Health and demography in late 19th century Kimberley : a palaeopathological assessment

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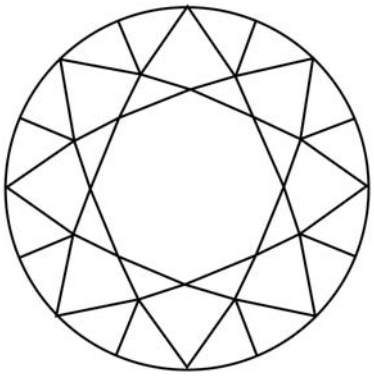

CHAPTER 3

Results

Modified from article accepted for publication as:

The history and health of a nineteenth-century migrant mine-worker population from Kimberley, South Africa

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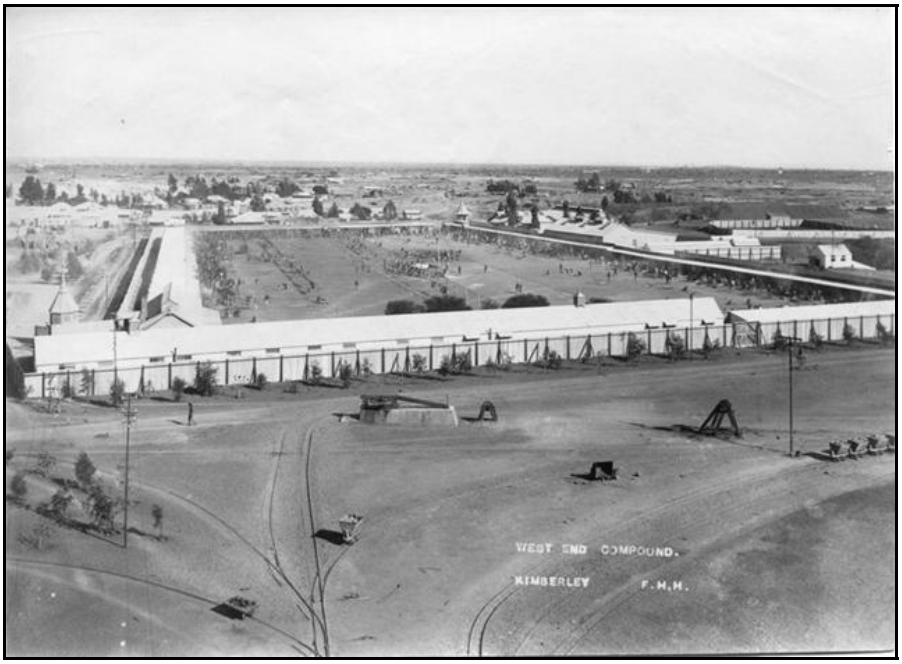
South African Archaeological Bulletin

Bultfontein mine compound
(McGregor Museum Kimberley photography nr.599)



Kimberley mine compound, 1904
(McGregor Museum Kimberley photography nr.833)

3.1 Archaeological findings

In general there was a consistency in burial pattern, although some aspects varied from grave to grave. Two of the 15 graves investigated contained only one individual each, buried in coffins. One grave contained two individuals, and the remainder of the graves contained between five and 14 skeletons each. Within the graves, some individuals had been laid supine with some semblance of decorum. Occasionally skeletons were found side-by-side, and successive inhumations were separated by a layer of grave-fill. However, in other instances skeletons were found prone, on their sides, squeezed into corners, or packed one on top of another (see Figure 3.1). In one case an individual had been placed on his back with his legs flexed upwards against the end wall of the grave, making room for another body that was lodged against the other end of the pit. It was clear that several of the burial events within these graves had involved multiple simultaneous interments.

Figure 3.1 One of the 15 graves excavated from the trench. It is clear from this photo that little attention was given to burial practices, with three individuals being visible in this grave: the first on his right side, the second lying prone and the third supine against the grave wall to his right.

In almost all instances, bodies were aligned with their heads to the west, though one individual was found facing east. The variability in the number of skeletons per grave may be a reflection on the fluctuating, yet high, daily 'pauper' mortality rates in Kimberley at the time, and it appears that perhaps one grave per day was provided for these burials. In 1883, 'native interments' at Gladstone Cemetery averaged 4.5 per diem (Swanepoel, 2003).

It is difficult to conceive of any attendant burial rite, and in many cases it could hardly be said a 'laying to rest' had taken place. There appears to have been scant regard for the dignity of the dead and one would wonder to what extent any living relatives would have been informed of these deaths.

