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Non-Compliant Class III Malocclusion – A Novel Treatment Approach

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Dental cross bites are said to be an orthodontic emergency. Correction of these at the earliest is required to prevent full-fledged development of the malocclusions. Therefore, arises the need of interceptive orthodontics. 1 Unfavorable growth traits are present in Class III malocclusion patients. One might anticipate their malocclusion to get worse over time if no treatment is given during their development spurts. It has been observed that complete dental Class III adjustments can be performed with relatively early orthodontic intervention, and that this normalization will hold over further growth. Young patients' increasing antero-posterior (AP) disparity has been addressed with a variety of interceptive orthodontic treatments and appliances. The ability to develop a more balanced craniofacial relationship in Class III patients can be easily aided by early therapy. This article describes a novel method of addressing Class III malocclusion in the mixed dentition phase with a fixed penta-helix appliance to achieve transverse expansion of maxilla as well as correct anterior dental crossbite.

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INTRODUCTION:

Class III malocclusions are still difficult to treat non-surgically in orthodontic field. To lessen the burden of severe Class III malocclusion in late adolescence, rapid diagnosis and early care of the condition is found to be useful. The diagnosis and treatment planning in early mixed dentition is

just as demanding and important as it is in comprehensive treatment. Specific treatment goals and appropriate endpoints are to be well defined before starting the treatment so that the patient's compliance is not exhausted at the time of comprehensive treatment.

The most difficult to treat Class III malocclusion is that due to the genetic potential of the individual which causes the overgrowth of the mandible leading to a more mesial position of mandible with respect to the maxilla. Class III malocclusion has been categorized by several writers using a variety of criteria. Based on the relationship between the permanent first maxillary and mandibular molars and the position of the teeth with respect to the line of occlusion, Edward Hartley Angle categorized malocclusions in 1899 as Class I, Class II, and Class III. Class III malocclusions were divided into two categories by Charles Henry Tweed: pseudo Class III malocclusions (category A), which had a normal mandible and an underdeveloped maxilla, and skeletal Class III malocclusions (category B), which had either a prognathic mandible or an underdeveloped maxilla.

Pre-treatment intra-oral photographs

CLINICAL FINDINGS AND DIAGNOSIS:

A 9-year-old girl reported to the department of Orthodontics and Dento-facial Orthopaedics with a chief complaint of mal-aligned teeth. The patient reported no abnormal medical history. She had not undergone any dental treatment before this visit. Her mother and elder sister depicted a concave profile with established anterior dental crossbite.

On extra-oral examination, patient had a symmetrical face with straight facial profile and competent lips at rest. On smiling, both maxillary and mandibular anterior teeth were visible, but the smile arc couldn't be assessed due to the crossbite with 21. No abnormal oral habits were reported.

Intra-oral examination revealed a mixed dentition with a class I molar relation bilaterally as well as class I deciduous canine relation bilaterally. Anterior dental crossbite with 21 and posterior dental crossbites on the left side with 63, 64, 65 and 26 were seen.

On clinical functional analysis, the patient showed an edge to edge incisor relationship in centric relation.

Panoramic radiograph depicts an early mixed dentition stage. A difference in the radiographic length of 11 and 21 can be seen suggesting a difference in their axial inclinations. No other gross abnormality was noticed.

Lateral cephalometric analysis revealed a Skeletal Class III jaw bases relationship with a retrognathic maxilla and mandible according to Steiner's analysis. The upper incisors were proclined while the lower incisors showed optimum angulations. The patient had an average growth pattern.

TREATMENT PLAN

Initially, the patient was started with a removable appliance therapy which consisted of a posterior bite plane with a Z spring on 21 for correction of the crossbite. With future appointments, it was observed that the patient was not compliant with the given treatment. Hence, she was shifted to a fixed appliance which consisted of five helices on the palate designed to treat transversely as well as antero-posteriorly at the same time.

The penta-helix appliance

TREATMENT PROGRESS

Tangible results were achieved in 3 months of treatment. Following this a 3 months of retention protocol was observed for the expansion achieved

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POST-TREATMENT INTRA-ORAL PHOTOGRAPHS

DISCUSSION

Young patients should have an orthodontic evaluation at age of 6 or 7 years, according to the American Dental Association (ADA) and the American Association of Orthodontists (AAO).[1,2] Early orthodontic examinations give practitioners the chance to identify existing or potential issues with their patients' occlusion and jaw growth. Patients in Class III malocclusion can benefit the most from this, in particular.

The doctor can offer interceptive orthodontic treatment to direct appropriate craniofacial development if he detects orthodontic problems including Class III, posterior crossbite, open bite, deep bite, and oral habits at an early age. The clinician may find it easy to provide this early instruction, which helps improve anatomical factors for the eruption of permanent teeth. Then, if needed, permanent teeth can be straightened via complete orthodontics. The best opportunity for a full correction for many patients with Class III malocclusion is this mixed dentition kind of treatment.

Because of their unfavourable growth features, Class III patients are typically acknowledged by orthodontists to be among the most challenging to treat. Numerous studies have demonstrated that Class III malocclusions deteriorate for people during critical growth phases in childhood and adolescence. The maxillomandibular discrepancy of untreated Class III patients increased in disparity in the subjects between the ages of 6 and 16 in the Wolfe et al[3] trials. When compared to their Class I counterparts, Class III individuals exhibit greater anteroposterior (AP) growth excesses, larger, more protruding mandibles, and smaller maxillae. In the study, Class III subjects had a big maxillomandibular difference and a modest Wits differential, which got worse as the subjects developed.

The differential horizontal growth (DHG) of 265 untreated developing patients from the Burlington and Bolton Brush untreated collections was the subject of substantial growth research by Donald B. McGann. He discovered the DHG and Wits angles and norms of various case kinds. Based on his DHG study, orthodontists can predict that if the mandible is not treated and is not restrained with correct occlusion, it will grow by 1.2 to 1.5 millimetres for every millimetre the maxilla grows.

Jorge Rodríguez de Guzmán-Barrera et al (2017) 4 conducted a systematic review and meta-analysis and concluded that although skeletal anchorage may be shown to be a successful treatment for skeletal Class III malocclusion, there isn't any conclusive proof that it performs better than other conventional treatments like disjunction and face mask.

CONCLUSION

Skeletal class III malocclusions if diagnosed and intercepted at appropriate age significantly reduce the severity and length of comprehensive orthodontics at a later stage. The penta-helix appliance described above was efficient enough in correcting the goals of the interceptive orthodontics.

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