

Mothers from the past: Gravettian vs. Epigravettian human mobility strategies at Grotta Paglicci inferred by Sr isotopes of deciduous tooth enamel

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The reasons behind human mobility strategies include a mix of different biological and social factors that span from the spatial dispersion of local resources to population dynamics. Because moving is bioenergetically expensive, human group movements should be reduced to a minimum threshold by natural selection, both in terms of single-travel distance and annual movements [1]. In this sense, the reconstruction of hunter-gatherer mobility patterns is a key point to understand how human relationships have been influenced by climatic changes and, in general, to get further insights into human mental templates. Strontium isotopes ($^{87}\text{Sr}/^{86}\text{Sr}$) can help unravel human mobility because of the strong link between the Sr isotopic fingerprint stored in human bones/teeth and the living location of the individual [2]. In particular, while permanent teeth reveal the place where an individual spent his/her childhood, deciduous teeth form during pregnancy and the first months of breastfeeding, thus reflecting the food ingested by the mother. As a consequence, it is possible to decrypt the mobility pattern of a pregnant woman within a period of ca. 1-2 years and, generalizing, of the entire human group. A crucial period in terms of both human mobility and climatic changes is the transition from the Gravettian to the Epigravettian culture. It has been recently suggested that the Epigravettian culture (Southern Europe) might be genetically correlated with Near East populations, reflecting movements of peoples at the end of the last Ice Age. In this work, we thus analyzed the Sr isotope composition of deciduous teeth ($n = 15$) from the Gravettian and the Epigravettian layers of Grotta Paglicci (Gargano Promontory, Southern Italy), by laser ablation MC-ICP-MS. This is one of the most important Upper Paleolithic sites in the Mediterranean Area, where a continuous sequence from the Aurignacian to the Epigravettian has released more than 140 *Homo sapiens* remains [3]. Radiocarbon dates of the site span from 40.939-36.570 to 13.712-12.970 yrs cal. BP (2σ), well across the Last Glacial Maximum, making this site an extremely important case to better understand *Homo sapiens* mobility strategies in relation to glacial/interglacial periods [4]. The deciduous teeth Sr isotopic signature is significantly different between Gravettian and Epigravettian individuals. While the former on average present local values with a high degree of intra-tooth variability, the latter show a clear non-local signature and a low degree of intra-tooth variability. We suggest that: 1) the Gravettian groups exploited mostly local resources, but also non-local foods with a high degree of annual travels over long distances; in this context, pregnant women/mothers were likely stable at the base camp while men moved in search of food. 2) The Epigravettian groups exploited a different mobility strategy, with a lower number of movements per year, where the whole group likely participated to the travel. Where the non-local individuals come from is still debatable. Based on our geochemical data, we can speculate they could have exploited resources from Southern Italy (e.g. Calabria), from the Central Italy volcanic areas or even from the Near East.

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