly consistent. The Lesser Antilles, on the other hand, show more diverse results and this lack of homogeneity casts doubt on considering this region a valid boundary in the case of cranial modification. In this section, the three regions will be compared directly to determine where regions differ substantially.

Prevalence

The regional prevalence rates for the Greater Antilles, Lesser Antilles, and Mainland are depicted in Graph 79. There is clear variation in the prevalence rates between the different regions: the rate seen in the Greater Antilles is relatively high whereas the mainland shows a much lower prevalence.

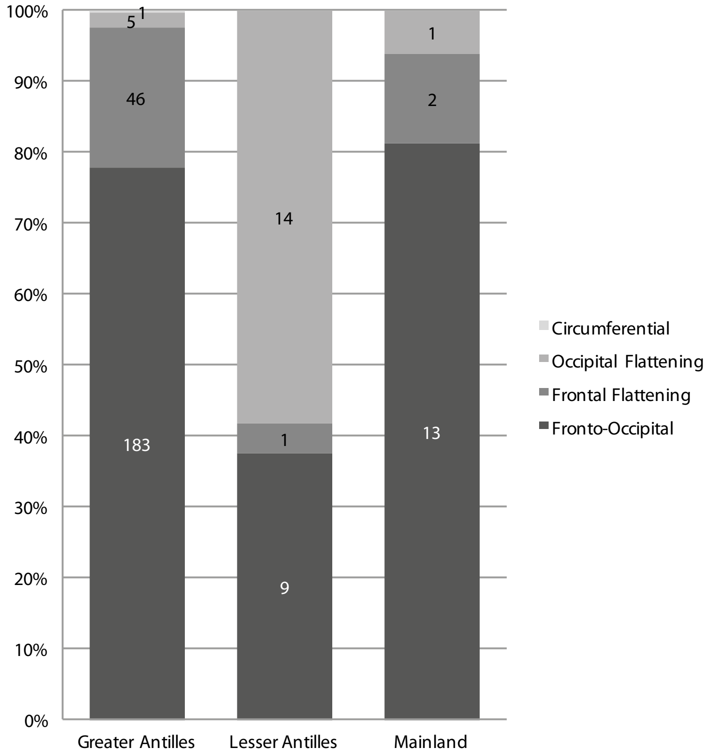


Graph 79 **Regional prevalence rates of intentional cranial modification.**

A Fisher's exact test was executed to determine if the observed differences in modification rates are statistically significant. The resulting $p<0.001$ indicates this is the case and that the three regions have markedly different prevalence rates.

Shape

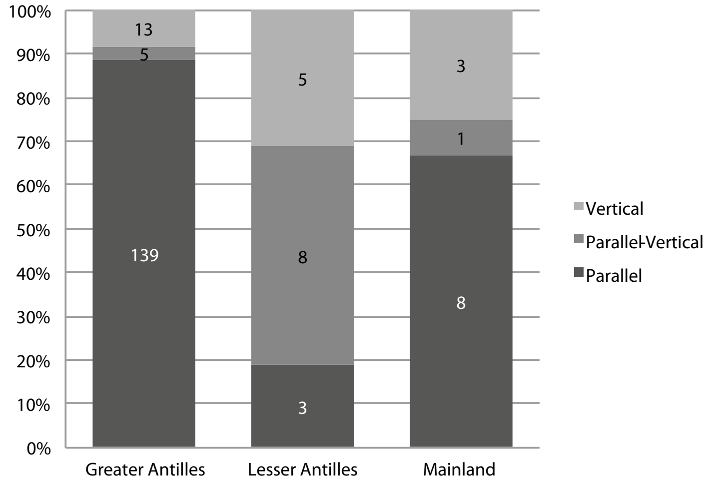
The types of cranial modification encountered in the sample are presented per region in Graph 80. A Fisher's exact test was executed and resulted in a $p<0.001$, suggesting there is a significant difference in the types encountered in the different regions.



Graph 80 **Types of cranial modification found per region.**

Studying the reported percentages per type, it is clear that the high number of occipital flattening cases in the Lesser Antilles is remarkable. This is partially due to preservation issues on the island of Guadeloupe, as has been explained previously. It is therefore unclear whether this represents an actual significant difference between regions or is an artefact created by the preservation issues.

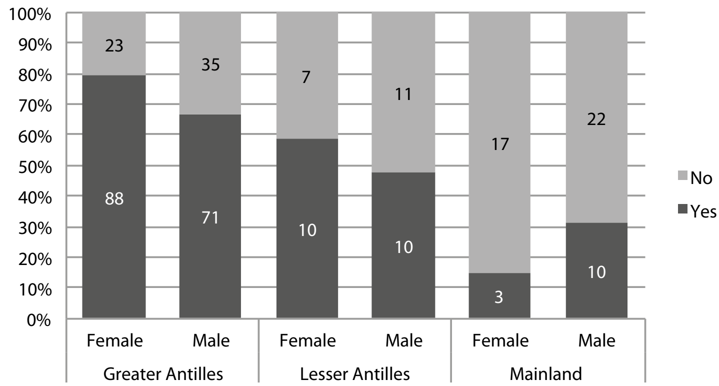
The ratio of the different subtypes encountered in each region is shown in Graph 81. The Lesser Antilles seems to stand out in in comparison to both the Greater Antilles and the Mainland. A Fisher's exact test produced a $p<0.001$, indicating a significant difference in subtypes among the three regions exists.



Graph 81 **Subtypes of cranial modification found per region.**

Sex

The rates of cranial modification among males and females in the three regions are visualised in Graph 82. The graph shows that the major differences can be found between the different regions, whereas the ratios within each region are roughly similar.



Graph 82 **Rates of modification among males and females per region.**

Several Fisher's exact tests were executed to test intra- and inter-regional differences. The results can be seen in Table 49. These results show that the rates within the regions are equal – with the exception of a (barely) significant difference in the male-female ratio in the Greater Antilles. The comparison of females and males across the regions both show significant differences as a result of variation in overall prevalence rates within each region.

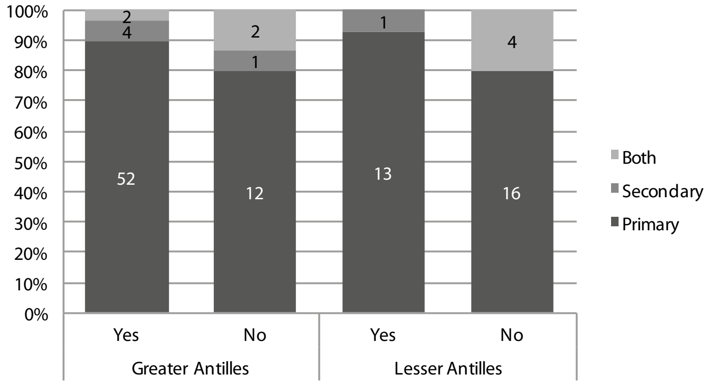
Table 49 Results of comparative analysis of sex and modification rates using Fisher's exact tests.

Greater Antilles	Lesser Antilles	Mainland	Females	Males
p=0.047	p=0.532	p=0.324	p<0.001	p=0.001

Burial Practices

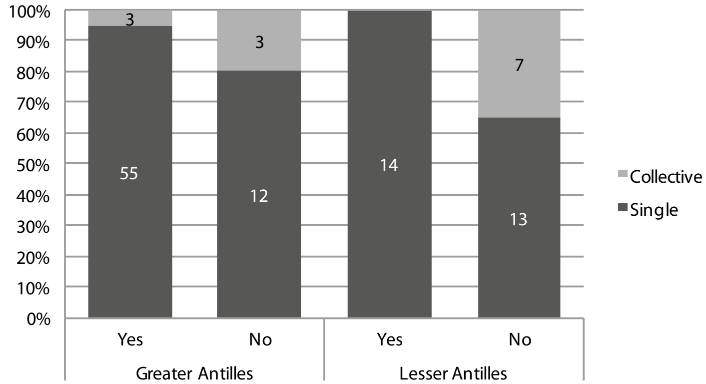
The contextual information from the mainland component of this sample is very limited, as a result of which only the burial practices of the Greater and Lesser Antilles could be compared.

The first variable investigated is burial type, shown for the two regions per cranial modification category in Graph 83. The graph shows the variety in burial practices encountered in the archipelago, although primary burials seem to be dominant. There is little intra-regional difference in the Greater Antilles, confirmed by a p=0.233 value produced by a Fisher's exact test. The Lesser Antilles show more diversity, likely due to the internal variation already noted in the region, with a Fisher's exact test result of p=0.070. Comparing the two regions shows no significant differences between the burial practices in the modified and non-modified categories, with Fisher's exact tests producing p=1.000 and p=0.640, respectively.



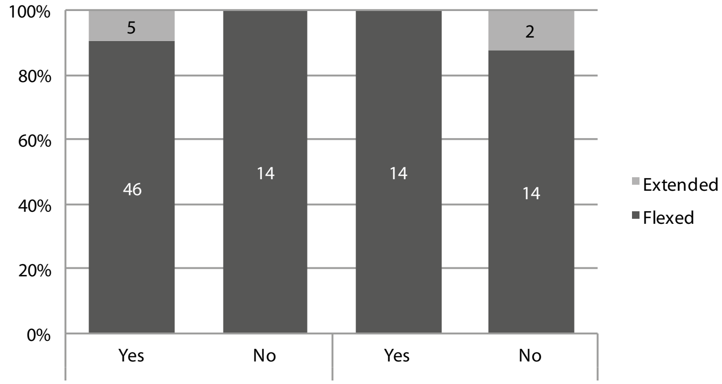
Graph 83 Relation between the type of burial and cranial modification in the Greater and Lesser Antilles.

Graph 84 shows the amount of individuals encountered in the grave context in relation to their cranial modification status in the Greater and Lesser Antilles. Single burials are dominant in both regions, with no significant difference detected between the modified and non-modified individuals in the Greater Antilles as shown by a non-significant p=0.097 result from a Fisher's exact test. The Lesser Antilles do show significant differences, with a Fisher's exact test result of p=0.026, between the two categories with collective burials reserved for non-modified individuals.



Graph 84 **Relation between the amount of individuals in a grave and cranial modification in the Greater and Lesser Antilles.**

The position of the body in the grave is predominantly flexed within both the Greater and Lesser Antilles. There are only a handful of exceptions. Several Fisher's exact tests were executed to investigate whether these differences were significant. There is no significant intra-regional variation with a *p*=0.576 for the Greater Antilles and a *p*=0.485 for the Lesser Antilles, nor any interregional differentiation with a *p*=0.576 for the comparison of modified individuals and *p*=0.485 for non-modified individuals.

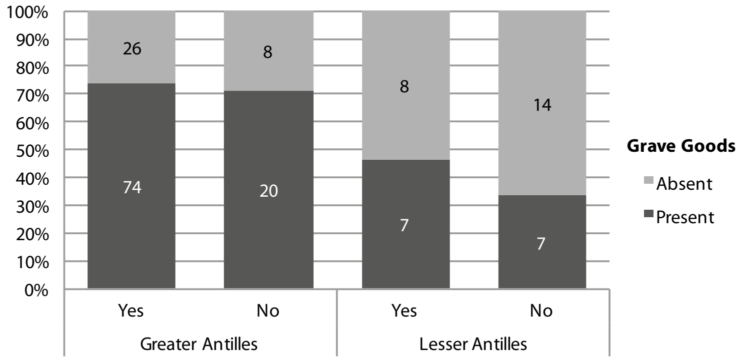


Graph 85 **Relation between body position and cranial modification in the Greater and Lesser Antilles.**

The orientation of the body in the burial context shows relatively similar patterns within both regions, as can be seen in Graph 86. Several Fisher's exact tests were run to determine differences within or between the regions with respect to burial orientation and modification status. The resulting non-significant values of *p*=0.556 for the Greater Antilles and *p*=0.344 for the Lesser Antilles confirm there is no intra-regional variation. The non-significant *p*=0.776 for the modified and *p*=0.400 for the non-modified individuals confirm the lack of interregional variation.

Graph 86 **Relation between body orientation and cranial modification in the Greater and Lesser Antilles.**

The relation between cranial modification and grave goods is expressed for both regions in Graph 87. The patterns within each region appear similar, suggesting little intra-regional differentiation between the modified and non-modified individuals. This is confirmed with the non-significant results of the Fisher's exact test, p=0.811 for the Greater Antilles and p=0.499 for the Lesser Antilles. There does appear to be variation in the overall rate of grave goods encountered in the region, as is evidenced by a significant Fisher's exact test result of p=0.011 for the comparison of the non-modified individuals. The modified individuals fail to reach the threshold of significance with p=0.064.



Graph 87 **Distribution of grave goods in relation to cranial modification in the Greater and Lesser Antilles.**

This section will provide a chronological overview of cranial modification practices in the Caribbean. The available radiocarbon dates and other contextual information needed to place samples in the right period vary substantially between different sites and limit our analysis of the temporal dimension of head shaping. Attempts were made to analyse patterns of modification in relation to the various cultural traditions of the region to gain a more intricate understanding of the temporal nuances of cranial modification and identity in the Caribbean. Unfortunately, the segment of the sample with sufficient contextual detail proved too small to undertake any meaningful analyses. Therefore, the temporal patterns presented here are based on the broader regional chronology. The previous analyses have already indicated that there is some merit to the regional boundaries, at least for the Greater Antilles and Mainland, and, consequently, these will be followed here to investigate modification practices. Combining all locations would increase the sample size, but simultaneously obscure interesting trends.

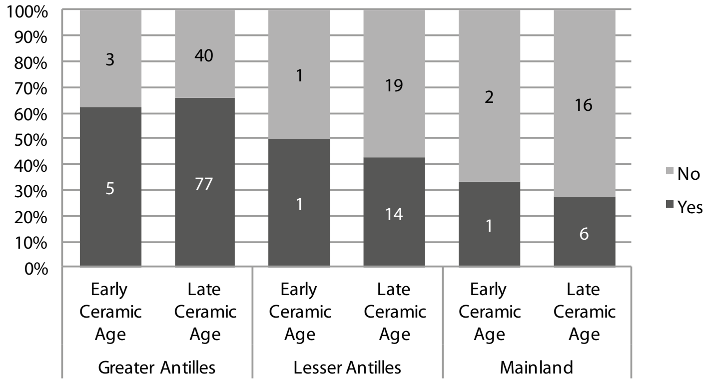
First, the head shaping practices in the Ceramic Age and Colonial period will be investigated for each region. Finally, the site of El Chorro de Maíta will be assessed to provide a more local view of cranial modification practices on the threshold between the pre- and postcolonial Caribbean.

Ceramic Age

The Caribbean Ceramic age has been divided into two phases corresponding to major social and cultural developments: the Early and Late Ceramic Age. Patterns of prevalence, shape, and sex distribution will be contrasted here to see if changes occur between the two phases.

Prevalence

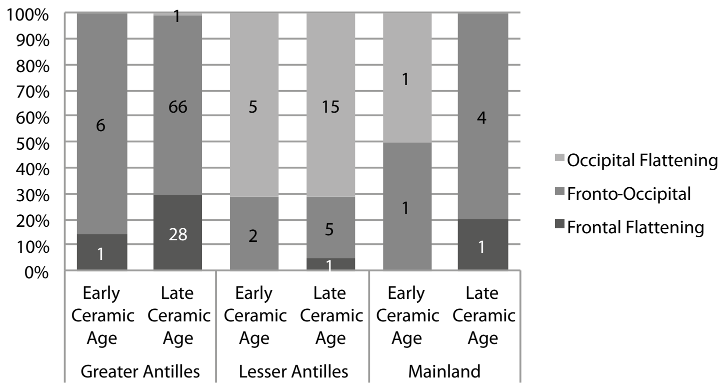
Graph 88 shows the prevalence rates for the Early and Late Ceramic Age for the Greater Antilles, Lesser Antilles, and Mainland. The prevalences look rather similar, suggesting no major shifts took place in head shaping practices between these periods. This is confirmed by Fisher's exact test comparing the early and late phases for each region, which produced three p-values of 1.000. However, the very small sample size for the Early Ceramic Age in each of these regions is problematic.



Graph 88 **The prevalence of cranial modification in each region in the Early and Late Ceramic Age.**

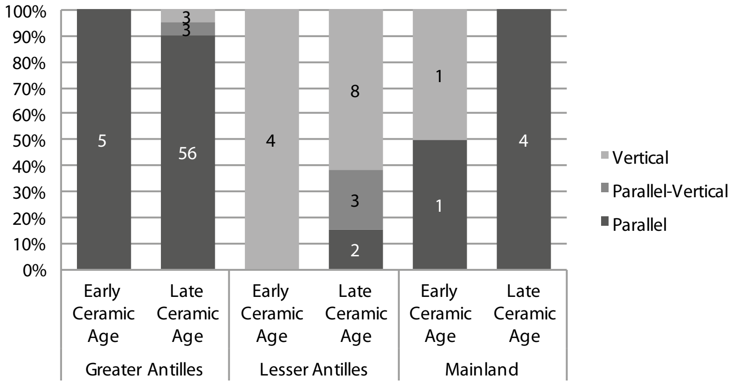
Shape

The different main types of modification have been displayed for each region and phase in Graph 89. Once again, major differences in sample size are seen. The overall proportions of the types seem similar in the Early and Late Ceramic Age on the Greater and Lesser Antilles. This is confirmed by the non-significant outcomes of the Fisher's exact test comparing the two phases for each region, p=0.692 and p=1.000 respectively. A shifting proportion is seen on the mainland, although the small sample size of in particular the Early Ceramic Age sample may cause a bias. A Fisher's exact test indicates no significant differences between the two phases with a p=0.524.



Graph 89 **Types of cranial modification found in each region in the Early and Late Ceramic Age.**

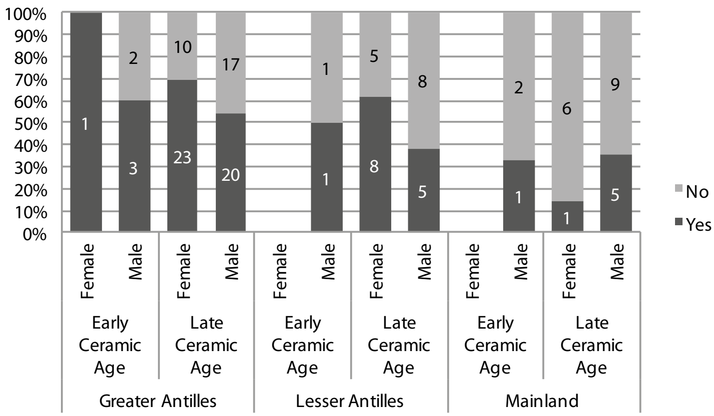
Graph 90 shows the different subtypes encountered in each of the regions in the Early and Late Ceramic Age. The small sample sizes in the Early Ceramic Age make this data difficult to interpret. The Greater Antilles seem to be characterised by parallel modification in both phases, whereas the Lesser Antilles show an inclination towards vertical modification.



Graph 90 **Subtypes of cranial modification found or each region in the Early and Late Ceramic Age.**

Sex

The prevalence rates for males and females are shown for both periods in each of the regions in Graph 91. Missing data and small sample sizes once again create issues, in particular the lack of females from the Lesser Antilles and Mainland in the Early Ceramic Age. Overall, the prevalence rates are relatively equal between the sexes of the same location and period. No major changes are observed between the Early and Late Ceramic age populations of the same region.



