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CONTENT

Kurt W. Alt, Marina Wiesinger, Nicole Nicklisch / Prevalence of taurodontism in a modern Austrian sample	49
Carlos David Rodriguez Flórez / A review of pre-Hispanic dental decoration in Colombia and report of two new cases	60
Anahit Yu. Khudaverdyan / Teeth in the nasal cavity in adult individual of a Late Bronze and Early Iron Ages Bardzryal site (Armenia)	69
Vineeta Saini, Ritu Kumari, Ananya G / Exploring sexual dimorphism in canines of contemporary North Indian populations using machine learning algorithms	77
Anastasiia V. Sleptsova / Biological affinities among Western Siberian forest-steppe groups in the Early Iron age based on dental non-metric data	87
Andrei V. Zinoviev / Dental health of the historical adult population of Tver (12th-19th centuries, European Russia): Report 2	97

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Teeth in the nasal cavity in adult individual of a Late Bronze and Early Iron Ages Bardzryal site (Armenia)*

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Abstract

Multiple supernumerary teeth is an infrequent developmental alteration. The paper reports on research into a nasal tooth sample belonging to a 20-29-years-old man excavated from the Bardzryal archaeological site in Lori province, Armenia. The tooth crown extended into that nasal cavity. X-ray revealed that another tooth is next to the first. The individual of Bardzryal was dated between the Late Bronze and Early Iron Ages.

Keywords: Armenia; Bardzryal; Late Bronze and Early Iron Ages; nasal tooth; supernumerary tooth; intranasal tooth

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Introduction

An aberrant tooth can be found in sites outside of the oral cavity and can be a supernumerary, deciduous, or permanent tooth (1). The maxillary sinus and palate are the most frequently affected sites. The presence of supernumerary or ectopic teeth is not an uncommon fact; however, the presence of teeth in the nasal cavity is a rare phenomenon, regardless of etiology (2). In some cases, there has been a history of facial trauma or osteomyelitis of the maxilla, causing displacement of one or more teeth into the nasal cavity (3).

Tooth eruption in the nose may cause recurrent or chronic sinusitis, nasal or cheek pain, speech problem, nasal obstruction, recurrent epistaxis, headache, nasal discharge, localized ulceration, foul smell, external deviation of nose, or nasal septal abscess (4). Heredity may also play a role in the occurrence of this anomaly. Medeiros et al. (4) found a prevalence of 0.48% intranasal teeth in children with complete cleft lip and palate. The exact etiology of eruption of a tooth into the nasal cavity remains obscure. A few theories have been proposed to explain it, including the theory

