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Unilateral absence of mandibular condyle in a Bronze Age male skeleton from Portugal

A.M. Silva^{a,b,c,*}, T. Tomé^{a,d}, C. Cunha^{a,h}, J. d'Oliveira Coelho^b, A.C. Valera^{e,f}, V. Filipe^c, G.R. Scott^g

^a Laboratory of Prehistory, CIAS – Research Centre for Anthropology and Health, Department of Life Sciences, University of Coimbra, Coimbra, Portugal

^b Centre for Functional Ecology (CEF), Department of Life Sciences, University of Coimbra, Coimbra, Portugal

^c UNIARQ, University of Lisbon, Portugal

^d Programa de Pós-Graduação em Antropologia, Universidade Federal do Pará, Grupo de Quaternário e Pré-História, Centro de Geociências – UC, Portugal

^e Era Arqueologia S.A., Portugal

^f ICArEHB – University of Algarve, Portugal

^g Department of Anthropology, University of Nevada Reno, Reno, NV, USA

^h Professora Adjunto, Graduação de Arqueologia, Programa de Pós-graduação em Arqueologia, Centro de Ciências da Natureza, Universidade Federal do Piauí

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ABSTRACT

In 2009, a pit burial dated to the Bronze Age was excavated in Monte do Gato de Cima 3 (Portugal). The purpose of this paper is to describe the pathological absence of the left mandibular condyle noted in an adult male skeleton and to discuss possible diagnoses, including subcondylar fracture, cystic defect, congenital absence, condylar aplasia and mandibular condylitis. The most likely explanation for the pathological alteration is subcondylar fracture with non-union. Although the occurrence of non-union and slight osteoarthritic alterations in the left glenoid fossa were evident, this mandible was likely functional, as can be inferred from dental wear and muscle attachment sites. This trauma probably occurred before adult age when remodelling capacity is still high. Thus, bones and muscles adequately compensated for the trauma and only minor asymmetry developed. Consequently, this injury seems not to have greatly influenced masticatory functions. This is in accordance with clinical data, which demonstrate that, in growing patients, conservative treatment (non-surgical) results in good remodelling and patient recovery. In addition, in the few paleopathological cases published, the healing capacity of these types of mandibular fractures seems to be good, as can be inferred by evidence from the bone.

1. Introduction

In the last 15 years, diverse prehistoric burial places were discovered in Southwest Portugal. It is in this context that the Bronze Age site of Monte do Gato de Cima 3 was excavated in 2009. One pit burial contained an adult male skeleton (MGC3.104), with evidence of pathological absence of the left mandibular condyle. The purpose of this paper is to describe this finding and discuss possible diagnoses. Investigation about how this pathology could have affected jaw mobility and the quality of life of this individual was also carried out.

2. Archaeological context

Monte do Gato de Cima 3 is located in South Portugal (Filipe et al., 2013) (Fig. 1).

The adult male individual was excavated from a pit grave. Human

bones were dated to the second quarter of the 2nd millennium BC (Beta 318,379–3360 ± 30: 1740–1540 – 2σ cal BC; Sac 2573–3260 ± 50: 1663–1430 – 2σ cal BC, Valera et al., 2014). The grave goods were comprised of two Bronze Age ceramic vases and part of the extremity of a bovid hoof, characteristic grave goods of Bronze Age hypogea and pit burials in this region (Filipe et al., 2013).

2.1. Skeleton and dental inventory

The skeletal remains from MGC3.104 are poorly preserved. Part of the mandible and maxilla were excavated in laboratory conditions from a sediment block containing those bones and most teeth articulated and *in situ*. The left mandibular condyle was not recovered. Pelvic morphology (Bruzek, 2002; Ferembach et al., 1980) and morphometric analysis of the talus and calcaneus (Silva, 1995) suggests a male individual. Sexing was confirmed by a-DNA analysis (Martiniano et al.,

* Corresponding author at: Department of Life Science, University of Coimbra, 3000-456, Coimbra, Portugal.

E-mail address: amgsilva@antrop.uc.pt (A.M. Silva).

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Fig. 1. Location of Monte do Gato 3 in Portugal.

2017). Fully calcified 3rd molars (closed radicular apex) indicate he was an adult individual. The overall morphology of the skeleton suggests a robust individual.

All skeletal elements were macroscopically observed for signs of developmental variations and pathologies, such as oral pathology, trauma, infection, and joint diseases. Tooth wear was scored based on Smith (1984), adapted by Silva (1996), calculus following Martin and Saller (1956), and cariogenic lesions from Moore and Corbett (1971). The mandible was radiographed with digital mammography (Mammograph General Electrics Senographe DMR, Voltage 30 kV, exposition: 56 mAs). A NextEngine™ 3D Scanner was used to replicate the mandible into a 3-dimensional digital rendering. Anatomical landmarks were obtained from the 3D virtual model generated for a simple morphometric assessment of the mandible's asymmetry. All the analyses were performed using the R statistical language (R Core Team, 2017).

2.2. Description of the mandibular condyle pathology

The area corresponding to the left mandibular condyle, condyle neck, and part of the mandibular notch is absent. The left extremity of the mandible, posterior to the coronoid process ends in a cavity, open to the mesial surface of the mandibular ramus (Fig. 2). This cavity has smooth edges, with no signs of active bone remodelling. There is no evidence of *post mortem* fragmentation such as sharp edges. The bone surface inside the cavity is also smooth, and there is no porosity or perforation that could be associated with either erosion or faunal activity. The X-ray did not reveal any lesion (Fig. 2). The right condyle was affected post-mortem by fragmentation and erosion (Fig. 3).

Macroscopic examination revealed that, from the region of the third molars to the right condylar extremity, the right ramus deviates farther from the mandibular midline than the left one (Fig. 4). This assessment was further confirmed by extracting bilateral landmarks from the mandible and comparing their distance to the plane of symmetry defined from three landmarks from the mandible midsection. The chosen paired landmarks were defined following von Cramon-Taubadel



Fig. 2. Adult male skeleton (MG3.104) uncovered from pit burial 104 in the site of Monte do Gato 3 (Serpa, Portugal).



Fig. 3. a – Posterior view of the mandible of skeleton MG3.104. Note the absence of the left condyle; b – Detail of the interior view of the left condyle of skeleton MG3.104; c – Lateral view of the left mandibular ramus of skeleton MG3.104.

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