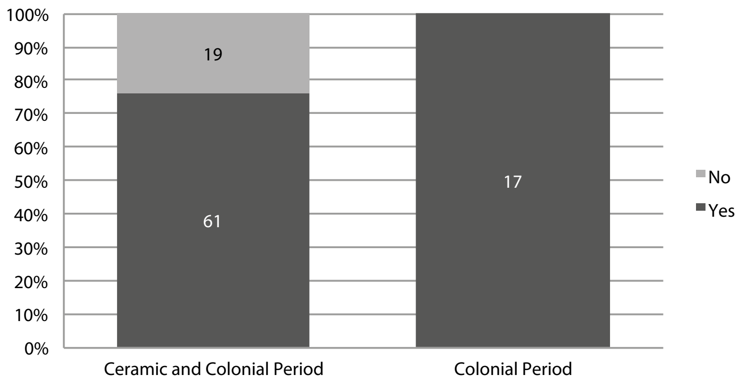
Graph 91 **Cranial modification and biological sex in each region in the Early and Late Ceramic Age.**

Colonial Period

The analysis of head shaping practices in the colonial period is restricted to the Greater Antilles, as this period is only represented by crania from Cuba and the Dominican Republic in the sample. The group Ceramic and Colonial period was formed by necessity and is used for individuals from a site with a Late Ceramic Age and early Colonial component which could not be attributed with certainty to either period. Unfortunately, this turned out to be a relatively high number of crania in the current sample and these are shown here to complement our knowledge of head shaping practices in indigenous societies at this historic moment.

Prevalence

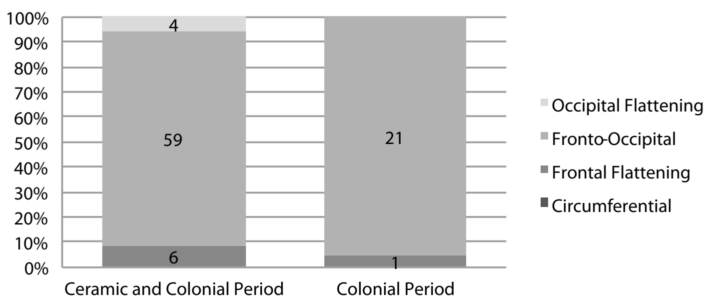
The prevalence of head shaping in the Late Ceramic and early Colonial period is seen in Graph 92. The Colonial period shows a prevalence of 100%, but this is unlikely to be a true prevalence rate. The 76% prevalence of the Ceramic and Colonial period category is very similar to the prevalence rate from Late Ceramic Age Greater Antillean locations and more likely to be realistic.



Graph 92 **Prevalence of intentional cranial modification in the Colonial period.**

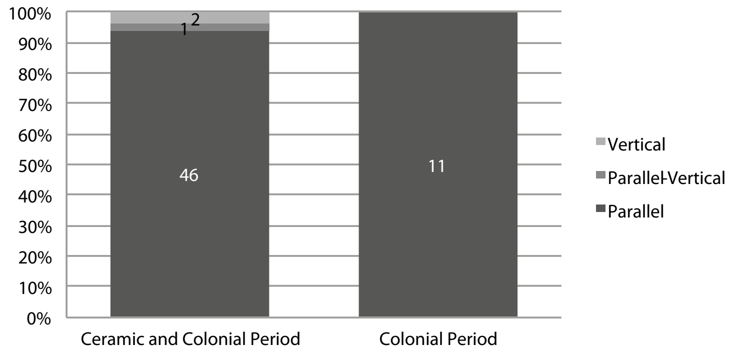
Shape

The main type of modification seen in this period is shown in Graph 93. The distribution of shapes is relatively similar, as is confirmed by the non-significant p=0.615 outcome of the Fisher's exact test.



Graph 93 **Types of intentional cranial modification in the Colonial period.**

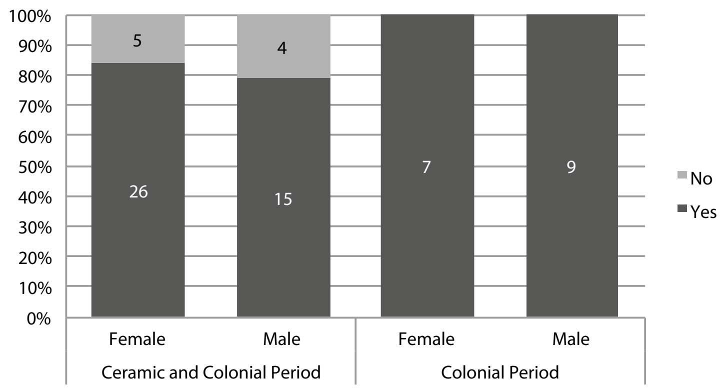
The subtypes present in the colonial period are shown in Graph 94. Again, the rates seem very similar and there is an undisputed preference for parallel modification of the occipital.



Graph 94 **Subtypes of intentional cranial modification in the Colonial period.**

Sex

The prevalence rates for males and females in the Colonial period are shown in Graph 95. This demonstrates the same issue discussed previously of a 100% prevalence rate in the Colonial period. The prevalence in the Ceramic and Colonial period is similar between males and females and this is confirmed by the non-significant p=0.715 result produced by the Fisher's exact test.



Graph 95 **Rates of modification among males and females in the Colonial period.**

Changing Community: El Chorro de Maíta

This brief look at the temporal dimension of head shaping practices in the Caribbean has shown that the lack of proper context for many individuals in the sample limits our understanding of changes in the custom through time. There is, however, an interesting case study from the island of Cuba which may shed more light on the effects of intercultural contact on cranial modification. The site of El Chorro de Maíta, previously discussed in relation to individual CDM72B, has been dated to the pivotal moment of change at the beginning of the colonial period with evidence of interaction between Amerindians, Europeans, and Africans.

Prevalence

The prevalence of head shaping at the site of El Chorro de Maíta is relatively high with an adjusted prevalence of 89% of Amerindians showing evidence of cranial modification, as can be seen in Table 50. Removal of the individuals of suspected non-Amerindian descent is crucial, as their inclusion would obscure the indigenous head shaping practices.

Table 50 **Prevalence of intentional cranial modification at El Chorro de Maíta. * Indicates suspected non-Amerindian ancestry.**

ICM	Number of Individuals	Prevalence (%)	Adjusted Prevalence (%)	Adjusted Amerindian Prevalence (%)
Yes	58	79.45	85.29	89.23
Ambiguous	5	6.85		
No	7 + 3*	13.70	14.71	10.77
Total	73	100.00	100.00	100.00

The prevalence of head shaping at El Chorro de Maíta is relatively high, but comparable to the rates found at other Late Ceramic Age Greater Antillean sites. However, there is a unique aspect to the prevalence patterns found at the site. The original investigators of the skeletal assemblage noticed a peculiar pattern in the distribution of cranial modification at the site with children having significantly lower rates of modification than adults (Guarch Delmonte 1996).

This significant difference was confirmed in this study. Table 51 shows this difference, expressed both in percentages and actual individuals. It is immediately apparent that cranial modification rates are lower in the non-adult age group, which combines infants, children, and adolescents. These age categories were grouped together to create a more balanced sample size for statistical testing.

Table 51 Prevalence of cranial modification in adults and non-adults at El Chorro de Maíta.

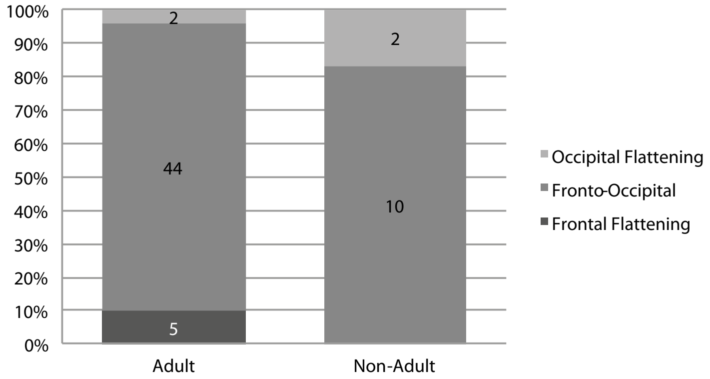
ICM	Prevalence (N)		Adjusted Prevalence (N)		Adjusted ancestry Prevalence (N)	
	Adult	Non-adult	Adult	Non-adult	Adult	Non-adult
Yes	85.45% (47)	61.11% (11)	91.67% (44)	64.71% (11)	95.65%(44)	68.75% (11)
Ambiguous	7.27% (4)	5.56% (1)				
No	7.27% (4)	33.33% (6)	8.33% (4)	35.29% (6)	4.35% (2)	31.25% (5)

To test the statistical significance, three Fisher's exact tests were carried out on the prevalence, adjusted prevalence and adjusted ancestry prevalence categories, as seen in Table 51. All three outcomes were statistically significant with p=0.026, p=0.015, and p=0.010, respectively. This means the null hypothesis can be rejected and that there is a statistically significant difference in the ratio of modified/non-modified individuals between the two age groups, irrespective of adjustments of the data for ambiguous cases and/or ancestry.

Similar comparisons for the prevalence rates between adults and non-adults were carried out for the most comparable skeletal assemblages in the sample: Juan Dolio, La Caleta, and Constanza. These sites are all from neighbouring Dominican Republic and the closest to El Chorro de Maíta in terms of age, all Late Ceramic Age or Early Colonial period, and overall sample size. These sites have similar proportions of modified and non-modified individuals in both age categories and produced statistically not significant outcomes in the Fisher's exact test. A further comparative test including all skeletal material from the Dominican Republic also showed no significant difference between the different age categories. This is the expectation if cranial modification practices are relatively stable over time. The significant difference between the age categories at El Chorro de Maíta points towards a shift in modification practices.

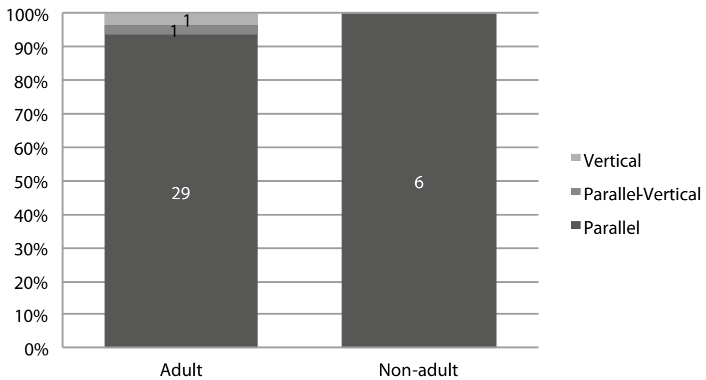
Shape

The distinct prevalence rates between adults and non-adults seen at El Chorro de Maíta warrant further investigation of differences in shape. The types of modification found in adults and non-adults at the site can be seen in Graph 96. Frontal flattening is only present in the adult sample and occipital flattening is far less prevalent among adults. A Fisher's exact test results in a p=0.140, indicating these differences are not significant.



Graph 96 **Relation between modification types and age categories at El Chorro de Maíta.**

Graph 97 shows the relationship between the subtypes and age categories at El Chorro de Maíta. Parallel modification is by far the predominant subtype found in both adults and non-adults. A Fisher's exact test produced a p=1.000, confirming the absence of any significant differences.



Graph 97 **Relation between modification subtypes and age categories at El Chorro de Maíta.**

8 SHAPING IDENTITY

This study has produced a myriad of details and intricate patterns of information on head shaping practices in the Caribbean from the coasts of the South American mainland to the islets of the Bahamian archipelago. The interpretation of these multiscalar and diachronic results will make full use of the heuristic framework of identity developed in this study in order to understand the ties that bind individuals, communities, and altered head shapes in a social web. It will also incorporate additional evidence from historic sources, ethnographic accounts, and previously published archaeological data from the region and beyond to present a comprehensive view of the multifaceted social context of head shaping practices in the indigenous world of the Caribbean.

The exploration and interpretation of Caribbean head shaping practices will follow the structure of Chapter 7 for ease of reference. Here, interesting elements and patterns of cranial modification in the region will be highlighted and expanded upon in a multiscalar fashion ranging from the individual experiences and life histories of a Caribbean infant and young woman to the tangled connections of head shapes in an early colonial *encomienda* settlement. A general history of head shaping practices in the Caribbean will be sketched showing the rise, decline, and resurgence of intentional cranial modification against the backdrop of important social and historical developments before and after the arrival of Columbus.

8.1 MEASURING MODIFICATION

Correctly identifying cranial modification in skeletal material forms the basis of any investigation of head shaping practices in past societies and can be achieved through visual assessment or the application of metric methods. Visual assessment procedures and classification systems should be clearly described to compensate for the inherent qualitative nature of the methods and to reduce the issues surrounding subjectivity as well as intra- and inter-observer errors. Assessment of head shaping through methods based on cranial metrics partially solves these concerns surrounding subjectivity. Such techniques assume that alterations to the cranial shape produced by modification practices result in consistent, quantifiable differences between measurements of normal and altered crania. Taken further, it can also be suggested that different modification types and subtypes will leave distinct metric signatures.

The validity of this premise for the Caribbean was investigated by comparing the means of 24 different cranial measurements taken during this study from crania classified as normal and modified by visual assessment. There were substantial differences between these two categories predominantly in measurements that relate to cranial breath and length. Modified crania from the Caribbean were shorter and broader than their non-modified counterparts. The statistically significant metric differences were not restricted to cranial vault measurements, but also showed an impact on the upper facial region. This was expected given the functional and developmental unity of the different regions composing the human skull (Lieberman et al. 2000).

The differences between modification types and subtypes were also investigated by comparing the means of the cranial measurements produced by the respective groups. An analysis of main types frontal flattening, fronto-occipital modification, and occipital flattening only showed significant differences in the maximum cranial length and parietal chord. The limited variation can be explained by the similarity in modification types found in the Caribbean dataset. Fronto-occipital modification consists of pressure exerted on the front and back of the skull, essentially combining frontal and occipital flattening into a single shape. Thus, each of these types was very similar and difficulty separating them based on metrics was expected. Unfortunately, only a single case of circumferential modification was encountered in the region preventing this category from being used in the ANOVA analysis. The metric differences between fronto-occipital and circumferential modification have proven to be much more significant in previous investigations using different populations (Clark et al. 2007; O'Brien and Stanley 2011).

The means of the suite of cranial measurements were also compared for the three subtypes, parallel, parallel-vertical, and vertical, respectively. Again, the only substantial difference was found in the maximum cranial length. The parallel subtype can be distinguished from the parallel-vertical and vertical subtypes based on this measurement, showing the merit of using a classification system that includes these subtypes for the Caribbean. The difference is not clear enough to rely solely on metrics to differentiate the subtypes, yet it could be a useful aid in assessing the reliability of observer assessment at the population level.

Two techniques based on metric differences have been developed to aid in the identification of cranial modification. The first, by Clark and colleagues (2007), distinguishes between modified and non-modified crania. The second, developed by O'Brien and Stanley (2011), indicates whether the skull has been subjected to fronto-occipital or circumferential modification. Both methods have a relatively high correspondence with the visual classification employed in this study, at 68 and 73 percent respectively, with the conservative nature of the Clark method explaining the slightly lower figure. The O'Brien and Stanley technique is not impacted by different modification types or subtypes, but Clark's method has difficulty with the correct identification of sole frontal or occipital flattening as predicted by the authors. Comparing the agreement between both methods and the visual inspection shows that total disagreement, an indication of normal from both methods but a verdict of modified from visual inspection, only occurs in 15% of cases. Of these, most were classified as mild cases of modification with cranial shapes and metrics expected to be close to normal shape variation. Thus, these crania would be difficult to differentiate from normal crania using metric methods.

The comparison between the metric methods by Clark et al. (2007) and O'Brien and Stanley (2011) and the visual inspection have shown that both function well when applied to Caribbean skeletal material and can aid in the recognition and classification of cranial modification. However, the major reason that cranial measurements are less effective as the main method of identification and classification of cranial modification is the nature of archaeological skeletal material. Unlike anatomical specimens collected under optimal conditions, crania from an archaeological context can be (and often are) damaged or incomplete. A single missing data point means the necessary measurements cannot be taken and the skull cannot be classified using the chosen metric method. In the current dataset, only 30% of the crania had all measurements necessary for the Clark method and a mere 20% could be classified using the technique by O'Brien and Stanley. This is an unacceptable reduction in sample size, particularly in a region like the Caribbean, where skeletal material is relatively sparse, and a clear reason to prefer visual inspection and classification of cranial modification as the main method employed when studying head shaping practices. Metric methods can, however, be very useful to support visual inspection in difficult or ambiguous cases.

A Note on Ambiguity

The discussion on cranial modification has so far been focused on making the distinction between modified and non-modified individuals, essentially creating binary categories. However, in reality cranial shapes exist on a continuum ranging from normal cranial variation to extreme cranial alterations caused by pathology or human action. In an archaeological assemblage, this may result in a group of crania that are difficult to classify, as their shape may place them in the ambiguous middle ground between the two extremes. Such ambiguity is often difficult to deal with from both an osteological and statistical perspective, leading to the removal of these crania from the study sample or selective removal from certain analyses.

While ambiguity complicates matters for the scientist wishing to create clear and discrete categories, it is fascinating from a social perspective for several reasons. The fact that ambiguously shaped skulls occupy a continuum from normal variation to cranial modifications suggests that people may be emphasizing the natural cranial shape. This is certainly the case in the Caribbean, where a natural tendency towards a broader meso- to brachycephalic skull (Stewart and Newman 1950; Tacoma and Van Vark 1991) is enhanced by fronto-occipital modification, which broadens and shortens the cranium even more.

Ambiguous cranial shapes may also result from variations in head shaping practices within a single community. It stands to reason that families or lineages may perform cranial modification slightly differently depending on the distribution of knowledge and experience among practitioners. Hoshower and colleagues (1995) demonstrated such variation between kin groups in their analysis of the Peruvian Omo M10 site. Disparities in the construction of the modification device, duration of wear, and the amount of pressure exerted, may all lead to mild degrees of modification difficult to distinguish from normal cranial variation. These variations in degree or other minor differences in shape may point to communities of practice sharing a way of doing within the larger social context or represent expressions of individual agency and personal choices influencing the practice.

Most interesting from a theoretical perspective, however, is that the presence of ambiguous skulls may suggest that being subjected to the practice of head shaping as an infant is more important than the resulting cranial shape itself. The move towards a more social understanding of cranial modification in recent years, and in particular the inclusion of socially-constructed notions of identity, has highlighted the role of head shaping practices in early socialisation, identity formation, and the process of becoming a social agent (cf. Duncan and Hofling 2011; Geller 2004; Joyce 2000; Tiesler 2012). Under such circumstances the theoretical framework developed for this study suggests the crucial element of the process, from a social point of view, may be the participation in the event by the newborn representing a passage rite into personhood. The altered head shape may be viewed as a beneficial, but not strictly required, by-product of a social process.

This hypothesis is also crucial for explaining the absence of cranial modification in certain individuals within a social setting or a single archaeological skeletal assemblage. The practice of cranial modification may of course be linked to specific social ideas that only apply to certain individuals within the community. For example, modification may be restricted to particular social groups or genders, like among several societies from the North American Northwest Coast, where head shaping was the prerogative of free individuals and prohibited among slaves (Dingwall 1931). The issue becomes more complicated when group identity is proposed as one of the motivations for cranial modification. After all, if head shaping plays such a vital role in representing a collective social identity of a newborn, what does this mean for the individuals without signs of cranial modification? Here, the absence of modification is more salient, as at first glance this seems to imply that those without altered head shapes may not have been considered members of the social collective marked by cranial modification. The argument that the social emphasis on undergoing the practice is the pertinent aspect of the *rite de passage* for the infant, as argued above, can explain these instances. Variations in execution resulting in cranial shapes within the range of normal variation and thus appearing unmodified would not diminish the social relevance of the practice.

