

Triple Fusion in the Primary Dentition from Law's Site, Alabama (1MS100): A Case Report

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ABSTRACT Dental fusion of the primary dentition is a rare congenital anomaly. Evidence in the literature of bioarchaeology is scarce. Burial MS100-14 was recovered from Law's Site on Pine Island, in Marshall County, Alabama. Analysis of the remains found that MS100-14

presented a clear case of triple fusion of primary dentition in the maxilla. This appears to be the first case of triple fusion reported from among prehistoric Native American remains in the Southeastern United States. *Dental Anthropology* 2010;23(1):25-27.

Dental fusion of the primary dentition is a rare congenital anomaly. Examples in the literature of bioarchaeology are exceedingly scarce. Skeletal remains of an infant from the Law's Site (1MS100), in Marshall County, Alabama, presents a clear case of triple fusion of the primary dentition. This is a highly unusual condition, and thus a significant find for the fields of dental anthropology and bioarchaeology.

unilaterally in the mandibular arch, and most often in the anterior region; that is, either two incisors, an incisor and a canine, or a supernumerary tooth fused with an incisor (Barberia *et al.*, 2001; Cheng *et al.*, 2003; Favalli *et al.*, 1998; Modrizuki *et al.*, 1999; Oliván Rosas *et al.*, 2004; Yonezu *et al.*, 1997).

LITERATURE REVIEW

Examples of dental fusion in the anthropological literature are uncommon, and texts on dental anthropology, developmental osteology, and paleopathology give the topic little or no attention (Aufderheide and Rodríguez-Martín, 1998; Hillson, 1996; Ortner, 2003; Scheuer and Black, 2000). Two fused deciduous mandibular incisors are shown in Figure 1.1 of *The Anthropology of Modern Teeth* (Scott and Turner, 1997: 5), but neither the defect nor the provenance of the specimen is discussed in detail. A rare "talon cusp" found on a deciduous lateral incisor was the primary topic of a case report of a juvenile skeleton excavated in England, though the report states that "the affected incisor also shows abnormal widening, probably representing a double tooth", and mentions the presence of a supernumerary permanent incisor (Mays, 2004:206). It is unclear if this "double tooth" is an actual case of dental fusion, or a case of gemination, defined as the unsuccessful or incomplete division of one tooth germ into two (Canut Brusola, 1988; Oliván Rosas *et al.* 2004). Some authors agree that distinction between fusion and gemination can sometimes be confusing, and the term "double teeth" should be used when the diagnosis is inconclusive (Andlaw and Rock, 1999; Gonzalez Marquez and Mendez-Nuñez, 1993; Killian and Croll, 1990; Oliván Rosas *et al.*, 2004; Uys and Morris, 2005).

Although there is little in anthropological sources concerning the topic of dental fusion, there have been some relevant clinical studies on modern populations, and some patterns have been documented regarding this dental anomaly. These clinical studies agree that fusion in the primary dentition usually affects two teeth

Studies among European, (Asian) Indian, and Turkish populations reveal a prevalence of less than 1% for double fusion in primary dentition (Aquiló *et al.*, 1999; Barberia Leache and Boj Quesada, 2001; Boj Quesada 1990; Bruce *et al.*, 1994; Erdem *et al.*, 2001; Reddy and Munshi, 1999). North American populations have a prevalence ranging from 0.14 to 3% (Hagman, 1988). A study in Shenyang city, China, reported 1.52% prevalence among children there (Cheng *et al.*, 1999). The prevalence appears to be highest in Japan, where 4.1 to 5% of children studied presented this anomalous feature, and unlike other populations, there was a tendency regarding sex, as a significantly higher proportion of boys displayed congenital dental fusion (Modrizuki *et al.*, 1999; Yonezu *et al.*, 1997).

As rare as double fusion appears to be, it is not surprising that triple fusion of primary dentition is even less common. In the study of Indian children (n = 4,205), there was no case of triple fusion (Reddy and Munshi, 1999), though a separate team from India reports the case of a child with triple fusion involving two ipsilateral incisors and a supernumerary tooth (Prabhakar *et al.*, 2004). Among Chinese children studied (n = 4,286), only one case of triple fusion was found, involving two ipsilateral incisors and the adjoining canine (Cheng *et al.*, 1999). The prevalence of "triplication of primary teeth" among Turkish children was stated as 0.02% (Erdem *et al.*, 2001).

Problems associated with the congenital fusion of primary dentition may include an increased susceptibility to caries in the fused teeth (Reddy and Munshi, 1999).