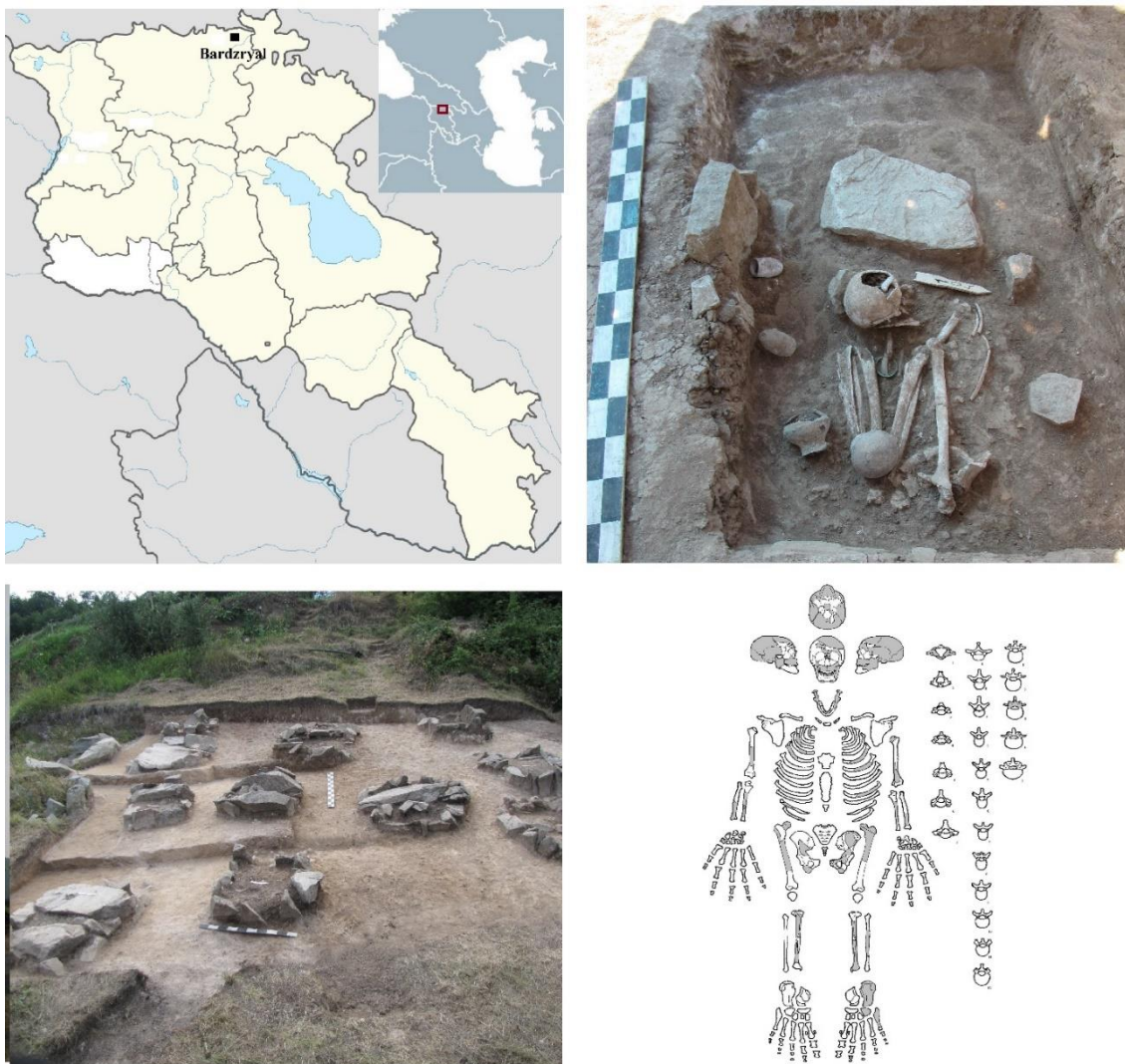


Figure 1. Location map of the Bardzryal cemetery, plan of Burial 104, available skeletal elements from Burial 104-2 of the Bardzryal cemetery (photo of the burial ground and burial of S. Hobosyan).

of developmental origin, which states that ectopic eruption may occur either due to reversion to the dentition of extinct primates having three pairs of incisor teeth, defect in migration of neural crest derivatives destined to reach the jaw bones, or due to a flaw in the multistep epithelial-mesenchymal interaction (5). Other causes include developmental disturbances such as cleft lip and palate, trauma, or cystic lesions leading to tooth displacement, genetic factors, persistent deciduous teeth, and supernumerary teeth (6). Complications of nasal teeth include rhinitis caseosa with septal perforation, aspergillosis, and oronasal fistula (7).

The purpose of this paper is to report rare case of supernumerary teeth into the nasal cavity individual of a Late Bronze and Early Iron Ages Bardzryal site, which was not known in the ancient Armenia populations. Multiple supernumerary teeth are defined as the existence of any excessive number of teeth in relation to the normal dental formula (i.e., 20 in deciduous dentition and 32 in the permanent dentition). It is common to primary as well as permanent dentition and can occur in maxilla or mandible. It is common to primary as well as permanent dentition and can occur in maxilla or mandible. Brook reported that supernumerary teeth were present in 0.8% of primary dentitions and 2.1% of permanent dentitions (8).

Material and methodology

The human remain that was analyzed and that are discussed here were excavated by a team of archaeologists from Armenia under the direction of S. Hobosyan at the Bardzryal site located on the Lori region (Figure 1). The burial to have been primary interments, typical of the Late Bronze Age and Early Iron Age (c. 13th–11th BCE), and oriented in an east-west direction.