Evidence that cranial modification practices can be limited by circumstances is found in the European documentation of the indigenous peoples of the Lesser Antilles in the early colonial period. Breton (1999 [1665]:49) notes that babies who were perceived as ill or weak in the first weeks after birth were not subjected to cranial modification practices. Here, the health of the infant was prioritised over social constructions of identity and personhood. Another complementary explanation for the absence of cranial modification in certain individuals within an assemblage is the movement of people between different groups. Those marrying into another community or moving to a different village would not have the characteristic local cranial shape instilled in early infancy. Besides resolving issues with absence of modification, migration may also explain different types or subtypes of modification in an assemblage.

8.2 FROM THE INDIVIDUAL TO THE SOCIAL

The head shapes produced by cranial modification connect the individual to the social and vice versa. The alteration of the individual body takes place on a very intimate and personal level and will have a profound and lasting impact on the personal identity of the individual, influencing how they see themselves and simultaneously how they view and interact with others. At the same time, cranial modification surpasses the individual and expresses identities that connect and divide on a larger scale. Altered head shapes may mean subtly different things to individuals within the same social context, as this would allow for the incorporation of the practice into individual concepts of identity (Cohen 1994; Jenkins 2014; Wells 2012). This fluidity means that investigating the meaning behind cranial modification may not yield a single clear cut answer but an interdependent array of motives. In order to understand the social ties surrounding the practice, it must be approached from different scales of analysis that yield complementary insights. By analysing the practice at the individual level and then moving up to local and regional comparisons, the complex social ties surrounding head shaping practices can be examined for the indigenous Caribbean before and after the pivotal contact in 1492.

Getting Ahead in Society

Infant KR337 lived at the settlement of Kelbey's Ridge 2 on the island of Saba in the Late Ceramic Age between AD 1350 and 1450. The settlement was located on a volcanic ridge in the north-east of the island with views of the sea and neighbouring islands. Several round houses occupied the ridge likely representing a short occupation span of about a century. The ties to the sea were emphasised by a predominantly marine subsistence strategy, although inhabitants of Kelbey's Ridge also had easy access to the plentiful rainforests of Saba (Hofman et al. 2008; Hoogland 1996; Hoogland and Hofman 1993, 1999). The Chicoid pottery found at Kelbey's Ridge 2 and other items of the material cultural assemblage, such as threepointed objects and ceremonial paraphernalia associated with the inhalation of hallucinogenic substances, link this community to the Greater Antillean interaction sphere (Hofman 1993; Hoogland and Hofman 1999). The most likely explanation is that the inhabitants of Kelbey's Ridge 2 moved from the Greater Antilles to Saba where they established an outpost probably related to resource exploitation of the Saba Bank and/or control of trade routes towards the Lesser Antilles and the South American mainland (Hofman and Hoogland 2011, 2016; Hoogland and Hofman 2013).

Infant KR337 died at Kelbey's Ridge 2 aged between two and three years old. No evidence of disease or trauma was found on the skeleton and the cause of death could not be established. The body was interred underneath one of the houses in the village in a tightly flexed position and a smooth oval stone was placed beneath the head. The right humerus was purposefully removed from the grave at a later stage. All burials at the site were found associated with domestic structures, although the burial practices were elaborate and variable. Grave goods were only found in the graves of children (Hoogland 1996; Hoogland and Hofman 1993, 2013; Weston 2010). Despite the fragile and fragmented nature of KR337's cranial remains, evidence of fronto-occipital parallel modification was found in the form of mild frontal and occipital flattening and bulging of the parietals. KR337 was the only individual with an altered head shape at the site, though it should be noted that overall conservation was poor and only 40% of crania could be assessed.

The presence of an infant with cranial modification at the site of Kelbey's Ridge is intriguing. It is the only case of head shaping reported for Saba in the rare Amerindian skeletal material available from the island. It might be interpreted as another reflection of the ties between Kelbey's Ridge 2 and the Greater Antilles, so clearly visible in the material culture. Cranial modification of the type seen in KR337 was common in the Greater Antilles during the Late Ceramic Age and served as a shared marker of group identity in these communities (as will be argued below), though fronto-occipital modification was not restricted to this region as it was also found in the Lesser Antilles and on the mainland. The altered cranial shape of KR337 may have been a way of emulating the head shapes seen in the Greater Antilles in order to strengthen and reinforce social ties between these distant communities using this shared social signal.

Another explanation is that infant KR337 moved from the Greater Antilles to the site of Kelbey's Ridge 2 at a very young age. The cranial shaping would have been initiated in the home community before the family migrated to Saba, emphasising notions of group identity and shared kinship within the social collective. Strontium isotope analysis was carried out to investigate the potential movements of the inhabitants of Kelbey's Ridge 2. Unfortunately, the local strontium range of Saba is broad as a result of high contributions from non-geological sources to the strontium intake of organisms. Infant KR337 shows a local strontium signature, but as a result of the significant variation on Saba, this overlaps with other Caribbean regions including eastern Hispaniola and other regions of the Greater Antilles (Laffoon 2012; Laffoon and Hoogland 2012). Regardless of where infant KR337 was born, it seems motivations behind the altered head shape remain similar and can be tied to expressing a shared group identity with the social collectives of the Greater Antilles.

From a more personal perspective, the parents of KR337 may have decided to alter the shape of their infant's skull to give their child a head start in society. The altered cranial shape would have been invaluable in future social interactions with other social agents and have been beneficial in case of a future migration by KR337 to a different part of the interaction sphere. Fitting in through the altered head shape could have presented KR337 with a social advantage. Such considerations are likely complementary to the motivations explored above as social motives extend simultaneously on different levels.

The altered cranial shape of KR337 shows the inhabitants of Kelbey's Ridge 2 brought and produced both tactile material and intangible social reminders of their homeland. The community on Saba remained tied into the social network of the Greater Antilles despite the increased geographical distance. These social relations were embodied in the head shape of KR337 through the practice of intentional cranial modification.

Home Ties

The burial of individual CDM72B, found at El Chorro de Maíta on the island of Cuba, gives us a rare glimpse into life and death in the cultural melting pot of the early colonial period. The settlement of El Chorro de Maíta was part of the Spanish *encomienda* system, regulating indigenous labour and tribute in the colonies. Evidence of intercultural interaction is seen in many aspects of the site; from European objects and non-native animal remains to syncretic burial practices and the presence of a potential first generation enslaved African (Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011; Laffoon et al. 2013).

Individual CDM72B was a young woman who died aged between 18 and 25 years old. There are no signs of disease or trauma on her skeletal remains that would allow us to reconstruct a potential cause of death. At 161.12 cm, CDM72B was more than 10 cm taller than the average Chorro female stature of 148.21 cm (Weston 2012). She was buried in a prone position, with the head turned towards the right and her right hand next to her head. Her legs were in a semi-flexed position, held in place by a large boulder resting on the upper legs. Two other rocks were found near the body, but no objects were recovered from the grave. The lack of grave goods and the semi-extended position of the body are not unique at the site, but only three other individuals were found in a prone position and none of these were accompanied by stones (Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011).

The body of individual 72B also showed evidence of permanent cultural modifications. She had undergone cranial modification as an infant, resulting in a fronto-occipital vertical shape (Figure 13). This altered shape was created using a modification device constructed of two rigid boards, the first placed on the forehead and the second larger board placed at an almost upright angle against the back of the head. This occipital flattening is almost vertical and very different in orientation to the normal low and mild parallel occipital flattening typically encountered in both El Chorro de Maíta and the wider Caribbean archipelago. The longer plane of flattening indicates a larger board at the back, potentially a cradleboard. There is a slight asymmetry to the skull seen in the superior view (Figure 13), which supports this hypothesis.

Figure 13 **Frontal, lateral, and superior view of individual CDM72B from El Chorro de Maíta, from the collection of CISAT in Holguín, Cuba. (Photos by Anne van Duijvenbode, 2009).**

The skull was classified as vertical modification on account of the almost vertical occipital plane of flattening and the distinct differences with the normal low parallel flattening seen in the rest of the Chorro population. However, using the classification system recently published by Tiesler (2010, 2012) in her extensive study of cranial modification practices among the Maya, this skull would perhaps fit better within the fronto-occipital parallel modification category as the flattening of individual CDM72B is not completely upright at a 90 degree angle. However, a strict application of this Mesoamerican classification would discount the distinct differences in the angle and extent of the occipital modification seen in CDM72B compaired to the remainder of the Cuban crania and thus obscure distinctions vital to understanding the social connections of cranial modification at El Chorro de Maíta and in the broader research area.

At some stage during her life, the upper incisors and canines of CDM72B were filed to create a distinctive pattern. This custom is known as intentional dental modification, another permanent bodily alteration that is practiced for various social reasons (Mickleburgh 2013; Valcárcel Rojas et al. 2011). Isotope analyses were carried out on the skeletal remains of CDM72B and the strontium, carbon, and oxygen signatures produced by the respective analyses are outliers in comparison with the other individuals found at El Chorro de Maíta and the Caribbean population in general (Laffoon 2012; Laffoon et al. 2013; Valcárcel Rojas et al. 2011). All of these features provide unique glimpses into the life of CDM72B, which allow for the reconstruction of her personal history. Her body modifications, the outlying isotope signatures, the manner of her burial, and her height all indicate CDM72B is different from the remainder of the population buried at El Chorro de Maíta.

A single isolated case of dental modification has been found in an indigenous Caribbean individual from Cuba dated through direct radiocarbon dating to the Late Ceramic Age (Roksandic et al. 2016). The remainder of cases have been recovered in skeletal material of African-born individuals buried in the region as a result of the African slave trade. Both the style encountered in the dentition of CDM72B and skills displayed in the execution of the practice suggest a Mesoamerican origin. This particular type of filing is most commonly encountered in Belize or Guatemala (Mickleburgh 2013; Valcárcel Rojas et al. 2011). It is not the presence, but the type of cranial modification that distinguishes CDM72B. The angle and size of the occipital plane of flattening are different from the modifications encountered in the other residents of El Chorro de Maíta. The vertical subtype is relatively rare in the Caribbean sample, having been identified in 4.5% of individuals in the current study. It should be noted that these 24 individuals share the vertical direction of occipital flattening seen in CDM72B, yet have smaller affected areas suggesting a different construction of the modification device. The vertical subtype is more commonly found on the American mainland, including Mesoamerica (Dembo and Imbelloni 1931; Tiesler 2012).

The isotope analyses provide further valuable insights into the possible origin of CDM72B. The strontium signature produced by a sample of her dental enamel falls outside of the local range. This indicates she was not originally from El Chorro de Maíta. Locations matching the signature of CDM72B are found in the Caribbean and on the American Mainland. Her oxygen signature is lower than the range established for inhabitants of the Caribbean archipelago, supporting the idea that CDM72B may be non-local to the Caribbean. Her carbon value is relatively high and indicates differences in her diet, in particular a high intake of C4 plants such as maize. Again, this supports the idea of a mainland – and possibly Mesoamerican – origin (Laffoon et al. 2013; Valcárcel Rojas et al. 2011).

The prone position of her body and the presence of stones in the grave are a unique combination in the cemetery of El Chorro de Maíta. These features highlight something is different about this young woman, though this is partly negated by the presence of her body in the central burial ground. The deviant burial practices involving individual CDM72B must be re-examined in light of the evidence pointing towards a non-local origin. Bodies buried in a prone position with semi or fully flexed legs have been found in several Late Classic and early colonial sites in Belize, including several coastal villages and the interior site of Lamanai. Prone burial is only rarely reported for the remainder of the Maya region (Graham et al. 2013, Steenbakker 2014). The similarities with the burial practices of CDM72B are striking and suggest that her burial should not be considered deviant but simply conforming to the customs of her homeland.

Taken together, these lines of evidence point firmly towards a Mesoamerican origin for individual CDM72B. She was born somewhere on the American mainland, likely on the Yucatán peninsula, yet buried in a Cuban cemetery. Her mother or midwife performed the rituals and practices surrounding head shaping, starting almost directly after birth and carrying on during early infancy, ensuring a permanent alteration of her body likely used to signal group identity (Tiesler 2012; 2013). This early alteration of her head shape would have felt natural and normal to CDM72B, who would not have been able to remember looking different, and would have matched her cultural and aesthetic ideals on human head shape. At some point after her 15th birthday, the process of filing her teeth into a pattern was started. In earlier periods, dental modification may have signalled social status, but by the late prehistoric and early colonial period the meaning had shifted to a means of displaying group affiliation, perhaps tied to family, local, or regional group identities (Tiesler 1999; Williams and White 2006). Both body modifications confirmed CDM72B's social role and positioned her in her social network.

At some point before dying young, aged between 18 and 25, individual CDM72B moved from the Yucatán peninsula to the island of Cuba. It is difficult to establish her motivations for this migration, if indeed the move was voluntary. The historic sources mention forced migrations of indigenous peoples from the mainland onto the islands in the early colonial period by the Europeans, but here the dating of individual CDM72B becomes crucial. Though she likely dates to this early colonial period, the exact radiocarbon dating places her death between AD 1465 and 1685 spanning the crucial pre- and post-contact period in Cuba defined by the Spanish arrival in AD 1511 (Bayliss et al. 2012). Until more precise methods become available to date her remains, it is impossible to establish with certainty whether CDM72B was buried before or after the intercultural contact between Europeans, Amerindians, and Africans that shaped the history of the Caribbean and the world (Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011).

The cause of her death also remains a mystery, as no evidence of disease or trauma was encountered on her skeletal remains. However, the body of CDM72B was buried in the traditional manner of her homeland. This suggests she either communicated her wishes for her interment or other people from her home community were present at this moment at El Chorro de Maíta, ensuring her body was laid to rest according to their burial customs emphasising and reinforcing her identity and home ties on foreign soil.

8.3 ISLAND LIVES

The island of Hispaniola, shared by the modern nations of Haiti and the Dominican Republic, has functioned as a backdrop to crucial moments in Caribbean history from the development of early pottery in the Archaic to the first Spanish settlements founded by Columbus in the Americas (Boomert 2014; Veloz Maggiolo 1972, 1993). The Dominican Republic has yielded an abundance of skeletal material dating to the Ceramic Age, a period in which a reformulation of kinship and increased social stratification leads to the formation of *cacicazgos* (Curet and Oliver 1998; Torres 2012). These developments are often generalised for the entire island despite the existence of different *cacicazgos* and languages reported in the colonial documents (Granberry and Vescelius 2004; Wilson 2007). In fact, the society and culture of the Greater Antilles were frequently seen as a homogenous unit referred to as 'Taíno' despite growing archaeological and historical evidence to the contrary, a trend that has been countered in recent studies (Curet 2003, 2014; Keegan 2013; Hofman et al. 2008; Oliver 2009; Wilson 2007). Here, the different skeletal assemblages of the Dominican Republic will be compared and contrasted to see if patterns of cranial modification are homogenous across the island or show distinct differences that may be related to local social or cultural developments.

Increasing population size and social stratification during the transition from Early to Late Ceramic Age have previously been related to the growing importance of head shaping as an expression of group identity on Puerto Rico (Crespo Torres 2000). Although it would be interesting to investigate this matter further, the temporal resolution of the Dominican samples is not sufficient to compare patterns of modification between the Early and Late Ceramic Age. Therefore, this section is limited to describing the patterns seen in the Ceramic Age as a whole.

The majority of Dominican skeletal assemblages were recovered from the country's southern coastline (Luna Calderón 1985; Morbán Laucer 1979; Ortega 2002; Veloz Maggiolo et al. 1976), though this comparison includes a collection of skeletal material from the interior (Krieger 1930) and a site on the east coast (Atiles 2004). The prevalence of cranial modification shows minor variation between assemblages but presents a relatively uniform picture. Overall, just over half the sample shows definitive evidence of head shaping, increasing to 69% if ambiguous cases are excluded from the prevalence calculation. A similar pattern is seen for the types and subtypes of cranial modification encountered on the island. There is some variation between and within sites, but no significant differences have been detected. Fronto-occipital modification is by far the dominant type, followed by frontal flattening. In both cases, the modification of the forehead is the same, implying this may be the salient aspect of the altered cranial shape. This prominence may be due to the importance of the face – including the forehead - in interaction and communication (Knapp and Hall 2002; Zebrowitz and Montepare 2008) and the fact that this alteration would have been far more visible during life, as opposed to occipital modifications that are easily obscured by hair. All but one of the individuals with cranial modification in the Dominican Republic share this flattened forehead and the single exception will be discussed in more detail below.

There is no difference in the modification patterns seen in males and females. Men and women have roughly comparable rates of modification and there is no correlation between sex and type or subtype. Analyses of the relationships between cranial modification and various aspects of burial practice, including the type of inhumation, position and orientation of the body, and the presence or absence of grave goods, show no significant patterns, though it should be noted that only limited contextual information was available for these assemblages.

The different skeletal collections show remarkably similar patterns of cranial modification. The theoretical insights into the social construction of identity and early socialisation processes suggest that cranial modification practices formed a key part of becoming human in these societies by emphasising, enhancing, and reinforcing the tendency towards the natural brachycephalic cranial shape of Amerindians (Stewart and Newman 1950; Tacoma and Van Vark 1991), paying particular attention to the forehead. The relatively frequent presence of altered head shaping combined with a shared emphasis on the flattened forehead suggest that cranial modification was used to express group identity on a large scale, exceeding the level of communities and even *cacicazgos*. The latter is evidenced by the lack of geographic diversity seen in the cranial modification patterns, despite reports of several *cacicazgos* and different languages on the island of Hispaniola at the beginning of the colonial period (Granberry and Vescelius 2004; Hofman et al. 2008; Wilson 2007). If the identities expressed through head shaping practices in the Late Ceramic Age and early colonial period represented different social collectives following the boundaries of particular *cacicazgos* or linguistic affiliations, distinct patterns of cranial modification would be seen in different regions and locations. Instead, the homogeneous pattern of modification found on the island implies that social ties transcend this scale and must be investigated from a regional perspective. Patterns of modification in the entire Greater Antillean interaction sphere will be investigated in more detail below to see if the homogenous pattern found in the indigenous communities of the Dominican Republic expands beyond geographical boundaries and what this may mean for the notion of one 'Taíno' identity.

The boundaries of these past social collectives did not conform to the modern separation of the island into the Dominican Republic and Haiti and it is very likely that head shaping practices similarly transcended this division. Unfortunately, very little skeletal material has been recovered from Haiti and only a handful of individuals could be studied in the current investigation. Such numbers pale in comparison to the Dominican material and do not present the opportunity to properly study the pattern of modification in order to confirm or deny the likely correspondence to the Dominican data. All that can be said with absolute certainty regarding Haitian cranial modification is that it was present in pre-Columbian times and that head shapes mirror those found on the Dominican side of the island. Ethnographic data among a 20th-century Haitian community reported the remnants of head shaping practices among current early child care practices in the form of cranial moulding of newborns by their mothers (Herskovits 1964). Such longevity, in the face of centuries of social change, is another indication of the deep roots and former social importance of head shaping in the indigenous communities of the region, based on the ingrained and embedded nature of elements of identity transmitted during early socialisation (Cornell and Hartmann 1998, Jenkins 2014).

