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Case Study

Congenital aural atresia in an adult female from Apollonia Pontica, Bulgaria

Anne Keenleyside*

Department of Anthropology, DNA Building Block "C", 2nd Floor, 2140 East Bank Drive, Trent University, Peterborough, Ontario, Canada K9J 7B8

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ABSTRACT

Few cases of congenital malformation of the external auditory meatus have been reported in the paleopathological literature. This paper describes a case of unilateral aural atresia in an adult female skeleton from the Greek colonial site of Apollonia Pontica on the Black Sea coast of Bulgaria. The anomaly is described and its impact on this individual's ability to hear is evaluated using modern clinical data. Despite the loss of directional hearing and a visible malformation of the external ear, this individual would likely have led a fairly normal life and would have been capable of performing any number of everyday tasks.

1. Introduction

Congenital malformations of the cranium are infrequently seen in archaeological remains due to high mortality of affected individuals early in life, poor preservation of skeletal elements, particularly those of infants and young children, and/or differential burial practices resulting in the interment of individuals with skeletal anomalies in burial grounds separate from those used for the general population. Nevertheless, a variety of congenital conditions have been documented in archaeological crania, including cleft palate (Phillips and Sivilich, 2006), hydrocephalus (Richards and Anton, 1991), craniosynostosis (Duncan and Stojanowski, 2008), biparietal perforations (Ortner, 2003), congenital herniations (Ortner, 2003), and other developmental irregularities (Blau, 2005).

Malformations of the temporal bone have also been reported in the paleopathological literature, most notably a supernumerary external auditory meatus (Lukaszek et al., 2010), fusion of the malleus to the tympanic ring (McGrew and Gregg, 1971), otosclerosis and stapedial footplate fixation (Birkby and Gregg, 1975; Dalby et al., 1993), and congenital stenosis or absence of the external auditory meatus, also known as aural atresia (Hodges et al., 1990; Hrdlicka, 1933; Kato et al., 2007; Knüsel and Bowman, 1996; Lukaszek et al., 2010; Panzer et al., 2008; Wells, 1962). Of relevance to the specimen reported in this paper, Hrdlicka (1933) described seven cases of complete absence of the external auditory meatus in archaeological crania from Peru, Arkansas, and New Mexico, six of them females. In all cases the condition was unilateral and affected the right side. Wells (1962) documented complete atresia of the right auditory canal in an Anglo-Saxon skeleton from Caister-on-Sea, Norfolk. More recently, complete atresia of the left auditory canal was reported in a Late Woodland skeleton from Iowa (Hodges et al., 1990), and an 18th to 19th century skeleton from St. Bride's Church, London (Knüsel and Bowman, 1996). Panzer et al. (2008) documented unilateral aural atresia in a 14th to 18th century juvenile male from an ossuary in southern Germany, and Lukaszek et al. (2010) described unilateral atresia in a partial adult cranium from the Iron Age site of Lachish in Israel. Kato et al. (2007) also reported a case of unilateral stenosis of the external auditory canal in a pre-Columbian child from Peru. While Hrdlicka (1933), Hodges et al. (1990), Panzer et al. (2008), and Kato et al. (2007) provide detailed descriptions of their specimens, only the latter three comment on the impact of this condition on the affected individual's ability to hear, and none of these reports considers the way in which individuals with this condition were viewed by the society in which they lived.

This report presents a case of a congenitally absent external auditory meatus in an adult female from the ancient Greek colony of Apollonia Pontica, located on the Black Sea coast of Bulgaria. The skeletal malformation observed in this individual is described, the impact of this condition on her ability to hear is evaluated, and its social significance is assessed using information drawn from ancient literary texts, modern clinical data, and archaeological evidence. This case is the first of its kind to be documented in ancient Greek remains, and as such, provides important insight into congenital malformations of the ear and their significance in Classical antiquity.

* Tel.: +1 705 748 1011x7852; fax: +1 705 748 1613.
E-mail address: akeenleyside@trentu.ca

