Management of Complicated Crown Fracture and Associated Palatally Placed Impacted and Inverted Mesiodens

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ABSTRACT
Teeth may vary in size shape and number. Mesiodens being the most common type of supernumerary tooth, seen in between two maxillary central incisors, usually results in malocclusion, poor esthetics and cyst formation if it is not corrected. The management protocol involves surgical removal. The situation can be complicated in young permanent dentition where there are a lot of chances of damage to the permanent dentition during surgical removal of impacted teeth. This article reports a case of palatally placed impacted and inverted mesiodens which was diagnosed during management of complicated crown fracture. The case was followed up to 3 years which showed a good bone formation.

Keywords: Fracture, Impacted, Mesiodens, Supernumerary tooth, Surgery.

INTRODUCTION
In Dentistry, we come across numerous anomalies. Some anomalies, which are erupted in the oral cavity, may be detected through routine checkup. However, some may remain impacted within the bone without causing signs and symptoms. The detection of such anomalies will come to picture only while diagnosing some other problems. Supernumerary teeth are relatively common disorder of odontogenesis characterized by excess number of teeth, with mesiodens being the most frequent.1 The most commonly occurring supernumerary tooth is “mesiodens,” this term is used to refer to an unerupted supernumerary tooth in the central region of the premaxilla between the two central incisors. This is due to complex interaction of genetic and environmental factors. It is one of the most significant dental anomalies during the primary and early mixed dentition.2,3

A mesiodens is a supernumerary tooth located in the maxillary central incisor region, and the overall prevalence of mesiodentes is between 0.15 and 1.9%.4 Mesiodens can occur individually or as multiples (mesiodentes), may appear unilaterally or bilaterally, and often do not erupt. The incidence of occurrence of mesiodens in Indian population was estimated to range from 0 to 1.4%.3 A review by Meighani and Pakdaman4 in 2010 found that the prevalence of mesiodens in various studies from 1932 to 2008 is between 0.09 and 2.05%.

Many complications can be associated with supernumeraries, such as impaction, delayed eruption or ectopic eruption of adjacent teeth, crowding, development of median diastema, and eruption into the floor of the nasal cavity. This may also cause formation of follicular cysts with significant bone destruction and root resorption of the permanent incisors. When any of the above complication occurs or is anticipated, surgical removal of impacted teeth is indicated. The etiology of supernumerary teeth is considered to be multifactorial comprising of environmental and genetic components. Hyperactivity of the dental lamina is the result of an environmental influence. Autosomal dominant inheritance with incomplete penetration has been the proposed genetic theory. A sex-linked pattern has also been proposed as males are affected thrice as frequently as females.5,6 This article presents the clinical management of a complicated crown fracture associated with an inverted and impacted supernumerary tooth.

Custom post and core gives us the advantage to change the alignment of the long axis of the tooth and bring it to an acceptable position so as to give a pleasing esthetic pleasing appearance and maximum preservation of natural tooth structure.7-10
CASE REPORT

A 20-year-old male patient reported to the department of conservative dentistry and endodontics with chief complaint of fractured upper front tooth. There was a history of trauma to the same tooth about 3 years back. Medical history was noncontributory. Intraoral examination revealed complicated crown fracture in maxillary left permanent central incisor which is labially displaced. On clinical examination, Ellis’s class IV fracture was found in relation to #21 (Figs 1A and B). Radiographic examination revealed a radiolucent periapical lesion with respect to maxillary left central incisor (tooth #21). Surprisingly there was small tooth like structure (mesiodens) found close to the apex of 21 (Figs 2A and B). With parallax technique, horizontal tube shift technique, the buccolingual position of the unerupted mesiodens was evaluated. To know the proper position of this tooth, a same lingual opposite buccal (SLOB) rule was used which revealed that tooth was placed palatally (Figs 2A and B). Endodontic therapy in the maxillary left central incisor and surgical extraction of an impacted mesiodens was planned. To change the angulation of the crown, custom cast post and core was planned followed by porcelain-fused metal (PFM) crown. As mesiodens was placed palatally, palatal approach was used for its removal. After achieving complete local anesthesia, palatal crevicular incision was placed from right maxillary canine to left maxillary canine and mucoperiosteal flap was raised exposing the bulge of the inverted supernumerary tooth present at the apex of right maxillary central incisor. Bone was removed until the crown of the mesiodens was exposed (Figs 3A and B). Mesiodens was extracted (Fig. 4) and postextraction hemostasis was ensured. Silk sutures were placed and postoperative instructions explained. Antibiotics and analgesic medication was prescribed 1 week postoperatively. Patient was recalled after 1 week and sutures were removed. Satisfactory healing of the extraction wounds was noted. Patient was recalled at interval of 1 month. After complete healing of the operated area, endodontic treatment was completed (Figs 5A and B).

Figs 1A and B: (A) Clinical photograph showing fractured left central incisor labially displaced (front view); and (B) fractured left central incisor (palatal view)

Figs 2A and B: (A) Intraoral peri-apical radiograph showing inverted, impacted mesiodens i.r.t. #21; and (B) IOPAR with “horizontal tube shift technique”
Management of Complicated Crown Fracture and Associated Palatally Placed Impacted and Inverted Mesiodens

Post space was prepared (Fig. 5C) and coronal preparation was done and then wax impression was taken. A post and core wax pattern was build up using blue inlay wax (Fig. 6). Post and core wax pattern was then sent to laboratory for casting procedures. After the fabrication, cast post and core was cemented inside the canal space with zinc phosphate cement. The metal core was shaped so that it resembles a prepared tooth (Figs 7A and B). After cementation, an impression was taken for the fabrication of the PFM crown. Porcelain-fused metal crown was then cemented over the metal core (Figs 8A and B).