Sex and age at the death of the individual were determined according to standard osteological methods (9, 10, 11, 12). Maximum bucco-lingual and maximum mesio-distal diameters were measured for each tooth in the dental arcade, following Zubov (13). Our macroscopic and radiographic investigations revealed a teeth into the nasal cavity.

The material is kept at the Laboratory of physical anthropology of the Institute of Archaeology and Ethnography, NAS RA in Yerevan. Bone was radiographed at "New Dent" dental clinique (Yerevan).

Results

The skeleton in Burial N 104-2 was fragmented and incomplete. Fractures and cracks that led to fragmentation were produced post mortem. The bone inventory of the analysed skeleton can be seen in Figure 1. Analysis suggests that this a young male, based on morphological characteristics of the skull and pelvis, approximately 20 to 29 years old based on dental wear, stage of fusion of the cranial sutures, and auricular surface morphology scoring system. It was possible to observe the crown of the maxillary central incisor inside the right nostril. It was an incisor like tooth with 15 mm (± 2) length and was white coloured (Figure 2b). The extra tooth had an amorphous view, in the form of a cone and completed its crown-root development (Figure 2c).

X-ray revealed that another tooth is next to the first (Figure 2c). It was an incisor like tooth with 7 mm (± 2) length (Figure 2b). The teeth lied cross in the jaw. One crown was located in the floor of the nasal cavity (meatus nasi inferior), the other was inside (Figure 2c). Because to supernumerary teeth, lateral displacements of the alveolar (tooth) socket of the medial incisors are observed (Figure 2e). His intraoral dentition was normal (Figure 2a). He had a fully erupted dentition. No maxillofacial trauma was elicited.

On the surface of the skull there were foci of inflammation. The right temporal bone presented a rounded hole with a maximum diameter of 4 mm, located superior to the mastoid process (Figure 3a). The edges of this perforation were smooth and rounded, whilst the interior wall of the perforation presented a slight osteoblastic response and pitting. In the middle ear, however, there is bone destruction involving most of the retrotympa. The hole could be an abscess caused by the infection. We found a midline cleft palate and dental calculus.

In Figure 3b, an exuberant lesion on a right humerus corresponding to a benign tumor (diameter 12.8×10mm) can be seen. The lesions, which occur on the vault of the skull (Figure 3c) are generally smaller, usually about four millimeters in diameter, and are smooth and no regular in outline. This is button osteoma.

Discussion and conclusions

The incidence of supernumerary teeth generally affects 0.1–1% of the population (14). Most common ectopic-tooth which arises in the maxillary midline is known as a mesiodens. This unusual condition should be supposed to be present in individuals with nasal

