Triple and Double Teeth in the Same Quadrant: Report of a Rare Case with Literature Review

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Received Date: May 18, 2016, Accepted Date: June 03, 2016, Published Date: June 13, 2016.
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Abstract
Variations in normal tooth anatomy of primary teeth are rarely encountered during clinical practice. Occurrence of triple teeth (fusion among three teeth) and double teeth (fusion between two teeth) in the same quadrant of the patient is not reported so far. The aim of this paper is to report such a rare condition where both triple and double teeth occurred in the mandibular anterior region of the male patient. In addition the article briefly reviews the literature pertaining to this rare anomaly.

Keywords: Double Teeth; Fusion; Tooth Germ; Triple Tooth

Introduction
The term ‘fusion’ or syndontia means union of two separately developing tooth germs. It is also referred as double teeth, conjoined teeth, joined teeth, or dental twinning as described by various authors [1]. The prevalence of fusion in primary dentition varies from 1% to 5% as compared to permanent dentition (0.01% - 0.2%) [2]. It is more commonly encountered in anterior teeth with no gender predilection. Fusion anomaly reported more in mandible and unilateral compared to bilateral occurrence. It may be complete or incomplete, can be seen with supernumerary teeth or normal counterpart.

Fused teeth clinically present as a single enlarged tooth or joined (double) tooth in which the tooth count shows a missing tooth when the anomalous tooth is counted as one [1]. Triplet teeth or fusion is rarely encountered phenomenon. The present article reports occurrence of both triple and double teeth in same quadrant of a seven year old Indian male patient which is not reported till date in the literature.

Case Report
A seven-year-old boy reported to the Department of Pedodontics and Preventive Dentistry, College Of Dental Sciences, Davangere with the chief complaint of pain on the right upper back tooth region since two days. In medical history it was detected that he was born at 33 weeks gestation to a 30 year old mother and 37 year old father. The pregnancy and delivery was normal and his birth weight was approximately 3 kg. Past medical history given by the patient’s mother was non-significant and patient appeared to be well nourished with moderate height and built. He was well oriented to time, place and person. This was his first dental visit. The family history was non-contributory. The clinical extra oral examination did not show any different alteration. The intra oral examination revealed the patient was in primary dentition stage. Oral and dental structures had a normal pattern obeying the chronology of eruption. The child’s dentition revealed flush terminal molar relation bilaterally. A mid line diastema was also noted in maxilla. The main cause for the patient’s visit was deep occlusal caries involving enamel and dentin in 54. Apart from these, an unusual finding was seen in the lower anterior tooth region i.e. the presence of triple teeth (crowns of 81, 82 and 83 – Federation Dentaire Internationale (FDI) notation) as well as double teeth (crowns 71 and 72 - Federation Dentaire Internationale (FDI) notation) in the mandibular anterior region (Figure 1). There was a deep vertical groove at the union without caries or any other dental abnormalities (Figure 2 and 3). On enquiring the mother told that no other member of the family was affected with similar dental anomaly and that the family had never noticed that he had abnormality regarding mandibular anterior teeth. Intraoral periapical radiograph showed fusion of two primary incisors on left and three primary teeth on the right side (Figure 4). However these teeth had separate pulp chamber and root canals. Radiographically the erupting succedaneous central and lateral incisor and canine were normal. Based on clinical and radiographical findings, the

Figure 1: Intra oral photograph showing triple (yellow arrow) and double fusion (red arrow).

Figure 2: Grooves separating the triple fused teeth.
provisional diagnosis of fused triple and double teeth was made. Further treatment plan involved thorough oral prophylaxis and pulp therapy with relation to 54. Since the fused teeth were asymptomatic, recall examination was planned until exfoliation of triple teeth.

**Discussion**

Abnormalities in tooth size, shape, and structures are caused by disturbances during the morpho-differentiation stage of development [2]. Malformation under this category includes gemination, fusion and concrescence also known as twinned, connated, double, or triple teeth [3]. The term triple tooth is used to describe a rare dental abnormality in which three primary teeth appear to be joined which have been considered the result of fusion or gemination of teeth [4]. The first such case was reported by Bennett back in year of 1887 followed by Sprawson in year 1931. The study done by Ravn was the only study which gave the prevalence of triple tooth in primary teeth which is 0.02% [5].