DISCUSSION

Morphologically, the mesiodens appears as a rudimentary tooth, with a cone-shaped crown, smooth surface, and smaller size than the normal teeth. Sometimes it may present with a tuberculate shape or a normal size or may be found to mimic a natural tooth. The mesiodens is most frequently found between the upper central incisors, in particular on the palatine side, along the sagittal medial plane, which gives it its name. Mesiodens is more common in permanent teeth than in the primary dentition. The direction of eruption of a mesiodens can be divided into three groups, viz., normal, inverted, or horizontal direction. The most common management of
impacted mesiodens is surgical removal of the impacted tooth. In the present case, impacted mesiodens was surgically removed and a regular follow-up was done. The increased frequency of mesiodens among developmental anomalies and its deleterious effects on normal function, sometimes their asymptomatic nature when they are impacted, emphasize the importance of radiographic examination of all children. Early diagnosis assists early intervention, more favorable prognosis, and minimal complications. The present case is unique in several aspects. First, the occurrence of mesiodens is very rare in the mid-palatal region. The mesiodens was very small in size with conical in shape. Depending upon their location, several terms have been used to describe the supernumerary teeth. A supernumerary tooth in the maxillary anterior region is termed as the “mesiodens,” and an accessory fourth molar is often called a “distomolar” or “distodens.” A posterior supernumerary tooth situated lingually or buccally to a molar tooth is termed a “paramolar.” Multiple supernumerary teeth are frequently associated with various craniofacial anomalies, including cleft lip and palate, Gardner’s syndrome, and cleidocranial dysostosis.3-5

Inverted teeth have been reported in both maxilla and mandible, and most of them are inverted impacted 3rd molars and premolars. In the present case, supernumerary tooth in the anterior maxilla between central and

![Fig. 6: Wax impression post and core](image)

Figs 7A and B: (A) Clinical photograph showing custom cast post and core cemented; and (B) IOPAR after post cementation

Figs 8A and B: (A) Pretreatment photograph; and (B) after porcelain-fused metal crown cementation (posttreatment photograph)
lateral incisors was noticed, which is very rare. Although inverted impacted teeth may remain in position for years without clinical manifestation 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 are associated with it.4,5

It is possible that a mesiodens is found during a routine radiographic checkup without significant effect on the adjacent teeth. Panoramic, maxillary occlusal, and periapical radiographs are indicated to assist in the diagnosis of mesiodens. The identification of the location (palatal or labial, superior or inferior) of the impacted supernumerary teeth and its relation with the adjacent structures help to formulate an appropriate treatment plan.5,6 In this present case, with parallax technique and horizontal tube shift technique, the buccolingual position of the unerupted mesiodens was evaluated. Same lingual opposite buccal rule was used which revealed that tooth was placed palatally (Figs 2A and B). So palatal surgical approach was used to remove this inverted mesiodens (Figs 3A and B).

Complicated and uncomplicated crown fracture is the most common injury to the permanent teeth. Crown fracture with pulp exposure represents 0.9 to 13% of all traumatic injuries to the teeth. The important part in determining the prognosis of the tooth with pulp exposure is minimizing the bacterial invasion to the pulp. However, providing a hermetic seal once the removal of the infected pulp tissue is done is critical in the prognosis.7 In the present case, Ellis’s class IV fracture was found. Ellis’s class IV fracture is defined as the traumatized teeth that become nonvital with or without loss of crown structure. The maxillary incisors are the most frequently injured teeth in the primary and permanent dentition. Since the patient had not reported any dentist and the tooth left untreated, tooth become necrotic and infected. Root canal therapy was initiated. Access to the root canal was created and calcium hydroxide dressing was placed in the root canal for 2 weeks. After complete disinfection of the canal, root canal was then obturated with Gutta-percha.

As in our patient, maxillary left central incisor was labially displaced, to change the angulation of the crown custom cast post and core was given (Figs 7A and B). In the present case, the prime reason for using custom cast post and core was to change the orientation of the crown. A cast post and core is usually indicated when a tooth is misaligned and the core must be angled in relation to the post to achieve proper alignment with the adjacent teeth. Perhaps the biggest disadvantage for cast post and cores is in areas that require an esthetic temporary restoration. Satisfactory result obtained both functionally and esthetically bought to forefront the benefits of cast post and core. Conventional custom post and core technique is still advantageous against newer materials in case of altering the alignment of tooth. Its disadvantages are high level of precision and occurrences of casting failure.8-10 Custom-fabricated, cast post and cores are still regarded as the established technique or gold standard for restoring extensively damaged teeth (Figs 8A and B). In the present scenario, the patient was addressed due to trauma and impacted mesiodens was accidentally determined with the help of radiograph and managed appropriately.

CONCLUSION
This case report highlights the need for regular follow-up following any surgical procedure in young permanent dentition. Mesiodens is not a rare phenomenon, but inverted mesiodens that was diagnosed following trauma to the permanent teeth and the follow-up period of 3 years justifies the case for publication.

REFERENCES