A singular shape

There is a single exception to the ubiquitous flattened frontal created by applying a tablet found in the Dominican skeletal material: a case of mild (pseudo)circumferential modification in individual LGC441 from the skeletal collection of Constanza. The narrower and longer cranial vault is indicative of wrapping the skull in bandages, in contrast to the broadening and shortening seen when boards are applied. LGC441 is an adult female recovered from the Valley of Constanza in the central interior Dominican Republic by Krieger in 1930 (see Figure 14). Unfortunately, all context for this individual is lost as Krieger (1930) collected skeletal material and objects from the caves surrounding the valley without documentation. This means the cultural affiliation and date of individual LGC441 are unknown.

Figure 14 **Lateral view of individual LGC441 from Constanza, catalogue No. 349441, Department of Anthropology, Smithsonian Institution.**

Without such contextual information, it is impossible to determine why LGC441 has this slightly different cranial shape. Only one other instance of circumferential modification has been reported in the insular Caribbean. This case was also found in the Dominican Republic and concerns a child dating to the Archaic Age found in Cueva de Berna in the east of the country. Unfortunately, only a single X-ray image of the cranium, in a less than ideal position, was published (Luna Calderón 1977) and no other photographs, drawings, or detailed anatomical descriptions of this skull were ever released. The assessment was made by well-known Dominican physical anthropologist Luna Calderón, but there are issues with his conclusion. The cranium appears relatively broad and bulging on the published X-ray, whereas circumferential modification causes a reduction in the width of the skull as seen in the photographs of LGC441 in Figure 14. These inconsistencies remain unsolved, however, as the current location of the skull is unknown.

Based on the rather limited information available on LGC441 and the Cueva de Berna child, two likely hypotheses can be proposed. If the Cueva de Berna case is accepted as circumferential modification, this suggests this type of head shaping may have been practiced by the Archaic Age populations of the island and implies a previously unknown shift to a different cranial shape. It would also be the earliest case of cranial modification and push back the introduction of the practice in the region by more than a thousand years. However, the evidence is rather problematic until the cranium is recovered for renewed study and radiocarbon testing.

Discounting the Cueva de Berna skull as problematic until further study can take place, there are two hypotheses that may explain the cranial shape of LGC441. The first is a conscious decision by the mother or practitioner to create a shape distinct from local styles of modification by using a different modification device. The second potential explanation is that LGC441 migrated to the Dominican Republic from an area where different head shaping practices were the norm. No evidence of this type of modification has been found elsewhere in the Caribbean, suggesting LGC441 must have come from the American mainland where this shape is known among Andean populations and communities in northern North America (Dembo and Imbelloni 1931; Stewart 1950). There is evidence of long distance interaction and exchange between the Dominican Republic and various areas of the mainland throughout the history of the region (Hofman and Bright 2010; Hofman and Hoogland 2011; Laffoon et al. 2014; Rodríguez Ramos 2011), lending some credibility to this notion. This hypothesis could be tested in future studies by undertaking various isotopic analyses of LGC441, including strontium and oxygen to investigate her potential origins and carbon and nitrogen to look at dietary practices. Radiocarbon dating of the remains would establish a better social and cultural context for the individual. Until such time, LGC441 remains an intriguing exception in the region.

8.4 CARIBBEAN COMMUNITIES

The view of islands as bounded entities has long been overhauled in favour of a dynamic setting of interaction and exchange facilitated by travel across waterways, be it seas or rivers. The Caribbean Sea is not restrictive but conductive to the flow of goods, people, and ideas (Hofman and Bright 2010; Hofman and Hoogland 2011; Hofman et al. 2007, 2008). However, when studying cranial modification patterns in skeletal assemblages, islands in some way form a convenient bounded unit of analysis (Fitzpatrick et al. 2007). Differences most certainly exist among Caribbean communities based on their locations, but the inherent connected nature of Caribbean societies should always be kept in mind.

Prevalence

The prevalence of cranial modification shows an interesting pattern that already seems suggestive of the importance of larger regional interaction spheres. Most of the Caribbean islands show adjusted prevalence rates between 60% and 85%, discounting those locations with small unrepresentative sample sizes. The prevalence rates on the American mainland, represented here by Ceramic Age assemblages from Venezuela and Suriname, are lower than in the insular Caribbean with 28% and 22%, respectively. No skeletal material was available for study from the Southern Caribbean Region during this investigation, but the practice has previously been reported on Aruba and Curaçao (Koeze 1904; Tacoma 1980, 1987). Unfortunately, no prevalence rates could be reconstructed from the publications.

There are two notable exceptions in the insular prevalence rates: the islands of Saba and Trinidad. The unique nature of the Saban skeletal assemblage of Kelbey's Ridge 2 has already been highlighted in our discussion on the life and death of infant KR337. The single case of modification recovered from this site can be tied to the connections between the community of Kelbey's Ridge and the Greater Antillean interaction sphere. The poor skeletal conservation of this material may have prevented the recognition of other instances of cranial modification.

The skeletal population from Manzanilla on Trinidad, located close to the South American mainland, shows no definitive evidence of cranial modification.[1] The absence of modification is rare in larger skeletal assemblages from the region, though a second example is the site of Tutu on St. Thomas in the United States Virgin Islands (Righter 2002). In both cases, cranial modification has been reported in publications on other archaeological remains from the islands. De Booy (1917) reported two cases of cranial modification found at the site of St Bernard on Trinidad, though he does not describe the shape. Similarly, Hatt (1924) recovered a skull with frontal flattening from St. Thomas and cranial modification has also been found on two more islands in the Virgin Islands archipelago (Caesar and Lundberg 1991; Winter et al. 1991). This seems to indicate variations in head shaping practices between different communities on Trinidad and in the Virgin Islands. Without additional contextual information on the cases of cranial modification or larger skeletal assemblages from the islands, it is impossible to determine why such differences exist and what the altered head shapes may have meant to the indigenous inhabitants. Two general scenarios can be advanced based on the theoretical insights into processes of identity formation and expression combined

1 Only part of the skeletal population from the site could be studied, as not all burials were excavated (Dorst 2008).

with the social motivations gained from historic and ethnographic documents. The first is differentiation within the group, where head shaping practices are restricted to certain families, lineages, or social strata. The second option is that cranial modification is linked to particular communities on the island and functions as a small scale group identity distinguishing inhabitants of particular sites or regions of an island.

Cranial Shape

The previous analysis of cranial shape on the Dominican Republic demonstrated an emphasis on the flattened forehead through the pattern of modification types, consisting predominantly of fronto-occipital modification followed by frontal flattening. This pattern is visible in all locations represented by large skeletal assemblages in the Caribbean, with the exception of Guadeloupe. The locations that have yielded less than five individuals in the study have been excluded as those rates would be significantly impacted by outliers and sampling issues. Several cases of occipital flattening and a single case of circumferential modification are present, but these represent only a small number of individuals.

The only significant deviation from the emphasis on frontal flattening is found among the inhabitants of Guadeloupe. Here, occipital flattening is the most common type of modification encountered. It should be stressed that this pattern may be taphonomical rather than social in nature. The cranial remains from Guadeloupe were poorly preserved and highly fragmented, hindering both the recognition of head shaping practices and the determination of type. The assemblage, consisting of individuals from Anse à la Gourde, Morel, Anse Betrand, Folle Anse, Pointe Canot, and an unknown location on the island, was investigated regardless, as this is one of the few large skeletal collections found in the Lesser Antilles and any evidence of head shaping was considered valuable. The data gathered on the subtypes of modification present on Guadeloupe is much more interesting. Just over half the individuals showed a vertical direction of occipital modification. Again, poor preservation decreased the accuracy with which the subtype could be assessed.

Taken together these patterns seem to suggest that head shaping practices on Guadeloupe are much more variable than in other areas of the Caribbean. No connections could be detected between cranial modification and sex, various aspects of burial practices, or the strontium isotope indications of origins in the assemblage. After discounting these factors as potential explanations for the variety in cranial shapes, three potential hypotheses remain. Cranial modification may be linked to a small-scale group identity, such as families or lineages within the community, which have different head shaping practices. The variation in head shaping practices can also be attributed to the exogamous marriage practices seen in these communities (Ensor 2013; Keegan and Maclachlan 1989; Whitehead 1995). Spouses born and raised at a different location would have been subjected to varying local early socialisation practices before moving into the village of their partner. This would have resulted in wider variation in the presence, types, and subtypes of cranial modification found in a single community, as these would represent the diverse head shaping practices of multiple social collectives. Finally, the mild alteration seen in some individuals coupled with the high number of ambiguous cases may also suggest that undergoing the process is the important social element of cranial modification, as has been argued earlier, and the resulting shape is less important, thus leading to more variation in cranial shape in the assemblage.

Other cases of the vertical subtype of modification have been found on St. Kitts and the Greater Antilles, but the parallel subtype is dominant in the insular Caribbean and Suriname. Venezuela shows more variation in subtype, with instances of parallel, parallel-vertical, and vertical directions of modification observed in the skeletal assemblages. The location of these archaeological sites may shed light on the variety of practices seen here. These sites are all located near Lago Valencia, a centre of trade in the Ceramic Age that was tied in a network of exchange with the Caribbean and the interior of Venezuela and beyond (Antczak 1998; Kidder 1944). This interaction would have certainly exposed the inhabitants of the lake shores to new ideas and may also have resulted in the movement of people between locations, leading to more varied head shaping practices recovered in the cemeteries of the region.

The second exception to the dominance of parallel modification in the Caribbean is the island of St. Kitts. Only a single skull with cranial modification was studied from the Ceramic Age site of Bloody Point, but it showed evidence of a vertical direction of flattening on the occipital. One cranium does not constitute a pattern, yet there is some supporting evidence for vertical modification on St. Kitts. Branch's discussion of a skull found in a burial at West Farm indicates that the occipital was flattened in a vertical or upright manner, though he does not mention whether the shape of the frontal was in any way altered (Branch 1907). The presence of vertical occipital flattening in these two crania, from different locations on the island, points towards a very tenuous trend in head shaping practices that is interesting in light of the relative rarity of the subtype in the Caribbean.

Other Social Variables

There is no evidence of any type of sex related differentiation in cranial modification practices among the indigenous inhabitants of the Caribbean. Both boys and girls were subjected to head shaping and there are no significant differences in the prevalence rates of the sexes at any location. The same lack of differentiation is seen in the types and subtypes of modification found in men and women. This uniformity between the biological sexes does not necessarily imply a lack of gender differentiation, as sex and gender are not synonymous. However, few studies have been carried out on gender in the indigenous Caribbean, complicating this analysis. Most work to date has focused on the early colonial Taínos of the Greater Antilles, where evidence suggests relatively flexible and non-exclusive gender dynamics. Social roles and activities were generally open to both men and women (Deagan 2004). Combined with the fact that cranial modification occurs almost directly after birth, leaving little time for the social construction of gender to take place before the decision to shape the infant's skull is made, it can be said that gender differentiation is not a motivation for head shaping among the communities of the Greater Antilles. Though care must be taken not to extrapolate such ideas directly to other regions of the Caribbean where knowledge on gender roles is even more limited, the current investigation does not provide any reasons to assume sex or gender divisions played a role elsewhere in the Caribbean.

The burial record of the Caribbean before and after contact shows a great degree of variation in practices; such as the nature of the burial, the number of individuals in a grave, the position and orientation of the body within the confines of the burial pit, and the grave goods. None of the patterns seen in the burial record could be related to head shaping practices, suggesting that other social factors and elements of identity were far more influential in determining the manner in which an individual was buried.

Information on the mobility of individuals based on their strontium isotope signature was also investigated in relation to cranial modification. The vast majority of the individuals in this sample have a local signature and no significant patterns could be detected. The only case of interest in this regard is individual CDM45 from El Chorro de Maíta. The elevated strontium signature places the origin of this adult male beyond the Caribbean and his carbon and oxygen signatures are also outside the expected range (Laffoon et al. 2013). There are several additional interesting features about CDM45. His body was interred in an extended position with crossed arms, reminiscent of 16th-century Christian burial practices. Several metal objects recovered from the grave were identified as brass aglets, a part of European dress from the 14th to the 17th centuries (Martinon-Torres et al. 2007; Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011). His skull does not show any signs of cranial modification, an exception among adults at this early colonial site given the high prevalence of the practice. An analysis of cranial metrics in Fordisc 3.0 tentatively suggests an African origin for CDM45 (Laffoon et al. 2013; Valcárcel Rojas et al. 2011; Weston 2012). Taken together, these lines of evidence support the hypothesis that CDM45 may be a first generation enslaved African transported to the Spanish colony of Cuba in the early colonial period. The unusual lack of cranial modification simply represents the local practices in the region where he was born and not the norm of the social collective where he was buried.

8.5 TIES THAT BIND

The analysis of cranial modification in the Caribbean has so far highlighted the social ties of head shaping practices in specific individuals, sites, and locations to provide insight into connections and motivations on individual and communal levels. However, a key aspect of Caribbean communities is their inherently connected nature. Each period of Caribbean history sees the development and expansion of regional exchange networks that transport goods, people, and ideas across the region (Hofman and Bright 2010; Hofman et al. 2007; 2008, 2014). Individuals and communities are tied up in these interaction spheres and attempting to understand head shaping practices without taking these wider connections into account is bound to fail, as has already been demonstrated in the analysis of the altered head shapes of KR337 and CDM72B that, as expected based on the earlier exploration of social identity formation and expression, show simultaneous social ties on different levels.

Despite the connected nature of the insular and mainland Caribbean, different social and cultural developments are taking place in distinct locations during the Ceramic Age and Colonial Period. Previous research has indicated that the Greater Antilles, Lesser Antilles, and coastal mainland follow divergent yet interconnected trajectories (Hofman and Hoogland 2011; Petersen et al. 2004). The Greater Antillean societies develop institutionalised social stratification culminating in the *cacicazgos* of Hispaniola encountered by the Spanish in the 16th century (Curet 2003; Keegan 2013; Wilson 2007). The northern Lesser Antilles are integrated into the Greater Antillean interaction sphere in the Late Ceramic Age, whereas the southern Lesser Antilles orient themselves towards the South American mainland (Boomert 2014; Hofman et al. 2007; Rodríguez Ramos 2010; Petersen et al. 2004. Notwithstanding these local developments, the Caribbean remains interconnected through exchange networks and social ties that span the entire region (Hofman and Hoogland 2011).

It is interesting that the patterns seen in the cranial modification at different locations mirror these grander social and cultural developments. In particular, similarities in prevalence and shape are seen on the different Greater Antillean islands. The patterns encountered in the mainland locations also seem relatively similar, whereas the Lesser Antilles show much more variety in head shaping practices.

Greater Antilles

A homogenous pattern of cranial modification is found in the Greater Antilles, with similar prevalence rates, types, and subtypes found in skeletal assemblages on each of the islands. The prevalence of head shaping is relatively high in all skeletal assemblages from the Greater Antilles, ranging between 60 and 85 percent. The almost significant outcome of p=0.052 produced by a Fisher's exact test indicates that minor variation in rates exist, although it is just above the level of statistical significance. This result is likely due to the lowest prevalence rate of 59% seen on Puerto Rico and can be explained by looking at the skeletal assemblages representing the location in this sample in more detail. Many of the Puerto Rican individuals date to the Early Ceramic Age, the period in which head shaping appears to have been introduced in the Caribbean. The vast majority of the other Greater Antillean assemblages studied in this investigation date to the Late Ceramic period of major social and cultural developments. Crespo Torres (2000) has argued that head shaping practices on Puerto Rico shifted from an in-group social status indictor to a shared communal identity during this crucial period of transition from Early to Late Ceramic Age. This explains the slightly different prevalence pattern seen in Puerto Rico, produced by the mixture of the two periods in the current sample of skeletal material.

The cranial shapes found in the Greater Antilles show a similar level of correspondence. Fronto-occipital modification is the dominant type on all islands, followed by a substantial minority of frontal flattening. A handful of individuals show evidence of occipital flattening and a single case of circumferential modification was found on the Dominican Republic. A Fisher's exact test produced a statistically significant result of p=0.005 when comparing the distribution of types between the different locations. There are two key differences that explain this variation. The first is the preference for fronto-occipital modification on the island of Cuba, which has resulted in a higher proportion of that type and a lower rate of frontal flattening. The second is the singular case of circumferential modification, found solely in the Dominican Republic.

Regardless, almost all individuals from the Greater Antilles share the flattened forehead produced by fronto-occipital modification and frontal flattening. Taken together, the two categories represent 97.5% of all Greater Antillean inhabitants with cranial modification in this sample. This further validates the proposed emphasis on the importance of the forehead already touched upon in the discussion of modification patterns on the Dominican Republic. The flattened forehead would have been visible from some distance, unobscured by hairstyles or other adornments, unlike occipital modification. In fact, historic sources describing the hair styles of the inhabitants of Hispaniola in the very early stages of the colonial encounter confirm this: Columbus describes the hair as being worn long and tied at the back (Dunn and Kelley 1991), exposing and emphasising the forehead while obscuring changes to the back of the head. The salience of the face in interpersonal interactions and identification (Knapp and Hall 2002; Zebrowitz and Montepare 2008) cannot be disregarded in this respect, as the frontal flattening would ensure that identity expressed through head shaping would have been unequivocally present during verbal and non-verbal interactions between two social agents.

There is also a clear trend in the subtypes of modification in the region, dominated by a parallel placement of the occipital board in relation to the frontal one. Some variation is seen, evidenced by the presence of vertical and parallel-vertical subtypes. However, there are no significant differences in subtypes between the islands. These minor variations could be attributed to slight disparities in head shaping practices on a site or family level. More detailed analysis shows the subtypes are distributed equally between different assemblages and do not correlate with particular sites. Minor variations in execution, including the construction of the modification device or the exact placement of the boards on the head, are likely due to slightly different traditions passed down to practitioners within a family or lineage. This situation has been demonstrated in the Andean Omo M10 site, where slight variations were related to different kin groups (Hoshower et al. 1995). Unfortunately, the archaeological context of these sites does not allow us to identify particular families within assemblages at this point, so this hypothesis cannot be corroborated further.

The link between head shaping and other social variables was tested to shed further light on the potential motivations behind the practice. No relationship exists between the sex of an individual and the presence, type, or subtype of head shaping in the Greater Antilles. This suggests that boys and girls were subjected to head shaping in equal measure and that there is no correlation between sex and the chosen cranial shape. Likewise, the correlation between head shaping and a variety of burial practices, including the nature of the inhumation, the number of individuals in the grave, the position of the deceased, and the orientation of the body within the grave provided no significant results. The same can be said for any relationship between the presence or absence of grave goods and cranial shape. Isotopic indications of origin similarly showed no significant patterns in relation to head shaping practices.

Homogeneous patterns

Across the Greater Antilles, a uniform pattern of cranial modification emerges typified by high prevalence rates and an emphasis on frontal flattening. This homogeneity suggests that these interconnected communities shared a similar vision of the social function of head shaping practices. The altered head shape embodied a large scale group identity that crossed the Caribbean Sea and connected the inhabitants of the Greater Antillean interaction sphere. Such a shared marker of identity imprinted directly on the body and visible during interpersonal communication would have facilitated interaction and exchange between different individuals and communities in this vast region stretching from the Bahamian archipelago in the north into the Leeward Lesser Antilles in the south.

A unified notion of group identity would also have contributed to the internal social cohesion of communities on a smaller scale. As previously mentioned, Crespo Torres (2000) argued that the transition of altered head shapes into a marker of group identity coincides with crucial socio-political developments in the Late Ceramic Age. Developing social stratification and *cacicazgos* go hand in hand with a growing population and increased number of settlements (Curet and Oliver 1998; Torres 2013). Unifying these expanding communities into a single social collective is crucial to a functional and sustainable chiefdom. A practice like cranial modification, that embodies identity in a directly discernible manner, is well suited for fostering social cohesion.

