Triple tooth in primary dentition: A proposed classification

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Abstract

Triple teeth may result from fusion, gemination or concrescence causing transient esthetic and functional problems in primary dentition and retardation or alteration of development and eruption of permanent successors. We report an unusual case of a boy aged five with fusion among maxillary left primary central incisor, lateral incisor and a supernumerary tooth concomitant with agenesis of permanent lateral incisor. A review of literature on triple tooth was done along with a proposed classification of the triple teeth.

Keywords: Classification, fusion, gemination, supernumerary, triple teeth

Introduction

Malformations of teeth could be classified based on the size, shape, number and structure. Malformations in primary dentition can lead to relatively transient esthetic and functional problems in addition to retard or alter the development of permanent teeth. The most common dental anomaly reported in primary teeth is conjoined teeth.\[1\] Though “double teeth” (result of fusion or gemination) is relatively common with a reported prevalence ranging from 0.1% to 1.55%, occurrence of union of three teeth which is reported as “triple tooth” is very rare.\[2-11\] There is only one study by Ravn\[2\] that reported a prevalence of 0.02% of triple tooth in primary dentition. Triple tooth may occur due to fusion, gemination or concrescence.\[1\] We report a case of triple tooth in left maxilla (fusion of incisors with supernumerary tooth) associated with missing succedaneous lateral incisor. This paper provides a critical analysis of cases of triple tooth reported in literature since its first report in 1887 by Bennett\[6\] and proposes a classification for triple teeth.

Case Report

A 5-year-old boy presented to the Department of Pedodontics and Preventive Dentistry, with an abnormal upper front tooth. Past history and the family history were not relevant and there was no history of trauma. Examination revealed irregular morphology of teeth in the upper anterior region and there was fusion of left maxillary central incisor, lateral incisor and a supernumerary tooth and the fused teeth were free of caries [Figure 1]. The remaining primary teeth in both arches were normal. Occlusal radiograph revealed fusion of the central and lateral incisors to the supernumerary tooth with no clear distinction of root canal in the supernumerary tooth and agenesis of succedaneous upper left lateral incisor [Figure 2]. Parents were counseled regarding the anomaly and were made conscious about the concomitant problems expected with these anomalies. At 1-year follow-up, the succedaneous tooth germ of central incisor was found to be developing normally and he was advised regular follow-up.

Discussion

“Triple tooth” is seldom reported in primary dentition. After the description of first case by Bennett in the late 1880s, Sprawson in 1931 probably described another case of triple tooth in his book.\[6,7\] Since then there were only five cases

![Figure 1: Intraoral photograph showing triple tooth in left maxillary incisor region](image-url)
They did not mention the number of pulp chambers or root canals in their histological findings.\[17\] Mohapatra et al. reported three separate crowns with separate pulp chambers at the crown, three joined roots with separate pulp canals at the middle third and pulp canals progressively joining to form common apical section.\[20\] Six cases (of available data for 13 cases) showed absence of the corresponding succedaneous teeth.\[9,10,15,16,19,20\] In the present case, there is agenesis of left maxillary permanent lateral incisor.

The portrayal of triple tooth is not the same with different authors. Long\[8\] termed his case as gemination of three primary lower incisors and described three connected primary mandibular incisor crowns which were probably two normal incisors and a supernumerary tooth. Most of the reported cases describe triple tooth as a union between the central and lateral incisors and a supernumerary teeth. Bennett, Kurihara and Mochizuki et al. described triple tooth as a fusion between three normal teeth.\[6,14\] Rao had described her case as synodontia of primary maxillary central and lateral incisors with a supernumerary tooth.\[15\] Trubman and Silberman described their case of triple tooth as a rare combination of fusion and gemination in one clinical crown.\[13\]

