INTERCEPTIVE ORTHODONTICS – A BOON FOR THE PEDIATRIC DENTISTRY

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ABSTRACT:
Interceptive orthodontics involves procedures to restore a normal occlusion once a malocclusion has started to develop. Early recognition of developing malocclusions and the potential for uncomplicated orthodontic treatment procedures can minimize or eliminate future costly treatment1. Creating a normal occlusal relationship and a balanced neuromuscular environment at an early age can help normal growth of the facial skeleton in an otherwise healthy child2. Removal of supernumerary teeth falls under preventive as well as interceptive orthodontics procedures, as it eliminates the associated complications like prevention or delay of eruption of associated permanent teeth. This procedure also corrects mid-line diastema, eliminates crowding and ectopic eruption of the permanent teeth. The following case report presents treatment of a rotated incisor of a patient, with erupted two supernumerary teeth in the midline using unconventional technique of sectional arch wiring.

Key words: Interceptive orthodontics, supernumerary teeth, sectional arch wiring, supracrestal fibromy.

INTRODUCTION:
“An ounce of prevention is worth a pound of cure”, this axiom aptly forms the basis of preventive orthodontics as it aims to preserve the integrity of what appears to be normal at a specific time and attempts to ward off anything that would change the normal course of events. Preventive orthodontics can be defined as any action taken to preserve the normal development in a child’s dentition and to maintain normal relationships in the developing occlusion through prevention of abnormal oral habits, restorative care, and space maintenance [1-5,7]. It includes procedures which are undertaken in anticipation of development of a problem.

Interceptive orthodontics or secondary preventive orthodontics can be defined as any procedure that eliminates or reduces the severity of developing malocclusion [6]. Interceptive orthodontics is employed to recognize and eliminate potential irregularities and malposition in the developing dentofacial complex. These procedures are employed to lessen or to eliminate the severity of developing malocclusion. e.g. serial extraction, correction of crossbite and midline diastema, extraction of supernumerary
and retained primary teeth.\textsuperscript{[8]} Conceptually, preventive and interceptive orthodontics relate to the possibility of treating young patients in ways which will obviate the need for later comprehensive fixed orthodontic treatment \textsuperscript{[9]}.

Comprehensive orthodontic treatment is a coordinated approach to improvement of the overall anatomic and functional relationships of the dentofacial complex, as opposed to partial correction with more limited objectives.

The concept of two phase therapy of skeletal correction in the growing child during growth spurt with a suitable functional appliance and later on a comprehensive fixed appliance therapy is decreasing day by day \textsuperscript{[8]}. The orthodontists and pedodontists are now focusing on one phase therapy, if diagnosis is made properly and at an early age of the child.

The treatment of supernumerary teeth falls under the realm of both preventive and interceptive orthodontics. Supernumerary teeth are those which are additional or in excess of the normal number. They can be either single or multiple, unilateral or bilateral and can be present anywhere in the dental arch with predilection in the midline of maxilla \textsuperscript{[3]}. Supernumerary teeth are estimated to occur 8.2 times more frequently in the maxilla than the mandible and commonly affect the premaxilla \textsuperscript{[10-12]}. Complications do arise with the presence of supernumerary teeth, they may include: crowding and midline diastemas in permanent dentition, rotation of incisors, failure of eruption (impaction) or ectopic eruption, displacement of permanent teeth, development of odontogenic cyst, and resorption of roots of neighbouring teeth \textsuperscript{[13-15]}.

The treatment of supernumerary teeth varies depending upon the severity of complication. It can range from clinical follow-up for a particular period to surgical removal. When a permanent maxillary central incisor is impacted due to the presence of supernumerary teeth, it should be surgically removed. The similar procedure should be carried out when an impacted supernumerary is causing root resorption of the permanent central or lateral incisor. It may be necessary to remove these teeth when there is midline diastema due to their presence followed by orthodontic intervention. The surgical procedure for removal of supernumerary teeth is carried out during the mixed dentition period when half of the affected tooth root is formed \textsuperscript{[18]}. In other circumstances, an impacted supernumerary tooth which is lying high in the palate and causing no pathological change to the adjacent structures should be followed up.

**CASE DETAIL:**

A 10 year old boy reported to the Department of Pedodontics and Preventive Dentistry of Himachal Dental College, Sundernagar with the chief complaint of malaligned front teeth (figure 1). The medical and family histories were non-contributory. Clinical examination revealed mixed dentition.
with well aligned lower arch but there was rotation in 21 due to presence of erupted two supernumerary teeth in the maxilla (figure 1). There was an increased overjet and 90 degrees rotation of left maxillary central incisor. The right maxillary central incisor was slightly labially placed. The parents of the child were concerned about the aesthetics of the child and wanted alignment of the teeth.