In striking contrast to the somewhat haphazard disposal of corpses within the graves was the formal regularity of the graves themselves: precisely dug in rows, orientated east-west to a depth of 2 meters, with the sides tapering slightly outwards towards the base. Earlier there was anxiety about certain Kimberley burials having been too close together and "of a depth totally inadequate" (Matthews & Shillito, 1879), but altogether more systematic cemetery management was clearly in place by the 1890s. Even so, these Gladstone graves were filled to within half a meter of the surface in some cases – hence the disturbance of remains when trenching eventually brought the unmarked graves to light. A final indignity was that as the earth and any slight mounds settled and subsided, aggravated by the flow of waste water from the adjacent mining property (Swanepoel, 2003), trash from the ash heap, including discarded broken bottles and flattened tins, was dumped as fill to form a stratigraphic veneer over the graves. Thus, it is not unexpected that this portion of the burial ground was excluded when the cemetery was later re-fenced.

A markedly small percentage of the interments that were investigated were in coffins (n = 3). It appears that the greater proportion of corpses brought to this part of the cemetery would have arrived wrapped only in hessian sacking (partially preserved in a few cases) or other fabric. There were limited indications of clothing in the graves, with buttons, parts of leather shoes (with metal eyelets) and belt buckles being found in only a few instances.

Grave goods were predominantly in the form of personal ornaments and were comprised of glass, copper and iron beads, twisted copper and iron bangles (worn on wrists, arms, ankles or as necklaces), and copper ear-rings. The only grave goods of an explicitly religious nature were a clutch of objects probably from a bag (traces of which had disintegrated) clearly representing *ditaola*, i.e. animal bones, shells and buttons, used for traditional African divining. All of these personal objects point to rural connections. A summary of all grave goods recovered during excavation can be seen in Appendix 2.

Evidence of medical intervention was encountered repeatedly during the archaeological phase of the investigation. This included bandaging on limbs and several instances of amputation. In one case part of an amputated limb (wrapped in dressings) was found inside a coffin belonging to another individual. There was also evidence of

postmortem procedures, such as craniotomies, known to have been carried out by pathologists in Kimberley from the 1880s. It seemed possible that the majority, if not all, of those individuals buried in this part of the cemetery had come from a hospital context.

3.2 Demography

Skeletal elements salvaged from the dump site about a kilometer away, to which the trench contents were taken, represented a minimum number of 26 individuals with a minimum number of 17 males, 5 females and 4 persons of unknown sex (see Table 3.1). It is important to consider that some of the remains excavated from the dumpsite may have belonged to individuals who were partly exhumed from the trench and were therefore already accounted for. Thus, although remains from the dump represent at least 26 individuals, it cannot be assumed that these bones increase the sample size of the skeletal population in general. The main focus of this study was the remains excavated from the trench and only these will be discussed further. Tables describing all the elements recovered from the dump as well as calculations made to determine the minimum number of individuals (MNI) represented by the remains can be seen in Appendix 3.

Table 3.1 Number of individuals excavated from the Gladstone cemetery and Dumpsite and their sex distribution.

Site	N	M	%	F	%	U	%
Dump site	26*	17*	65.3	5*	19.2	4*	15.3
Gladstone cemetery	107	86	80.3	15	14	6	5.7

*This number represents the minimum number of individuals represented by the skeletal elements recovered from the Dump site. N = number of individuals/skeletons in the population, M = Male, F = Female, U = unknown

The 15 graves that were exhumed yielded 107 *in situ* skeletons and included 86 males, 15 females and 6 individuals of unknown sex. Almost all individuals excavated from the trench were between 20 and 49 years of age (see Table 3.2), matching the high mortality rate reported in archival documents for people aged between 15 and 45 years in Kimberley at the time (Stoney, 1900a,b). One foetus, two infants and 13 juveniles aged between 11 and 19 years were the only non-adults observed in this study. Fifty-two individuals were between 20 and 34 years of age (n = 52). Twenty-five persons were estimated to have been

between 35 and 49 years of age at the time of death and only four individuals were estimated to have been older than 50 years. Due to the fragmentary condition of some of the remains investigated in this study, eight individuals could only be described as being adult and two were of indeterminate age.

Table 3.2 Summary of the age distribution of skeletons excavated from the trench at Gladstone

Age in years	n	%	Cum. %
Antenatal	1	0.9	0.9
0-10	2	1.9	2.8
11-19	13	12.1	14.9
20-34	52	48.6	63.5
35–49	25	23.4	86.9
≥50	4	3.7	90.6
Adult	8	7.5	98.1
Unknown	2	1.9	100.0
Total	107	100	

n = number of individuals,
Cum % = Cumulative %

3.3 Palaeopathology

A list of all the pathological conditions observed in this sample population can be seen in Table 3.3. Infectious diseases, including treponemal disease, tuberculosis and non-specific osteomyelitis, were observed in 11 individuals (10.3%). Lesions suggestive of treponematosis were observed in nine skeletons. This condition was mainly characterized by osteomyelitic changes and subperiosteal bone growth on the anterior tibia resulting in sabre-shin tibiae (77.8% of those affected) (see Figure 3.2). Osteomyelitic changes of the fibula (66.7% of cases) and humerus (in one case), as well as gummatous lesions on the cranial vault (55.6% of cases), were also frequently observed. Due to the small sample size of females in this study, no significant difference (χ^2 = 2.15, p-value > 0.1) could be found in the prevalence of treponemal infection between males and females.