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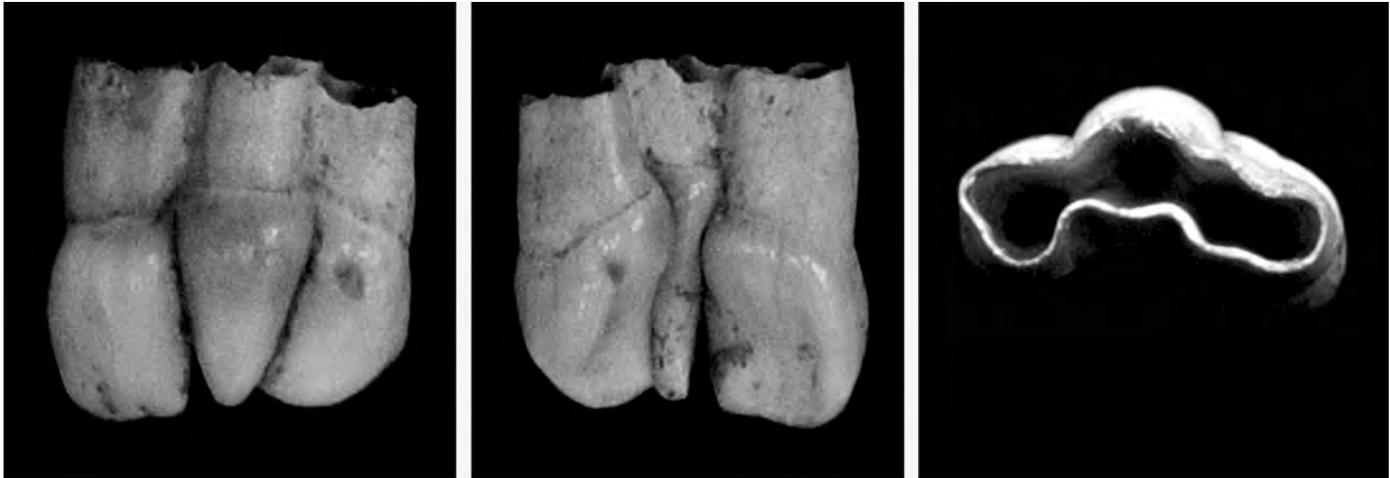


Fig. 1. Fused teeth of Burial MS100-14. (*Left*) Labial view with the left primary central incisor (i1) to the left of the photograph, a conical lateral incisor (i2) in the center, and the canine (c) to the right. (*Center*) Lingual view of the fused teeth, with c to the left and i1 to the right. (*Right*) Alveolar (apical) view of the formative roots with c to the left and i1 to the right of the photograph.

There is also an association between fusion of primary dentition and agenesis of the corresponding permanent teeth; with regard to this condition, various authors cite percentages of incidence ranging from 20 to 75%, the occurrence of which may depend on which teeth are fused (Aquiló *et al.*, 1999; Barberia Leache and Boj Quesada, 2001; Boj Quesada 1990; Canut Brusola 1988; Oliván Rosas *et al.*, 2004; Ostos Garrido and Peñalva Sanchez, 1996; Hagman, 1988; Reddy and Munshi, 1999).

MATERIALS AND METHODS

A standard osteological analysis was performed on the skeletal remains recovered from Law's Site (1MS100). The Law's Site was a village on the southern end of Pine Island in Marshall County, Alabama. The site was excavated in 1938 by the Works Project Administration (WPA) under the direction of Carl F. Miller (Webb and Wilder, 1951). Shortly thereafter, Pine Island was inundated when construction of Guntersville Dam was completed and the low-lying Guntersville Basin flooded to become Guntersville Lake.

The site had seen Native American occupation since the Archaic Period (about 8,000-1,000 B.C.) (Walthall, 1980); though many of the burials have been convincingly attributed to the post-contact period, between 1540 and about 1715 (Fleming, 1976; Padgett, 2007; Webb and Wilder, 1951). It is believed that the Native occupants of this latter period were the historically known Koasati, or Coushatta, tribe (Padgett, 2007; Swanton, 1985, 1989), though there is some dispute on this issue (Hudson, 1997).

CASE REPORT

Burial MS100-14 was an infant of indeterminate sex, aged about 9 months based on dental eruption. No indications of pathological infection or physical trauma were found among the remains.

Burial MS100-14 exhibited fused dentition, appearing as a block of three teeth fused side by side in their standard position. The fused set consists of the deciduous left maxillary central incisor, lateral incisor, and canine (Fig. 1). The central incisor and canine appear to be of normal dimensions, while the lateral incisor is reduced in mesiodistal width, and appears to be a conically-shaped "peg tooth."

DISCUSSION

The three teeth are fused at both the enamel and the dentin, though all three can be recognized as distinct from the others (Fig. 1). Furthermore, it is apparent that although the pulp cavities of the three teeth are continuous with each other, each tooth was maintained by its own root canal. These observations support the assertion that this is a true case of dental fusion, rather than gemination of a single tooth (Oliván Rosas *et al.*, 2004; Uys and Morris, 2005).

Some studies have found a predilection for one sex or the other regarding fused teeth or peg teeth (Wu and Feng 2005; Yonezu *et al.*, 1997); however, no evidence relating to sex can be interpreted from the remains or associated materials of Burial MS100-14.

CONCLUSION

The expression of triple fusion in MS100-14 as a dental anomaly is unusual in that it occurred among the maxillary dentition, as other researchers have found that when dental fusion occurs it is predominantly in the mandibular arch (Cheng *et al.*, 2003; Yonezu *et al.*, 1997). The peg-shaped tooth, while an anomalous feature, is typical in the respect that it is a lateral incisor (Wu and Feng, 2005). Burial MS100-14 represents a rare case in physical anthropology of triple fusion of primary dentition found in an archaeological context. Furthermore, the case

of MS100-14 is significant as it appears to be the first case of triple fusion reported from among prehistoric Native American remains in the Southeastern United States.

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