

A case of conrescent tooth—A developmental anomaly in a 19th century skull from Uganda



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ABSTRACT

Dental abnormalities in archeological material such as conrescence or odontoma are rare cases often found accidentally, mostly during routine X-ray analysis or during macroscopic examination of the mastication apparatus. In this study, we present a rare case of conrescence between an upper left third molar and a supernumerary fourth molar in a 19th century skull from Uganda. Simultaneously, it is a critical revision of earlier studies on the same object (which considered this abnormality as an odontoma), using dental X-ray imaging and histological analysis.

Conrescence is a rare dental anomaly and this specimen is, to the best of our knowledge, the first such case reported in paleopathological studies of Eastern Africa. It may contribute to recognition and identification of etiopathogenetic factors in dental developmental defects in historical and contemporary populations of Africa.

1. Introduction

Some tooth abnormalities are rarely identified in archeological material and may be hard to diagnose, including odontogenic tumors and twinning defects. Odontogenic tumors can appear at any age, but are often encountered among young people (Ali Azhar et al., 2013; An et al., 2012). Twinning anomalies of teeth (namely: fusion, gemination and conrescence) are formed only at the growth stage and involve differentiation of the tooth bud tissues during the prenatal and postnatal period until the end of puberty (Thomas and Goldman, 1960; Whaites et al., 1994). Twinning anomalies (or twin teeth) in the permanent dentition are quite rare, appearing in approximately 0.3–0.5% of population samples according to studies by Javali and Meti (2015) and Şener (2011) of dental patients from India and Turkey, respectively.

According to Shrestha et al. (2015), normal tooth development depends on the interaction between the dental epithelium and the underlying ectomesenchyme. Depending on the type, twinning anomalies can be found within the maxillary or mandibular alveolar arches, both in the mesial and distal teeth (Foran et al., 2012). These abnormalities can be divided into three major types: fusion, gemination and conrescence, which vary in the degree of union between affected teeth. Fused teeth include common dentin, enamel, chamber and crypt

with fully or partially conrescent root (Strecha et al., 2012). They may involve two normal teeth or one normal and one supernumerary. The common crown of fused teeth is excessively large. When the fusion occurs during growth and formation of tooth buds, it is called true fusion, while when it occurs during local inflammatory condition after completion of root growth it is spurious fusion (Gunduz et al., 2006).

Gemination shows similar union of teeth as fusion, but is characterized by development of two separate crowns (Rajeswari and Ananthalakshmi, 2011). Unlike fusion, gemination leads to an increased number of teeth in the dental arch.

Conrescence includes union of cement and, in some cases, enamel at crown level. Conrescent teeth have independent root canals and pulp cavities (Golusińska-Kardach et al., 2016). This dental anomaly occurs at a late stage of development. Conrescence is the rarest of the twinning anomalies, occurring in about 0.03% of modern Indian population (Javali and Meti, 2015).

X-ray image of twinning abnormalities and odontogenic tumors may appear similar, making diagnosis difficult (Romito, 2004). In paleopathological studies, as in clinical studies, cases of odontoma and other dental anomalies are often found accidentally, for example during macroscopic assessments of the mastication apparatus as well as during routine X-ray analysis of various osseous complexes (e.g., splanchnocranium) (An et al., 2012; Anderson and Andrews, 1993; Forshaw,

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Fig. 1. Location of the excavation by Edward Loth in 1938–1939.

2009). However, sometimes, as a result of similarities among X-ray images of particular abnormalities or incorrect interpretation of histological slides, macroscopic assessments may produce a false description of the pathological changes in question. This is especially the case in preliminary examinations.

Often the results of consultations based on extended diagnostic methods indicate a necessity of reassessment of the case. Our study aims to reassess one such case—a dental developmental anomaly from a collection of 19th century skulls from the ethnic population of Uganda, which was preliminarily diagnosed as an odontoma (Nowakowski et al., 2009).

To the best of our knowledge, there is no study to date that describes a similar case in archeological material from the region. By offering a valuable revision, the case may contribute to recognition and identification of etiopathogenetic factors of dental developmental defects in historical and contemporary populations of Africa.

