Tooth Fusion, a Rare Dental Anomaly: Analysis of Six Cases
Chandramani Bhagwan More, Mansi N Tailor

Abstract
Fusion is a rare developmental anomaly of shape of tooth, characterized by the union of two adjacent teeth, seen in both the primary and permanent dentition and has very little documentation in Indian population. The prevalence of tooth fusion in the primary dentition is 0.5-2.5% and 0.1% in permanent dentition. The exact aetiology is not known, but it is thought that some physical forces or pressures cause the contact of developing teeth. The clinical presentation often ranges from two separate crowns to a crown of double the size of normal. The tooth fusion may contribute to various significant problems. Correct diagnosis of the condition implicates right treatment and a better prognosis. Management of fusion warrants regular and careful monitoring with long-term follow-ups. The purpose of the present study was to analyse six cases of teeth fusion with emphasis on clinical and radiographic findings and to review the literature.

Keywords: Dental Anomaly; Gemination, Hypodontia, Primary Incisors, Succedaneous Tooth, Synodontia, Tooth Fusion

Introduction
Developmental anomaly in number, size and shape may be due to abnormalities during the morpho-differentiation stage of the dental lamina and the tooth germ.\(^1\) Dental anomalies of number and form may occur in the primary and permanent dentition. Various terms have been used to describe fusion: gemination, dental twinning, concrescence, double teeth, conjoined teeth, twinned teeth, double formations, gemini-fusion and vicini-fusion.\(^2\) Teeth fusion also termed as synodontia, presents as one of the most unusual and rarest anomaly of shape of the tooth. In 1963, Tannenbaum and Ailing defined fusion as union between the dentin or enamel of two or more separate developing tooth buds (Fig 1a & b). There may be complete union to form one abnormally large tooth, union of crowns or union of roots only.\(^3\) A supernumerary tooth is frequently associated with fusion.\(^2\)

The literature shows controversial concept to correctly differentiate between fusion and gemination. The uncertainty is more when there is fusion between a normal tooth and a supernumerary tooth. Fusion arises through the union of two normally separated tooth germs, whereas gemination is an attempt by the tooth bud to divide and this partial division is halted before the development is completed. For a differential diagnosis between this two anomalies, the dentist must carry out a highly careful radiographic and oral examination.\(^4\) The purpose of the present study was to analyse six cases of teeth fusion with emphasis on clinical and radiographic findings and to review the current literature on this dental anomaly. All these cases were reported in our department, during the year 2010 - 2011.

Case synopsis
After a judicious evaluation of all the information, the summary of the present six cases are as under the table 1.

Discussion
Fusion is seen both in, deciduous (0.5-2.5%) and permanent dentition (0.1%) and more commonly involve the mandibular anterior teeth (Fig 1c). It is most commonly unilateral, usually involving the lateral incisor and canine.\(^4\) Very few cases of fusion are reported involving premolar and molar teeth.\(^5\) The males and females are equally affected, and the incidence is seen higher in Asians and Native Americans.\(^6\) In Indian population the prevalence of unilateral fusion was confirmed to be 0.14% by Reddy and Munshi.\(^7\)

In the present analysis of six cases, we found that the patients were in the age range of 7-19 years. There was no gender...
predilection and the ratio was 1:1. We noted that the fused teeth were most commonly seen in mandibular anterior region (83.3%) then maxillary anterior region (16.7%). The frequency of involvement was unilateral (100%) and both the dentitions were involved, with two cases (33.3%) in primary dentition and four cases (66.7%) in the permanent dentition. We also observed that the fusion of teeth was either between incisors or between incisors and canine. The teeth affected with fusion were maxillary permanent lateral incisor and canine (16.7%), mandibular permanent lateral incisor and canine (16.7%), mandibular permanent central and lateral incisor (16.7%), mandibular permanent central incisors (16.7%), mandibular primary lateral incisor and canine (16.7%) and mandibular primary central incisor and lateral incisor (16.7%). The fused teeth in our analysis showed partial type of fusion (Fig 2A, 2B, 2C, 3A, & 3B) in five cases (83.3%) and complete fusion (Fig 3C) in one case (16.7%). Surprisingly only one succedaneous tooth was missing. Distinctly only one case (16.7%) had infected dental cyst. It is significant to note that, the findings of fusion were accidental. None of the patient noticed any symptom.