Various studies cited possible etiopathologic factors for triple tooth formation. Long and Burley and Reynolds described their cases as gemination of three lower incisors.\[8,10\] In the case of triple tooth due to fusion, the diagnosis of gemination (one pulp chamber and one root canal) versus fusion (separate pulp chambers and root canals) has been followed.\[17,21\] Knapp and McMahon suggested that it could be a fusion between primary and permanent elements, if aplasia of permanent tooth is present and in case where all permanent teeth are present it could be a gemination or supernumerary teeth.\[5\] Trubman and Silberman described his case as a combination of fusion and gemination.\[13\] In contrast, based on CT and histological findings, Aguilo et al. suggested, considering triple tooth as a fusion between two primary and a supernumerary tooth with or without missing permanent incisors. Clinical and CT findings of the involved teeth and supernumerary tooth correspond to those of primary dentition. If there are no missing permanent teeth, the cause of triple teeth could be hyperactive dental lamina and if the succedaneous teeth are missing, the cause could be disproportionate activity of dental lamina leading to a combination of hyperdontia-hypodontia state.\[16\]

Based on this analysis we propose to classify triple tooth into two types [Table 2]. Type I with three pulp chambers and three root canals due to fusion; Type Ia - fusion of two normal teeth with a supernumerary tooth as in cases described by Aguilo et al., Rao,\[15,16\] and others; Type Ib - fusion of three normal teeth as in the cases described by Bennett, Kurihara, Fukushima, Kurosu and Mochizuki et al.\[6,14\] and Type II with two pulp chambers and two root canals which can be Type Iia, a combination of one gminated (double
| Author/year | Age/sex of patient | Location | Teeth involved in triple tooth (FDI) | Radiological features of triple teeth | Associated radiological features | Treatment |
|-------------|--------------------|----------|-------------------------------------|--------------------------------------|---------------------------------|-----------|
| Bennet, 1887-1888 | NA | Right maxilla | 61, 62, 63 | NA | NA | NA |
| Sprawson, 1931 | NA | NA | NA | NA | NA | NA |
| Fukushima, 1932 | 3/M | Left mandible | 71, 72, 73 | NA | NA | NA |
| Coyler, 1938 | NA | NA | NA | NA | NA | NA |
| Long, 1951 | 7/M | Left mandible | 71, S, 72 | Three separate pulp chambers | Missing 31 | Extraction |
| Ohta and Kitamura, 1952 | 8/F | Left maxilla | 61, S, 62 | NA | NA | NA |
| Munro et al., 1958 | 4/M | Left maxilla | 61, S, 62 | Fused crowns and roots, with distinct pulp chambers and root canals | Presence of all permanent teeth | NA |
| Munro et al., 1958 | 3/M | Left maxilla | 61, S, 62 | Three separate pulp chambers and root canals | Missing 12 | NA |
| Burley et al., 1965 | 4 years 10 months/F | Left maxilla | 61, 62, S | NA | Supernumerary 22 | Extraction |
| Kurthara et al., 1974 | 8 years 8 months/M | Right mandible | 81, 82, 83 | NA | NA | NA |
| Kurthara et al., 1983 | 2 years 9 months/M | Right maxilla | 51, S, 52 | NA | NA | NA |
| Kurthara et al., 1983 | 4/M | Right mandible | 81, S, 82 | NA | NA | NA |
| Dhoooria et al., 1983 | 10/M | Left maxilla | 61, S, 62 | Fusion at enamel and cementum | All permanent teeth present | Extraction (over-retained) |
| Kobayashi et al., 1984 | 1 year 11 months/M | Right maxilla | 51, S, 52 | NA | NA | NA |
| Knapp and McMahon, 1984 | 6 years 6 months/F | Left maxilla | Geminated 61 and 62 or 61, 62, S | Confluence of enamel, dentin, and pulp chamber of mesial and middle elements; dentin of distal element confluent with other parts, but there is separation of labial enamel | All permanent teeth present | Extraction (over-retained) |
| Sawaguchi et al., 1987 | 6 years 4 months/F | Left maxilla | 61, 62, S | NA | NA | NA |
| Trubmann et al., 1988 | 3/M | Right mandible | 81, 82 (combined fusion and gemination) | 81 with two crowns, single root canal; 82 with single crown and root canal | NA | NA |
| Trubmann et al., 1988 | 6/M | Right mandible | 81, 82 (combined fusion and gemination) | 81 with two crowns, single root canal; 82 with single crown and root canal | NA | NA |
| Hatano et al., 1992 | 6 years 1 months/M | Right maxilla | 51, S, 52 | NA | NA | NA |
| Hatano et al., 1992 | 6 years 10 months/M | Left maxilla | 61, S, 62 | NA | NA | NA |
| Mochizuki et al., 1999 | 2/F | Maxilla | 52, 51, 61 | Three crowns, separate coronal pulp; single root | Incomplete data | NA |
Table 1: Contd...