A similar tendency towards homogeneity in head shaping patterns in a period of intense social change was noted by Torres-Rouff (2003, 2009) in skeletal assemblages from Peru. The pattern of modification found in complex Andean societies consists of a high prevalence rate and uniformity in head shape, very similar to the situation seen in the Greater Antillean skeletal assemblages. Torres-Rouff posits that this homogeneous pattern represents the creation of a unified group identity aimed at creating social cohesion within society. She likens the altered head shapes to shared elements of dress or architecture also aimed at expressing such a consolidated group identity. Though the socio-political structure of the Andean societies is different from the *cacicazgos* of the Greater Antilles, the principle behind the pattern of cranial modification matches the data and hypothesis on head shaping in the Caribbean. The slightly higher shape variation in the Caribbean may in fact result from the less direct power wielded by the *caciques* in the emergent *cacicazgos* as opposed to the more stringent political control exerted by rulers in the developing Andean states.

It is important to stress unequivocally that the notion of an overarching group identity in the Greater Antilles is not simply a reiteration of the old notion of Taíno homogeneity (e.g. Rouse 1992). The term Taíno itself is problematic, not least as this native word was never used as a self-identification by the indigenous communities. It also tends to overemphasise cultural similarities and creates a false sense of unity and cultural homogeneity (Curet 2003; Hofman 1993; Oliver 2009; Wilson 2007). The fact that the inhabitants of Hispaniola and other Greater Antillean islands shared a large scale group identity does not erase the differences in material culture and language recently (re) discovered by scholars (cf. Curet 2014; Granberry and Vescelius 2004; Hofman and Carlin 2010; Hofman et al. 2008; Keegan 2013) and does not imply that these people all shared an identical set of cultural and material features. In other words, the existence of a unified group identity should not be equated to a uniform bounded cultural unit. The presence of such a shared group identity was easily mistaken for and conflated with the concept of a national identity early colonial writers were familiar with from their own European post-medieval backgrounds, reinforcing the false notion of a singular bounded identity in the region.

Despite these issues regarding the Taínos, the pattern of cranial modification does point towards a unified group identity in the region. The key to understanding this apparently contradictory situation is the multi-scalar nature of identity processes. Identity formation and expression takes place at many different levels simultaneously due to their fluid and contextual nature (Díaz-Andreu and Lucy 2005; Jenkins 2014). In certain contexts, the overarching regional group identity embodied in the altered head shapes of the Greater Antilles will have played an important role. It is very likely, however, that the indigenous inhabitants of the region had various other group identities based on their chiefdom, lineage, village, or family. In a social interaction taking place between members of the local community, the overarching identity expressed by head shaping will have had little direct significance whereas social status or kinship ties would have been much more important. Such identities would have been expressed through different means, such as ceramics or objects in a particular style, clothes, hair styles, or personal adornments, and explain the simultaneous similarities and differences seen in the archaeological record of the Greater Antilles.

Boundaries

It is interesting to re-evaluate the slight differences in the patterns of head shaping seen on each of the Greater Antillean islands in light of the social embedding of the custom as an expression of an overarching group identity. The highest adjusted prevalence of the practice is seen on Cuba and Jamaica at 83% and 82%, respectively. Previous investigations into cranial modification among Amerindian Jamaican inhabitants have suggested that the prevalence rate might even have been higher in some populations, implying an almost complete uptake of head shaping in certain communities (Santos et al. 2011). It is fascinating, though perhaps not unexpected in light of Barth's (1969) pivotal work on social boundaries, that the highest rates of cranial modification are found at the margins of the Greater Antillean cultural sphere on Jamaica and Cuba.

The island of Jamaica was first settled during the Ceramic Age by communities from the Greater Antilles as evidenced by the Ostionoid ceramics found in the earliest known settlements (Allsworth-Jones 2008; Keegan and Atkinson 2006). The ties to the interaction sphere continue during the Late Ceramic Age, with a local variation on Meillacoid pottery found throughout the island (Allsworth-Jones 2008; Keegan and Atkinson 2006). The little information that can be gained from early European sources on Jamaica concurs with these findings, concluding that the language and customs of the island are similar to those found on Hispaniola (Wesler 2013). This is certainly the case for head shaping practices, which follow a similar pattern. As seafaring between Jamaica and the remainder of the interaction sphere is more challenging than most routes in the Caribbean Sea (Callahan 2008), the emphasis on head shaping as seen in the higher prevalence rate can be considered a way of stressing the shared social ties with others across the sea and overcoming these physical boundaries on a social level.

In this same light, it would also be interesting to investigate the social ties of head shaping among the communities inhabiting the Bahamian Archipelago, another region on the geographical fringe of the Caribbean with strong connections to the Greater Antilles. Unfortunately, no large skeletal assemblages with known archaeological context are currently available for study. The handful of individuals from the archipelago that were studied during the course of this research, as well as published reports on additional cranial material (Brooks 1887; Drew 2009; Keegan 1982; Schaffer et al. 2010; Winter 1991), show that head shaping was practiced in the area, but does not allow for a more detailed investigation into patterns of modification or social motivations.

A different, if equally fascinating, situation is seen on the island of Cuba. Here, ties between the communities in the east of the island and the remainder of the Taíno cultural sphere are strong (Dacal Moure and Rivero de la Calle 1997; Wilson 2007). However, the historic sources indicate the west of the island is inhabited by a different society known as the Guanahatabey. Little is known about these Guanahatabey, who are often uncritically and incorrectly presented as the descendants of earlier Archaic communities. There is some evidence they spoke a different language and had different customs (Keegan 1989, 2007; Wilson 2007), which did not include the practice of cranial modification (Rivero de la Calle 1960). Consequently, head shape is often used as an identifying population characteristic by Cuban archaeologists working on the skeletal material of the island (Tabío and Rey 1966; Rivero de la Calle 1960).

The exact nature of the social dynamics between these two distinct societies is unknown, but such a social boundary must not be confused with a physical one and was likely the location of exchange and interaction (cf. Barth 1969). In this setting, the group identity expressed by the altered head shapes of the eastern communities took on additional importance as a marker of group differentiation within Cuba. Head shaping practices now simultaneously expressed their belonging to the Greater Antillean cultural sphere, as well as emphasising their difference from the western Guanahatabey. These concurrent associations with group identity explain the higher prevalence of cranial modification in the Cuban assemblages in comparison to Hispaniola and Puerto Rico.

Mainland

The patterns of cranial modification among the Caribbean communities of mainland Venezuela and Suriname show similarities and differences to those observed in the archipelago. There is also some variation in the head shaping practices seen in the two distinct Ceramic Age mainland communities. The Venezuelan skeletal material originates from the Lake Valencia Basin, a local centre of interaction connecting the South American hinterland and coast. These people are associated with the Valencioid ceramic tradition (Kidder 1944), while the inhabitants of coastal Suriname were using variations of Arauquinoid pottery, a style that originated in Venezuela and spread through the coastal zone in the Late Ceramic Age (Rostain 2008; Versteeg 2008). Interaction and exchange networks connect the communities of Venezuela and Suriname with each other, the Caribbean archipelago, and the South American hinterland (Boomert 2000; Boomert and Kroonenberg 1977; Rostain and Versteeg 2004).

The prevalence of head shaping, present in 26% of the examined individuals from Suriname and Venezuela, is significantly lower than the rates observed in the Greater Antilles. The relatively low incidence of head shaping among mainland communities points towards the expression of small scale identities shared by a certain subset of the population, or in other words, in-group differentiation between social actors. Head shaping might express kinship bonds in a certain family or lineage or social status differences ascribed at birth in these communities. Patterns in types and subtypes of modification can aid in the assessment of social motivations behind cranial modification.

Though the prevalence rates of the two groups are relatively similar, differences can be seen when investigating the cranial shape. All individuals from Suriname exhibit fronto-occipital modification with a parallel placement of the occipital board. This uniformity in shape suggests that the practice was executed in the same manner each time and that the signal sent through the altered head shape is likely the same. Unfortunately, the archaeological context of the Suriname skeletons has been lost and no other social variables can be investigated to determine potential additional ties to head shaping practices that might aid in our understanding of the social use of the practice.

Though fronto-occipital modification is the dominant type in Venezuela, there is more variation present in both types and subtypes. These represent different choices in the construction of the modification device, which may be linked to different communities of practice. Families or lineages can have slightly different traditions of head shaping passed through generations that result in variations in cranial shape. This heterogeneity ties in with the low overall prevalence of the practice, which suggests smaller scale identity was expressed through altered head shape either as a representation of kinship or social status. A second explanation for the variety in head shapes may be found in the position of the Lake Valencia Basin as a central hub in the local trade network (Antczak 1998; Kidder 1944). This would have created a continuous flow of people, goods, and ideas and likely resulted in individuals from various origins passing through and perhaps moving into the region. The variation in head shaping seen in the cemeteries may in part represent practices and traditions in the region where these individuals were born as opposed to local Valencioid practices.

The patterns of modification in the coastal mainland communities of the Caribbean point towards processes of in-group differentiation and heterogeneity in contrast to the homogeneous patterns seen in the Greater Antilles where social cohesion and group identity appear to be driving factors. The islands of the Lesser Antilles form the bridge between these two regions, in both a physical, and more importantly, a social sense, and an analysis of the patterns of modification will show which influences held the most sway.

Lesser Antilles

The head shaping practices of the Lesser Antillean communities are characterised by variety, in contrast to the homogeneous patterns seen in the Greater Antilles and the similarities found in mainland customs. The prevalence rates vary widely from a complete absence of head shaping to 73% of individuals in a community having undergone cranial modification. This latter rate is similar to those seen in the Greater Antilles. Such variation suggests that combining these communities into a single region for analytical purposes would not reflect past social boundaries. This corresponds to other archaeological investigations (Boomert 2014; Hofman 1993; Hofman and Hoogland 2011; Petersen et al. 2004) noting a distinct divergent trajectory in Lesser Antillean societies during the Ceramic Age when the northern Virgin and Leeward islands became part of the Greater Antillean interaction sphere whereas the southern Windwards oriented themselves towards the mainland. This pattern is reflected in the limited prevalence data available for the Lesser Antilles, which shows a community on Guadeloupe in the Leewards with rates similar to those in the Greater Antilles and a sample from Trinidad, close to the South American mainland, with a complete absence of cranial modification.

A similar tendency for diversity can be seen in the types and subtypes of modification in use among the Lesser Antillean inhabitants. There is a strong emphasis on occipital flattening in the population from Guadeloupe, though care should be taking interpreting this on a social level as the poor preservation of the crania may have resulted in an overestimation of the number of cases of occipital flattening. This would not have affected the analysis of subtype, which shows a preference for vertical positioning of the occipital board. Such vertical flattening is relatively rare in the Caribbean, present in 4.5% of the sample assessed for this study and found on St. Kitts and in the Greater Antilles. Its presence on the Leeward island of St. Kitts, close to Guadeloupe, is intriguing but complicated as it is based on only two crania from different archaeological contexts. Until a skeletal population with secure contextual information is recovered from this island, it will be difficult to determine the preferred cranial shape and social motivation behind head shaping. The overall pattern of types and subtypes found in the Lesser Antilles shows more variation and does not correspond with the clear preference for fronto-occipital parallel modification in the Greater Antilles.

No significant relations could be detected between cranial modification and sex, a variety of burial practices, or isotopic origin in the Lesser Antillean sample. Combined with the diversity seen in the practice, this suggests social motivations for head shaping in the Lesser Antilles cannot be found on the regional scale but must be investigated on smaller and more individual scales that more accurately represent past social boundaries. It is clear, however, that the social relevance of head shaping practices is different from the homogeneous pattern seen in the Greater Antilles and instead points towards in-group differentiation between subsets of social actors or the demarcation of different groups on a smaller scale currently obscured by the coarseness of the archaeological data. The fluctuations and flexibility in leadership and social status differentiation seen in these communities make these unlikely motivations for modification given the permanence and early commencement of head shaping. Kinship, and in particular notions of shared ancestry, which are also emphasised in the mortuary practices of these social collectives (Hoogland 1996; Hoogland and Hofman 2013), are a more probable basis for head shaping practices.

An additional explanation for the variety in cranial shapes found in particular Lesser Antillean assemblages is the manner in which these communities are organised as exogamous unilineal descent groups (Ensor 2013; Keegan and Maclachlan 1989; Whitehead 1995). Marriage partners must be found outside the settlement, creating the need for lasting social ties between communities as well as opportunities for power negotiation between lineages. The matrilocal post marital residence seen in the Lesser Antilles and wider Caribbean would lead to mobility of individuals between different villages and islands (Ensor 2013; Hofman and Hoogland 2011; Hoogland et al. 2010; Keegan 2007; Laffoon 2013). The latter would have contributed significantly to diversity in cranial modification patterns seen in Lesser Antillean assemblages, both with regards to the presence, type, and subtype of modification, as individuals subjected to varying head shaping practices in their communities of birth are buried in the same cemetery. Among the peoples of the Greater Antilles, on the other hand, the same set of principles governing social organisation produces a homogeneous pattern, as head shaping practices in these communities are much more uniform. Therefore, marriage partners from other villages are far more likely to share similar head shapes and patterns of modification appear relatively consistent.

Historic Practices

In contrast to the sparse information that can be gained on head shaping practices from the archaeological record of the Lesser Antilles, much can be learned from the relatively rich historical record of the region created by Europeans in the 16th, 17th, and 18th centuries. Due to the Spanish opinion that the gold and other riches they desired were more likely to be found in the Greater Antilles and on the South American mainland, the inhabitants of the Lesser Antilles were not subjected to the full force of European colonisation and intercultural interaction until the 17th century, leaving more time for their languages and customs to be recorded in written documents (Hulme and Whitehead 1992; Kiple and Ornelas 1996; Paquette and Engerman 1996). These documents contain information on the social context of head shaping that cannot be gained from archaeology and form an important additional source for our understanding of the practice. Care should be taken in the uncritical application of these data to archaeological societies, as has been argued earlier in this dissertation, yet in light of the difficulties with the archaeological record presented above, overlooking these sources would be a critical oversight.

Cranial modification is one of the indigenous customs often discussed in historic accounts of the Caribbean, likely because these altered head shapes were strange to the authors and did not correspond with their biblically informed notions of the human body and how it should be treated (Geller 2006). From small snippets of information in a variety of sources, a picture of cranial modification as part of early socialisation among the Lesser Antillean Carib can be reconstructed.

The process of modification was started almost immediately after birth. Oviedo y Valdés (1851) and Leblond (1813) describe pressure placed on the forehead and back of the head, while Du Tertre (1654), De La Borde (1674), and Labat (1742) only emphasise frontal flattening. This may seem inconsistent, but might in fact simply be a reflection of slight differences in modification practices corresponding with the variety of cranial shapes recovered from the Lesser Antillean archaeological record. A single author, Breton (1999 [1665]), mentions the compression of the skull by daily pressure from the mother's hands. Such a custom would have resulted in mild shape alterations difficult to distinguish from natural variation, which if observable in the archaeological record would yield an ambiguous designation. Most accounts confirm the modification was executed by the mother. This matches with modern ethnographic accounts from the Caribbean and beyond in which knowledge of head shaping customs was part of the female domain and was likely passed on through a female line (Fitzsimmons et al. 1998; Tiesler 2012).

The duration of the practice also seems to have varied. The most detailed description of an infant undergoing modification by Leblond (1813) suggests pressure was applied for nine days straight, after which the device was removed and readjusted until the desired shape was reached. Though he does not specify an age, Leblond does remark that many three to four month old infants were still undergoing modification. Others have contended the practice continues until a child is weaned (Rochefort 1667) or about two years of age (Breton 1999[1665]). It is likely that the duration, like the modification device, would vary depending on the desired shape and the response of the child's skull to the process.

There are indications that the process of head shaping is part of a suite of early socialisation processes, all aimed at turning the newborn into a fully-fledged social actor and human being. Other pivotal events in the Caribbean infant's life taking place in these early months include name giving and piercing of the ears, lower lip, and septum (Du Tertre 1654; Rochefort 1667). This was occasionally accompanied by a small feast. Though these were important steps in the social life of an infant, there are some signs that it was not an absolute necessity to be a functioning member of society. Several authors mention that cranial modification and piercing may be skipped if the child was considered too ill or weak during the early weeks and months of life (Breton 1999 [1665]; Du Tertre 1645). This idea has fascinating implications for the absence of cranial modification in the archaeological record in those societies where group identity is being expressed through altered head shapes. Though head shaping practices appear to be an important step on the road to personhood, such considerations do not trump concerns regarding the health and safety of the infant and there is sufficient social leeway for choice by the practitioner in this matter.

The final - and in light of the aims of this research most crucial - point offered by the historic sources are insights into the social motivations behind head shaping. Most agree that aesthetics are a key motivation for altering the cranial shape of infants (De La Borde 1674; Breton 1999[1665]; Rochefort 1667). The connection between social notions of beauty and cranial modification is common in societies that practice head shaping, as was evidenced during the exploration of ethnographic and historic accounts on head shaping practices undertaken to develop the framework presented in Chapter 3. The tie between the two concepts is based in the embedding of the practice in early socialisation (Conklin 1996; Grusec and Hastings 2007; Jenkins 2014), which likely creates deep relations between the altered head shape and the idealised appearance of human beings in social collectives.

8.6 FAMILIAR FACES

Traces of head shaping practices in the Caribbean were also reflected in the material culture produced by its inhabitants. Greenstone Huecoid amulets found in the north-eastern Antilles, three-dimensional stone *Macorís* heads and human *adornos* on ceramic vessel rims in the Greater Antilles, and Valencioid figurines in Venezuela, all depict altered head shapes and in the latter case the modification device is sometimes also reproduced. These depictions echo the cranial modification seen in the skeletal material and assist in looking at the living faces beyond the skeletal material. More importantly, these representations serve to reify and proscribe cultural ideals on the appearance of a social person. These visual messages carry more weight in societies without a written language (Wells 2012). However, there is more happening in the material cultural repertoire of these communities that is worth discussing: the almost ubiquitous depictions of human faces in the Ceramic Age Caribbean.

Representations of the human face take centre stage in the material cultural repertoire of the late pre-colonial Caribbean (Mol 2007, 2014). Faces are depicted on numerous different materials and used in a variety of contexts ranging from rock art and shamanistic paraphernalia to pottery and domestic utensils (Mol 2007, 2014; Roe and Hayward 2008; Samson and Waller 2010). The focus on the face seems to start in the material culture of the Saladoid communities moving from the coastal mainland into the island chain at the beginning of the Ceramic Age, although the human countenance is part of a wide range that includes zoomorphic and anthrozoomorphic depictions. As time progresses, human facial iconography becomes more and more important until it dominates the repertoire (Mol 2014). The positioning of the face and the disproportional size of the head underline this increased importance of faces (Mol 2014; Samson and Waller 2010).

The centrality of the face as a social tool, enabling personal and social identification as well as verbal and non-verbal communication (Knapp and Hall 2002; Zebrowitz and Montepare 2008), has already been proposed as a way of understanding the importance of cranial alterations in identity formation and expression. This argument is equally valid for the depiction of human faces in material culture in its own right, but the presence of head shaping in the Caribbean adds another dimension to these numerous renditions. The growing importance of human facial depictions during the Ceramic Age coincides with the introduction and expansion of cranial modification practices in the region.

