Impaction of the Maxillary Central Incisor Associated with Supernumerary Tooth: Surgical and Orthodontic Treatment

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Abstract:

Impaction of maxillary permanent incisor is not a frequently case in dental practice, but its treatment is challenging because of its importance to facial esthetics. Supernumerary teeth are the main cause of impaction of upper incisor. Supernumerary teeth when present can cause both esthetic and pathologic problems. Supernumerary teeth in the maxillary midline are common. Early detection of such teeth is most important if complications are to be avoided.

We report a case of 12 year old male with an impacted supernumerary tooth in the maxillary anterior region, which was interfering with the eruption of the permanent, left central incisor. The impacted supernumerary tooth was surgically removed. With the application of an orthodontic traction, impacted left maxillary central incisor was brought down to its proper position in the dental arch.

Key Words: Impacted incisor, orthodontic traction, supernumerary.

Introduction:

Although the impaction of a permanent tooth is rarely diagnosed during the mixed dentition period, an impacted central incisor is usually diagnosed, when there is a delay in the eruption of the tooth. Supernumerary teeth are the main cause of impaction of upper incisor (Smailene, 2006). Supernumerary teeth are the extra teeth formed due to the disturbances during the initiation and proliferation stages of tooth development (Bergstrom, 1977; Humeryfelt, 1985). The supernumerary tooth present in the midline or just lateral to the midline is referred to as mesiodens.

Supernumerary teeth are most frequently located in the maxillary incisor region (64.3%) with mesiodens accounting for 32.4% of such presentation. 56-60% of premaxillary supernumerary teeth cause impaction of permanent incisor (Gregg and Kinirons 1991; Becker, 1998) due to a direct obstruction for the eruption tipping of adjacent teeth towards the place of the impacted tooth, narrowing of the dental arch, displacement of the permanent teeth bud, or malformations of the unerupted tooth root (Rajab and Hamdan 2002; Roberts-Hary and Sandy 2004).

An interesting case of an impacted supernumerary tooth in the maxillary anterior region, interfering with the eruption of the permanent left central incisor is presented. Combined surgical and orthodontic treatment employed, to bring the impacted left maxillary central incisor to its proper position in the dental arch is discussed.

Case Report:

A 12-year-old male patient reported with the chief complaint of unerupted upper left front tooth. Patient had no significant medical history & Dental history and intra oral examination revealed missing maxillary permanent left central incisor (Fig. I). An intra oral periapical radiograph of upper anterior region demonstrated an impacted supernumerary tooth and an impacted permanent left central incisor (Fig. II). Upper occlusal radiograph was taken which showed the presence of supernumerary tooth (Fig. III) and SLOB (same side lingual, opposite side buccal)
Technique with two intra-oral periapical radiographs confirmed the presence of supernumerary tooth on the palatal side and an impacted tooth in the buccal side.

The treatment plan comprised of surgical removal of the supernumerary tooth and orthodontic traction of the impacted incisor with closed eruption technician to bring it into proper position in the dental arch. With the patient under local anesthesia, full thickness mucoperiosteal flap on the palatal side was reflected. After careful elevation of the flap, adequate amount of bone was removed using the rotary cutting instruments and the impacted supernumerary tooth was exposed (Fig. IV). The supernumerary tooth was removed surgically and extraction socket was inspected for any pathology. The extracted supernumerary tooth was conical in shape. The palatal mucoperiosteal flap was repositioned but not sutured at this time. A full thickness mucoperiosteal flap was reflected labially, the bone and the follicular connective tissue covering the impacted incisor was removed and adequate amount of crown was exposed for bonding of the orthodontic bracket (Fig. V). Ligature was twisted to the flat Begg’s incisor bracket and made into a hook form and was bonded on the labial surface of the impacted incisor. The labial and palatal flap was repositioned and sutured, keeping the ligature wire hook suspended in the oral cavity making sure the occlusion was not interfered (Fig. VI). After a week, the healing was normal and the sutures were removed. Begg’s bracket was bonded on lower permanent incisors and canines and 0.020 A. J. Wilcock arch wire (sectional) was used for anchorage. Yellow elastic was tied to the ligature wire hook and was engaged to the lower brackets for the traction (Fig. VII). Elastic was engaged more towards the left side of the mandibular teeth so as to de-rotate the impacted incisor. The patient was demonstrated about how to engage the elastics and was told to disengage the elastics during eating and long speech. Elastics were changed every fifth day. After two weeks of traction with the yellow
elastics, the incisor with the bracket was seen in the oral cavity. Begg’s bracket was bonded on permanent maxillary left central incisor, lateral incisor, and canine and right lateral incisor and canine. 0.020 A. J. Wilcock arch wire was used for anchorage. The ligature wire hook was cut till the arch wire and the remaining part was passively tied to the arch wire. Elastic thread was tied from the slot of the bracket to the sectional arch wire for further traction of left central incisor (Fig. VIII). After the crown of the impacted incisor was sufficiently erupted, 0.016 NiTi round arch wire (sectional) was used to align the incisor. Once the incisor was well aligned the mammelons were trimmed and lingual fixed retention was given. The patient showed normal clinical crown length with acceptable
gingival contour (Fig. XI) and the tooth maintained its vitality with no evidence of root resorption (Fig. X). At six-month follow up (Fig. XI), the left maxillary incisor remained vital and responded normally to percussion and mobility and sensitivity testing with good width of attached gingiva.

**Discussion:**

Supernumerary teeth can affect the normal position and eruption of adjacent teeth and often require clinical intervention (Harris and Clark, 2008). The most common complication due to presence of supernumerary teeth is the failure of eruption of maxillary incisors (Rajab and Hamdan 2002). Supernumerary teeth in the premaxillary region are broadly of two types: one containing teeth of normal morphology known as supplemental teeth and the other of abnormal shape. The latter class has been further categorized into the conical type (peg-shaped) and the tuberculate type. The tuberculate supernumerary tooth seems to occur most frequently palatal to the upper central incisor and to be later in its development than the conical tooth. It also tends to delay or prevent the eruption of the corresponding permanent central incisor, and is rarely seen erupted in childhood. It has also been documented that the conical-shaped supernumerary tooth does not usually affect the eruption of the adjacent permanent incisors but may cause their displacement, which may involve the crown, the root or the whole tooth. The conical supernumerary may be non-inverted or inverted. When non-inverted, it may remain unerupted palatal to the permanent incisors. When inverted, it may point posteriorly towards the nose or may even erupt into the nose (Mills, 1987; Profitt, 1992). In the present case the associated supernumerary tooth was conical, non-inverted and impacted on the palatal side and interfered with the eruption of the permanent tooth.

The treatment protocol available for management of impacted permanent teeth due to supernumerary teeth are diverse. Methods of management of crowding or impaction due to supernumerary tooth are: removal of supernumerary teeth or tooth only, removal of supernumerary teeth and bone overlying impacted teeth, incision of fibrous tissue over the alveolar ridge to promote the eruption with or without orthodontic traction (Regezi et al., 2003; Bhat, 2006).

Spontaneous eruption of impacted maxillary incisors occurs in 54-76% of cases when supernumerary tooth is removed and if there is enough space in the dental arch (Crawford, 1997; Garvey et al., 1999). However, research data indicate that the spontaneous eruption of impacted maxillary incisor may take up to 3 years and sometimes orthodontic treatment is necessary to achieve adequate alignment of the erupted tooth in the dental arch (Witsenburg et al., 1981; Mason et al., 2000). If the root of the impacted tooth is still developing, the tooth may erupt normally; but, once the root apex has closed, the tooth has lost its potential to erupt (Kokich and Mathews, 1993). In the present case the root formation was almost complete and because of its rotation and labial placement, it was not desirable to wait for spontaneous eruption.

After thorough clinical and radiographic examination, it was decided that the present case required a combination approach comprising of both surgical and orthodontic treatment to bring an unerupted maxillary central incisor into position as done by various authors (Cangialosi, 1982; Kamakura et al., 2002; Kocadereli and Turgut, 2005). Surgical exposures of impacted incisors or surgical repositioning have also been used to bring impacted teeth into occlusion (Kamakura et al., 2002; Kocadereli and Turgut, 2005). Surgical exposures of impacted incisors or surgical repositioning have also been used to bring impacted teeth into occlusion (Kamakura et al., 2002; Kocadereli and Turgut, 2005). Surgical exposures of impacted incisors or surgical repositioning have also been used to bring impacted teeth into occlusion (Kamakura et al., 2002; Kocadereli and Turgut, 2005). 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closed eruption technique was used for better and esthetic gingival margin. At the end of the treatment, patient showed normal clinical crown length with acceptable gingival contour.

The extrusion force applied on the impacted central incisor in the present case was very light and measured in the range of 40-50 grams. This may have accounted for the little difference in the clinical crown length and maintenance of vitality of the impacted tooth post-alignment. The chances of nonvitality are naturally much lower when the treatment is initiated at a younger age due to the presence of a wide apical foramen (Chawla and Kapur, 2009), but in the present case the patient was 12 years old at the time of initiation of the treatment. In our view, forces for traction greater than 50 grams should not be applied as it may be the cause of nonvitality as reported by Uematsu et al. (2004). In the present case the duration of treatment was around 7-8 months and the aligned left maxillary incisor remained vital and responded normally to percussion and mobility and sensitivity testing.

Early diagnosis of the maxillary central incisor impactions with surgical removal of supernumerary tooth coupled with adequate space spontaneous eruption of the impacted maxillary central incisors (Smailene, 2006). If the impacted tooth is diagnosed at a later stage with its root completely formed or if present in the unfavorable position, combination of surgical and orthodontic treatment has to be carried out.

Conclusion:
Supernumerary teeth may result in the non-eruption of adjacent permanent incisors. Early diagnosis of the presence and removal of supernumerary teeth is essential. Maxillary permanent left incisor was successfully positioned in the maxillary arch by surgical exposure and orthodontic traction, which showed good stability.

Bibliography:

24. Rajab LD, Hamdan M. Supernumerary teeth: review of 
the literature and a survey of 152 cases. . *Int. J. Paediatr. 
25. Roberts-Hary D, Sandy J. Orthodontics. Part 10: 
26. Regezi JA, Sciubba JJ, Jordan RCK. *Oral Pathology: 
Clinical Pathologic Correlations.* 4th ed. Saunders: 
27. Smailene D, Sidlauskas A, Bucinskiene J: Impaction 
of the central maxillary incisor associated with 
supernumerary teeth: Initial position and spontaneous 
eruption timing. *Somatologiga, Baltic Dental and 
28. Scheiner MA, Sampson WJ. Supernumerary teeth. A 
review of the literature and four case reports. *Aust Dent 
29. Uematsu S, Uematsu T, Furusawa K, Deguchi T, Kurihara 
S. Orthodontic treatment of an impacted dilacerated 
maxillary central incisor combined with surgical exposure 
30. Vermette ME, Kokich VG, Kennedy DB. Uncovering 
labially impacted teeth: Apically positioned flap and 
closed eruption techniques. *Angle Orthod.* 1995; 65: 23- 
34.