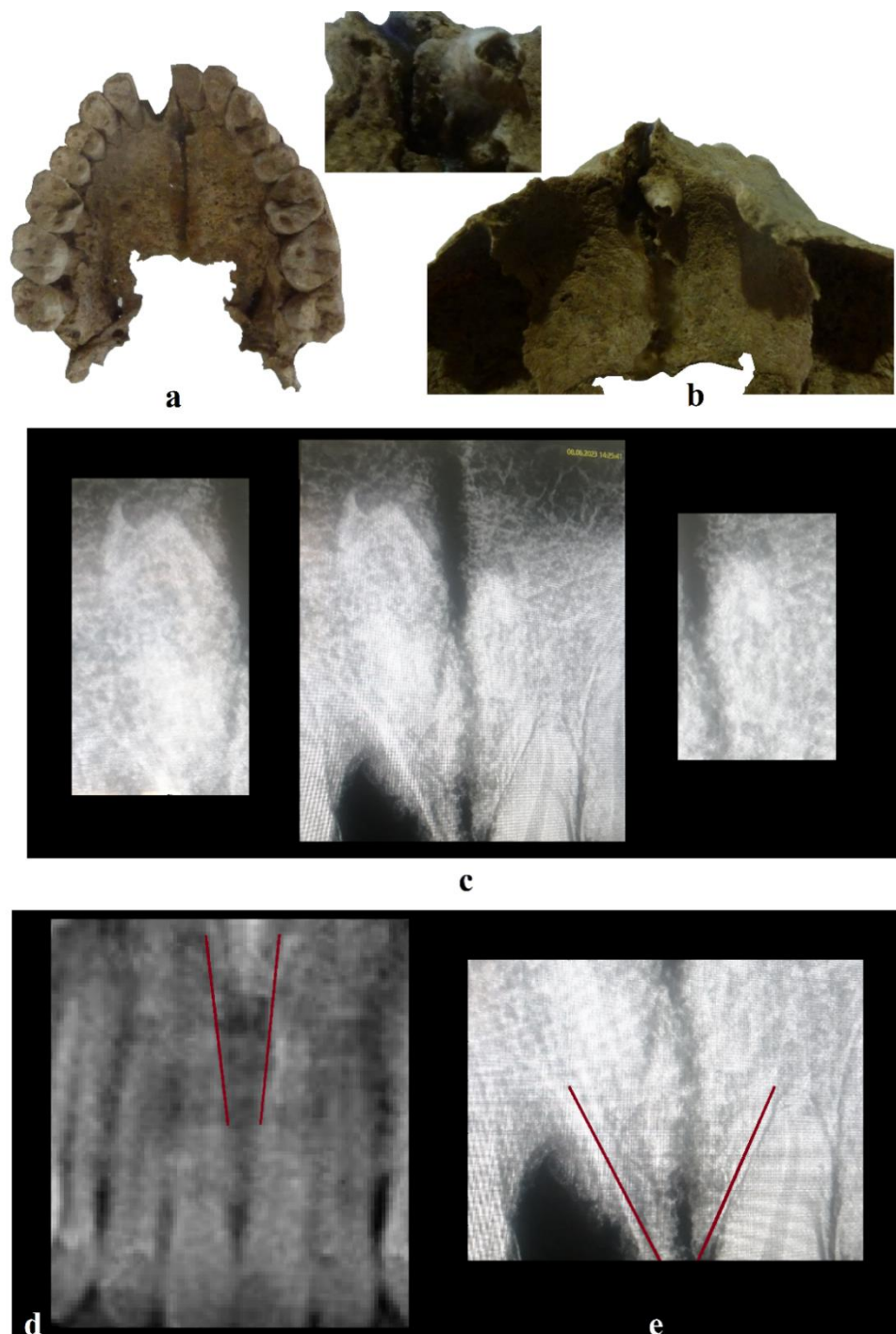


Figure 2. Intraoral dentition (a), location of the nasal tooth in the maxilla (b), radiographic investigations (c), lateral displacements of the alveolar (tooth) socket of the medial incisors are observed (e), normal alveolar (tooth) socket of the medial incisor (d).

blockage/obstruction and unilateral purulent rhinorrhoea (15-19). Supernumerary teeth develop either from a third tooth bed that arises from the dental lamina near the permanent tooth

bud or, possibly, from splitting of the permanent bud itself (14). Another theory is that their development is a reversion to the dentition of extinct primates, which had three pairs of incisors

