Close encounters of the third kind? Neanderthals and modern humans in Belgium, a bone story

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Timing the transition between Neanderthals and anatomically modern humans (AMHs) is crucial in archaeology and paleoanthropology. While there is increasing evidence of admixture and co-existence of the two hominin species in central and eastern Europe, Belgium might show a different scenario. Our radiocarbon analyses – made on bone implements (bone retouchers and bone points) related to the Late Mousterian and the Early Aurignacian – and late Neanderthal remains highlight a hiatus in the occupation of the territory. It seems that in northwest Europe, Neanderthals evolved and went extinct without any influence from modern humans. This hypothesis is further reinforced by the absence of genetic introgression between northwestern Neanderthals and AMHs as well as by the absence, in modern excavations, of interstratification between stratigraphic units associated with Late Mousterian and Aurignacian occupations.

The dynamics of the transition between late Neanderthals and early anatomically modern humans (AMHs) are the subject of intense debate: the location and duration of the coexistence of the two hominin populations, as well as their relation and the cultural exchanges that could have occurred during this transitional period - referred to as the Middle Palaeolithic to Upper Palaeolithic Transition (MUPT) – are still being discussed. The precise chronological position of the different cultural facies, as well as the human remains associated with them, are therefore key ele-ments that delineate the chronological framework within which Neanderthals and AMHs could have interacted. It bears upon the dynamics of the colonization of Eurasia and the replacement of the last Neanderthals by AMHs. There is increasing evidence of admixture and co-existence of Neanderthals and AMHs in central and eastern Europe. In northern and western Europe the situation appears to have developed according to a different scenario. Genetic analyses show the absence of genetic flow from early AMH to late Neanderthal populations as well as the absence of Neanderthal genes in northern European early Upper Palaeolithic modern humans. However, this interpretation is based on a limited number of hominin specimens because of their scarcity in the archaeological record.

Mousterian and Aurignacian bone industries, associated with Neanderthals and AMHs respectively, are present in much larger quantities, and can also be used to define the timing of both occupations. Few radiocarbon dates, measured on ultrafiltered collagen, have been produced for these industries. These data suggest a possible coexistence of Mousterian (42,300–39,900 cal BP) and Aurignacian (41,650–39,250 cal BP) industries.

During our research we challenged this model of coexistence by re-evaluating the chronology of the latest Mousterian and the earliest Aurignacian cultural evidences as well as the late Neanderthal remains, using the compound specific radiocarbon dating approach (CSRA), which is the most robust pre-treatment method to date. Our new data obtained on diagnostic bone implements (bone points and bone retouchers) suggest that the latest Mousterian occurrence ended around 45,900–42,900 cal BP (95% probability) and that the earliest Aurignacian started around 42,100–40,300 cal BP (95% probability) – a date that is much earlier than the dates previously obtained on the same objects. If one also considers the dates on Lincombian-Ranisian-Jerzmanowician industries, these new data tend to confirm the existence of a hiatus implying that Neanderthals and AMHs did not coexist in this region.

Our model fits quite well with other western regions such as France, where no interstratification between the Aurignacian and the Late Mousterian is reliably documented. Even the so-called transitional techno-complex Châtelperronian is sometimes associated with the Late Mousterian and the Neanderthals, but never stratigraphically related to the Early Aurignacian.

The combination of all data collected during our research shows that the MUPT should not be interpreted on a macro-geographical scale, but that it should first be approached on a regional scale. It is also necessary to generalise the use of reliable technologies such as precise stratigraphic observations which must take into account depositional and post-depositional processes. The input of genetics and hydroxyproline dating also contributes to a more reliable definition of the interpretative framework of the archaeological data, which ultimately makes it possible to sketch out models of the settlement dynamics.