

5. Gran Dolina-TD6 and Sima de los Huesos dental samples: Preliminary approach to some dental characters of interest for phylogenetic studies

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Abstract

The Sima de los Huesos (SH) and Gran Dolina-TD6 sites in Sierra de Atapuerca (Spain) have each yielded an impressive fossil hominin sample representing Middle Pleistocene and Late Lower Pleistocene European populations, respectively. Paleontological evidence, paleomagnetic analyses, and radiometric dates (U/Th) suggest an interval of 400 to 500 ky for the SH hominins. At Gran Dolina, radiometric dates (ESR and U-series) combined with paleomagnetic analyses and fossil evidence indicate an age range between 780 and 860 ky for the Aurora Stratum of the TD6 level where the fossil hominins were found. We have assigned the SH hominins to the *Homo heidelbergensis* species, whereas the TD6 hominins are representative of *Homo antecessor*, the species named in 1997 (Bermúdez de Castro et al., 1997) to accommodate the variability observed in the TD6 fossil human assemblage. Dental collections of the SH and TD6 sites include more than five hundred deciduous and permanent teeth. The detailed description and morphological comparison of the Atapuerca dental samples will be published elsewhere in a near future, but the examination of an extensive human fossil record, has already revealed some dental characters we consider crucial for phylogenetic studies. We describe those characters and provide an overview of their distribution across the hominin fossil dental record. On the basis of these traits we explore some questions about the phylogenetic relationship between TD6 and SH hominins as well as the evolutionary scenario of these two populations.

Introduction

The Sima de los Huesos and Gran Dolina sites in Sierra de Atapuerca (Spain) have each yielded an impressive fossil hominin sample representing Middle Pleistocene and Late Lower Pleistocene European populations, respectively (Arsuaga et al., 1997b; Bermúdez de Castro et al., 1999a).

The Sima de los Huesos (SH) site is placed well inside the Cueva Mayor-Cueva del Silo Karst System of the Sierra de Atapuerca. At present, the Sima de los Huesos site has provided more than five thousand fossil human remains. All of them come from the same level and belong to a minimum of 28 individuals (Bermúdez de Castro et al., 2004a, b). The human assemblage was assigned to the *Homo heidelbergensis* species (Arsuaga et al., 1997a, 1999). Paleontological evidence, paleomagnetic analyses, and radiometric dates (U/Th) suggest an interval of 400,000 to 500,000 years for the hominin level (Bischoff et al., 2003).

Gran Dolina (TD) is one of the filled caves located at the right wall of the Mining Railway Trench, opened at the end of the nineteenth century. The infilling of the Gran

Dolina is 20 meters high and its stratigraphic sequence consists of 11 levels (Parés and Pérez-González, 1995) deposited from the late Early Pleistocene to the end of the Middle Pleistocene. Seven levels (TD4, 5, 6, 7, 8, 10, and 11) are rich in fossils and stone tools. The Aurora Stratum of the TD6 level has yielded a rich archaeological-paleontological assemblage, including approximately one hundred human fossil remains (Carbonell et al., 1995). Radiometric dates (ESR and U-series) combined with paleomagnetic analyses and fossil evidence indicate an age range between 780 and 860 kyr for the Aurora Stratum of the TD6 level (Falguères et al., 1999).

The TD6 hominins are representative of *Homo antecessor*, the species named in 1997 to accommodate the variability observed in the TD6 fossil human assemblage with its unique combination of a modern face with a primitive dentition (Bermúdez de Castro et al., 1997). Different skeletal parts are represented in the TD6 hypodigm, which correspond to a minimum of seven individuals. We have proposed that *H. antecessor* could represent the last common ancestor for Neandertals and modern humans (Bermúdez de Castro et al., 1997). This is an alternative hypothesis to the one that considers the Afro-Eurasian Middle Pleistocene species *H. heidelbergensis* the last