The altered head shapes embody important elements of identity and the representations of the head in material culture reflect and reiterate these social ties adding an additional layer of meaning to the rich iconography of the region.

8.7 *LIVING FACES*

The depictions of human faces in the material culture of indigenous Caribbean societies serve as a powerful reminder that cranial modification does not exist in a vacuum. The altered skulls encountered by the archaeologist in the field or museum are not the living faces ancient peoples would have seen and interacted with on a daily basis. Skulls show their modification in a clear and direct manner that seems to almost exaggerate the alterations. During life, such clarity is partially obstructed by skin, hair, and potentially head gear or bodily adornments. Understanding what the indigenous Amerindians of the Caribbean would have looked in the flesh can be done by creating facial reconstructions of individuals recovered by archaeologists or using photographs of the practice taken in the late 19th and early 20th centuries. This picture can then be completed by elements of personal adornment such as hair style, jewellery, head coverings, face paint, or tattoos to recreate the living faces of the past.

This presents problems in an archaeological setting, as delicate or temporary elements such as face paint or hair style rarely leave direct traces recoverable through excavation. This can be overcome by studying depictions of humans in material culture, investigating the objects used for decorating the body, or using information gained from the historic documents on the appearance of the indigenous inhabitants in the early colonial period. Clearly, great care must be taken in simply extrapolating the latter for all groups and periods of indigenous habitation but as one of the few sources available this may yield valuable clues.

Assessing photographs of living individuals will provide a better understanding of the relation between the underlying skull and living features. Unfortunately, no photographic material is present from the Caribbean context, so this has been replaced by examples from North America. Franz Boas' work among different indigenous peoples of North America at the end of the 19th and the beginning of the 20th century has left us with photographs of several individuals with altered cranial shapes. Whilst leading the Jesup North Pacific expedition, Boas recorded detailed information on what he referred to as the 'sugar-loaf' head of the Kwakwaka'wakw created intentionally using a cradle board (Boas 1909). A portrait of an older lady, reproduced in Figure 15 ,clearly shows this altered cranial shape and the obvious nature of the alterations despite the individual's hair.

Figure 15 Frontal and lateral view of an individual from the Kwakwaka'wakw with cranial modification produced by a cradle board, photographed during the Jesup North Pacific expedition (Boas 1909: Plate XXXVI).

Figure 16 Portrait of Charles Cultee, showing cranial modification produced by a cradle board (Boas 1894 frontispiece/plate 1).

Boas took a great interest in the languages and stories of the Chinook, another group from the Pacific Northwest, after learning they were rapidly being lost. He tracked down one of the few remaining speakers, Charles Cultee, in order to transcribe and translate the stories. The portrait of Charles that serves as the frontispiece of the Chinook Texts (Boas 1894), seen in Figure 16, shows another clear case of cranial modification.

This modification is also created by a cradle board, but of a different construction creating a much broader appearance from the front. This type of frontal flattening is much more reminiscent of the cranial shapes seen in the Caribbean.

Facial reconstruction – a recreation of a human face based on the morphology of the skull – has proved to be a useful tool in the identification of unknown human remains in forensic settings. The techniques have also been used on archaeological material to create portraits of past individuals and allow us to come face to face with our ancestors (Prag and Neave 1997; Wilkinson 2004, 2010) . It is this last application of this forensic method that can help us understand how the indigenous inhabitants of the circum-Caribbean might have looked.

There are several different methods of facial reconstruction, each with different issues regarding reliability, reproducibility, and accuracy (Wilkinson 2010). These concerns are valid in a forensic context, but in this case the aim is not to produce an accurate reconstruction of facial features as much as a better understanding of cranial modification in living individuals. Tissue depth in the facial region may vary substantially depending on the sex, age, weight, and ancestry of an individual but the skin across the cranial vault follows the contours of the underlying bone quite closely (Phillips and Smuts 1996; Prag and Neave 1997; Wilkinson 2004, 2010). This implies that the changes in the regions of the skull most impacted by cranial modification – in particular the forehead – should be relatively clear in living individuals.

Figure 17 **Facial reconstruction of individual TH11 from Kwatta Tingiholo, Suriname, created by Dr. H. Mickleburgh. (Photo by H. Mickleburgh 2014).**

A facial reconstruction was made by Dr. Hayley Mickleburgh using the skull of individual TH11 from the site of Kwatta Tingiholo in Suriname. This adult male has fronto-occipital modification with more pronounced frontal flattening and a minor occipital involvement (Tacoma et al. 1991; van Duijvenbode 2012). The lateral view of the clay reconstruction in Figure 17 shows both the visibility of the frontal flattening and the fact that the hairstyle and mild nature of the occipital modification make it difficult to observe the changes to the back of the skull.

8.8 THE RISE AND DECLINE OF INTENTIONAL CRANIAL MODIFICATION

The practice of cranial modification was widespread in the Caribbean by the time Columbus first set foot ashore in the region and described the altered head shapes of individuals he encountered in his diaries. The arrival of European colonisers and later enslaved Africans was a crucial moment for the indigenous societies of the Caribbean and the resulting social and cultural changes impacted head shaping in unexpected ways. Before looking at the repercussions of cultural contact on the practice expressed through its decline and surprising revival, the question of its origins must be addressed.

Pioneering Practices

The earliest confirmed cases of cranial modification in the Caribbean come from the Early Ceramic Age. The region had been inhabited for thousands of years by this point, but rising sea levels and difficult conservation conditions mean that little skeletal material is available from these first Lithic Age inhabitants (Cooper 2011). Burials dating to the Archaic Age are more numerous (Crespo Torres et al. 2013), although they are still vastly outnumbered by human skeletons dating to the Ceramic and Colonial period. Cranial modification has not been reported in any Archaic Age skeletal material to date, with the possible exception of a single individual from Aruba.

The cranial shape of this person, individual C2 from the Archaic Age site of Canashito on Aruba in the Southern Caribbean Region, was described by Tacoma as a potential case of cranial modification (Tacoma 1959). The site has been dated to 2210±95 BP, based on radiocarbon analysis of bone from individual C1. The skull of C2 was not available for reanalysis in the current investigation, but the published lateral photographs show some ambiguity in the cranial shape, which may be attributed to natural cranial variation or head shaping practices, the former being more likely. This early case, dating to the cusp of the transition between the Archaic and Ceramic Age, is intriguing especially considering the proximity of Aruba to the South American mainland as a likely origin for knowledge of the practice. However, until the skull can be re-examined using new methods, no reliable determination of its modification status can be made.

The earliest reliable example of cranial modification in the Caribbean was found at the site of Morel on the island of Guadeloupe. This site has a long history of habitation beginning in the Early Ceramic Age (Delpuech et al. 1995). A female skeleton was discovered from this beach in 1987 wearing an elaborate necklace of zoomorphic beads executed in the Huecoid style (Durand and Petitjean Roget 1991). The cranium shows evidence of frontal flattening. Unfortunately, the occipital is not preserved and only a lateral photograph was published by Durand and Petitjean Roget (1991), meaning the potential parietal bulging and shortening of the vault could not be assessed. The skeleton was later radiocarbon dated to 2410±120 BP (Delpuech et al. 1995). This implies the female from Morel is a little older than individual C2 from Canashito. However, the conditions in Morel present challenges for radiocarbon dating. The entire skeleton was found encased in beachrock, a lithification of beach sediment into a cement-like substance (Molenaar and de Boer 1992). The effects of these taphonomic conditions on radiocarbon dating are unknown. The Huecoid necklace places this individual securely in the Early Ceramic Age, which on Guadeloupe is generally considered to range between c. 400 BC and AD 600. The earlier date produced by the radiocarbon analysis therefore seems somewhat suspect.

The connection between Huecoid material culture and cranial modification was previously noted by Crespo Torres (2005), who discussed evidence of frontal flattening in typical Huecoid bird pendants. It is interesting that the cranial shape of the Morel female matches the form depicted in the material culture, namely flattening of the frontal, seemingly confirming the relationship. No other Huecoid skeletal material that may resolve the issue of cranial modification practices among this group has been recovered to date.

Based on this scanty evidence, it seems that the first cases of cranial modification in the Caribbean appear at the beginning of the Ceramic Age, when a new wave of pioneers moved from the coastal regions of South America into the islands. These immigrants met the Archaic inhabitants of the islands and evidence of their interaction and exchange is found in the form of the emerging Huecoid style (Hofman et al. 2007, 2014; Rodríguez Ramos 2010). In addition to these developments in material culture, cranial modification makes its first appearance at this frontier. In fact, a combination of data gathered during the current study and previously published information shows almost all skeletal evidence of head shaping practices in this period is found in Saladoid skeletal assemblages from the north-eastern Caribbean. The origin of head shaping practices in the Caribbean thus seems linked to the flurry of communication and exchange taking place along social boundaries, reiterating Barth's (1969) focus on such frontiers as the loci of interaction and innovation. The evidence from the archaeological record is at this point insufficient to indicate whether the practice was transported from the mainland of South America or was a local development produced by the interaction between the two groups.

Changing Tides at El Chorro de Maíta

After these early forays into head shaping in the Early Ceramic Age, the practices developed and expanded in tandem with the socio-political developments of Caribbean societies. The formation of *cacicazgos* accompanied by increased social stratification in the Greater Antilles went hand in hand with higher prevalence rates of cranial modification and a homogeneous set of shapes in the region. By the end of the Late Ceramic Age, altered head shapes were tied to a group identity extending across the Greater Antillean interaction sphere. This dynamic and developing social world is abruptly impacted by the arrival of Columbus in 1492 and the ensuing era of intercultural contact and colonisation. It stands to reason that a socially embedded practice like cranial modification would be affected by the profound changes in indigenous communities that occurred as a result of intercultural contact and the skeletal assemblage from El Chorro de Maíta is uniquely situated to investigate these early colonial developments.

El Chorro de Maíta is a settlement in the north-eastern Cuban province of Holguín that was inhabited during the crucial period spanning the end of the Late Ceramic Age and the early colonial period. This indigenous village was likely part of an *encomienda*, the Spanish system used to regulate labour and tribute in the early colonial period (Valcárcel Rojas 2012). The graves of 133 individuals excavated from the central section of the site show numerous indications of intercultural contact, from syncretic burials practices and European materials to the presence of a potential first generation enslaved African male (CDM45) and a presumed Mesoamerican female (CDM72B) discussed above (Laffoon et al. 2013; Valcárcel Rojas 2012; Valcárcel et al. 2011). Given the evidence of Christian influences on indigenous burial practices, it is interesting to investigate how cranial modification was impacted by intercultural contact.

Head shaping practices at El Chorro de Maíta match the expected pattern of high prevalence rates and uniform cranial shapes seen in other Late Ceramic Age Greater Antillean communities, the closest comparable collections to this unique Cuban context. The rough and adjusted prevalence rates are high at 79% and 85%, respectively, and removing any potential non-Amerindian individuals from the sample elevates this to 89%. Fronto-occipital modification is dominant in the sample, with only a few exceptions including the notable head shape of Mesoamerican CDM72B. There is no evidence of any differentiation based on sex, the presence or absence of grave goods, or origin based on the strontium isotope signature. The only significant pattern found in the burial practices was a distinctly higher rate of secondary burial among non-modified individuals. It should be noted that the sample of non-modified individuals is relatively small due to the high prevalence of cranial modification in the sample and this may have influenced the data.

At a first glance, there is no significant difference between the pattern of cranial modification found at El Chorro de Maíta and other Late Ceramic Age sites in the Greater Antilles, suggesting a continuation of head shaping practices and the use of altered head shapes as a marker of group identity. A closer look at the prevalence data reveals a peculiar pattern, first noticed by the original investigators of the site (Guarch Delmonte 1996), that questions this apparent continuity. The non-adults buried at El Chorro de Maíta have a significantly lower prevalence of cranial modification than the adults. This difference is statistically significant for the rough and adjusted prevalence rates and remains significant if an adjustment is made to account for the issues regarding the suspected non-Amerindian ancestry of certain individuals in the sample. For ease of comparison with the other sites in the sample, the adjusted prevalence rate is cited here. Cranial modification is found in 92% of the adult crania and 65% of non-adult crania recovered from the cemetery at El Chorro de Maíta.

The significant gap between the prevalence rates of adults and non-adults at El Chorro de Maíta is both unique and unexpected. Analysis of the most comparable sites in the sample in terms of cultural context, time period, and size show similar rates of modification for the different age categories, as would be expected for a stable and enduring practice like cranial modification. The pattern seen at El Chorro de Maíta thus suggests a destabilisation of head shaping practices at the site during the time in which the cemetery was used to inter members of the community. Guarch Delmonte (1996) attributed this pattern to a decline in cranial modification practices as a result of the arrival of the Spanish. Before looking at this argument in more detail, issues regarding the internal chronology of the site must be discussed.

The burials in the cemetery cannot be differentiated into different temporal phases and have therefore been studied as a single population. This makes it impossible to determine whether the non-adult modification rate is an accurate representation of the developments in the latter part of habitation at El Chorro de Maíta. Weston (2012) determined that the mortuary profile of the cemetery appears consistent with that of a catastrophic cemetery, caused by a single disastrous event or brief period of calamity. Given the early colonial context of the site, endemic diseases unwittingly brought into the Americas by Europeans against which the Amerindian communities had no immunity, may have contributed to the palaeodemographic profile of El Chorro de Maíta (Valcárcel Rojas 2012; Valcárcel Rojas et al. 2011; Weston 2012). This is interesting for the debate regarding the internal chronology, as catastrophic cemeteries tend to be the result of short-term events and represent the living population more accurately than traditional attritional cemeteries. However, it must be noted that although there appears to be evidence for a catastrophic element in the El Chorro de Maíta cemetery, the number of burials, the styles of interment, including a number of secondary burials, and the range of radiocarbon dates, all suggest that there was an attritional component to the cemetery as well (Valcárcel Rojas 2012; Weston and Valcárcel Rojas in press).

Regardless of the issues surrounding the internal chronology of the cemetery, the unique pattern of differential prevalence rates at El Chorro de Maíta and the implied shift in head shaping practices requires explanation. Once more, the context of the site points towards the likely culprit: the arrival of the Spanish and the ensuing social upheaval and intercultural contact of the early colonial period. There are, however, several ways in which the momentous events of this period could have impacted the head shaping practices of the indigenous inhabitants of Cuba.

The negative European attitude towards altered head shapes, evidenced in written documents of the era, is often seen as an important factor in the decline of cranial modification in colonial contexts in the Americas and Africa (Dingwall 1931; Tiesler 2012; Tommaseo and Drusini 1984; van Duijvenbode 2011). This culminated in several Spanish attempts to suppress the practice through decrees and laws on the South American mainland. One of the earliest attempts is found in Lima's Provincial Court and dates back to 1567 (Dingwall 1931:215). Though European documents certainly support unfavourable attitudes towards the practice, it is vital to realise that the decline in cranial modification seen during the colonial period at El Chorro de Maíta and elsewhere is not simply caused by outsiders, but demonstrates a fundamental change in indigenous culture as a response to intercultural interaction and colonial processes. By simply attributing the absence of cranial modification to negative European attitudes, we unjustly remove indigenous agency from the equation.

The intricate ties of cranial modification to concepts of personal and group identities formed in the earliest phase of life during the socialisation process of the infant (Conklin 1996; Jenkins 2014) explains the potential impact of intercultural contact on the practice. In Cuba, as in other Greater Antillean communities at the crucial historic transition from Late Ceramic Age to early colonial period, altered head shapes represent a regional group identity. Besides representing these communal ties, the altered heap shape would also simultaneously have been integrated into the personal identity of the individual as a fundamental aspect of who they are as a human being and social actor (Jenkins 2014). The individual, after all, would not have remembered a time before the cranial modification took place and would never have seen a personal reflection without the resulting head shape. Such fundamental and socially integrated notions of identity are resistant to change under normal circumstances (Cornell and Hartmann 1998; Jenkins 2014).

However, the exceptional and unique context of individuals buried at El Chorro de Maíta does not represent a normal indigenous society. The arrival of Columbus heralded an unrivalled period of intercultural interaction and social change through processes of colonisation and enslavement. Contact between individuals from the Americas, Europe, and later Africa created a true melting pot of cultures still found in the Caribbean to this day. The colonisation of Cuba had a momentous impact on the indigenous world view and would have profoundly affected social concepts and structures. In such a changing world, the social ties that connected the inhabitants of the Greater Antilles would have lost the importance they once held in indigenous communities as social structures crumbled under European pressure and adapted to new realities. As indigenous identities transformed in the early colonial period, the marker of the old social ties would have lost its former relevance, leading to a decline in head shaping practices. This process would likely have taken place at different rates in different communities and families, as some may have clung to old notions of identity while others adapted more rapidly. It would also have depended on the nature of intercultural contact and colonial processes, with changes occurring faster in groups in direct and prolonged association with European colonisers.

The pattern in head shaping prevalence rates found at El Chorro de Maíta fits well with this scenario, as it is obvious that head shaping practices were declining at a differential rate within the community with some continuing and others discontinuing the practice. The diminished importance of altered head shapes as a result of disintegrating and shifting social structures, perhaps aided by the negative European opinions on cranial modification in the *encomienda* of El Chorro de Maíta, resulted in a decline of head shaping practices. In this sense, cranial modification is not unique but one of many indigenous customs lost as a result of the colonisation of the Americas.

The Carib Case

The decline of cranial modification seen in the skeletal material from El Chorro de Maíta has exemplified how the European colonisation of the Caribbean after 1492 led to inevitable and profound changes in Amerindian lifeways and customs. The cultural contact between Europeans, Amerindians, and Africans and disparate political and economic developments in the region led to a dynamic social setting that produced an unexpected revival of head shaping practices among the Black Carib.

These communities of African descendants lived on the island of St. Vincent and were referred to as Black Carib in historical documents in order to distinguish them from the Carib or Kalinago communities of the island (Gullick 1976; Hofman and Hoogland 2012, Whitehead 1995). Little is known about the early dynamics between the two groups, though interaction and exchange must have taken place as the Black Carib adopted the

Amerindian language and several customs including head shaping. By the end of the seventeenth century, relations had soured and each group occupied a distinct portion of the island (Kerns 1983; Taylor 2012). At the same time, European nations intensified attempts at colonising the Lesser Antilles and the English Crown took a particular interest in St. Vincent (Gullick 1976).

It is against this dynamic and instable back drop that the revival of cranial modification occurred among the Black Carib communities. There is no human skeletal material available that can be ascribed to the Black Carib with certainty[2], but French and English travellers recorded detailed if occasionally contradictory information on the practice that may be used to reconstruct this interesting resurgence of head shaping.

Black Carib cranial modification was achieved by a device consisting of a frontal board wrapped in cotton or padded to protect the infant's skin. This board was secured with a strap around the back of the skull (Amic 1791; Davidson 1787). Chanvalon (1761) talks of a second board at the back of the skull, but this information cannot be confirmed. This construction was very similar to the device used by the Amerindian communities of the region. Cranial modification also occurred in certain parts of Africa and given the varied origin of the Black Carib, some may have remembered head shaping from their homelands. As African cranial modification predominantly used wrapping of the skull to create a long elongated shape (Ricci et al. 2008), the construction of the modification device and resulting cranial shape among the Black Carib supports the notion that they copied the practice from their Amerindian neighbours.

