

Synodontia between Permanent Maxillary Lateral Incisor and A Supernumerary Tooth: Surgical Treatment Perspective

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ABSTRACT

Synodontia or fusion is union of two independently developing primary or secondary teeth. In the case reported here, clinical and radiographic examination suggested fusion between maxillary lateral incisor and a supernumerary tooth with the resultant loss of eruption space for permanent canine. Since the teeth exhibited separate pulp chambers without any pulpal involvement, surgical separation followed by odontoplasty was done. Follow-up revealed the tooth to be asymptomatic and sufficient space for eruption of canine was created. The case report highlights the surgical management in case of fusion and timely intervention to prevent periodontal, endodontic and orthodontic complications.

Keywords: Fusion, supernumerary, surgical separation.

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The anomaly of conjoined teeth has been described under a variety of names. ‘Connate’ was one of the first introduced terminologies by Tomes (1859). Later, De Jonge (1955) proposed the terms ‘Schizodontia’ to describe teeth, which originate by partial division of dental anlage and ‘Synodontia’ for those formed by the inability of adjacent tooth germs to retain their individuality. Although the term double teeth, suggested by Miles (1954) seems to be more widely accepted and is more appropriate if the etiology is not known.

Tooth fusion is defined as union between the dentin and/ or enamel of two or more separate developing teeth.(1,2) The fusion may be partial or total depending upon the stage of tooth development at the time of union, a distinguishing feature between fusio-totalis, partialis-coronaries and partialis-radicularis.(3,4) If the contact occurs before the calcification stage, the teeth unite completely and form one large tooth. Incomplete fusion may be at root level if the contact and union occurs after formation of crown. Prevalence of tooth fusion is estimated as 0.5-2.5% in the primary dentition with a lower prevalence in permanent dentition.(3) The etiology of fusion is still an enigma and many different views have been put forward. Shafer *et al*(5) speculated that pressure produced by some physical force prolongs the contact of the developing teeth causing fusion. Lowell and Soloman(6) believe that fused teeth result from some physical action that causes the young

tooth germs to come into contact, thus producing necrosis of the intervening tissue, thus allowing the enamel organ and dental papilla to fuse together. Many authors have also suggested hereditary involvement as an autosomal dominant trait with reduced penetrance.(7) Fusion may be unilateral or bilateral and most commonly occurs in primary teeth with more predilection for anterior teeth.(8) Fusion may occur between two normal teeth or between a normal tooth and a supernumerary tooth. Clinically fused anterior teeth frequently have a groove or notch on the incisal edge that goes in buccolingual direction and radiographically, the dentin of fused teeth always appears to be joined in some region with separate pulp chambers and canals.

Supernumerary teeth develop as a consequence of proliferation of epithelial cells from dental lamina with the incidence ranging from 0.5 to 3.8% and maxillary anterior region in males being more affected.(9)

This case report describes the comprehensive surgical therapy of a patient with unilateral fusion of left permanent maxillary lateral incisor and a supernumerary tooth.

Case Report

An 11-year old girl reported to the Department of Pedodontics and Preventive Dentistry, Govt. Dental College, Rohtak with



Fig. 1: Clinical presentation of the patient with fused left maxillary lateral incisor and supernumerary teeth

a complaint of abnormally shaped upper front teeth. The patient had a non-significant medical history and no case of fusion was reported in the family. Intra-oral examination of the patient exhibited normal age specific dentition with class I occlusion.



Fig. 2: Intraoral periapical radiograph showing the extent of fusion

A supernumerary tooth was present in the region of left lateral incisor and appeared to be fused to it (Fig. 1). Facial and lingual aspects of both lateral incisor and supernumerary teeth were found to be caries free. No discomfort was present on vertical and horizontal percussion or on palpation in the surrounding area. Thermal and electric pulp testing was done on left lateral incisor, right lateral incisor, mandibular lateral incisor and on supernumerary teeth. Intra-oral periapical radiograph showed that fusion between maxillary left lateral incisor and supernumerary teeth was beyond the level of crown but the exact level of fusion could not be clearly demarcated. Radiograph also revealed the blocking out of permanent canine by the supernumerary tooth (Fig. 2).

Treatment was recommended in order to prevent periodontal disease, development of dental caries, to improve the esthetic status of the patient and to provide a normal eruptive pathway for canine. Initially the fused teeth were separated in the coronal level using long, thin diamond bur. After this, an elevator was used to try and separate the supernumerary tooth from the lateral incisor. However, this was not successful thus indicating the level of attachment much below the anticipated level, it was then decided to separate the fused teeth by raising a full thickness periodontal flap.

The treatment plan was explained to her family and with their consent; the periodontal flap was raised after anaesthetizing the area. Roots of the fused teeth were separated using a thin tapering diamond bur (Fig. 3) and Glass Ionomer cement was placed in the defect seen on the root of the lateral incisor after sectioning (Fig. 4). Odontoplasty was performed on this root to establish an anatomy consistent with a normal lateral incisor. The periodontal flap was then replaced and sutured (Fig.5). Patient was called for observation after one week and the sutures were removed. Esthetic rehabilitation of the lateral incisor of the patient was done after one month (Fig. 6). Patient



Fig. 3: Raised periodontal flap with the visible defect seen in the root of lateral incisor after separation of fused teeth



Fig. 4: Restoring of the defect by GIC

is on recall appointments and the tooth is asymptomatic without any pathological root resorption or any sign of pathosis of periapical tissues. Postoperative radiograph exhibits normal periodontal and periapical tissues with sufficient space for the eruption of canine (Fig. 7).

Discussion

Fusion is often confused with the process of gemination. Gemination occurs when, during the proliferative stage of dental development, a single tooth germ attempts to divide by invagination. These two can be differentiated by the below parameters:(10)

- **Morphology:** gemination results in mirror images of the coronal halves, whereas fusion takes place at an angle causing a crooked appearance.
- **Anatomy:** pulpal anatomy is very useful in diagnosing the type of double teeth. Fused teeth would mostly have separate pulp chamber and root canals while geminated teeth usually have one big pulp canal.



Fig. 5: Post-surgical suture placement



Fig. 6: Completely healed tissues and esthetically rehabilitated postoperative photograph of the patient

- **Location by jaw:** fusion is common in mandible and gemination in maxilla but fusion between supernumerary and normal tooth is more common in maxilla.



Fig. 6: Completely healed tissues and esthetically rehabilitated postoperative photograph of the patient

- **Crowding:** fused teeth would more often cause ectopic eruption and geminated teeth would cause more of crowding. However, when a normal tooth is fused with a supernumerary tooth, crowding and even impaction of other teeth may result. So this factor is not a good diagnostic feature.
- **Number of teeth:** fusion is counted as one tooth and thus diminishes the number of teeth whereas number is increased in gemination. According to Mader, the 'two tooth rule' may be helpful in differentiating fusion from gemination. If the resulting dental structure is counted as two teeth and the normal number of teeth are present in the region, the case probably represents an example of fusion. If, however, the abnormal dental structure is counted as two teeth and if an extra tooth is present in the region, then the case may represent an example of gemination or fusion between a normal and a supernumerary tooth.

All the above factors like the angled appearance of teeth, its pulpal anatomy having two distinct root canals and according to the rule of two along with the radiographic findings confirmed the diagnosis of fusion between maxillary lateral incisor and a supernumerary tooth.

Several different approaches for the treatment of these abnormalities are available, but the morphology of fused teeth varies so greatly that one can only decide on individual basis. Various methods include selective grinding, surgical separation or extraction followed by prosthesis. Surgical separation has been successfully reported in past by many authors. (11-14) Stillwell and Coke (12) suggested separating the fused teeth when they were retained in the mouth after esthetic restoration was done. Clem and Natkin (13) recommended the removal of one part of fused teeth due to esthetic, periodontal and orthodontic problems. In a case reported by Oncag *et al* (14) where fusion between mandibular lateral incisor and a supernumerary tooth was present, they separated the teeth and endodontically restored it. In our case the level of fusion, separate pulp canals of fused teeth, vitality of tooth, availability of space for eruption of canine and esthetics were achievable so we decided to go for surgical separation.

It has been found that the sequel of such teeth may result in delayed eruption, ectopic eruption or even impaction of permanent teeth; hence the proper diagnosis by clinical and radiographic methods and intervention at appropriate time is of paramount importance.

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