

## Fusion of maxillary incisors across the midline: clinical report

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### Abstract

*A clinical report is presented of fusion of maxillary primary central incisors associated with a dental disturbance in the corresponding area of the permanent dentition in a child with other nondental malformations.*

**F**usion is the union of two normally separated tooth germs. It may be complete with the formation of one abnormally large tooth, or incomplete with the union of crowns or union of roots only. The prevalence of this anomaly is less than 1% in Caucasian populations,<sup>1,3</sup> although a higher prevalence has been reported in Japanese<sup>4</sup> and in American Indians.<sup>5</sup> Fusion is seen in both primary and permanent dentitions; however, it is seen most commonly in the mandibular anterior region of the primary dentition.<sup>4,5</sup> The most frequent combinations involve fusion of the central and lateral incisors, or of the lateral incisor and canine.<sup>3,4</sup> Though rare, fusion of maxillary central incisors across the midline also has been reported.<sup>6,7</sup> With fusion of primary teeth, hypodontia in the permanent dentition is common.<sup>1,3,4</sup>

The specific etiology of fusion is unknown; however, it has been suggested that it arises from some physical force or pressure that produces contact between the developing teeth.<sup>6</sup> Using a strain of Lakeland terriers, Hitchin and Morris<sup>8</sup> showed that the primary anatomical abnormality that could initiate fusion was the persistence of the interdental lamina (which maintains continuity between tooth germs). They also demonstrated that this abnormality was hereditary, although no distinct inheritance pattern could be identified. Several instances of fusion in one family have been reported,<sup>1,3,5</sup> also suggesting a hereditary pattern.

In addition, an association between fusion of teeth and other nondental malformations has been reported.<sup>3,9</sup> In a group of 40 Swedish children with thalidomide embryopathy, the prevalence of fusion was 5.2%,<sup>7</sup> ten times the prevalence reported in a group of normal Swedish children.<sup>1</sup> In one case, fusion of the maxillary central incisors in both the primary and permanent dentitions was noted in a child with bilateral syndactyly of hands and feet, low position of external ears, and a cleft palate.<sup>7</sup>

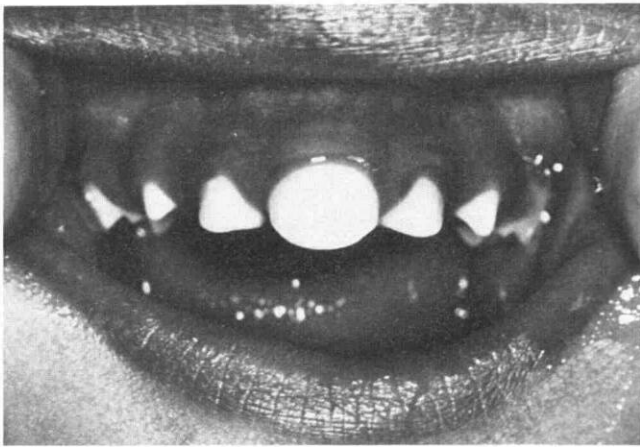
In mouse embryos with exencephaly induced by maternal overdosage of vitamin A, fusion of maxillary central incisors was extremely common, occurring in 68% of the population.<sup>10</sup> The most frequent condition (51.5%) was fusio dentium, in which all tooth layers including enamel, dentin, and pulp crossed the midline. Moreover, this fusion was evident as early as the bud stage of development. Although the direct cause of this dental anomaly could not be determined, Knudsen suggested that the abnormal brain development might have influenced the abnormal tooth development. One argument in support of this theory is the possible inductive effect of the neural crest cells in tooth formation. However, in order to exclude the possibility of a direct effect of vitamin A on the tooth buds, Knudsen<sup>11</sup> included similar midline incisor fusions in mouse embryos by producing exencephaly from maternal injection of trypan blue.

The purpose of this article is to report fusion of maxillary incisors across the midline in a child with other nondental malformations.

### Patient Presentation

An 18-month-old black female patient presented for dental evaluation of a single, midline, maxillary incisor. Clinical examination revealed an abnormally large central incisor (in relation to the size of the lateral incisors) with no definite incisal edge pattern to distinguish it as either a right or left central incisor (Figure 1). Radiographic examination disclosed that this tooth had a single root and pulp canal with a single corresponding permanent incisor tooth bud (Figure 2). However, because of the rotation of the the permanent incisor bud, its eventual morphology and size could not be determined.

The child's medical history revealed numerous



**Figure 1.** Fusion of maxillary primary incisors has resulted in an abnormally large midline incisor with no definitive incisal edge pattern.



**Figure 2.** Radiographic examination reveals a single root and pulp canal on the fused tooth and a single corresponding permanent incisor tooth bud.

developmental anomalies including microcephaly, left torticollis, strabismus, and premature gynecomastia. The patient was born three weeks prematurely and her prenatal history included a maternal asthmatic episode in the third month of pregnancy for which theophylline was administered. The patient's dental history was negative with no reported history of trauma or irradiation to the area. The family history revealed no similar developmental anomalies.

## Discussion

The size and morphology of the midline incisor was used to distinguish this presentation as fusion of the central incisors from that of congenital absence of a central incisor with midline migration of the contralateral incisor. Although it was noted that only one permanent successor to this tooth existed, it is still undetermined whether fusion of central incisors or hypodontia is present in the permanent dentition.

The prenatal history of theophylline administration

could not be implicated directly in the child's developmental anomalies. However, the association in this patient between fusion of the maxillary central incisors and microcephaly is interesting. The clinical appearance of a single abnormally large tooth suggests that fusion occurred at the time of initiation of the tooth germs rather than at a later stage of development. This is in agreement with Knudsen's dental findings in exencephalic mouse embryos, and may suggest that the abnormal brain development influenced the abnormal tooth development since no hereditary basis could be identified. It is particularly noteworthy that the fusion in this case occurred in the same unusual location as in the exencephalic mouse embryos. However, since a case of fusion of maxillary central incisors without associated brain malformations has been reported,<sup>6</sup> these findings may be coincidental.

This case, nevertheless, demonstrates the need for radiographic examination of the permanent successors of fused primary teeth. As in other reported cases, fusion of primary teeth in this child appears to have resulted in a dental anomaly in the permanent dentition.

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