The relatively rapid adoption of this cultural practice suggests it served an important social function. Most sources cite a functional reason for the altered head shapes: to prevent Black Carib being mistaken for runaway slaves (Chanvalon 1791; Davidson 1787; Leblond 1813). Though such a practical motivation might have been behind the initial appropriation of the practice, by the end of the eighteenth century one writer referred to it more poetically as the 'character of their nation' (Amic 1791:133). In the volatile social context of seventeenth- and eighteenth-century St. Vincent, cranial modification was a powerful way of expressing Black Carib group identity, fostering internal community cohesion, and creating an effective distinction between in- and outsiders.

There are some indications that the practice was starting to lose some of its significance towards the end of the eighteenth century as Black Carib identity became firmly established. Amic (1791) notes that some families had reportedly stopped practicing

2 Two crania supposedly found on St. Vincent are depicted in the cranorium by Blumenbach (1790). These skulls may have belonged to Black or Island Carib individuals, but without proper context regarding the origin of the crania this is impossible to ascertain. The current location of the skulls is unknown.

head shaping altogether. The outbreak of the renewed Carib war against the British in the final decades of the eighteenth century resulted in a British victory and the wholesale deportation of the community from St. Vincent to Central America. Cranial modification rapidly disappeared after this momentous upheaval and was no longer found among the displaced communities on the coast by the 1820's (Conzemius 1828; Roberts 1827).

8.9 SHARED MOTIFS

The history and development of head shaping in Caribbean communities from its beginnings in the Early Ceramic Age to the remnants still present in current child care practices are inherently intertwined with the broader social and political transformations of the region. The story of cranial modification sketched throughout this chapter shows three common threads. First, head shaping practices and their associated identities are deeply ingrained in the individual and social practice as part of early socialisation processes and form an integral part of becoming a person and human being. Second, interaction between individuals and communities across social boundaries is a crucial element in the (trans)formation of social identities and consequently intentional cranial modification. Third, the Caribbean is characterised by the ongoing tension between diversity and similarity, as is particularly noticeable in the contested case of the Tainos. These three shared motifs will be explored in the conclusion.

9 FACING SOCIETY

The colourful communities of the Caribbean present the contrasts and conflicts that lead one to compare the area with a continually changing kaleidoscope
Mathews (1965:32)

Ever since the first settlers set foot ashore some eight thousand years ago, the Caribbean has been a cultural kaleidoscope characterised by an ongoing tension between similarity and diversity (Keegan and Hofman 2017; Mathews 1965). Identification processes, based simultaneously on such connecting and differentiating cultural features, take place at numerous spatial and temporal scales creating social collectives of varying composition and size. Intentional cranial modification is part of the suite of cultural practices shaping, expressing, and transforming the social identities of past Caribbean peoples. As a cultural custom that uses the human body as its canvas to create an embodied social signal, a study of head shaping practices provides a unique perspective for the analysis of past identities embedded in the individual human body.

Building on these ideas, this research aimed to elucidate the social connections of head shaping practices though a framework combining social constructionist perspectives on identification and early socialisation processes with information on head shaping practices gained from osteological data as well as ethnographic and historic sources. Such an approach bridges the divide between natural sciences and the humanities,

The study was guided by the main research question:

> What can the study of head shaping practices contribute to a better understanding of identities in the indigenous communities of the Caribbean in the Ceramic Age and early Colonial Period?

This overarching question was approached by a multiscalar investigation of two complementary dimensions of head shaping practices in indigenous Caribbean societies: 1) the spatial distribution of the custom investigated to determine whether patterns of cranial modification varied between individuals, communities, and larger social collectives, and 2) a diachronic perspective used to determine whether social and cultural developments throughout time impacted head shaping practices and by extension social identities. Taken together, these components form an integrated social history of head shaping in the Caribbean that contributes to a better understanding of past indigenous identities in the region.

9.1 SHAPING CARIBBEAN IDENTITIES

The practice of head shaping is first found among Caribbean communities in the Early Ceramic Age at the social boundary between new immigrants from the mainland and Archaic Age communities already present in the north-eastern Caribbean. This frontier led to social and cultural innovations, including the emergence of the Huecoid (Boomert 2014; Oliver 1999) and the appearance of head shaping in Huecoid and Saladoid communities present in both human remains and material culture. At this point, there is insufficient evidence to determine whether head shaping was part of the cultural customs brought into the islands by mainland communities or an innovation emanating from the social exchange across boundaries between different peoples. Regardless, the Early Ceramic Age was a dynamic period in Caribbean history that shaped its inhabitants for centuries to come.

After the introduction and subsequent spread of intentional cranial modification, altered head shapes were likely used to express in-group differentiation and localised identities in the Early Ceramic Age. The transition to the Late Ceramic Age was marked by a shift in social organisation that emphasised local communities and their ancestral ties (Curet and Oliver 1998; Torres 2012). These emergent developments impacted social structure and identities and therefore both head shaping practices as well as the composition and scale of communities.

In the Greater Antilles, these developments formed the basis for the *cacicazgos* and increased social stratification encountered by European colonisers in the early colonial period. The Late Ceramic Age Taíno communities of the Greater Antilles were embedded in a regional network of mobility and exchange that crossed geographical and social boundaries (Hofman et al. 2008). Here, a homogeneous pattern of cranial modification emerges with similar prevalence rates and cranial shapes throughout the region representing a collective social identity. As communities and political networks expand, such a shared feature ties people and communities together and facilitates social interaction across larger distances. The altered cranial shape of infant KR337 from Kelbey's Ridge 2 on Saba, a trading post on the edge of the Greater Antillean interaction sphere (Hofman and Hoogland 2011; Hoogland and Hofman 1999), demonstrates the importance of maintaining social connections between communities and individuals across the Caribbean Sea.

A similar reorientation in kinship structures towards ancestral lineage and local community was seen in the Lesser Antilles at the beginning of the Late Ceramic Age, but leadership and social status differentiation remained more flexible and transient in these communities (Boomert 2014; Hofman and Hoogland 2011). Cranial modification patterns show a great deal of diversity in prevalence and shape, reflecting the local developments of the Lesser Antilles: the Leeward Islands becoming part of the Greater Antillean interaction sphere and the Windward Islands orienting themselves more towards the South American coast. The exogamous marriage practices of Caribbean communities contribute to the variety in head shapes found in the skeletal assemblages from the region. Partners born in another village may have a different cranial shape as a result of diverse local child care practices in this region.

In tandem with these developments in social organisation seen during the Ceramic Age, there is an increased focus on depicting human faces in the material culture of the entire Caribbean region (Mol 2014). These anthropomorphic heads are found in a variety of media, from two-dimensional representations in rock art to three dimensional sculptures in stone, ceramics, or shell, and sometimes including references to head shaping such as a portrayal of the altered head shape or modification device. These depictions serve to reiterate and reinforce cultural ideals and underscore the growing importance of the head in Caribbean culture and society.

The arrival of Columbus in 1492 marks the beginning of intercultural interaction in the Caribbean on a global scale between the Amerindian indigenous inhabitants, the European colonisers, and later the enslaved Africans (Hofman et al. 2014). Processes of colonisation, acculturation, and resistance impacted indigenous social organisation and in turn head shaping practices. This is seen in cranial modification patterns from the early colonial *encomienda* settlement of El Chorro de Maíta, Cuba. A decline in cranial modification seen among the non-adult individuals buried at the central cemetery in this village can be attributed to a significant transformation in the group identity expressed by the altered head shapes as a result of profound changes to indigenous social structure. These adjustments to cultural practices took place at a different pace across communities and islands as a result of variations in local context and the expression of individual agency by indigenous people.

The case of the Black Carib in the Lesser Antilles demonstrates that a loss of head shaping practices was not the only possible outcome of the dynamic social situation in the early colonial melting pot. This community of African descendants on the island of St. Vincent adopted intentional cranial modification from their indigenous neighbours (Kerns 1977). At first, the altered head shapes may have functioned as a mark to distinguish freeborn African descendants, but they likely transformed into a symbol of group identity that facilitated internal group cohesion. However, this revival of cranial modification in the Caribbean was short lived as the deportation of the Black Carib after the Carib Wars against the British, at the end of the 18th century, resulted in the abandonment of the practice (Conzemius 1828).

This marks the end of intentional cranial modification in the Caribbean, though ethnographic and medical studies conducted on modern inhabitants of the region have shown that traces of head shaping practices in the form of moulding and more general elements of early socialisation processes remain to this very day (FitzSimmons et al. 1998; Herskovits 1964). The longevity of components of these cultural practices, despite centuries of social interaction and transformation, is testimony to their embedded nature as a result of integration into early socialisation processes and their inherent resistance to change.

9.2 *THEMES AND FUTURE RESEARCH*

During this research, three main themes emerged with broader social and cultural implications for the study of Caribbean indigenous communities that represent key directions for future research. After a discussion of these themes, this chapter will close with some remarks on the technological advances that may assist the study of intentional cranial modification and the promising aspects they provide for the dissemination of scientific results to a wider audience.

Becoming Human

This study has shown that intentional cranial modification, which commences almost immediately after birth, is part of the cultural customs surrounding childbirth and early child care in Caribbean societies. As such, it is a component of early socialisation processes aimed at creating a social person from the newborn infant and represents an important passage rite. Despite the importance of early socialisation processes for developing personhood, it is – like most social and cultural customs – not rigidly adhered to in all cases but open to a certain degree of flexibility. Slight variations in head shape may, for example, represent different ways of executing head shaping by practitioners that do not necessarily affect the underlying social connotations of the altered head shape. Ill health of the infant in the first months of life, the window in which cranial modification must commence, may be reason to postpone head shaping or opt out of the custom altogether. This may also help explain absence of cranial modification in certain individuals in communities where cranial modification is used to express a shared notion of group identity. Therefore, head shaping practices are perhaps best viewed as a cultural and social ideal that may be trumped by circumstances and influenced by choices made by social agents.

The early colonial sources documenting the Lesser Antillean Carib provide glimpses into other cultural customs executed at this crucial period in the infant's life, such as the naming of the child by a chosen relative or friend or the piercing of ears, lower lip, and septum. This is an important reminder that cranial modification does not exist in isolation, but is part of a suite of cultural modifications and decorations of the human body related to social and cultural ideals. The importance of moving beyond crania to living faces and people, integrating all aspects of physical appearance, has been stressed throughout this study. This may be achieved by investigating other elements of body modification and decoration, for example body painting using ceramic body stamps, decorative shell or stone beads and pendants, or the binding of female calves mentioned in early colonial sources on the Lesser Antilles (Allaire 1997). A study of historic documents may yield information on additional aspects of physical appearance or cultural practice, as not all human behaviour leaves traces in the archaeological record. Such a multifaceted approach may yield complementary insights into embodied identities in the Caribbean.

The human body is an excellent canvas for signalling social identities, but past and present communities use all available means to display social affiliations. A holistic approach to identity practices must move beyond the body and incorporate all types of material culture recovered from the archaeological record, such as ceramic styles (Hofman 1993; Hofman et al. 2007; Ulloa Hung 2014), shell faces (Mol 2014), or lithics (Knippenberg 2006). The divergent patterns produced by such a study will be a more accurate reflection of past social collectives existing simultaneously on various scales and move beyond the neat bounded cultural units produced by previous archaeological investigations. The latest views on social organisation and kinship structure will inform such explorations, but because of the dialectical relationship and entangled nature of social webs, new insights into identity practices will simultaneously influence and transform our understanding of indigenous societies.

Boundless Interaction

The role of boundaries between different social collectives as loci for interaction and innovation, essentially and perhaps counterintuitively connecting rather than dividing, is seen throughout Caribbean history. Bridging social borders brings about new ways of thinking and doing and these processes are reflected in the development of head shaping practices in the region. The rise, decline, and revival of intentional cranial modification all occur at peaks of interaction between different social collectives.

Head shaping practices in the Caribbean appear at the start of the Ceramic Age in the north-eastern Caribbean at the peak of interaction along social boundaries between different communities, including Archaic Age peoples and new immigrants from the mainland. Direct evidence of these pioneering practices is scarce, complicating the intriguing question concerning the origin of the practice. Was cranial modification a local innovation or a cultural custom originating on the mainland that was introduced by the newcomers? A twofold approach would be able to shed more light on this matter: the incorporation of Lithic and Archaic Age skeletal material as well as a refinement of the chronology of Early Ceramic Age skeletal assemblages through radiocarbon dating of each individual.

Recent investigations have demonstrated that the exchange networks of the indigenous Caribbean communities, and by extension the social boundaries of these communities, spread far beyond the adjacent coastal regions of the South American mainland (Hofman et al. 2010; Hofman and Hoogland 2011; Laffoon et al. 2014; Rodriguez Ramos 2011). A geographical expansion of the societies under investigation incorporating the Lower Orinoco and Amazonian interaction spheres and Central America using the heuristic framework and integrated multiscalar approach advocated in this study, may yield better insights into the social ties represented by cranial modification on both an individual and community scale as well as past indigenous Caribbean identities as a whole.

Between Unity and Diversity

The tension between diversity and homogeneity, a defining feature of the Caribbean kaleidoscope of peoples throughout its history, is visible in the development of head shaping during the Ceramic Age. A homogeneous pattern of cranial modification is found in the Greater Antilles communities of the Late Ceramic Age, representing a collective identity that tied the various Taíno communities together. However, this overarching display of similarity in head shapes does not in any way diminish the local heterogeneity in language and material culture found among the Taínos (Curet 2003; Keegan 2013; Hofman et al. 2008). Rather than returning to the old vision of a singular homogeneous culture proposed in the early decades of Caribbean archaeology based on the writings of Columbus and other early chroniclers, this study has instead elucidated one of the social mechanisms that integrated these varied social collectives on a larger regional scale. Fostering a feeling of shared cultural and social ideals through similar and clearly visible altered head shapes would have facilitated interaction and exchange between distant communities and supported the growing scale of social and political organisation due to the expansion of the *cacicazgos*.

Dealing with this tension between uniformity and diversity, exemplified well by the case of head shaping practices among the Taínos yet present in most archaeological studies, will require archaeologists studying past social worlds to consider scale and context as crucial aspects of their investigation. Identification processes as understood in the social constructionist paradigm, which underlie many different elements of the archaeological record, will always create multiple semi-overlapping patterns with mismatched boundaries. Distribution patterns of languages, pots, flint, architectural features, house plans, or personal adornments, for example, will not necessarily correspond neatly to one another. This must not be considered a difficult nuisance to be dealt with by smoothing over differences to create convenient categorisations or homogeneous units, but seen as a realistic multifaceted representation of ancient social worlds that presents new opportunities for studying and understanding the past.

Bringing Head Shaping into the 21st century

Recent technological advancements in three-dimensional (3D) imaging and digitisation have opened up new opportunities for the study, documentation, and preservation of human skeletal material. Portable and relatively inexpensive 3D laser scanners allow researchers to produce high resolution digital models of specimens. These models can be used to obtain measurements and coordinates, virtually reconstruct fragmented bones, or apply more sophisticated analytical techniques (Kuzminsky and Gardiner 2012; Tocheri 2009). In addition, their use will limit the necessity of handling of fragile human remains and thus aid in the preservation of skeletal collections. Online archives of digitised skeletal collections will improve access for investigators and encourage collaborative efforts (Algee-Hewitt and Wheat 2016; Kuzminsky and Gardiner 2012; Sumner and Riddle 2009).

Digital imaging techniques have already been applied to study intentional cranial modification through two-dimensional landmark and outline data and three-dimensional geometric morphometric approaches (e.g. Friess and Baylac 2003; Kuzminsky and Gardiner 2012; Ross and Ubelaker 2009). These approaches have changed and improved our understanding of the effects of cranial modification on anatomical metrics and non-metrics and provide new means of analysing and quantifying altered head shapes.

The scope of recent advances in 3D imaging techniques reaches beyond academia into the public domain and has profound implications for scientific outreach and valorisation. Digital models can be used in the construction of interactive museum exhibits and even virtual expositions in an online environment leading to improved access to, participation in, and knowledge of scientific studies and insights. In the case of human remains, virtual imaging can also partially solve the moral and ethical issues regarding the public display of skeletal material.

The life histories of KR337 and CDM72B sketched in this investigation could be brought to life using these techniques. Virtual facial reconstructions based on 3D models of their crania would bring the public face-to-face with their ancestors and provide a powerful tool for interacting with the past. This experience could be enhanced with digital reconstructions of the burial context and the village in which they lived. Incorporating these new developments in such a manner would strengthen the distribution of knowledge gained by academic studies to the general public, certainly the core task of archaeology and science as a whole.

The archaeological past can also be tied to the present using the theme of identity, surely as important in bygone communities as it is in today's increasingly globalised world. This investigation has, through a multidisciplinairy approach to processes of identification, illuminated various matters of identity in indigenous Caribbean communities and in doing so has underlined that identities matter.