After clinical and radiographic examinations, treatment was planned and the same was explained to the parents. With the consent of the parents, both the supernumerary teeth were extracted immediately and patient was subsequently recalled for orthodontic correction.

The treatment plan consisted of sectional arch wiring extending from maxillary right deciduous canine to maxillary left deciduous canine (figure 3) followed by circumferential supra-crestal fibrotomy and a fixed retainer to prevent relapse. The sectional fixed arch wiring was planned to aid in the correction of midline diastema and rotation of left maxillary central incisor simultaneously. The sectional arch wiring, unlike the conventional fixed orthodontic technique, does not involve the banding of permanent molars and bonding of all the teeth in the arch. It requires placement of brackets only on a section of teeth involving the malocclusion and a few adjacent teeth (figure 3, 4, 5). This technique provides faster results than removable appliances and is more comfortable to the patient.

The patient was recalled every 15-20 days to notice the progress of the treatment. Initially the derotation of maxillary left central incisor was achieved with elastic-chain (figure 3). Thereafter, intrusive tooth movement and further derotation of 21 was achieved by bonding a Begg’s bracket on the palatal aspect of 21 and giving intrusive force using ligature wire (figure 4). There was minor rotation left following the intrusion and midline diastema of 21 which was again corrected using ligature wire and elastic-chain (figure 5). Finally, after the correction of entire rotation and closure of spaces (diastema), fibrotomy was done and fixed retention was given (figure 6, 7).

DISCUSSION:

The development of tooth is a continuous process with a number of physiologic growth processes and various morphologic stages interplaying to achieve the tooth’s final form and structure. Hypodontia, oligodontia or supernumerary teeth arise as a result of interference at the initiation process of tooth development. The incidence of supernumerary teeth is said to be 0.3%-0.8% in the primary dentition and in the permanent dentition 1.5%-3.5% 16. The conditions commonly associated with an increased prevalence of supernumerary teeth include cleft lip and palate, cleidocranial dysplasia, Gardener’s syndrome, Down’s syndrome etc. Multiple supernumerary teeth are rare in individuals with no other associated diseases or syndromes [17]. But in this case, an otherwise healthy patient
presented with two erupted mesiodens in the maxilla, which were unesthetic in appearance (figure 1). These erupted supernumerary teeth also caused rotation of tooth number 21 and midline diastema after their extraction (figure 2).

The management of supernumeraries always depends on the type of supernumerary teeth and its position, relation to other tooth and its effects on adjacent teeth. But spontaneously erupted supernumerary teeth are always indicated for extraction. The timing of interceptive treatment should be done as soon as possible following clinical detection of an abnormal eruption pattern. The orthodontic alignment of a rotated permanent central incisor should be carried out as and when it is detected irrespective of root growth.

In the present case, the orthodontic alignment of teeth was achieved by an unusual and unique approach of sectional arch wiring. It was not only a cost effective and time saving technique but was also more comfortable to the patient unlike conventional fixed mechanotherapy and removable appliance treatment. Occasionally, minor unwanted tooth movement and stabilization of the arch wire prove to be a challenge, but overall this unconventional technique is a more desirable approach for minor tooth movements than the removable orthodontic appliances. It helped in achieving derotation, mesial migration and intrusive tooth movement simultaneously which is not possible with removable appliances.

Relapse of rotated teeth is very common after their correction. A major cause for rebound of rotated teeth is the network of elastic supracrestal gingival fibres. These fibres tend to stretch into a new position when the tooth is derotated and they remodel very slowly. To prevent relapse, three procedures can be performed, which include over-correction of the rotated tooth, circumferential supracrestal fibrotomy and prolonged retention. Some cases of midline diastema may require a permanent fixed retainer. In this case, we performed supracrestal fibrotomy and a fixed retainer was given to prevent relapse (figure 6, 7).

CONCLUSION:

A thing of beauty is joy forever” is a common saying. The concept of aesthetics has fascinated mankind for centuries. In the adolescent years, when the child is under peer pressure, his looks often determine how well he can function in the society. Interceptive orthodontics, at this stage, can work as a miracle for correcting malaligned front teeth and restoring a million dollar smile of the child. We, as pedodontists owe a pleasing smile to every child.

REFERENCES:


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**FIGURES:**

**Figure 1:** Pre-operative view of two erupted supernumerary teeth with 90 degree rotation in 21.

**Figure 2:** After extraction of the supernumerary teeth, diastema was created.

**Figure 3:** Sectional arch wiring in place with traction of 21 was given using E-chain.

**Figure 4:** 21 was corrected considerably and intrusive force applied with ligature wire from a palatal bracket.

**Figure 5:** Complete closure of space and well aligned 21 in place.

**Figure 6:** Debonding of the brackets.

**Figure 7:** Lingual fixed retainer in place.