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Case Report

Interception of developing anterior malocclusion due to supernumerary tooth by "2 x 4 Appliance": A clinical case report

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ABSTRACT

Interceptive orthodontics in mixed dentition period of children is practiced to prevent the severity of incurred malocclusion at an incipient juncture of life. Identifying malocclusion at a very early phase and diagnosing it at right age can help the pediatric dentists to achieve stability as far as the treatment is concerned. Mesiodens is a common type of supernumerary tooth which is found commonly in the incisor region of oral cavity. This anomalous occurrence can lead to varied complications like unerupted teeth, displaced teeth etc. This case report deciphers a case of mesiodens causing anterior teeth malocclusion and its management by 2 x 4 Orthodontic appliance.

1. Introduction

Pediatric orthodontics is always seen with an eye of speculation. It is an offshoot of orthodontics and is broadly divided into preventive and interceptive segments. Preventive orthodontics is practiced to prevent the occurrence of malocclusion and interceptive orthodontics is practiced to prevent the occurrence of malocclusion or to prevent the severity of incurred malocclusion. Interceptive orthodontics in mixed dentition is not uncommon but is limited to few conditions. And one of the common conditions is developing malocclusion in anterior region either because of cross-bite or ectopically placed supernumerary tooth. Anterior teeth malocclusion in developing maxillary arch due to a common supernumerary tooth, mesiodens is not uncommon.[1]

Supernumerary teeth are defined as extra teeth in comparison to normal dentition.[1] According to Alberti et al mesiodens is most common type of supernumerary tooth.[2] Mesiodens may occur as single, multiple, unilateral or bilateral. The presence of multiple supernumerary teeth is called 'mesiodentes'.[3] Morphologically, mesiodens occur in various heterogeneous forms; namely, conical or peg shaped, tuberculate and supplemental (tooth like), of which the conical form is the most common type.[4] Although incidence of mesiodens is very rare in primary teeth; it is considered as one of the most common dental abnormalities seen in permanent dentition.[5] Complications are a usual consequence with Mesiodens. Delay in the eruption of permanent teeth and displacements of permanent maxillary incisors are more common complications, while crowding, diastema, dilaceration of permanent teeth are less common.[6] Sporadically, cyst formation may be seen or the tooth eruption into the nasal cavity has also been reported. It has been inferred in a study that the presence of supernumerary teeth might cause delayed eruption in 26–52% of the cases and displacement or rotation of adjacent teeth in 28% to 63% of the cases.It is more apparent in the literature that tuberculate types of mesiodens produce delayed eruption, and conical types often cause displacement of the adjacent tooth.[7,8]

Immediate extraction of mesiodens in the early mixed dentition is clearly indicated in order to facilitate spontaneous eruption and alignment of the incisors. Munns

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stated that the earlier the mesiodens is removed, the better the prognosis.[9] Malocclusion resulted from supernumerary teeth can be fixed by segmental orthodontic interventions like 2 x 4 appliance. The fixed appliance 2 x 4 has two main components: "2" means two bands cemented or two tubes bonded on the first permanent molars and "4" means four brackets bonded onto the erupted maxillary permanent incisors, and a continuous archwire to provide good arch form. This appliance is acknowledged for rapid correction of numerous incipient malocclusions in a single short phase of fixed appliance therapy in the early mixed dentition stage.[10]

This case report highlights a case of developing anterior teeth crowding because of ectopic mesiodens followed by the treatment with 2x4 orthodontic appliance in mixed dentition.

2. Case Report

A 10 year old girl reported to the Department of Pediatric and Preventive Dentistry, Hazaribagh College of Dental Sciences and Hospital with a chief complaint of irregularity in upper front teeth with an extra crooked tooth in the inner surface region of upper front region of the mouth since 3 years (Figure 1). History did not reveal any previous trauma in that region. Intraoral examination revealed vital 11 and 21 with a palatal mesiodens present at the lingual side of 21 (Figure 2).The mesiodens was inclined distally which had deflected 21 up in the alveolus in superior and buccal direction occupying the space reserved for 21(Figure 3). Orthopentamograph revealed, a conical mesiodens in relation to 21 (Figure 4). As mesiodens has taken the place where 21 was supposed to be; and because of conical shape and less mesiodistal dimension of mesiodens, there is space available at the site. And upper left lateral incisor has tipped in that space. This has led to the crowding in the upper anterior region of the mouth. Mandibular occlusion was noted as Angle Class I with crowding in lower anterior teeth region.