Till date, there have been 31 such cases reported including the case presented (Table 1). All these cases involved in the fusion of two primary and a supernumerary tooth. Only nine cases involved, however, the fusion of three mandibular primary teeth, including the present case [1,7,9,10]. A ratio of 2:1 exists for prevalence of triple tooth in males and female where males are more commonly affected. Occurrence is more commonly seen in maxillary arch (21 out of 31 cases). Preponderance is seen for left side of the arch 15 out of 31 cases were seen on left side. For most of the case no treatment was done [5]. The case presented above is unique of its kind because the patient showed presence of both double as well as triple fusion in the same arch involving primary teeth. Cases of bilateral fusion are uncommon and frequency is reported to be 0.05% [6].

Reason for occurrence of fusion is controversial. Some says physical forces or pressure between adjacent tooth germs resulting in contact of the developing teeth result in fusion. According to other various factors like environmental influences, genetics, trauma, systemic disease, lack of vitamins, and lack of space in the dental arch are possible causes [2]. Yet other cause of fusion can be excess administration of vitamin A, viral infection during pregnancy, and the use of thalidomide by pregnant women have been documented to cause fused teeth. The embryological cause of fused teeth, however, has not been clarified [6]. As none of the above mentioned factor seems to be present in the present case, we assume the malformation might have occurred because the young tooth germs developed close to one another, and near the completion of the calcification of the crown, when the cells began to form the root, the tooth germ of the three incisors on one and two incisor on other side came in contact and fused.

Depending upon the stage of development of teeth at the time of union, fusion may be either complete or incomplete. If the contact occurs before the beginning of calcification, then the two teeth may be completely united to form a single large tooth, whereas late occurrence of contact when a portion of the tooth crown has completed its formation, lead to union of the roots only [3]. In the above presented case 71 and 72 as well as 81, 82 and 83 appears to united completely. Though a vertical groove was present between 83 and 81, 82; the radiograph showed presence of a large completely fused tooth. This indicates that in this case the contact between the germs might have taken place before beginning of calcification.

Clinically, a geminated and fused tooth looks similar. However fusion can be differentiated from gemination by reduced number of teeth in the dental arch if the fused tooth is considered as one large tooth. But this does not hold true if there is a fusion between a normal tooth and supernumerary tooth [2]. However no supernumerary tooth was involved, in the case presented here. This can be confirmed as the shape of the fused tooth was that of the primary incisors, not the cone shape indicative of a supernumerary tooth, thus. All three teeth are believed to be primary incisors including canine on the right side and two incisors on the left side.

In cases of fusion in primary teeth, the permanent dentition may be: normal, presence of supernumeries and repetition of fusion in permanent teeth would be seen [7]. Therefore when detected, the progression of eruption of permanent teeth should be monitored closely by careful clinical and radiographic observation [8]. The radiographic evaluation of above mentioned case revealed that the permanent right mandibular lateral incisor i.e. 42 is missing. Apart from this no other abnormal findings were noticed.