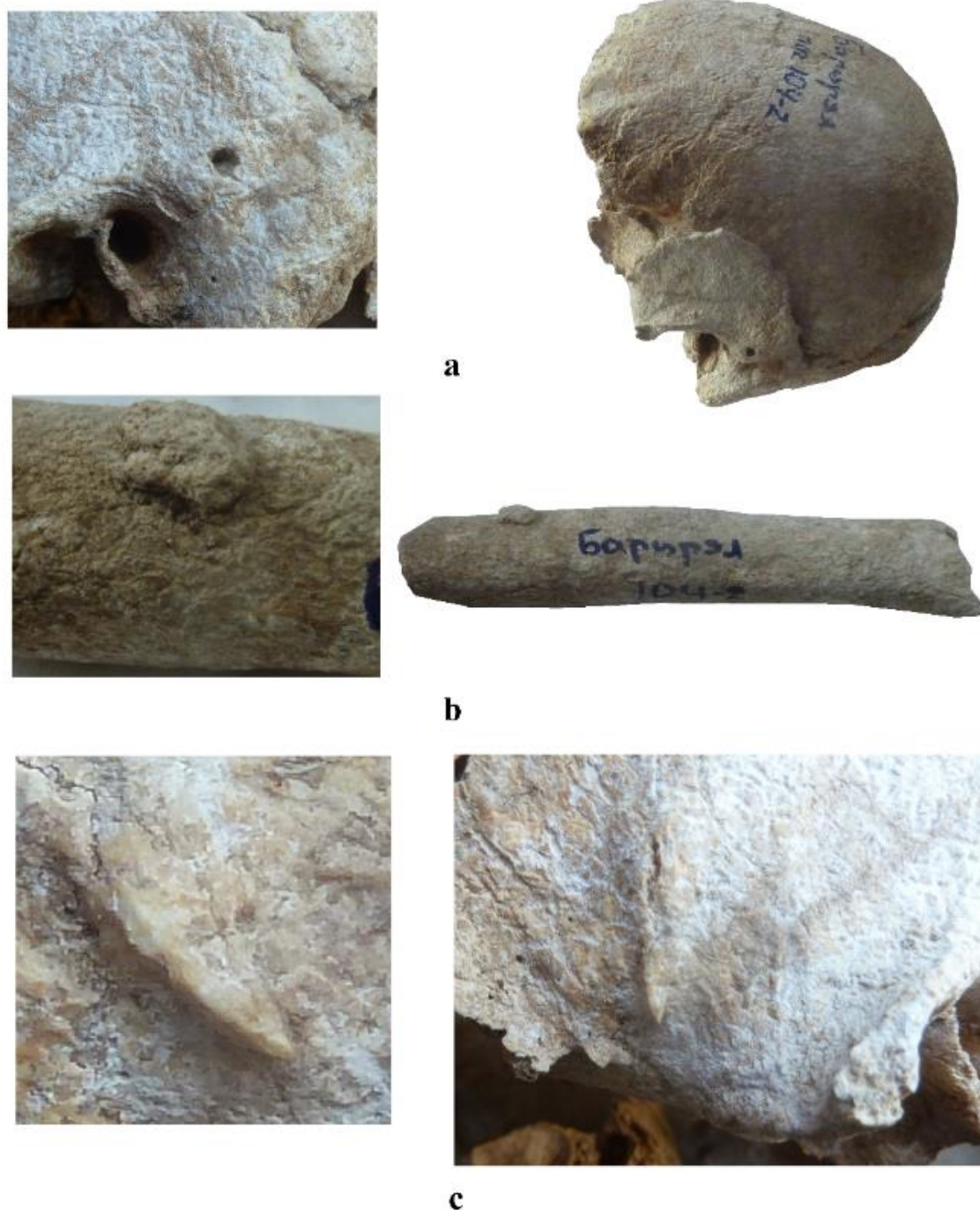


Figure 3. Foci of inflammation on the skull (a), button osteoma on the right humerus (b), exostosis on the left temporal bone (c) .

(14), and also defect in migration of neural crest derivatives to reach the jaw (20), or a multi-step epithelial-mesenchymal interaction (20, 21). Although the cause of Supernumerary teeth is not well understood, it has been attributed to obstruction at the time of tooth eruption secondary to crowded dentition, persistent

deciduous teeth, or exceptionally dense bone (17). Other proposed pathogenetic factors include a genetic predisposition; developmental disturbances, such as a cleft palate; rhinogenic or odontogenic infection; and displacement as a result of trauma or cysts (17). Supernumerary teeth eruption of teeth may happen nearby the

orbit, chin, maxillary sinus, palate and even nose (22).

The differential diagnosis of nasal teeth includes radiopaque foreign body; rhinolith; inflammatory lesions due to syphilis, tuberculosis, or fungal infection with calcification; benign tumors, including hemangioma, osteoma, calcified polyps, enchondroma, and dermoid; and malignant tumors, such as chondrosarcoma and osteosarcoma (23).