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APPENDIX A

Fetal/Infant recording form

ICM Recording Form

Fetus/Infant

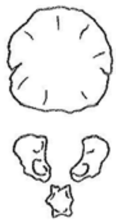
Site | Observer
Feature Number | Date
Burial/Find Number | Location
Additional Information

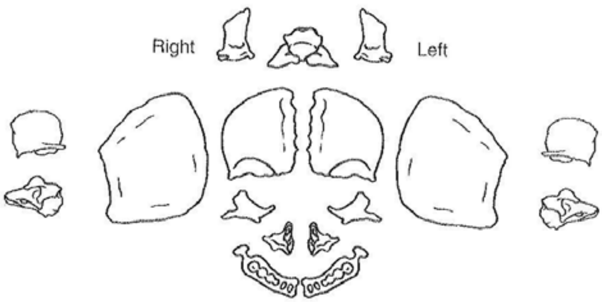
Cranial Inventory

Preservation poor / moderate / good / excellent

Reconstruction yes / no

Manner of reconstruction:





Indicate missing areas

General Information

Burial Position

Grave Goods

Period

Palaeopathology Present / Absent / Unknown

Type of Pathology:

Remarks

Site: Burial:

Age Determination

Element	Open/Partially Fused/Fused	Age

Fetus (<40 weeks) Infant (0-3 years) Child (3-12 years)

Cranial Modification

Modification present yes / no / possibly

Intentional yes / no / Undetermined

Type of Modification Fronto – Occipital / Circumferential /

Frontal flattening / Occipital flattening

Other:

Subtype Parallel / Vertical / Undetermined

Degree Slight / Moderate / Marked

Asymmetry Present / Absent

Direction:

Photographs yes / no

Photo Numbers

Remarks

Outline of Skull

APPENDIX B

Child recording form

ICM Recording Form

Child

Site

Feature Number

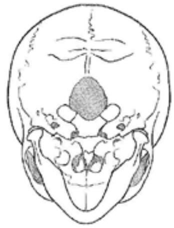
Burial/Find Number

Additional Information

Observer

Date

Location

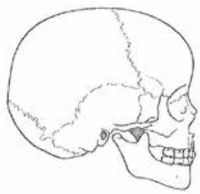


Cranial Inventory

Preservation poor / moderate / good / excellent

Reconstruction yes / no

Manner of reconstruction:



Indicate missing areas

General Information

Burial Position

Grave Goods

Period

Palaeopathology Present / Absent / Unknown

Type of Pathology:

Remarks

Site: Burial:

Age Determination

Element	Open/Partially Fused/Fused	Age

Fetus (<40 weeks) Infant (0-3 years) Child (3-12 years)

Cranial Modification

Modification present yes / no / possibly

Intentional yes / no / Undetermined

Type of Modification Fronto – Occipital / Circumferential / Frontal flattening / Occipital flattening

Other:

Subtype Parallel / Vertical / Undetermined

Degree Slight / Moderate / Marked

Asymmetry Present / Absent

Direction:

Photographs yes / no

Photo Numbers

Remarks

Outline of Skull

APPENDIX C

Adolescent/Adult recording form

ICM Recording Form

Adolescent and Adult

Site

Observer

Feature Number

Date

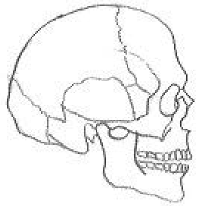
Burial/Find Number

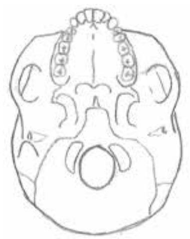
Location

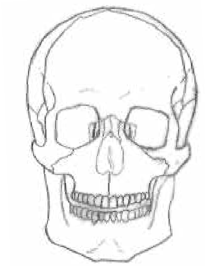
Additional Information

Cranial Inventory

Preservation	poor / moderate / good / excellent
Reconstruction	yes / no
	Manner:







Indicate missing areas

General Information

Burial Position	
Grave Goods	
Period	
Palaeopathology	Present / Absent / Unknown
Remarks	

Site: Burial:

Sex Determination

Pelvic Traits	Score
Ventral Arc	
Subpubic Concavity	
Ischiopubic Ramus Ridge	
Greater Sciatic Notch	
Preauricular Sulcus	

Cranial Traits	Score
Nuchal Crest	
Mastoid Process	
Supraorbital Margin	
Prominence of Glabella	
Mental Eminence	

Estimated Sex:

Age Determination

Adolescent (12-18 years)

Adult (18+ years)

Based on:

Site: Burial:

Cranial Modification

Modification present	yes / no / possibly
Intentional	yes / no / Undetermined
Type of Modification	Fronto – Occipital / Circumferential /
	Frontal flattening / Occipital flattening
	Other:
Subtype	Parallel / Vertical / Undetermined
Degree	Slight / Moderate / Marked
Asymmetry	Present / Absent
	Direction:
Photographs	yes / no
Photo Numbers	

Remarks

Outline of Skull

Clark *et. al.*

Frontal Arc				Frontal Index	
Frontal Chord				Parietal Index	
Parietal Arc				Occipital Index	
Parietal Chord					
Occipital Arc				Score	
Occipital Chord				Modified	

Site: Burial:

Metrics

Cranial measurements (mm)	Measurements
1. Maximum Cranial Length (G – Op)	
2. Maximum Cranial Breath (Eu – Eu)	
3. Bizygomatic Diameter (Zy – Zy)	
4. Basion – Bregma Heigth (Ba – B)	
5. Cranial Base Length	
6. Basion – Prosthion Length	
7. Maxillo – Alveolar Breath	
8. Maxillo - Alveolar Length	
9. Biauricular Breath	
10. Upper Facial Heigth	
11. Minimum Frontal Breath	
12. Upper Facial Breath	
13. Nasal Heigth	
14. Nasal Breath	
15. Orbital Breath*	
16. Orbital height*	
17. Biorbital Breath	
18. Interorbital Breath	
19. frontal Chord	
20. parietal Chord	
21. Occipital Chord	
22. Foramen Magnum Length	
23. Foramen Magnum Breath	
24. Mastoid Length*	

* Bilateral Measurement: always on the left side. If substituted for right side, indicate with (R)

Cranial Indices	Value	Category
Cranial Index		
Cranial Length-Height Index		
Cranial Breath-Heigth Index		
Mean Heigth Index		
Fronto-Parietal Index		
Upper Facial Index		
Nasal Index		
Orbital Index		
Maxilloalveolar Index		

Site: Burial:

Non Metrics

Trait		Score		Comments
Metopic Suture				
Supraorbital notch	Number	L	R	
	Position	L	R	
	Size	L	R	
	Shape	L	R	
Supraorbital foramen	Number	L	R	
	Position	L	R	
	Size	L	R	
Infraorbital Suture		L	R	
Accessory Infraorbital Foramina		L	R	
Zygomatico-facial Foramina	Number	L	R	
	Position	L	R	
	Size	L	R	
Parietal Foramen	Number	L	R	
	Position	L	R	
	Size	L	R	
Inca Bone				
Condylar Canal	Number	L	R	
	Size	L	R	
Divided Hypoglossal Canal		L	R	
Flexure of Superior Sagittal Sulcus				
Foramen Ovale Incomplete		L	R	
Foramen Spinosum Incomplete		L	R	
Pterygo-spinous Bridge		L	R	
Pterygo-alar bridge		L	R	
Tympanic Dihiscence/ Huschke		L	R	
Auditory Exostosis		L	R	
Mastoid Foramen	Number	L	R	
	Position	L	R	
	Size	L	R	

Trait		Score		Comments
Mental Foramen	Number			
	Size			
	Type of Division			
Mandibular Torus		L	R	
Mylohyoid Bridge	Location	L	R	

Site: Burial:

Trait		Score		Comments
Epipteric ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Coronal ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Bregmatic ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Saggital ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Apical ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Lambdoid Ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Asterionic Ossicle	Number	L	R	
	Position	L	R	
	Size	L	R	
Occipito Mastoid WB	Number	L	R	
	Position	L	R	
	Size	L	R	
Parietal Notch Bone	Number	L	R	
	Position	L	R	
	Size	L	R	

SUMMARY FACING SOCIETY

'and all of them very wide in the forehead and head'
Columbus (translated by Dunn and Kelley 1991:69)

In one of his first descriptions of the inhabitants of the Americas, Christopher Columbus introduces the practice of intentional cranial modification. This permanent and visible alteration of the human skull shape has been a topic of academic and popular debate ever since. This research uses such head shaping practices to investigate matters of identity among the indigenous Caribbean communities in the pre-colonial Ceramic Age and Colonial period. This is achieved using a multidisciplinary approach combining archaeology, anthropology, history, and sociology to study the social ties of intentional cranial modification against the broader social, cultural, and political developments in the Caribbean both before and after the crucial intercultural encounters of 1492.

Intentional cranial modification is a practice that produces a permanent alteration of the shape of the skull through the application of pressure in early infancy, usually executed by the mother or midwife. Different shapes and degrees of alteration can be achieved through variations in the location and duration of pressure, as well as the materials used to construct the modification apparatus. The permanence and high degree of visibility make it a convenient marker of social identity that has become embodied by the transformation of the human body. Identity is considered here as a dynamic and situational social construct that describes who a person is, particularly in relation to other individuals and collectives. There is no singular identity, but rather overlapping elements of identities. These processes of identification are central to human social life.

Fundamental to the study of identity in Caribbean indigenous communities was the (re)analysis of skeletal material from the region. In total, 556 individuals from 76 different sites in 15 countries from the Caribbean archipelago and mainland region were studied. The size of the skeletal assemblages and available contextual information varied considerably, though the majority of the material can be dated to the Late Ceramic Age (AD 600 – 1492). The data produced by this study can be used to reconstruct patterns of modification in Caribbean communities, such as the prevalence of head shaping and the cranial shape(s) encountered. Other variables such as biological sex, geographic origin of individuals, and various aspects of mortuary traditions have been taken into account wherever possible as these may serve as proxies for elements of identity.

To study such a diverse sample, a twofold multiscalar approach was developed incorporating the complementary spatial and temporal dimensions of intentional cranial modification. The spatial analysis ranged from local to regional, as the social boundaries demarcated by modification may be found within or between individuals and communities at various scales. Patterns of modification, consisting of prevalence, head shapes, and relations between head shaping practices and other social indicators from the archaeological record, were also assessed against the everchanging social backdrop of the Caribbean characterised by interaction and exchange throughout its history. The embedded nature of the practice implies that broader social and cultural changes will impact the identities expressed through altered head shapes.

The first evidence of head shaping practices in the Caribbean was found in the skeletal remains and material culture of the Early Ceramic Age, particularly in the north-eastern Caribbean. This is where a new wave of immigrants from the mainland of South America interacted with the first Archaic inhabitants of the islands. The emergence of cranial modification, in this respect, seems to be linked to processes of interaction and exchange across social boundaries, where frontiers between social collectives serve as important places for interaction and innovation.

In the Late Ceramic Age, head shaping practices were present in communities throughout the Caribbean and mainland, yet different regional patterns of modification can be distinguished. A high prevalence and relatively homogeneous pattern of cranial modification was found in the Greater Antilles with an emphasis on flattening of the forehead. These shared head shaping practices indicate a collective group identity. As communities and political networks expanded during the Late Ceramic Age, such an identity would have tied people and communities together. These communal practices extending across seas also connected the communities in the Greater Antillean interaction sphere and facilitated interaction and exchange between distant communities.

In the Lesser Antilles and on the mainland, a much more diverse pattern of cranial modification characterises the Late Ceramic Age reflecting the divergent social developments in the region. The Leeward Islands become part of the Greater Antillean interaction sphere, whereas the Windward Islands orient themselves towards the

South American mainland. The exogamous marriage practices also contribute to the variety of head shaping practices found in the skeletal collections from the region.

The arrival of Columbus in 1492 marked a turning point in indigenous Caribbean history. The intercultural interaction and resulting processes of colonisation, acculturation, and resistance had profound repercussions for indigenous societies and identities, thus impacting head shaping practices. Direct evidence of this can be found at the early colonial site of El Chorro de Maíta in north-eastern Cuba. A decline in cranial modification in the non-adult individuals buried in the cemetery was the result of significant changes to indigenous identity in the early Colonial period. Such transformations of deeply embedded social practices took place at different rates across the Caribbean depending on the local circumstances.

A decline in head shaping practices was not the only potential response to colonial processes in the dynamic social setting of the early colonial Caribbean, as is illustrated by the Black Carib of the Lesser Antilles. This group of free African descendants living on the island of St. Vincent adopted head shaping practices from neighbouring indigenous communities likely, at first, to differentiate freeborn African children from enslaved Africans. The altered head shapes may also have served to facilitate internal community cohesion as a symbol of group identity. The deportation of the Black Carib after the Carib Wars against the British at the end of the 18th century caused an abandonment of the practice and cut short the renewal of intentional cranial modification in the Caribbean. Even so, modern ethnographic and medical studies still find traces of head shaping practices in the form of mild moulding as well as other elements of indigenous socialisation processes in modern Caribbean communities. This longevity, even after centuries, is a demonstration of the deeply embedded nature of early socialisation processes and shows how indigenous social practices still effect the current multi-ethnic and multi-cultural Caribbean.

SAMENVATTING HOOFDZAKEN VAN DE SAMENLEVING

'and all of them very wide in the forehead and head'
Columbus (vertaald door Dunn en Kelley 1991:69)

In één van de eerste beschrijvingen van de bewoners van Amerika, introduceert Christoffel Columbus de sociale traditie van intentionele schedelmodificatie. Deze permanente en zichtbare verandering van de menselijke schedelvorm is sindsdien een onderwerp van debat voor zowel academici als leken. In deze studie wordt identiteit in de indiaanse Caraïbische gemeenschappen van de pre-koloniale (Ceramische) en koloniale periode onderzocht aan de hand van schedelmodificatie. Met een multidisciplinaire aanpak, bestaande uit een combinatie van archeologie, antropologie, geschiedkunde, en sociologie, wordt intentionele schedelmodificatie bestudeerd in het licht van de bredere sociale, culturele, en politieke ontwikkelingen in de Caraïben vóór en na het cruciale interculturele contact van 1492.

Intentionele schedelmodificatie veroorzaakt een permanente verandering van de menselijke schedelvorm door het toepassen van druk op de schedel in de eerste levensjaren van een kind. Dit wordt vaak uitgevoerd door de moeder of vroedvrouw. Verschillende vormen en gradaties kunnen worden bereikt door variatie in de locatie en duur van de druk, evenals de materialen waaruit het modificatie-apparaat bestaat. De definitieve aard en hoge zichtbaarheid van de verandering maken van dit gebruik een handig signaal van sociale identiteit, die tegelijkertijd wordt belichaamd door de transformatie van het menselijk lichaam. Identiteit wordt hier beschouwd als een dynamische en contextueel sociaal construct, dat beschrijft wie een persoon is, met name in relatie tot andere individuen en groepen. Een persoon heeft niet één unieke identiteit, maar eerder overlappende elementen van identiteit die elkaar aanvullen. Processen van identificatie staan daarom centraal in het sociale leven en interacties tussen individuen.

Cruciaal binnen deze studie van identiteit in Caraïbische indiaanse samenlevingen was de (her)analyse van skeletmateriaal uit de regio. In totaal werden 556 individuen afkomstig van 76 verschillende sites in 15 landen van de Caraïbische archipel en het vaste land bestudeerd. De grootte van de skeletassemblages en de beschikbare contextuele informatie is zeer gevarieerd, hoewel het merendeel van het materiaal afkomstig is uit de Laat Ceramische Periode (600 – 1492 na Chr.). Op basis van deze analyse werden patronen van modificatie in Caraïbische gemeenschappen gereconstrueerd, zoals de ratio van schedelmodificatie binnen een groep en verschillen in schedelvorm. Andere variabelen, zoals biologische sekse, geografische oorsprong van individuen, en verscheidene aspecten van grafritueel, zullen waar mogelijk ook worden meegenomen, omdat deze aanwijzingen kunnen geven over elementen van identiteit.

Het bestuderen van deze diverse dataset vereiste de ontwikkeling van een tweevoudige multi-level aanpak waarin de complementaire ruimtelijke en diachrone dimensies van schedelmodificatie bestudeerd kunnen worden. De ruimtelijke analyse varieert van lokaal tot regionaal, omdat de sociale grenzen aangegeven door schedelmodificatie binnen of tussen individuen en gemeenschappen op verscheidene niveaus een rol kunnen spelen. Patronen van modificatie worden ook bekeken tegen de steeds veranderende sociale achtergrond van de Cariben, gekarakteriseerd door interactie en uitwisseling, omdat de ingebedde natuur van het gebruik betekent dat bredere sociale en culturele veranderingen een impact zullen hebben op de identiteiten die worden uitgedrukt door veranderde schedelvormen.

Het eerste bewijs voor schedelmodificatie in de Cariben is te vinden in de skeletresten en materiële cultuur van de Vroege Ceramische Periode, met name in de noordoostelijke Caraïbische archipel. Hier ontmoette een nieuwe groep immigranten van het vaste land van Zuid Amerika de Archaïsche bewoners van de eilanden. De opkomst van schedelmodificatie lijkt dus gerelateerd aan de interactie en uitwisseling die plaatsvond rond deze sociale grens. Dit onderbouwt het inzicht dat de scheidingslijnen tussen sociale groepen belangrijke plaatsen zijn voor interactie en innovatie.

Schedelmodificatie is in de Late Ceramische Periode aanwezig in samenlevingen in de Caribische archipel en op het vaste land, maar er zijn verschillende regionale patronen zichtbaar. Een relatief homogeen patroon van schedelmodificatie werd gevonden in de Grote Antillen, gekenmerkt door een hoge frequentie van modificatie en een nadruk op afvlakking van het voorhoofd. Deze gedeelde schedelmodificatiepraktijken wijzen op een collectieve groepsidentiteit. Deze gedeelde identiteit kan mensen en samenleving verbinden tijdens de groei van gemeenschappen en politieke netwerken die plaatsvindt tijdens de Late Ceramische Periode. Deze verschillende gemeenschappen van de Grote Antillen waren verbonden in een interactie- en uitwisselingsnetwerk en de gedeelde gebruiken vergemakkelijkten interactie en uitwisseling tussen verre groepen binnen het netwerk.

Op de Kleine Antillen en het vaste land is een veel gevarieerder patroon van schedelmodificatie zichtbaar tijdens de Late Ceramische Periode. Dit weerspiegelt de diverse sociale ontwikkelingen in de regio, waarbij de noordelijke Kleine Antillen onderdeel worden van het uitwisselingsnetwerk van de Grote Antillen, terwijl de zuidelijke Kleine Antillen zich meer richten op het vasteland. De exogame huwelijksregels in de regio dragen ook bij aan de diversiteit in schedelmodificatiepraktijken in de skeletcollecties van de Kleine Antillen.

De komst van Columbus in 1492 is een cruciaal keerpunt in de inheemse geschiedenis van de Caraïben. De interculturele interactie en resulterende processen van kolonisatie, acculturatie, en weerstand hadden enorme repercussies voor indiaanse samenlevingen en identiteiten, en dus ook voor schedelmodificatie. Direct bewijs hiervan is gevonden in de vroeg koloniale vindplaats El Chorro de Maíta op Cuba. Een daling in de frequentie van schedelmodificatie onder de niet-volwassen individuen van deze begraafplaats kan worden gezien als het resultaat van belangrijke veranderingen in inheemse identiteit in de vroeg koloniale periode. Zulke transformaties van diep ingebedde sociale praktijken zullen met variabele snelheid hebben plaatsgevonden in de Caraïben afhankelijk van lokale omstandigheden.

Het verdwijnen van schedelmodificatie is niet de enige optie als antwoord op koloniale processen in de dynamische sociale omgeving van de vroeg koloniale Caraïben, zoals wordt geïllustreerd door de Black Carib van de Kleine Antillen. Deze samenleving van vrije Afrikaanse afstammelingen op het eiland St. Vincent nam waarschijnlijk het gebruik van schedelmodificatie over van de naburige indiaanse groepen om aanvankelijk vrij geboren Afrikaanse kinderen te differentiëren van Afrikaanse slaven. De veranderde schedelvormen hebben mogelijk ook bijgedragen aan interne groepscohesie door te fungeren als symbool van groepsidentiteit. De deportatie van de Black Carib na het einde van de Carib Wars tegen de Britten aan het einde van de 18e eeuw betekende het einde van schedelmodificatie. Toch worden er in moderne etnografische en medische studies van huidige Caraïbische bewoners nog steeds tekenen van schedelmodificatie teruggevonden in de vorm van milde massages van het hoofd naast andere elementen van inheemse socialisatieprocessen. Deze bestendigheid, zelfs na enkele eeuwen, demonstreert de diepe inbedding van vroege socialisatieprocessen en bewijst dat inheemse sociale praktijken nog steeds een effect hebben op de huidige Caraïben.

CURRICULUM VITAE

Anne van Duijvenbode was born in the city of Leiden, the Netherlands, on the 5th of January 1987. She attended the Pieter Groen College from 1999 to 2005. Anne commenced her undergraduate studies in 2005 at the Faculty of Archaeology, Leiden University, where she obtained her BA in 2008 with a specialisation in Caribbean and Amazonian Archaeology. In 2008, Anne was accepted into the research master programme Religion and Society in Native American Cultures. Fieldwork in the Caribbean during her undergraduate studies had sparked an interest in osteology and she pursued a specialisation in human skeletal material from the Caribbean. This led to a semester abroad studying the subject at University College London under professor Simon Hillson and professor Tony Waldron as an Eramus Exchange Student. After receiving her research master degree in 2010, Anne worked as a research assistant professor for Corinne Hofman. Her PhD project Facing Society (322-60-001) commenced in 2011 and was funded by NWO through the PhD's in the Humanities scheme. Additional grants were obtained from the Leiden University Fund (LUF)/Byvanck and the Jo Kolk Studiefonds. Throughout her PhD, Anne presented the results of her research at international conferences, in peer reviewed journals, and to local stakeholders.

Facing Society investigates the identities of the indigenous peoples of the Caribbean before and after 1492 through an analysis of intentional cranial modification. Using a multidisciplinary approach combining archaeology, ethnography, ethnohistory, and sociology, this study explores the social ties of this permanent alteration of the human skull shape in Caribbean communities.