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**RESEARCH ARTICLE**

# Interception in pursuit of exquisite aesthetics – A case series

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## *Abstract*

**Introduction**: Malaligned teeth play a key role in hampering esthetic appearance. Minor orthodontic interventions provide the pedodontist with an occasion to improve esthetics and revert the joyful smile to the affected children. Malalignment caused by supernumerary teeth poses one such opportunity. Interceptive treatment is usually carried out in mixed dentition period in order to reduce the severity of malocclusion in future. **Case Report** : This paper presents interceptive orthodontic management of 3 cases that presented with severe malalignment caused by the presence of supernumerary teeth. **Comments**: The major advantages of treatment with fixed orthodontic therapy is the ease with which the force magnitude and vector are controlled accurately compared to removable appliance.

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## INTRODUCTION

An individual's facial and dental appearance influences their personality and social interaction to a great extent. (Ritter et al., 2006) The value of a captivating smile is undeniable. It plays a major role in building one's self image and boosting self confidence. (Manjunath et al., 2014) Self perception of unattractiveness may lead to low self esteem and a vulnerability to depression. Malocclusion that affect anterior dental aesthetics have negative repercussions on daily living. (Hegde et al., 2010) Prescence of supernumerary teeth is one of the several causes for developing malocclusion.

Supernumerary tooth may be defined as one that is additional to normal series of dentition and can be found in almost any region of the dental arch. (Verma et al., 2012) They can be classified according to their morphology into four types – conical, tuberculate, supplemental and odontome (Mitchell, 1989) and their location as mesiodens, paramolar and distomolar. (Sharma, 2003) Primosch classified supernumeraries into two types according to their shape as supplemental and rudimentary. (Primosch, 1981)

The presence of mesiodens can lead to local irregularities of which the most common are delayed eruption or impaction of adjacent teeth, displacement or rotation of adjacent teeth, development of dentigerous cysts, resorption of adjacent roots, crowding, midline diastema or maxillary incisors root dilaceration. (Lara et al., 2013)

The time and the degree of interception are major hurdles encountered in developing malocclusion. Appropriately timed interception can produce positive results in mixed dentition as demonstrated in the present case series. (Dali et al., 2011) The aim of this paper is to document the successful outcome of the interception of 3 cases that presented with severe malalignment caused by the presence of supernumerary teeth.

## Case Reports

### Case I

A 9 year old male patient reported to the Department of Paediatric and Preventive Dentistry with the chief complain of an extra tooth, in the upper front region with impaired aesthetics. The patient was healthy, medical history was non-contributory. Family history revealed the same malocclusion experienced by his father. Patient presented a symmetrical, mesofacial form with a convex profile. The patient had fair oral hygiene. Clinical examination showed presence of a mesiodens. (Fig. 1) The mesiodens had resulted in severe labial displacement of the permanent maxillary right central incisor (11) by 11 mm of overjet and 7 mm of overbite. Inter-arch relationship showed bilateral flush terminal plane molar relationship and class I canine relationship. Photographic records and study models were gathered to aid in the evaluation.

The radiographic examination consisted of intraoral periapical radiograph (Fig. 2), maxillary occlusal radiograph (Fig. 3) and an ortho-pantomogram(OPG) confirmed the presence of mesiodens along with an impacted supernumerary tooth positioned palatally and apical to the permanent maxillary left central incisor. The impacted supernumerary tooth was asymptomatic.

The treatment plan included extraction of mesiodens followed by fixed orthodontic therapy in the maxillary arch. No intervention was planned for impacted supernumerary tooth except for periodic evaluation. The extraction of mesiodens was done under local anaesthesia after obtaining parental consent. Post extraction reduction of overjet by 2 mm was observed. Moyer's and Tanaka Johnston's mixed dentition study model analysis revealed an excess of 13 mm in maxillary arch.The treatment planned and implemented involved, Begg's therapy-brackets bonded from deciduous maxillary right second molar(55) to deciduous maxillary left second molar(65).(Fig. 4) 0.014 NiTi wire was ligated. NiTi wire was replaced every 3 weeks.

The patient was recalled after 1 week and showed dramatic change in the alignment. Follow up was maintained at every 15 days. At the end of 8 weeks, the teeth were well aligned. (Fig. 5) Impressions were made and Hawley's retainer was fabricated and inserted following debonding. Retention phase with Hawley's retainer was continued for six months with periodic observation.

### Case II

A 10 year old male patient reported to the Department of Paediatric and Preventive Dentistry with the chief complain of forwardly placed upper front teeth and requested its correction. The child's medical history was noncontributory. The patient had fair oral hygiene. Patient presented a symmetrical, mesofacial form with a convex profile.