The diagnosis is done because of macroscopic findings and X-ray. An intranasal tooth is seen as a white mass in the nasal cavity surrounded. X-ray revealed that another tooth is next to the first. On the surface of the skull there were foci of inflammation, exostosis and cleft palate. Since cleft palate has a multifactorial etiology, including environmental and genetic factors (24), genetic predisposition as an etiology for the ectopic eruption of the dysmorphic tooth in the cannot be neglected. The occurrence of a cleft lip and palate is not a rare phenomenon with a prevalence of 1 in 800 births (25). Despite the corrective procedures these individuals suffer a number of dental and skeletal abnormalities such as anodontia, oligodontia, supernumerary teeth, delayed or premature eruption and maxillary arch hypoplasia (26). One of the rare complication of cleft lip and alveolus is nasally erupting tooth. A.S. Medeiros et al (4) stated that the prevalence of intranasal teeth was found 0.40 % in unilateral cleft lip and palate, and 0.61 % in bilateral cleft lip and palate. It is seen to occur more in females than males.

The man from Bardzryal suffered from calculus deposits, suggesting that their oral hygiene had not been adequate, or to a diet high in protein (27). Calculus was observed in the majority of teeth in an individual. If plaque is not removed from the teeth effectively (or on a regular basis) then it can mineralise and form concretions of calculus on the tooth crowns or roots (if these are exposed), along the line of the gums (28, p. 255-257).

Benign tumors were found on the skull and humerus. The most common tumours observed in palaeopathology are benign tumours, especially ivory or button osteomas. Osteoma is a slow-growing tumour formed by mature bone tissue. Osteomas are small, dense and round, protrude from the bone and form within the bone surface (periosteum) (29). They are symptomless (30, p. 171-172). The cause of osteoma has still not been defined. An exostosis is an extra growth of bone that extends outward from an existing bone and is a bump of dense bone most often

seen on the cranial vault. The stimulation is probably due to a developmental abnormality, trauma or possibly infection.

The male from Bardzryal cemetery had severe inner ear infections that breached into the brain cavity. The prevalence of infection and infectious disease correlated with fluctuating levels of environmental, social, and economic stress. Nasal tooth result from the ectopic eruption of supernumerary tooth and may cause a variety of symptoms and complications.

The first case reported for intranasal tooth in cleft lip and palate patient was in 1934 by Endicott. Other authors also reported similar case (3, 26). Kakade A. et al (31) presented case of a 4-year-old boy with right nasally erupted canine operated previously for bilateral cleft lip and palate. Al-Ahmari Y.D. and Al-Hayan A.M. (32) reported a case of intranasal tooth in 22 years old male. Gupta Y.K. and Shah N. (6) reported a case in 4 years old child. Dalben Gda S. et al. (33) reported a case in a 9 years old girl. There are only 8 cases reported in literatures (32) and we believe this is the first case reported in paleopathological materials from Armenia.

There are three dental studies on the ancient Anatolian populations whose samples are considered as nasal tooth. The first of these was found in Havuzdere (Medieval Age) in two individuals, a female and a child. The upper left central incisor of a female, aged 45-50, extended into the nasal cavity. In addition, the crown and root of this tooth had a distinct angle in neck region of the tooth. The upper left canine of another 15-years-old individual, whose root has not been formed, reflected the characteristic of a nasal tooth at the developmental stage (34). İznik (Late Byzantine) is the second population which had a nasal tooth as a canine-like tooth on the maxilla of one of the population members. The crown of this tooth had moved on up to the nasal cavity (35). In Kayalıpınar population (Hellenistic-Early Byzantine periods) at the 12-years-old child which had a nasal tooth on the maxilla (36). The nasal tooth sample in this study is located at the floor of the nasal cavity. It is not possible to determine whether the man was aware of the presence of this extra tooth (inverted mesiodens), there were any signs/symptoms caused by this tooth, or the tooth was surrounded by mucosa or granular tissue while the man is alive. Unfortunately, due to this insufficient comparison data, the nasal tooth in the Bardzryal male was mainly compared with clinical studies and these three populations.

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Declaration of Interest

None

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