3. Treatment

Extraction of the mesiodens was planned under local anaesthesia as it was the main reason for the malalignment of 21. The supernumerary tooth was extracted conservatively and the site was left for healing (Figures 5 and 6). The patient was called after one month to notify the movement of 21 if any. As, there was no changes seen in 21, we decided to intercept the malalignment with 2x4 orthodontic appliance involving upper four incisors and two permanent molars. Roth 0.018 prescription brackets were used and placed on 11,12,21,22 as per standardized protocol and two buccal tubes were bonded on the buccal surface of 16 and 26 at the center. 12 Niti wire was engaged in the brackets with elastic modules (Figures 7 and 8). The

Fig. 1: Extra-oral picture

Fig. 2: Palatal view ofmesiodens

Fig. 3: Labially displaced 21

Fig. 4: Orthopantomogram

patient was called after one month of bracket and wire placement and 21 was seen aligned with the maxillary arch (Figure 9) The wire sequence followed was 14 NITI, 16 NITI and 16SS and the brackets were debonded (Figure 10) The child and parents w11,12,13,14). The 22 was not fully aligned and patient was told for the fixed orthodontic therapy once the full permanent dentition sets in; but the parents were happy with the results and didn't want further alignment.

Fig. 5: Extracted mesiodens

Fig. 6: Post-extraction site

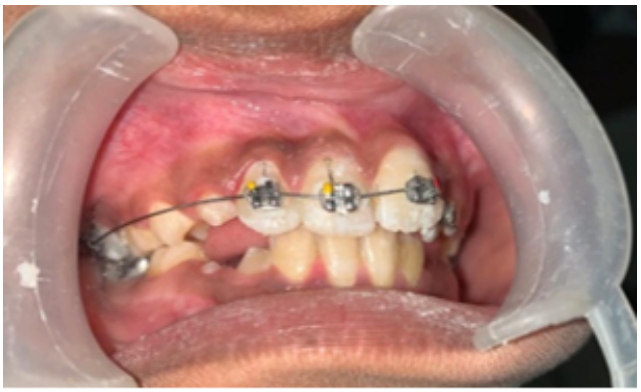

Fig. 7: 2 x 4 Appliance using Roth 0.018 prescription pre-edgewise brackets (Right side view)

Fig. 8: 2 x 4 Appliance (Left side view)

