

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.^[5] 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.

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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

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Figure 2: Occlusal radiograph showing triple tooth in left maxillary incisor region with missing permanent lateral

reported till 1984 when Knapp and McMahon reported a case and reviewed briefly all the previous cases.^[2,5,8-11] Knapp and McMahon used the word “triple tooth” for the first time describing this anomaly in children and the case reported by Dhooria and Badhe^[6] was not included in his review. In archeological literature, Bennazi *et al.* has reported recently a case of triple teeth in a 5-year-old child discovered in a late medieval cemetery in Italy.^[13] Table 1 collates the cases described in literature till date.^[2,5-11,13-20]

Triple tooth is more prevalent in boys compared to girls (2:1, with data not available from four cases). Out of 31 cases including the presented case, demographic data is not available for the cases reported by Bennett, Ravn, Sprawson and Coyle.^[2,6,7,11] Ravn mentioned of one case with triple tooth in his epidemiological study, but the details of the case are not available.^[2] Age of the children ranged from 1 year 11 months to 10 years with mean age of 4.9 years. Maxillary triple teeth are more common (22 cases: right - 8, left - 13 and one case of fusion of left and right primary incisors and right lateral incisor) than mandibular (7 cases: right - 4, left - 3) by location.^[14] There is a preponderance of triple tooth on left side over right side (4:3) with only Shultz-Weidner reporting bilateral occurrence of maxillary triple tooth.^[18]

Available radiological data reveal separate pulp chambers and root canals in most of the cases and the radiological data for the cases reported in Chinese and Japanese literature is not available.^[14] Knapp and McMahon reported that the mesial and central elements of triple tooth had separate root canals with a shared portion of pulp chamber.^[5] Only one study with computerized tomography (CT) description of triple tooth that describes a single morphological pattern of three nearly separate crowns with separate pulp chambers and three joined roots with three connected root canals.^[16] Only three reports provided histological findings of triple teeth cases and Aguilo *et al.* reported that the histological findings were similar to the CT findings. Prabhakar *et al.* described fusion of enamel in the crown and cementum only in the root, but

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 tooth. Bennett, Kurihara and Mochizuki *et al.* described triple tooth as a fusion between three normal teeth.^[6,14] Rao had described her case as syndontia 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 geminated (double

Table 1: Cases of primary triple teeth reported in literature

Author/year	Age/sex of patient	Location	Teeth involved in triple tooth (FDI)	Radiological features of triple teeth	Associated radiological features	Treatment
Bennet, ^[6] 1887-1888	NA	Right maxilla	61, 62, 63	NA	NA	NA
Sprawson, ^[7] 1931	NA	NA	NA	NA	NA	NA
Fukushima, ^[14] 1932	3/M	Left mandible	71, 72, 73	NA	NA	NA
Coyler, ^[11] 1938	NA	NA	NA	NA	NA	NA
Long, ^[8] 1951	7/M	Left mandible	71, S, 72	Three separate pulp chambers	Missing 31	Extraction
Ohta and Kitamura, ^[14] 1952	8/F	Left maxilla	61, S, 62	NA	NA	NA
Munro <i>et al.</i> , ^[9] 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 <i>et al.</i> , ^[9] 1958	3/M	Left maxilla	61, S, 62	Three separate pulp chambers and root canals	Missing 12	NA
Burley <i>et al.</i> , ^[10] 1965	4 years 10 months/F	Left maxilla	61, 62, S	NA	Supernumerary 22	Extraction
Kurso <i>et al.</i> , ^[14] 1968	6 years 5 months/F	Left mandible	71, 72, 73	NA	NA	NA
Ravn ^[2] 1971	NA	NA	Two regular and one supernumerary	NA	NA	NA
Kurihara <i>et al.</i> , ^[14] 1974	4 years 8 months/F	Right mandible	81, 82, 83	NA	NA	NA
Kurihara <i>et al.</i> , ^[14] 1983	2 years 9 months/M	Right maxilla	51, S, 52	NA	NA	NA
Kurihara <i>et al.</i> , ^[14] 1983	4/M	Right mandible	81, S, 82	NA	NA	NA
Dhooria <i>et al.</i> , ^[6] 1983	10/M	Left maxilla	61, S, 62	Fusion at enamel and cementum	All permanent teeth present	Extraction (over-retained)
Kobayashi <i>et al.</i> , ^[14] 1984	1 year 11 months/M	Right maxilla	51, S, 52	NA	NA	NA
Knapp and McMahon, ^[5] 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 <i>et al.</i> , ^[14] 1987	6 years 4 months/F	Left maxilla	61, 62, S	NA	NA	NA
Trubmann <i>et al.</i> , ^[13] 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 <i>et al.</i> , ^[13] 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 <i>et al.</i> , ^[14] 1992	6 years 1 months/M	Right maxilla	51, S, 52	NA	NA	NA
Hatano <i>et al.</i> , ^[14] 1992	6 years 10 months/M	Left maxilla	61, S, 62	NA	NA	NA
Mochizuki <i>et al.</i> , ^[14] 1999	2/F	Maxilla	52, 51, 61	Three crowns, separate coronal pulp; single root	Incomplete data	NA

Contd...

Table 1: Contd...

Author/year	Age/sex of patient	Location	Teeth involved in triple tooth (FDI)	Radiological features of triple teeth	Associated radiological features	Treatment
Rao, ^[15] 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
Aguilo <i>et al.</i> , ^[16] 2001	3/F	Left maxilla	61, S, 62	Separate pulp chambers and root canals.	All permanent incisors present	Extraction (trauma)
Aguilo <i>et al.</i> , ^[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 <i>et al.</i> , ^[19] 2001	2 years 6 months/M	Left maxilla	61, 62, S2	Separate pulp chambers and root canals	Missing 22	Extraction (abscess)
Prabhakar <i>et al.</i> , ^[17] 2004	6/M	Right maxilla	51, S, 52	Root canals not distinct	NA	Extraction (trauma)
Schulz-Weidener <i>et al.</i> , ^[18] 2007	4/M	Bilateral maxilla	51, S, 52; 61, S, 62	Three separate crowns and pulp chambers	Normal permanent teeth	Extraction (abscess)
Mohapatra <i>et al.</i> , ^[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) tooth and a supernumerary tooth; or Type IIb, one geminated tooth (double tooth) and a normal tooth as in the case described by Trubman and Silberman.^[13] Based on clinical and radiological features, we can describe our present case as Type Ia, a case of fusion of two normally developed teeth with a supernumerary tooth.

Diagnosis of triple teeth is imperative as they can lead to delayed exfoliation and susceptibility to dental caries because of grooves dividing the crowns. In case of delayed exfoliation, extraction of these teeth is recommended to prevent malocclusion. As presented in Table 1, extractions were done in 10 cases (four cases each due to over-retained

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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