Triple or double teeth are usually asymptomatic. However they may create problems like an unpleasant aesthetic tooth shape due to the irregular morphology [6], crowding, abnormal spacing (because of their abnormal morphology and excessive mesiodistal width) and delayed or ectopic eruption of underlying permanent teeth [5] and periodontal conditions [3]. If the tooth is free from caries, for instance, it may require no special treatment.
| S. No | Authors/Year reported | Age (years)/ sex | Location and teeth | Radiographic features | Treatment done | Different races studied |
|-------|-----------------------|------------------|--------------------|-----------------------|----------------|------------------------|
| 1.    | Bennett, 1887-1888 [5] | NA               | Maxillary left central, lateral incisor and canine | NA | NA | NA |
| 2.    | Fukushima, 1932 [9]    | 3/M              | Mandibular left central incisor lateral incisor, canine | NA | NA | Japanese |
| 3.    | Long, 1951 [10]        | 7/M              | Mandibular left central, lateral incisor and supernumerary tooth | Three separate pulp chamber of fused teeth with 31 missing | Extraction | NA |
| 4.    | Ohta, et al., 1952 [9] | 8/F              | Maxillary left central incisor, supernumerary, lateral incisor | Fused crowns and roots, with distinct pulp and root canals Presence of all permanent teeth | NA | NA | Japanese |
| 5.    | Munro et al., 1958 [11]| 4/M              | Maxillary left central and lateral incisor and supernumerary tooth | Three separate pulp chambers and root canals Missing 12 | NA | NA |
| 6.    | Munro et al., 1958 [11]| 3/M              | Maxillary left central and lateral incisor and supernumerary tooth | Supernumerary 22 | Extraction | NA |
| 7.    | Burley, et al., 1965 [12]| 4.10/F         | Mandibular left central incisor and supernumerary tooth | NA | NA | Japanese |
| 8.    | Kurosu, et al., 1968 [9]| 6.5/F            | Mandibular left central incisor, lateral incisor canine | NA | NA | Japanese |
| 9.    | Ravn, 1971 [13]        | NA               | Two regular and one supernumerary tooth | Japanese |
| 10.   | Kurihara et al., 1974 [9]| 4.8/F        | Mandibular right central incisor, lateral incisor canine | NA | NA | Japanese |
| 11.   | Kurihara, et al., 1983 [9]| 2.9/M        | Mandibular right central incisor, supernumerary, lateral incisor | NA | NA | Japanese |
| 12.   | Kurihara, et al., 1983 [9]| 4/M          | Mandibular right central incisor, supernumerary, lateral incisor | NA | NA | Japanese |
| 13.   | Kobayashi, et al., 1984 [9]| 1.11/M        | Maxillary right central incisor, supernumerary, lateral incisor | NA | NA | Japanese |
| 14.   | Sawaguchi, et al., 1987 [9]| 6.4/F         | Maxillary left central incisor, lateral incisor, supernumerary | NA | NA | Japanese |
| 15.   | Trubman, et al., 1988 [14]| 3/M         | Mandibular right central incisor, supernumerary, lateral incisor | 81 with two crowns, single root canal 82 with single crown and root canal | NA | Black |
| 16.   | Trubman, et al., 1988 [14]| 6/M         | Mandibular right central incisor, supernumerary, lateral incisor | 81 with two crowns, single root canal 82 with single crown and root canal | NA | Caucasian |
| 17.   | Hatano, et al., 1992 [9]| 6.1/M        | Maxillary right central incisor, supernumerary, lateral incisor | NA | NA | Japanese |
| 18.   | Hatano, et al., 1992 [9]| 6.1/M        | Maxillary left central incisor, supernumerary, lateral incisor | NA | NA | Japanese |
| 19.   | Mochizuki, et al., 1998 [9]| 2.8/F        | Bilateral maxillary central incisor, right lateral incisor | Three crowns, separate coronal pulp; single root | NA | Japanese |
| 20.   | Rao, 2000 [15]        | 6/F             | Maxillary left central, lateral incisor and supernumerary teeth | Incomplete fusion of crown with separate pulp chamber and canal with missing 22 | Restoration of caries, pit and fissure sealent | NA |
| 21.   | Aguilo, et al., 2001 [16]| 3/F           | Maxillary left central, lateral incisor and supernumerary teeth | Separate pulp chambers and root canals All permanent incisors present | Extraction (trauma) | NA |
| 22.   | Aguilo, et al., 2001 [16]| 2/M           | Maxillary right central, lateral incisor and supernumerary teeth | Separate pulp chambers and root canals CT: Separate crowns and pulp chambers Joint roots and canals Missing 12 | Extraction (abscess) | NA |
In this patient the teeth were neither carious nor the groove was deep, therefore no treatment was needed. The root of the fused teeth and the tooth germ of the permanent teeth are close, and thus extraction is not the option. Considering all factors no treatment was done. In future continued and careful monitoring of the patient along with, the physiological resorption of roots and the exchange process with permanent teeth will be carefully followed.

Table 1: Summaries of the reported cases of the triple teeth fusion. (NA: Not Applicable; M: Male; F: Female)

| Case Reference | Sex/Age | Diagnosis | Treatment | Follow-up |
|----------------|---------|-----------|-----------|-----------|
| Babaji, et al., 2012 [2] | 6/M | Mandibular right central, lateral and supernumerary teeth with fusion of mandibular central and lateral teeth | Separate pulp chamber and root canal with absence of 41 | Follow-up NA |
| Sharma, et al., 2013 [19] | 7/M | Maxillary left central, lateral incisor and supernumerary teeth | NA | Extraction (caries) NA |
| Yadav, et al., 2013 [20] | 10/M | Maxillary right central, lateral incisor and supernumerary teeth | Missing 22 | Extraction (caries) NA |
| Nagaveni, et al., 2015 [Present case] | 7/M | Mandibular right central, lateral incisors and canine with fusion of mandibular left central and lateral incisor | Missing 42 | Follow up NA |

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