Non-masticatory dental wear of anterior teeth in Late Neolithic individuals from Alicante (Spain) burial caves and rock shelters

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Introduction
Non-masticatory dental lesions (chipping, notching, interproximal grooving and lingual surface attrition of the maxillary anterior teeth -LSAMAT-) are especially helpful in assessing the impact that dietary and social-cultural habits had on ancient populations.

The aim of this work-study is to record and describe the unusual dental wear patterns macroscopically observed on 252 anterior teeth from the late Neolithic and located in 14 burial caves and rock shelters in Alicante, southeast Spain.

Material and methods
At the end of 20th century, 59 late Neolithic’s burial caves and rock shelters were excavated by an illegal amateur collector, most of them located in La Marina Alta (Alicante), southeast Spain. Of the 59 archaeological site, we have studied those in which teeth were preserved, specifically in 14. In addition, most of them are situated in the same area (Fig.1).

All the teeth studied were isolated as sex and age differentiation was not possible. Therefore, only the ones for which human remains were found were considered.

Results
The total frequency of chipping in maxillary and mandibular teeth is similar (41.72% vs 40.70%). In case of notching, it is slightly higher in mandibular teeth (22.38 % vs 10.07 %). The frequency of LSAMAT in maxillary teeth is 10.79% (Fig.5). Furthermore, statistically significant differences have been observed between the central incisors and canine (X² =11.039; p = 0.01).

When chipping frequencies between upper central incisors and lower canine teeth are compared, they show statistically significant differences (X² =5.844, p = 0.016) with a higher prevalence at central incisors sample. The lower canine series show significantly higher notching prevalence compared to upper central incisors (X² =4.335; p = 0.037) (Fig.6).

No interproximal grooving was found on any anterior teeth.

Discussion and conclusion
Non-masticatory dental wear in ancient populations are especially helpful in reconstructions of dietary and social habits, providing information on the type of production activities and clarify their behaviour. The use of teeth in daily activities often term as "teeth as tools" or "teeth as a third hand" (Corkeykowski, 2011, Molnar, 2013, Tanga et al., 2016). Nevertheless, there is no evidence to identify the type of objects which caused these lesions.

In case of chipping, the presence of higher frequency in incisors than in canine teeth could be related to activities such as holding objects during tool construction, retooshing stone tools, and so on. (Bonfiglioli et al., 2004).

Most of notching (indentation involving the tooth’s incisal or occlusal edge) show a smooth appearance. This suggests that it was a consequence of wear by the continued contact of some type of object, such as wood or bone used as needles, plant fibre threads, and so on. (Bonfiglioli et al., 2004), with a higher frequency lower canines.

The frequency of LSAMAT is difficult to interpret. Irish and Turner (1997), relate them to an abrasive action of acids (Mickleburgh, 2008). Other authors even attribute them to the processing of animal skins and types of object, such as wood or bone used as needles, plant fibre threads, and so on. (Bonfiglioli et al., 2004).

The presence of non-masticatory dental wear (chipping, notching and LSAMAT) (Figs. 2,3 and 4) was identified with the chi-square test and statistical significance was defined by probability levels of p<0.05.

Fig. 1. The geographic location of the burial caves and rock shelters analyzed. The green circles indicate where human remains were found.

References
Berbesque J.C., Marlowe F.W., Pawn I., Thompson P., Johnson G., Mabulla A. 2012. Sex differences in Hadza dental caries and related behaviour. The use of teeth in daily activities often term as “teeth as tools” or “teeth as a third hand” (Corkeykowski, 2011, Molnar, 2013, Tanga et al., 2016). Nevertheless, there is no evidence to identify the type of objects which caused these lesions.

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