2. Material and methods

The analyzed skull no. 355 is from a series of 120 skulls excavated from mortuary sites in Kibanda and Kabahangala caves, Uganda (Fig. 1). It belonged to an adult female in good health and nutritional status. All skulls (dated to the 19th century) were collected by Edward Loth during his 1938–1939 scientific expedition to Uganda (Loth, 1938). The collection was given to Jan Mudlarski during World War II and later to the Polish Academy of Sciences. The skulls were thoroughly measured and described by Górný (1957). Currently, the materials form part of the osteological collection of the Anthropology Department, Polish Academy of Sciences, Wrocław.

Together with the biological background of the series, the skull no. 355 was originally presented in 2009 at the Vth International Anthropological Congress of Aleš Hrdlička: Prague, Humpolec, Czech Republic (Nowakowski et al., 2009). Standard anthropological methods were used to estimate sex and age (Acsadi and Nemeskeri, 1970; Buikstra and Ubelaker, 1994). Dental X-ray images were used to identify the abnormal structure of the third and fourth supernumerary molars in the maxilla (Figs. 2 and 3). Subsequently, using a diamond saw, the crown and concrescent roots of the last molars were removed from the left alveolar arch along with the adjacent alveolar bones. The

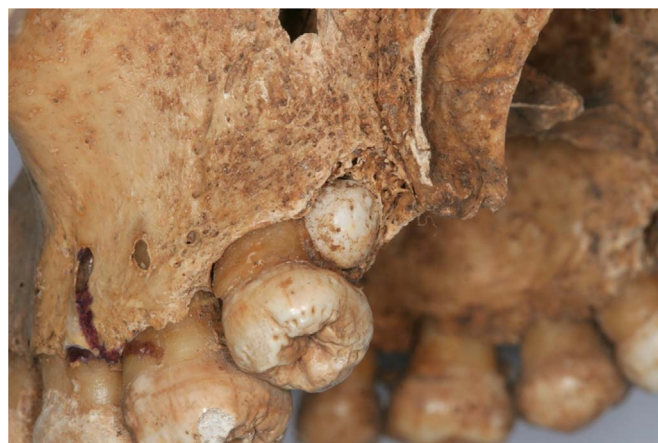


Fig. 2. Skull no. 355 with the abnormal structure in the left alveolar arch of the maxilla.

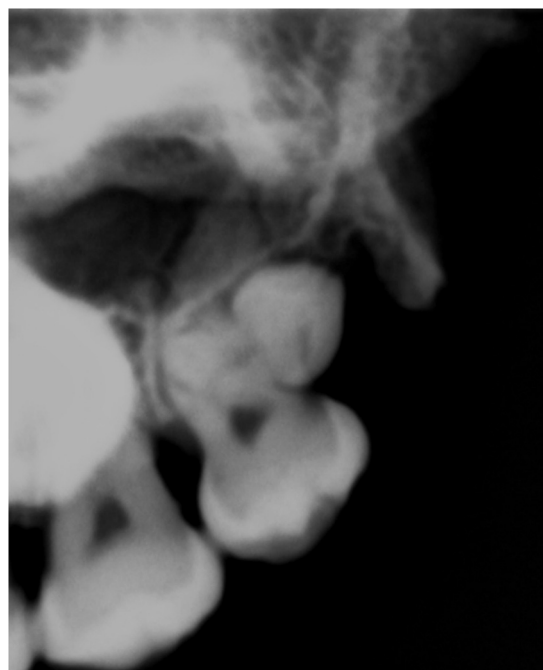


Fig. 3. X-ray photo of the abnormal third molar in left site of the alveolar arch. Concrescence of the two roots behind the distal surface of the third molar's crown.

specimen was embedded in Epon (Sigma-Aldrich Chemie GmbH) and histologically examined with a light microscope (Nikon Eclipse 80i).

3. Results

The periapical radiographs revealed the third molar and a structure similar to a supernumerary fourth molar in the left alveolar arch, as well as a concrescence between the roots of these two teeth. The root of the supernumerary tooth was directly associated with that of the third molar, but this association did not prevent the development or eruption of the third molar, nor disrupted the development of the surrounding alveolar bone (Fig. 3). The image revealed partial concrescence of the root cement with preserved autonomy of the root canals of the two teeth. There was no autonomous alveolus around the supernumerary dental structure, which was present distal to the third molar. The crown of the supernumerary tooth was small and its shape resembled a flower bud. Besides this, it preserved its distinct structural autonomy in relation to the crown of the third molar. The X-ray differential diagnosis included developmental changes termed twinning anomalies: gemination, fusion, or concrescence. Differential diagnosis was based on

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