Non-specific osteomyelitis was observed in only one individual with severe osteomyelitis of the right tibia and fibula (GLD SE11.2). A large cloaca was present on the medial aspect of the right tibia, with abundant reactive new bone growth on the affected tibia and fibula (see Figure 3.3). Evidence of new bone formation was present throughout the affected bones, causing a change in bone morphology as well as ankylosis of the proximal and distal ends of the joints. The infection also spread to the right foot and accordingly, severe infection and pathological new bone growth was seen on the right talus and calcaneus.

An individual with osteomyelitic changes to the lumbar vertebrae, left patella and right olecranon process was diagnosed with possible tuberculosis (GLD N8.3).

Table 3.3 Frequency of skeletal pathologies observed in the Gladstone sample.

Pathological condition	N	na	%
Infectious diseases			
Treponemal disease	107	9	8.4
Tuberculosis	107	1	0.9
Non-specific osteomyelitis	107	1	0.9
Metabolic and nutritional disorders			
Scurvy	107	16	15.0
Trauma			
Fractures	107	28	26.2
Myositis ossificans	107	9	8.4
Amputations	107	6	5.6
Spondylolysis	82	7	8.5
Longstanding subluxation	107	2	1.9
Degenerative disorders			
Schmörl's nodes	87	27	31.0
Degenerative joint changes	107	24	22.4
Degenerative disc disease	87	13	14.9
Non-specific indicators of pathology			
Cribra orbitalia	82	9	11.0

n = number of individuals assessed, na = number of individuals affected

Figure 3.2 Possible treponemal involvement of the tibia resulting in characteristic sabre-shin tibiae in a male between 35 and 50 years of age (GLD N74.7).

Figure 3.3 Osteomyelitis of the left tibia with cloaca formation, infectious involvement of the fibula causing widespread new bone formation, and proximal and distal ankylosis in an adult male (GLD SE11.2).

Healed scurvy was diagnosed in 16 individuals (15%): 13 males and three females. This diagnosis was based on the presence of mostly bilateral ossified subperiosteal haematomas on weight bearing bones and periodontal disease in the absence of poor dental health. Some of these individuals also displayed widespread subperiosteal bone apposition, most likely associated with slight healed/ossified subperiosteal bleeding. Although all of the abovementioned bone lesions may also be indicative of other diseases when viewed in isolation, the skeletal distribution of these lesions was interpreted as possible scurvy. This condition was well documented in hospital records and other historical documents as being problematic during the time period associated with the excavated remains. Further details, as well as histological findings associated with the ossified haematomas and scurvy observed in this sample, are discussed in Chapters five and six (Van der Merwe *et al.*, 2010a; Van der Merwe *et al*., 2010c).

A large number of individuals also presented with traumatic lesions, which included myositis ossificans, amputations, spondylolysis, lesions indicative of longstanding subluxation and fractures (see Table 3.3). Of the aforementioned lesions, healed and perimortem fractures were the most common, with 28 individuals (26.2%) being affected. Cranial fractures (see Figure 3.4) encompassed 48.8% of all fractures observed. Of special interest is the occurrence of amputations in this sample population (n=6). These included evidence of healed amputations, amputations done shortly before death as well as separated amputated limbs (Van der Merwe *et al*., 2010b). Trauma observed in this population will be discussed in more detail in Chapter four.