On intraoral examination, patient had proclined maxillary central incisors and an erupted mesiodens. (Fig. 6) The presence of mesiodens had resulted in labial displacement of the permanent maxillary right central incisor (11) by 10 mm of overjet and 7 mm of overbite. Inter-arch relationship showed bilateral Angle's class I molar and class I canine relationship. Radiographs involving IOPA (Fig. 7) and OPG confirmed prescence of a mesiodens.

Interception was planned by initial extraction of the mesiodens followed by teeth alignment with fixed orthodontic therapy. After parental consent, the mesiodens was extracted under local anaesthesia. A 11 mm of excess was observed in maxillary arch. Begg's brackets were bonded on labial surface from 55-65. 0.014 NiTi wire was engaged. The patient was followed up at 15 days interval, over a period of two months. 0.014 NiTi wire was changed every 3 weeks. Following proper alignment, debonding was done. Hawley's retainer was inserted immediately. (Fig 8) Regular follow up over a period of six months was performed.

### Case III

A 9 year old female patient reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of irregularly placed upper front teeth. The patient was healthy, with non-contributory medical history.

Clinical examination revealed presence of two mesiodens in the midline, distopalatally rotated 11 (by $180^0$) and 21. One mesiodens was proclined labially and second was positioned palatally. (Fig. 9) Radiographic examination revealed complete root formation of mesiodentes. (Fig. 10)

The treatment plan formulated and performed was - extraction of mesiodentes followed by fixed orthodontic treatment. Mesiodentes were extracted under local anaesthetic after obtaining parental consent. Begg's brackets were bonded on 14,11,21,22. Additional begg's bracket was placed on palatal surface of 11. One medium E-chain was engaged from labial aspect of 11 to labial aspect of 22 and another was engaged from palatal aspect of 11 to labial aspect of 14, for a period of 2 weeks in order to attain minor derotation of 11. (Fig. 11) Begg's brackets were bonded from 55,14,11,21,22,24,65. Subsequently placement of 0.014 NiTi wire was performed, with follow up over a period of 8 weeks. 0.014 NiTi wire was supplanted at every 3 weeks intervals.

After obtaining satisfactory derotation of 11 and 21 (Fig. 12), supracrestal fibrectomy was carried out, in order to prevent a relapse. Removable Hawley's appliance in retention phase was inserted for a period of 6 months.

## Discussion

The etiology of supernumerary teeth is considered to be multi-factorial comprising of environmental and genetic components. Hyperactivity of the dental lamina may result due to environmental influence. Autosomal dominant inheritance with incomplete penetration has been the proposed under genetic theory. (Primosch, 1981)

The prevalence of supernumerary teeth ranges between 0.3−0.8% in the primary dentition and 0.1−3.8% in the permanent dentition. Supernumerary teeth are estimated to occur in the maxilla 8.2 to 10 times more frequently than the mandible, and most commonly affect the premaxilla. (Rajab et al., 2002; Yusof et al., 1990; Stafne, 1932) These teeth may be single, multiple, unilateral or bilateral, erupted or unerupted. (Rajendran, 2006) Single supernumeraries occur in 76-86% of cases, double supernumeraries occur in 12-23% of cases and multiple supernumeraries in less than 1% of cases. (Rajab et al., 2002; Scheiner et al., 1997; Zhu et al., 1996; So LLY, 1990) The prevalence of mesiodens varies between 0.09 and 2.05% in different studies and it is reported to be more common in males than in females. (Meighani et al., 2010)

Conical mesiodens are commonly discoverd palatally or between the maxillary central incisors, liable to dislodge the erupting permanent central incisors. (Hattab et al., 1994) Von Arx reported that majority of supernumerary teeth lay palatal to the central incisors. (von Arx, 1992)

Mitchell and Bennett have suggested that different types of supernumeraries have been associated with diverse effects on the adjacent dentition. Foster and Taylor examined this relationship and found that tuberculate types more commonly produced delayed eruption, whereas conical types more commonly produced displacement of the adjacent dentition. (Sowjanya et al., 2013) In 28-63% of cases, mesiodens is noted to cause ectopic eruption, displacement or rotation of permanent central incisors. (Rotberg et al., 1984; Nazif et al., 1983; von Arx, 1993; Gardiner, 1961)

In this case series similar findings were observed. In case I and case II conical mesiodens had caused labial displacement of 11 whereas in case III mesiodens had caused severe rotation of both central incisors.

