



Bone stable isotope data of the Late Roman population (4th–7th centuries CE) from Mondragones (Granada): A dietary reconstruction in a Roman villa context of south-eastern Spain



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ARTICLE INFO

Keywords:

Paleodiet
Isotopes
Collagen
Breastfeeding
Late Antiquity
Spain

ABSTRACT

The aim of this study is to examine the diet, using bone stable isotope analysis ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$), of a Late Roman population (4th–7th centuries CE) from the Roman villa of Mondragones (Granada, Spain). This archaeological site presents an exceptionally high number ($n = 121$) of well-preserved skeletal remains (adults and non-adults), giving the opportunity to study for the first time the nutritional and health conditions of a Late Roman population by the analysis of stable isotopes and pathologies in the context of the south-eastern Iberian Peninsula. Stable isotopes ratios of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) were analysed in 46 individuals (21 adults and 25 non-adults) as well as in 7 faunal samples (2 cows/ox, 2 goats/sheep, and 3 large mammals). Frequencies of cariogenic lesions, dental calculus, dental enamel hypoplasia, porotic hyperostosis, and cribra orbitalia were also explored. The anthropological study revealed a high presence of dental caries and calculus in adults, which are related to a diet rich in starch and carbohydrates, and non-specific stress markers in non-adults, probably pointing to the weaning process or childhood diseases. Collagen isotope ratios suggested that the population of Mondragones had a diet rich in C_3 plants, with some meat intake from terrestrial herbivores. There were significant differences between non-adults and adults, but no differences were detected by sex. The youngest non-adults (aged 1 year \pm 4 months) showed the $\delta^{15}\text{N}$ mean value almost 4‰ above the adult female one, which could reflect the breastfeeding period.

1. Introduction

The study of stable isotopes in skeletal remains has gained importance in recent years in the context of the Iberian Peninsula. While there are a lot of paleodietary data in Spain from prehistoric (Salazar García, 2011; Fontanals-Coll et al., 2016; Villalba-Mouco et al., 2018) and medieval sites (Inskip et al., 2019; Guede et al., 2017; Jiménez-Brobeil et al., 2020), there is a deep gap for the Roman and Late Roman period, except for some works such as López-Costas (2012). There is a lack of studies in Spain for this specific period in comparison with near geographical areas as Italy (Rutgers et al., 2009; Tafuri et al., 2018; Milella et al., 2019), maybe because it is usually very difficult to find many skeletal remains from the Late Roman period with good

conservation conditions in the Iberian Peninsula as a result of cremation practices and taphonomic processes (Polo Cerdá and García-Prosper, 2005; Heras Martínez et al., 2011; López-Costas, 2012; Diéguez Ramírez, 2015). This paleodiet study is focused on a sample of the Late Roman and Late Antiquity population (4th to 7th century CE [Common Era]) buried at the Roman villa of Mondragones, located in south-eastern Spain. Therefore, it represents a great opportunity to know more about the nutritional conditions of this period on the Iberian Peninsula.

The study of stable isotopes in humans provides good quality data for the reconstruction of ancient populations' diets (Reitsema, 2013; Ma et al., 2016). Specifically, with this analytical technique it is possible to assess the type of vegetables that were consumed, as well as the sources

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<https://doi.org/10.1016/j.jasrep.2020.102566>

Received 2 May 2020; Received in revised form 24 August 2020; Accepted 26 August 2020

Available online 18 September 2020

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