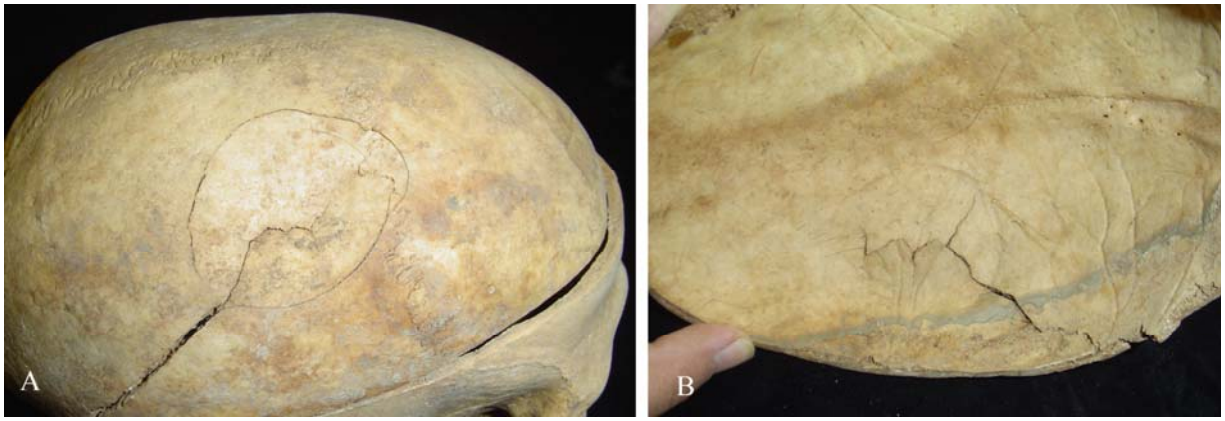


Figure 3.4 Perimortem blunt force trauma to the right parietal bone observed in a male 30 – 45 years of age at the time of death (GLD N74.6).

Although the majority of skeletons within this sample population were those of young individuals, several displayed skeletal lesions indicative of joint degeneration. Schmörl's nodes were observed in 27 individuals (31%). All those affected by the condition were younger than 45 years of age, with the majority being between 20 and 34 years old. When comparing the prevalence of these lesions to other South African skeletal samples such as the rural Venda and another contemporary sample of mine labourers from Koffiefontein it becomes evident that individuals in the Gladstone skeletal sample were significantly more affected by Schmörl's nodes (Venda (2.6%) (χ^2 = 33.81, p-value < 0.001), Koffiefontein skeletal sample (13.9%) (χ^2 = 3.8, p-value < 0.05)) (L'Abbé *et al.*, 2003; L'Abbé, 2005b).

Osteoarthritic changes[1] were noted in 21 (24.4%) males and three (20%) females. These included acetabular (7.5% of 133 acetabulums), sacro-iliac (n=2, 2%), acromio-clavicular, (n= 8, 7.9%), and temporo-mandibular (n=1, 1%) joint changes. No significant difference (χ^2 = 0.13, p-value > 0.2) in the prevalence of arthritic changes was observed between males and females (most likely due to the poor sample distribution).

Vertebral osteophytosis as a result of degenerative disc disease (Maat *et al.*, 1995) was noted in 11 males and two females. There was no significant difference in the frequency between males and females (χ^2 = 0.003, p-value > 0.2). The prevalence of this condition (14.9%) was statistically comparable to results obtained from another contemporary mining population sample from Koffiefontein (22.2%) (χ^2= 0.95, p-value > 0.05) (L'Abbé *et al.,* 2003).

[1] The terms "osteoarthritic changes" or "arthritic observations" are used here to refer to the general degenerative changes observed in synovial joints, without specifying the disease responsible for the change.

Lastly, non-specific indicators of health, particularly cribra orbitalia, were observed in nine individuals (11%). This included two (15.3%) females and seven (10.1%) males. Orbits were affected bilaterally in most cases except in two individuals (GLD SE7.8 and GLD N34.4). In both these cases, only the left orbit was affected. No porotic hyperostosis was noted in any of the affected individuals.

References

Maat, G.J.R., Mastwijk, R.W. and Van der Velde, E.A. 1995. Skeletal distribution of degenerative changes in vertebral osteophytosis, vertebral osteoarthritis and DISH. *International Journal of Osteoarchaeology* 5:289-298.

Matthews, J.W. and Shillito, J. 1879. Report on the sanitary condition of Kimberley. *Supplement to the Independent*, Saturday 29 March 1879. insert between pp.2-3.

Stoney, W.W. 1900a. *Annual Report of the Medical Officer of Health, Kimberley, for the Year 1898*.

Stoney, W.W. 1900b. *Annual Report of the Medical Officer of Health for the Year 1899*.

Swanepoel, S. 2003. *Gladstone Cemetery, 1880s to 1900s.* Archival report housed in McGregor Museum Kimberley, South Africa.

Van der Merwe, A.E., İşcan, M.Y., and L'Abbé, E.N. 2006. The pattern of vertebral osteophyte development in a South African population. *International Journal of Osteoarchaeology* 16:459-464.

Van der Merwe, A.E., Maat, G.J.R. and Steyn M. 2010a. Histomorphological observations of pathological lesions on the anterior tibiae of individuals from a 19th century mining community in Kimberley, South Africa. *International Journal of Osteoarchaeology* 20(2):227-239.

Van der Merwe, A.E., Steyn, M. and L'Abbé E.N. 2010b. Trauma and amputations in 19th century miners from Kimberley, South Africa. *International Journal of Osteoarchaeology* 20(3):291-306.

Van der Merwe. A.E., Steyn, M. and Maat, G.J.R. 2010c. Adult scurvy in skeletal remains from late 19th century mineworkers from Kimberley, South Africa. *International Journal of Osteoarchaeology* 20(3):307-316.