ABSTRACT:
Any treatment procedure that eliminates or reduces the severity of the developing malocclusion is referred as interceptive orthodontic treatment. By initiating orthodontic and orthopaedic treatment at an younger age the need for complex orthodontic treatment involving multiple extractions and orthognathic surgery is presumably reduced. The goals of early treatment involve correction of skeletal, dental and muscular abnormalities to correct the oral environment before completion of growth and development. Prompt interventions are advised for predisposing conditions that may potentially develop a malocclusion. This review highlights various clinical situations and its effective interceptive management modalities.

Keywords: Early treatment; interceptive management; mixed dentition.

1. INTRODUCTION:
The American Association of Orthodontists (1969) defined interceptive orthodontics as that phase of science and art of orthodontics employed to recognize and eliminate the potential irregularities and malpositions in the developing dentofacial complex. Profitt and Ackermann (1980) defined interceptive orthodontics as the elimination of existing interferences with the key factors involved in the development of the dentition. 14%-49% of children are reported to benefit from interceptive management. For the development of normal adult occlusion, transition phase from primary to permanent dentition should be thoroughly monitored and intervened when necessary. Planned intervention at mixed dentition eliminates future treatment complexities and further treatment needs can be categorized as elective. The conditions requiring interceptive management and various interceptive treatment modalities are described in this article. King et al 3 in 2010 concluded that interceptive orthodontics is effective in reducing the malocclusion even though it does not produce finished quality results. 57% of children are present with an anomaly during the transition phase from deciduous to mixed dentition. In view of the greater number of malalignments in the deciduous and mixed dentition there is an increased need for preventive and interceptive orthodontic therapy 4

2. DISCUSSION:
Early intervention mainly aims at the elimination of the primary etiologic factors. The commonly seen conditions are sagittal dysplasias, occlusal discrepancies, unilateral or bilateral posterior crossbite, anterior crossbite or open bite, habits associated malocclusions. Bishara et al in 1988 5 conducted a longitudinal study in 5 year old children. On following the subjects for over a period of eight years the study concluded that the distal step present in the primary dentition eventually developed into a class II malocclusion in
100% of cases. Tulloch in 1997 stated that spontaneous relief of lower anterior crowding is unlikely once the mandibular lateral incisors erupt. Managing arch length discrepancies to resolve crowding and future extraction indicates the need for early orthodontic treatment.

3. DEVELOPING CROSS BITES:
Anterior cross bites can either be skeletal, dental or functional. Guiding the mandible in centric relation helps in differentiating the skeletal cross bite with functional cross bites. Skeletal cross bites require maxillary protraction devices or chin cup therapy and continuous abnormal growth pattern of jaws can lead to relapse. Dental anterior cross bites can be corrected by fixed or removable mandibular acrylic inclined bite plane, Reversed stainless steel crowns, Tongue blade (deliver heavy intermittent forces), Removable appliance with auxiliary springs, Removable plate with screw, Maxillary lingual arch and fixed light arch wire (deliver light continuous forces).

Early treatment of posterior cross bites during the mixed dentition is essential for stable results. If the transverse problem is skeletal, treatment is indicated as soon as the permanent first molar erupts. For a dento-alveolar correction, treatment might be delayed until the eruption of permanent teeth, but only while the patients are in growth phase. The dental compensations must be considered prior to expansion as buccal version of the dentition might cause gingival resorption of posterior and canine. Additionally, if dental compensations are present expansion will result in scissor bite. Quad helix or removable appliance with slow expansion screw may be used to correct the dento-alveolar cross-bites. Rapid maxillary expansion is the preferred choice for skeletal cross bites. If the transverse alteration is accompanied by a vertical or anterior-posterior malocclusion, the transverse alteration is treated first. After correcting the transverse malocclusion at an early age, the results must be stabilised with retainers until all the permanent teeth have replaced the deciduous teeth. When a transverse discrepancy is observed a potential maxillary canine impaction may accompany it.

(Adopted) CLASSIFICATION OF POSTERIOR CROSS BITES (LORENTE, 2002)

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<th>UNILATERAL CROSSBITES (UCB)</th>
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<td>UCB with normal maxilla and constricted dentoalveolar process</td>
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<td>UCB with normal maxilla and asymmetrically-constricted dentoalveolar process</td>
<td>BCB with constricted maxilla and buccoveension of dentoalveolar processes</td>
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4. ARCH LENGTH DISCREPANCIES
The leeway space (E-space) provides adequate space to resolve crowding that is present in the mixed dentition. Early loss of deciduous teeth, interproximal caries are some factors that adversely influence arch length resulting in crowding. Arch-length tooth material discrepancies are more common in such cases. There are various space maintainers available among which the common appliances used to maintain leeway space is lingual arch and lip bumper. In a case of premature loss of primary canine, lingual arch can be used. The opposing deciduous canine can be extracted for the purpose of symmetry. The appliance prevents the lingual movement of lower incisors and maintains the arch length. A recommended strategy is to maintain arch length until the first premolars erupt. One exception is presence of dehiscence in mandibular anteriors as lingual movement of the incisors might be favourable in this case. A second exception is when erupting teeth are forced to erupt in an area of non-keratinized gingiva. Lip bumper with a relatively thick labial shield can enhance the length and width in the dental arch.
timing for insertion of lip bumper is after the eruption of first premolars. Treatment decision can be made based on the space requirements. For arch deficiency no more than 2mm, lip bumper is preferred; for greater arch discrepancies serial extraction can be recommended considering other factors. Gianelly in 2002 suggested that appropriate timing to correct crowding is during late mixed dentition stage. During the transition stage, when arch space is already utilized by migration of the adjacent teeth space regainers can be chosen. Serial extraction is most effective in class I malocclusions and bimaxillary dentoalveolar protrusions. Indicated when there is a marked irregularity in anterior teeth, premature loss of one deciduous canine, midline deviation, displaced lateral incisors, gingival recession and alveolar destruction in the labial surface of the anterior teeth. Several extraction sequences have been advocated with the most common ones being that of Dewel and Tweed. Absence of space in the primary dentition indicates 70% chance of crowding of the permanent teeth, if there is less than 3mm spacing there is 50% chance of crowding.