| Author/year | Age/sex of patient | Location | Teeth involved in triple tooth (FDI) | Radiological features of triple tooth | Associated radiological features | Treatment |
|-------------|--------------------|----------|-------------------------------------|--------------------------------------|---------------------------------|-----------|
| Rao, [14] 2000 | 6/F Left maxilla | 61, S, 62 | Incomplete fusion of crowns, separate pulp chambers and canals | Missing 22 | Restoration of caries; pit and fissure sealants |
| Agullo et al., [16] 2001 | 3/F Left maxilla | 61, S, 62 | Separate pulp chambers and root canals. | All permanent incisors present | Extraction (trauma) |
| Agullo et al., [16] 2001 | 2/M Right maxilla | 51, S, 52 | Separate pulp chambers and root canals. CT: Separate crowns and pulp chambers; Joint roots and canals | Missing 12 | Extraction (abscess) |
| Erdem et al., [13] 2001 | 2 years 6 months/M Left maxilla | 61, 62, S2 | Separate pulp chambers and root canals | Missing 22 | Extraction (abscess) |
| Prabhakar et al., [17] 2004 | 6/M Right maxilla | 51, S, 52 | Root canals not distinct | NA | Extraction (trauma) |
| Schulz-Weidener et al., [18] 2007 | 4/M Bilateral maxilla | 51, S, 52, 61, S, 62 | Three separate crowns and pulp chambers | Normal permanent tooth | Extraction (abscess) |
| Mohaptra et al., [20] 2010 | 10/M Right maxilla | 51, S, 52 | Three fused teeth, pulp chambers; root canals of incisors are distinct, but indistinct for supernumerary | Missing 12 | Extraction (caries) |
| Shilpa and Nuvvula, 2012 (present case) | 5/M Left maxilla | 61, S, 62 | Three fused teeth, pulp chambers and root canals of incisors are distinct, but indistinct for supernumerary | Missing 22 | Follow-up |

NA: Not available; S: Supernumerary tooth; FDI: Foreign Direct Investments

Table 2: Proposed classification of triple tooth by Shilpa and Nuvvula

| Type | Description |
|------|-------------|
| Type I: Three pulp chambers and three root canals |
| Type Ia | Fusion of two normal teeth with a supernumerary tooth |
| Type Ib | Fusion of three normal teeth |
| Type II: Two pulp chambers and two root canals |
| Type IIa | Fusion of a geminated tooth with a supernumerary tooth |
| Type IIb | Fusion of a geminated tooth with a normal tooth |

tooth or abscess and two due to trauma). [5,6,8,10,16-20] Age of the children in whom tooth was extracted ranged from 2 to 10 years. Though it is prudent not to extract teeth in very young children due to proximity of root of the fused tooth to developing permanent tooth germ, it is important to determine whether the anomalous tooth is retarding the development of any permanent tooth. Continued and careful monitoring of each patient therefore is required to determine when to extract the tooth and the triple tooth should be extracted when mandatory and interim prosthetic replacement placed until the permanent tooth erupts. [5] Since the longitudinal grooves created by the fusion of three teeth are susceptible to caries, sealant therapy and fluoride application may be necessary. Rao has performed restoration and sealing of pits and fissures in her case. [15] In cases of periapical lesions, pulp therapy would pose difficulties due to internal complexity of root canal system and extraction and prosthetic rehabilitation becomes inevitable should an endodontic complication occur. [18]

Conclusions

Clinical and radiological features together should be carefully evaluated and exact description of triple tooth must be made. CT and histological studies would further help us to understand the etiopathologic factors. Classification of triple tooth would help us to follow a common terminology. Over-retention, infection and trauma could require excision of triple tooth though sometimes restorative treatment would suffice.
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