Fig. 9: One month post-operative intraoral picture

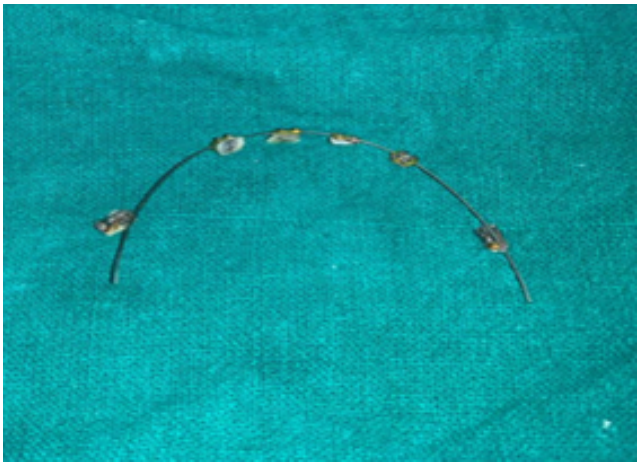

Fig. 10: Debonded bracket assembly after 3 months

Fig. 11: Post-operative palatal view

Fig. 12: Post-operativefrontl view

Fig. 13: Post-operative left sideocclusal view

Fig. 14: Post-operative right sideocclusal view

4. Discussion

Mixed dentition is the time of transition between primary and permanent dentition. It is usually recommended in the documents that a child should see a dentist by 7 years of age for orthodontic corrections.[11] This is the age of mixed dentition where children are mature enough physiologically and psychologically to accept appliances or other interceptive orthodontic therapies. Interceptive orthodontics is the branch of pediatric orthodontics which refers to procedures used to reduce the severity of malocclusion or to treat the malocclusions. There are few conditions in the developing children which needs utmost urgent attention. Cross-bites and anterior teeth displacements due to ectopic supernumerary tooth are among them. We are presenting a case of a 10 year old girl who presented with anterior tooth malocclusion in developing maxillary arch due to a common supernumerary tooth, mesiodens.

Supernumerary teeth are usually single and unerupted. In 76–86% of the cases, single supernumeraries occur, while double supernumeraries occur in 12–23% and the incidence of multiple supernumeraries is less than 1% of all cases.[12] There are various proposed classifications of mesiodens teeth. One well-known classification divides

mesiodens into conical, tuberculate and supplemental (tooth like) shapes.[4] Anotherone,classify mesiodens as eumorphic and dysmorphic. The eumorphic subclass is usually similar to a normal-sized central incisor, whereas the dysmorphic teeth have different shapes and sizes and are categorized into conical, tuberculate, supplemental and odontomes.[13] In our case, mesiodens was single fully erupted palatally and was conical or dysmorphic type.

There is a plethora of literature to support the fact that supernumerary teeth should be immediately refer for extraction if they lead to one of these complications like inhibition or delay of eruption, displacement of the adjacent tooth, interference with orthodontic appliances, presence of pathologic condition, or spontaneous eruption of the supernumerary tooth. Henry and Post stated that early removal of mesiodens in early mixed dentition is a necessity to promote eruption and proper alignment of adjacent teeth, which may reduce the need for orthodontic treatment. It was further observed that delayed extraction of the mesiodens after the age of 10 when the apex of the central incisor nearly forms may require more complex surgical and orthodontic treatment for correcting the malocclusion.[14]

The misaligned arch or impacted permanent tooth or displaced permanent tooth because of mesiodens should be corrected at the first priority. The displaced tooth or impacted tooth should be assessed and followed up clinically and radiographically after extraction of mesiodens for sufficient period of time for self-correction of malocclusion. But if the displaced or impacted tooth don't show any sign of improvement then it is wise to intercept the malocclusion.[15] In our case, we waited for one month and there was no significant change found in the position of displaced 21 and so, it was decided to intercept the malalignment.

Interception can be done by removable orthodontics, fixed orthodontics or fixed sectional orthodontics. Sectional orthodontics with 2X4 appliance is a simple yet effective method to treat minor malocclusions in mixed dentition stage. The fixed appliance 2 x 4 comprises four brackets bonded onto the erupted maxillary permanent incisors, two bands cemented or two tubes bonded on the first permanent molars and a continuous archwire to provide good arch form.[10] A 2 x 4 sectional fixed appliance offers more effective and efficient tooth positioning as it allows three-dimensional control of the involved teeth during correction of anterior crossbites or aligning ectopic incisors. This can be used for rapid correction of anterior teeth cross-bites, to reduce overjet and to align ectopic incisors. The distinctiveness of this appliance is that it is known to resolve various problems affecting the upper incisors in a simple manner and in a relatively short period of 6 months or less.[16] In our case, we have used 2x 4 appliance and the results obtained were very fast and satisfactory.

5. Conclusion

1. 'Mesiodens' is a common occurrence in permanent dentition leading to anterior teeth malocclusions.
2. Early management is of utmost importance to prevent further complexities in orthodontic management
3. Sectional appliances like 2 X 4 Appliance is a useful modality in treating developing malocclusions in anterior teeth in children of mixed dentition age.

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7. Conflicts of Interest

All contributing authors declare no conflicts of interest.

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None.

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