5. ECTOPIC ERUPTION
Young stated that ectopic eruption was approximately present 3% of the time with greater male predilection and added that two-thirds of the ectopically erupting first permanent molars erupted into position without any corrective treatment. Ectopic eruption of molars can either be reversible or irreversible. Reversible pattern occurs in approximately 66% of ectopically erupting permanent maxillary first molars. In the irreversible form, the permanent first molar remains in a locked position until active treatment is provided or premature exfoliation of a primary second molar occurs. Brass wire or a polyurethane module can be wedged interproximally. Humphrey banded the second primary molar and soldered a S-shaped Elgiloy loop to the band with the distal end placed at the central pit of ectopically erupting molar. Kennedy suggested a modification of the Halterman appliance where a reverse band and loop appliance with a bonded button on the permanent molar and chain elastic can be used for disimpaction. For ectopically erupting maxillary canines, extraction of deciduous canines is preferred. The condition is diagnosed along with orthodontic therapy if required. The orthodontic appliance is enforced as the final stage of intervention. Nail biting adversely causes malocclusion and root resorption of the anterior teeth, intestinal parasitic infections, change of oral carriage of Enterobacteriaceae, bacterial infection and alveolar destruction. Children with nail biting should be evaluated for emotional problems. Bruxism is one of the common problems encountered and the common clinical side effects include grinding or impacting sounds of teeth; erosion of the teeth occlusal surfaces and breakdown of repairs; hypertrophy of masticatory muscles; hypersensitivity of teeth to cold air; joint sounds. There is no special recommended regimen, but increasing awareness of the patient, intra oral appliances, behavioural treatment and drugs like diazepam and clonazepam have been reported to be effective.

6. HABITS
The detrimental effects of habits persist as malocclusion even after its cessation. Dental arch perimeters and occlusal characteristics are adversely affected. Thumb sucking, tongue thrusting, mouth breathing, pacifier, nail biting, lip chewing, bruxism are some of the habits in children. Early intervention is necessary to prevent the adverse effects. If the child continues the thumb sucking habit even after the age of 5 years at the time of eruption of permanent teeth the child is motivated, given rewards and reminder therapy is followed. The orthodontic appliance is enforced as the final stage of intervention. Nail biting adversely causes malocclusion and root resorption of the anterior teeth, intestinal parasitic infections, change of oral carriage of Enterobacteriaceae, bacterial infection and alveolar destruction. Children with nail biting should be evaluated for emotional problems. Bruxism is one of the common problems encountered and the common clinical side effects include grinding or impacting sounds of teeth; erosion of the teeth occlusal surfaces and breakdown of repairs; hypertrophy of masticatory muscles; hypersensitivity of teeth to cold air; joint sounds. There is no special recommended regimen, but increasing awareness of the patient, intra oral appliances, behavioural treatment and drugs like diazepam and clonazepam have been reported to be effective.

7. INTERCEPTIVE FUNCTIONAL THERAPY
Functional shifts caused by premature contacts, and unilateral posterior crossbites can be eliminated by minimal occlusal adjustments/expansion. Functional jaw orthopaedics is one of the vital treatment modality in orthodontics involving growth modification of the jaw base. For a class III orthopaedic correction, once the etiology is analysed appropriate treatment is rendered using Rapid palatal expanders, Facemask, or Chin cup along with orthodontic therapy if required. Class II skeletal pattern with mandibular deficiency is effectively treated by various functional appliances with twin-block gaining more popularity because of its ease of use and effective results. Late mixed dentition or early permanent
Dentition is considered the ideal treatment time for twin-block therapy. Treatment can be considered at a much early age if there are procumbent incisors predisposing to traumatic injury or any other psychosocial problems.

8. DENTAL FACTORS

Various other factors such as scissor bite of first molars, retained primary teeth, midline diastema, abnormal labial frenum might contribute to malocclusion. Supernumerary teeth might be one of the causes for delayed eruption of permanent teeth. All these factors raise the need for intervention to enable normal development of the mixed dentition. Sanin et al developed a method to assess if the space between the central incisors would close spontaneously during dentition development. He estimated that if the diastema is greater than 1.85 mm in the early mixed dentition stage, the possibility of spontaneous space closure reduces to 50%. For a 2.7 mm space the possibility of closure without treatment is only 1%. The measurements are made after the eruption of lateral incisors. Abnormal frenal attachment, oral habits, traumatic deep bite resulting in adverse proclination of the incisors, pathologic migration of teeth, Tooth size arch size discrepancy, angulation of teeth, odontomas occurring in the maxillary midline, developmental cysts in the orofacial midline, and flaccid lips are other proposed etiological factors leading to midline diastema. Hence, proper diagnosis of the etiology of diastema and appropriate effective intervention has to be carried out. The retained primary teeth or supernumerary teeth should be extracted to allow spontaneous alignment.

9. CONCLUSION:

Prompt recognition and elimination of malalignment and malposition is facilitated through interceptive orthodontics as they reduce or eliminate the severity of developing malocclusion. This review has discussed the common clinical problems and its management presenting during the mixed dentition. More awareness among parents and children are necessary for treatment and prevention of malocclusion at an early stage.

10. REFERENCES:


