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Esthetic Management of Inverted Mesiodens and Fractured Central Incisor - A Rare Case Report

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I. Introduction:

The term of mesiodens refers to a supernumerary tooth present in the midline of the maxilla between the two central incisors (1-3). It is clinically the most frequent of all supernumerary teeth (4-5). The etiology of mesiodens remains unknown, but many hypotheses have been reported such as atavism, dichotomy of the tooth bud and hyperactivity of the dental lamina. However the hyperactivity theory which states that supernumerary teeth are derived from independent local hyperactivity of the dental lamina has been more adopted (3-4, 6-7). Genetics are also thought to contribute to the development of mesiodens (4). Mesiodens can occur singly or multiply, and is responsible for disturbances in the eruption of maxillary incisor teeth (1-3). Most mesiodens never erupt and usually found to be impacted, with a conical crown and a single root, and often in an inverted position (8-9). When they do erupt, the most common site is behind the central incisors within the premaxilla (3). Inversion has been defined as 'the malposition of a tooth in which the tooth has reversed and is positioned upside down' (10). Inverted teeth have been reported in both maxilla and mandible, and most of them are inverted impacted third molars and premolars (11). Although inverted impacted teeth may remain in position for years without clinical manifestations and may be detected in radiographic examinations incidentally, many complications including delayed or ectopic eruption, crowding, diastema, eruption into the nasal floor, resorption of the adjacent root and development of a dentigerous or primordial cysts (10). However, very few cases of intraoral ectopic inverted tooth eruption have been reported (12).

Although in most cases it is unerupted, its presence may cause some clinical problems, especially in the stages of the primary and early mixed dentitions. Most common complications associated with mesiodens are abnormal central diastema, delayed or prevention of eruption and abnormal tooth eruption (1-2, 4, 7). Especially in the childhood these complications may cause phonation and esthetic problems. Also Alacam et al. reported that mesiodens can be a risk factor in treatment of trauma cases because of the predisposing factors of dental trauma such as open bite increasing overjet with protrusion of upper incisors and insufficient lip closure (6). Anterior maxillary supernumerary teeth are of great concern in young patients for both the dentist and the parents because of delayed eruption, occlusal and masticatory problems, and for esthetic reasons. Mesiodens or supernumerary tooth also may cause dilaceration of permanent teeth, crowding, cyst formation, root resorption, abnormal occlusion and eruption into the nasal cavity. Early diagnosis and treatment are required to prevent complications and orthodontic requirement. Parents must be careful about the asymmetric eruption of the teeth.

Modern Dentistry is based on two directions: prevention and aesthetics. Introducing new materials and improved technologies in dental practice has created new opportunities to attain these two goals. Furthermore, the rising popularity of dental aesthetics leads to a metal-free prosthetics trend [13, 14]. The crowns of the anterior teeth in young people and senior citizens as well, are often affected by cavities, color changes, extended filings, fractures or abrasion [15]. These teeth also require endodontic treatments in most cases [16], ultimately being covered with protective crowns that will give them back the natural shape of the teeth and their function [17]. In severe coronary destruction clinical case, with minimum dental substance remaining above the gum, a reconstruction with pre-made root pivots is recommended, followed by the later reconstruction of the crown [18]. For years metal pre-made root pivots were used, which involve major disadvantages: unaesthetic corrosion due to the fact that they shadow the gum borderline and sometimes even the crown itself, and cause allergies. Alternatives to metal pivots are the aesthetic ones [19].

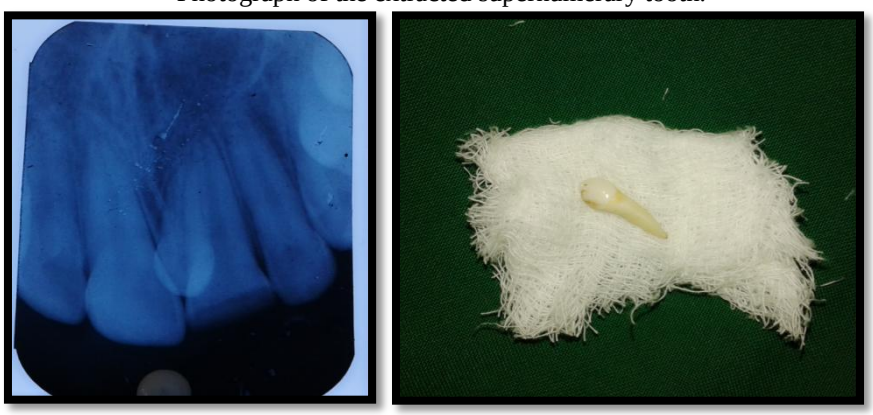
Reported here is a unique case of a mesiodens which inverted erupted in the middle of the hard palate with broken anterior tooth.

II. Case Report:

An 18-year-old male reported to the Department of Conservative dentistry and Endodontics, Guru Nanak Institute of Dental Science and Research, Kolkata- 700114, with the chief complaint of broken tooth of upper front region of mouth associated with a history of trauma 6 months ago and an intraoral eruption of a tooth in the midpalatal region (Figure 1). The family medical and dental histories were noncontributory. No abnormalities in general growth and development were noted. Clinical examination revealed that the fractured tooth (11) was non-vital and an inverted eruption of a supernumerary tooth in the middle of the hard palate. Radiography was recommended for diagnosis. An occlusal view of the maxilla revealed the presence of an inverted 'mesiodens' supernumerary tooth at the middle of the hard palate (Figure 2). Extraction of the supernumerary tooth was planned. Using a local anesthetic, the supernumerary was extracted without any complication (Figure 3)

Figure 1: Intraoral view of the supernumerary tooth in the mid- palate.

Figure 2 and Figure 3: Radiograph showing presence of a well developed inverted supernumerary tooth and Photograph of the extracted supernumerary tooth.



The tooth (11) was isolated with rubber dam and access cavity was prepared with round bur (Fig 4). Root canal orifice was spotted at the floor of the pulp chamber. One no. # 15 K file was inserted into the canal and radiograph was taken. Working length (19mm) was established radiographically and biomechanical preparation was performed using crown-down technique with rotary Protaper Universal files and the canal was enlarged upto # F5. Sodium hypochlorite (2.5%) and normal saline were alternatively used as irrigants at every change of instruments. The canal was dried with sterile paper points and obturation of the root canal was under taken with laterally condensed gutta-percha using lateral condensation technique (Fig 5). Post obturation radiograph was taken and the access cavity was sealed with Zinc oxide eugenol.

Post space was prepared with size no.4 (1.3mm) peeso reamer supplied by manufacturer (Fig 6). Fiber optic post of sizes number 2 with its diameter 1.06 was selected. The prepared space was cleaned with normal saline, air dried and dentin bonding agent was applied with help of an applicator tip and cured for 20 seconds. After that the esthetic fiber optic post is etched and dentin bonding agent was applied with help of an applicator tip and cured for 20 seconds. Dual cure flowable composite resin cement was inserted into the post space after which the fibre post was inserted. The fiber post and composite were cured together for 60 seconds (Fig 7). The excess coronal portion of the fiber post was cut with the help of a diamond bur. Final finishing and polishing was done with finishing burs and crown preparation for porcelain fused metal crown was done (Fig 8). The crown was finally cemented with tooth using GIC luting cement (Fig 9).

Figure 4: Access cavity was prepared in irt 11

Figure 5: Obturation of the root canal was under taken with laterally condensed gutta-percha using lateral condensation technique.

Figure 6: Post space was prepared with size no.4 (1.3mm) peeso reamer.

Figure 7: Fiber optic post was inserted into the post space and the core was build up with composite resin.

Figure 8: Crown preparation for porcelain fused metal crown was done.

Figure 9: The crown was finally cemented with tooth using GIC luting cement.

III. Discussion:

Most mesiodentes are impacted but eruption occurs in approximately 25% of the cases. Unilateral mesiodons may erupt into a position towards the midline or remain palatal to the incisors (20). Eruption is a continuous movement of a tooth from its developmental location to its functional position. Localized disturbances include primary impaction, ankylosis, and malpositioning of teeth (21). Mesiodens directions are divided into 3 groups as 'normal direction, inverted and horizontal'. In most previous reports the most common direction of mesiodens was inverted (2,7,22) and in most cases it was totally impacted (4). An inverted tooth is rather uncommon. The inversion of supplemental or supernumerary teeth (e.g. mesiodens) is somewhat more likely (13,23-24). Inverted impaction has been observed for incisors (25), canines (26), premolars and molars . Eruption of inverted teeth is extremely rare, but has been described for incisors and premolars . Inverted eruption may be observed as the appearance of the root apex in the alveolar arch or the perforation of the crown through the inferior cortical plate of the mandible (14). Based on this review of the literature, it is evident that the occurrence of an inverted and downward erupting mesiodens, as noted in the present case report, is extremely rare (12). This case is unusual in several respects. First, the supernumeraries are rarely seen in the palatal region (14). In fact, there are few reports of a supernumerary tooth in this area. Secondly, eruption of inverted mesiodens is a very rare phenomenon with only a few cases reported in literature.

Although in most cases it is unerupted, its presence may cause some clinical problems, especially in the stages of the primary and early mixed dentitions. Most commoncomplications associated with mesiodens are abnormal central diastema, delayed or prevention of eruption and abnormal tooth eruption (1-2,4,7. Especially in the childhood these complications may cause phonation and esthetic problems. Also Alacam et al. reported that mesiodentes can be a risk factor in treatment of trauma cases because of the predisposing factors of dental trauma such as open bite increasing overjet with protrusion of upper incisors and insufficient lip closure (6). Anterior maxillary supernumerary teeth are of great concern in young patients for both the dentist and the parents because of delayed eruption, occlusal and masticatory problems, and for esthetic reasons. Mesiodens or supernumerary tooth also may cause dilaceration of permanent teeth, crowding, cyst formation, root resorption, abnormal occlusion and eruption into the nasal cavity (1-2,4,7). Early diagnosis and treatment are required to prevent complications and orthodontic requirement. Parents must be careful about the asymmetric eruption of the teeth.

Teeth that have been endodontically treated often have little coronal tooth tissue remaining and as such require a post to retain the core and restoration. It was thought that the dentin in endodontically treated was more brittle because of water loss and loss of collagen cross linking. Huang et al. compared the physical and mechanical properties of dentin specimens from teeth with and without endodontic treatment at different levels of hydration. They concluded that neither dehydration nor endodontic treatment caused degradation of the physical or mechanical properties of dentin. These and other studies support the interpretation that it is the loss of structural integrity associate with access preparation, that lead to a higher occurrence of fractures in endodontically treated teeth compared with "vital" teeth. Access preparation results in increased cuspal deflection during function and increase the possibility of cusp fracture and micro leakage at the margins of restoration. Currently composite resin is most popular core material and has characteristics of an ideal buildup material. It has high tensile strength, high fatigue resistance to occlusal and the tooth can be prepared for a crown immediately after polymerization. Some authors showed that composite cores have fracture resistance comparable to amalgam and cast posts and cores. It is tooth colored and can be used under translucent restorations without affecting the esthetic results.

IV. Conclusion:

Supernumerary teeth should be extracted immediately if any of the above cited complications are present. In this reported case, the supernumerary teeth were removed for esthetic reasons, phonation and nutrition problems.

Aesthetic requirement of severely mutilated teeth has always been a challenge for a dentist. If certain basic principles are followed in restoration of endodontically treated teeth, it is possible to achieve high levels of clinical success with. Therefore, restoration of teeth after endodontic treatment is becoming an integral part of restorative dentistry. The treatment described in case report is simple and effective and represents a promising alternative for rehabilitation of grossly destructed or fractured teeth.

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