<table>
<thead>
<tr>
<th>Case. no.</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>Site</th>
<th>Unilateral / Bilateral</th>
<th>Affected Teeth #</th>
<th>Type of fusion</th>
<th>Missing Teeth</th>
<th>Associated lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>07</td>
<td>M</td>
<td>Anterior mandible</td>
<td>Unilateral</td>
<td>71 and 72</td>
<td>Partial</td>
<td>31</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>F</td>
<td>Anterior maxilla</td>
<td>Unilateral</td>
<td>22 and 23</td>
<td>Partial</td>
<td>--</td>
<td>Infected periapical cyst</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>F</td>
<td>Anterior mandible</td>
<td>Unilateral</td>
<td>32 and 33</td>
<td>Partial</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>09</td>
<td>M</td>
<td>Anterior mandible</td>
<td>Unilateral</td>
<td>82 and 83</td>
<td>Partial</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>F</td>
<td>Anterior mandible</td>
<td>Unilateral</td>
<td>31 and 41</td>
<td>Partial</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>M</td>
<td>Anterior mandible</td>
<td>Unilateral</td>
<td>31 and 32</td>
<td>Complete</td>
<td>--</td>
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</tr>
</tbody>
</table>

Table 1: The total case summary

Gellin et al., and Hagman noted that when fusion involved primary lateral incisor and canine, then chances of lacking the succedaneous lateral incisor was 100% and 75% respectively. Gellin also noted that when the fusion involved central and lateral incisors, only 37.5% of the cases presented with missing permanent successors. The exact aetiology of fusion are not known. But, physical force or pressure between adjacent tooth germs, environmental influences, genetics, viral infection during pregnancy, trauma, use of thalidomide, systemic disease, X-linked congenital conditions, cleft lip and palate, lack of vitamins and lack of space in the dental arch are the possible causes. Depending on the stage of development of teeth, fusion can be classified into two types: complete and partial. The complete fusion begins before calcification and the crown incorporates features of both participating teeth with regard to enamel, dentin, cementum and pulp, whereas the partial fusion occurs at a later stage and the tooth might exhibit separate crowns and fusion may be limited to the roots alone with pulp canals fused or separate. The crowns of fused teeth either appears large and single, or an inciso-cervical groove of varying depth or a bident crown. Fused teeth may cause aesthetic concern due to irregular morphology, space problems, caries and periodontal disease, early pulp exposure due to deep grooves, occlusal disturbances, delayed resorption of root due to greater root mass and increased area of root surface leading to delayed or ectopic eruption of the permanent successors.

The differential diagnosis for fused teeth includes gemination and macrodontia. Radiographically, the fused teeth may show an unusual configuration of the crown, pulp chamber and root canal. The presentation may range from separate pulp chambers and root canals to a common pulp chamber and root canal system. The radiographs disclose the unusual shape or size of the entire tooth and extent of the union.

Management
The management of fusion can be implied according to the affected teeth, the level of fusion and the morphology. Correct diagnosis of the condition implicates right treatment with multidisciplinary view and a better prognosis for the patient. The minimal
intervention technique and preventive approach for the management of the fused teeth should be advocated, if the pulp exposure is ruled out. Fluoride application should be indicated routinely. Management of fusion warrants regular and careful monitoring with long-term follow-ups.4,7

Figure 1: Schematic diagram showing partial (a), complete fusion (b) of teeth, along with clinical photograph showing fusion between teeth #81 and 82 (c).

Figure 2: shows intra oral periapical radiographs of partial fusion between tooth #81 and 82 (A), between tooth #22 and 23 (B), and between tooth #32 and 33 (C).

Figure 3: The intra oral periapical radiographs of partial fusion between teeth #82 and 83 (A), between teeth #31 and 41 (B) and complete fusion between teeth #31 and 32 (C).

Conclusion
Fusion in the primary dentition has to be carefully analysed as they may be associated with anomalies in the permanent dentition. Early diagnosis of the anomaly is of considerable importance and it should be followed by careful clinical and radiographic observations.

Acknowledgement
We would like to acknowledge all the staff members of oral medicine and radiology department for their support and guidance.

**Author Affiliations**
1. Dr. Chandramani Bhagwan More, Professor and Head, 2. Dr. Mansi N Tailor, Post Graduate Student, Department of Oral Medicine and Radiology, Sumandeep Vidyapeeth University, K.M. Shah Dental College and Hospital, Piparia, Vadodara – 391760, Gujarat, India.

**References**

**Corresponding Author**
Dr. Chandramani B. More, Professor and Head, Department of Oral Medicine and Radiology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth University, Piparia, Vadodara, Gujarat, India
Ph: +91 9974900278
E-mail: drchandramanimore@rediffmail.com

Source of Support: Nil, Conflict of Interest: None Declared.