Several clinical treatments have been proposed in the literature for correction of tooth malposition caused by a mesiodens. (Burton-Douglass J, 1993; Ochoa et al., 1993; Giancotti et al., 2002) According to Munns, the earlier the offending tooth is removed the better the prognosis.( Munns, 1981) Gomes et al verified that the most common treatment of choice was surgery followed by orthodontic therapy, i.e., in 62.0% of cases. In all the present cases extraction was followed by orthodontic treatment. This protocol is in accordance with various researchers and clinicians who have obtained excellent results in several similar clinical situations. (Verma et al., 2012; Kumar et al., 2012; Yeluri et al., 2012)

The impacted supernumerary tooth in Case I was kept under periodic review in accordance with Gravey et al and Shah et al as it was not associated with any complication.( Garvey et al., 1999; Shah et al., 2008)

In the cases presented here, fixed orthodontic therapy implemented, suitably resolved the malalignment, caused by the supernumerary teeth. Begg's technique offers a systematic approach for orthodontic treatment. It's important principles are based on anchorage control and light forces to produce tipping, uprighting and root torqueing with the aid of elastic traction and a variety of auxiliary springs.( Nimitpornsuko et al., 2001) The additional advantages are light orthodontic forces, minimal brackets-main archwire friction, rapid teeth alignment, dental occlusion opening, minimal oral anchorage, and low cost.( Swain, 1975)

Whenever supernumerary teeth are diagnosed, single or multiple, a decision regarding the appropriate management should be made cautiously. The clinical management of multiple supernumerary teeth poses a great challenge to clinicians. Therefore, a multidisciplinary approach would facilitate a well designed treatment protocol.

[A]

[B]

Figure 1. Preoperative [A] Front View [B] Maxillary Occlusal View

Figure 2. Intraoral Periapical Radiograph

Figure 3. Maxillary Occlusal Radiograph

Figure 4. Begg's Therapy (Front View)

[A] [B]

Figure 5. Postoperative [A] Front View [B] Maxillary Occlusal View

[A] [B]

Figure 6. Preoperative [A] Front View [B] Maxillary Occlusal View

Figure 7. Intraoral Periapical Radiograph

[A] [B]

Figure 8. Postoperative [A] Front View [B] Maxillary Occlusal View

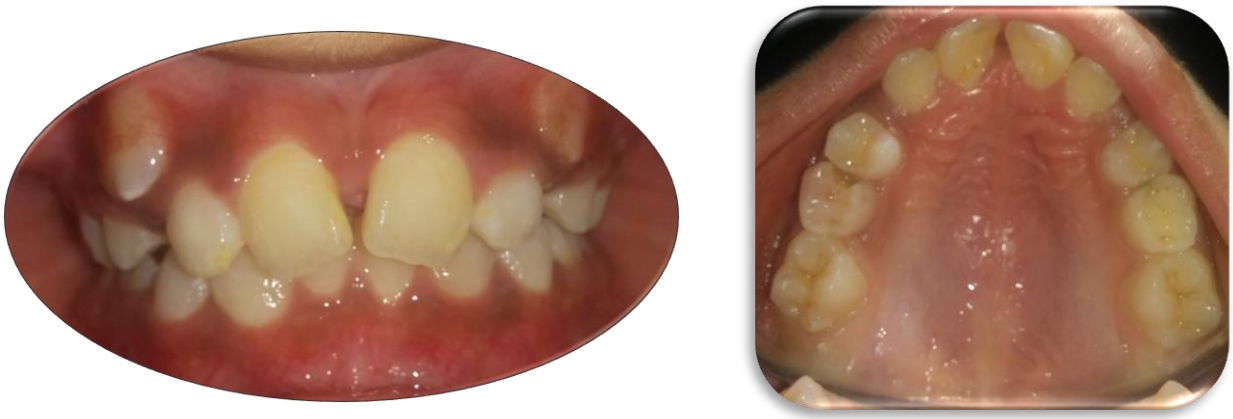
[A] [B]

Figure 9. Preoperative [A] Front View [B] Maxillary Occlusal View

Figure 10. Intraoral Periapical Radiograph

[A] [B]

Figure 11. Begg's Therapy with Medium E-chain [A] Front View [B] Maxillary Occlusal View



[A] [B]

Figure 12. Postoperative [A] Front View [B] Maxillary Occlusal View

## Conclusion

The three case reports described, clearly demonstrate the versatile application of Begg's appliance. The advantages of this type of appliance are significant and include:

- The ease with which the force magnitude and vector can be controlled much more precisely than with a removable appliance.
- The efficient and effective derotation of incisors.

This case series highlights the application of fixed orthodontic therapy within the purview of interceptive pedodontics.

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