

Enamel Thickness in Lower Third Premolars of the Early and Middle Pleistocene Hominins from Atapuerca, Spain

M Shruti Kamath^{1,2}, María Martín-Torres^{1,2}, Christophe Soligo¹, Laura Martín-Francés^{1,2,3}, Clément Zanolli³, Juan Luis Arsuaga⁴, José María Bermúdez De Castro^{1,2}

¹Department of Anthropology, University College London, UK, ²CENIEH, National Research Centre for Human Evolution, Burgos, Spain, ³PACEA Laboratory, University of Bordeaux, France, ⁴Mixed Centre (UCM-ISCI) for Human Evolution and Behaviour, Complutense University of Madrid, Spain

The Atapuerca sites continue to figure prominently in our understanding of European hominin evolution. Dental studies of these Early Pleistocene (EP) (*Homo antecessor*) and Middle Pleistocene (MP) (Sima de los Huesos – SH) hominins are particularly useful in providing phylogenetic contexts, and micro-computed tomography (μ CT) has offered opportunities to examine the tissue proportions of their molars and canines. Considering most Pleistocene hominins exhibit thick to hyper-thick enamel and Neanderthals demonstrate relatively thin enamel, the Atapuerca groups show affinities with Neanderthals for both dental classes. This study characterises the tissue proportions of the lower third premolar (LP3) crowns of the Atapuerca hominins to establish if they present the primitive or derived (Neanderthal-like) condition. We applied μ CT methods to the LP3s to extract a set of 3D variables, measuring complete crown and lateral (LET) enamel thickness. The samples comprised H. antecessor (n=2), SH (n=13), Early Homo from Africa and Asia (n=2), MP hominins from Tighenif, Africa (n=2), Late Pleistocene Neanderthals (n=12), Bronze Age and contemporary *Homo sapiens* from Africa and Europe (n=54). Despite their close phylogenetic relationship with Neanderthals, our study indicates that the SH hominins are more similar to modern humans than they are to Neanderthals. *Homo antecessor* is more comparable (for LET) to the Tighenif hominins and Neanderthals than to any other group. Currently, *Homo antecessor* and SH hominins are the only known populations of the genus *Homo* to exhibit a combination of primitive and derived conditions for the enamel thickness trait, highlighting the mosaic evolution of dentition. This research is supported by the Wadsworth International Fellowship, Wenner Gren Foundation (Gr. WIF-251). MINCIU-FEDER (PGC2018-093925-B-C31 and C33). The Leakey Foundation and British Academy (PM160019).