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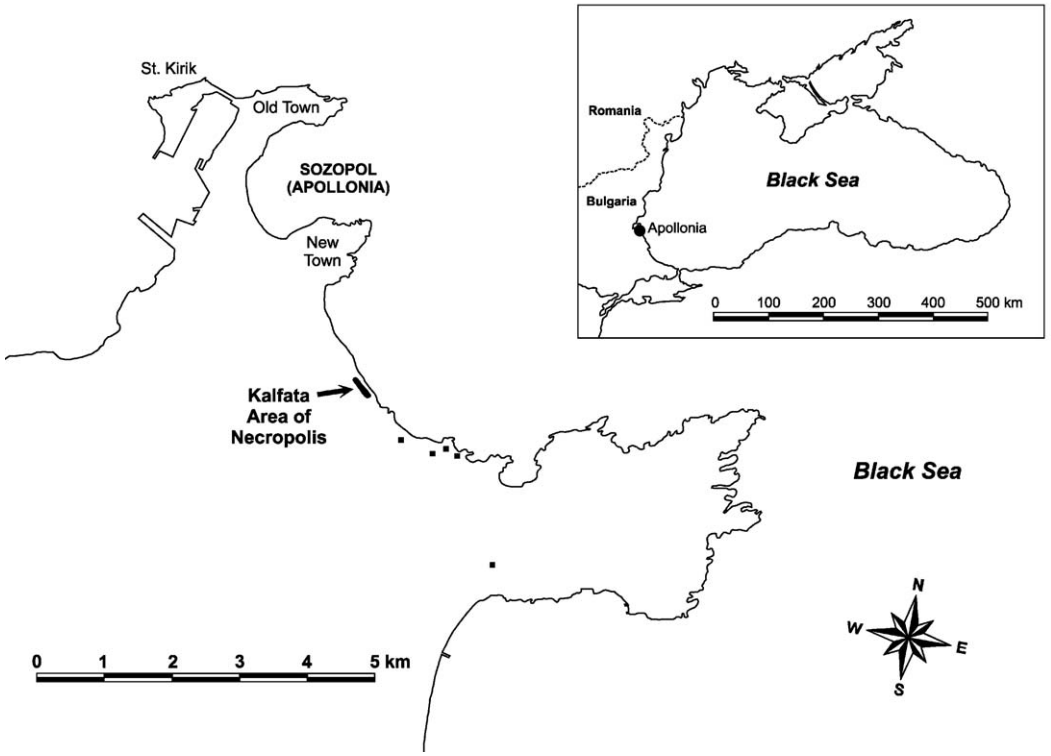

Fig. 1. Map of Apollonia showing the location of the Kalfata necropolis and the area in which the skeleton described in this paper was found.

2. Archaeological context

Apollonia Pontica was founded in 610 B.C. by colonists from the city of Miletus, located on the Aegean coast of Asia Minor in southern Ionia (today Turkey). Lying beneath the modern-day town of Sozopol, situated 35 km south of the city of Bourgas (Fig. 1), it was the first Greek colony to be established on the western Black Sea coast. Its strategic location contributed to its development as an important trade centre, and the colony prospered during the 5th and 4th centuries BC, producing its own ceramics, erecting temples and other public buildings, and establishing secondary settlements (Nedev and Panayotova, 2003).

The discovery in the 1930 s of a grave in a coastal area 2.5 km south of Sozopol led to the excavation of what is now known as the Kalfata necropolis. From 1946 to 1949 a total of 801 graves were uncovered, most of them common Greek inhumations containing single individuals laid out in an extended position, with their heads oriented primarily to the east (Venedikov, 1963). Since 1992, renewed excavation of the Kalfata necropolis and adjacent localities by Kristina Panayotova of the Institute of Archaeology in Sofia has uncovered over 1400 additional graves consisting of simple unlined pits, stone cists, tile graves, wooden coffins, pithoi, and amphorae (Nedev and Panayotova, 2003; Panayotova, 2007). Most of them have been dated from the second half of the 5th to the middle of the 3rd centuries BC based on associated grave goods. Some of these burials have been the focus of previous paleopathological studies (e.g. Keenleyside and Panayotova, 2006; Keenleyside, 2008), and the case examined in this report derives from these most recent excavations.

3. Case description

This individual, identified as burial #5518-156, is an adult female with an estimated age at death of 36–50 years based on the morphological appearance of the auricular surface (Lovejoy et al., 1985) and the degree of dental wear (stages 4–6 on Smith's (1984) scale). Her skeleton was missing the lumbar vertebrae and sacrum, and many of the remaining bones were incomplete. Healed cribra orbitalia was present on the roof of both orbits, and carious lesions were recorded in the right maxillary canine and first premolar, and the left mandibular third molar. The right maxillary first premolar exhibited an abscess on the buccal surface of the alveolar bone, and the left second maxillary molar and all mandibular molars, with the exception of the left third molar, had been lost antemortem. Slight to moderate calculus deposits were also noted on most of the teeth.

The right temporal bone exhibited complete absence of the external auditory meatus (Fig. 2). The canal had been filled in with bone, leaving only a small depression at the site of the meatus, and the tympanic bone was absent. The internal auditory canal, jugular fossa, mastoid, and petrous portion of the temporal bone were normal in appearance and did not differ in size and shape from

Fig. 2. The right temporal bone exhibits complete atresia of the external auditory canal.