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Early Correction of Class III Malocclusion with Combination Therapy

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Abstract

A clinical report describing a class III malocclusion characterized by maxillary retrusion. An 8-year-old male patient underwent treatment utilizing an orthopedic face mask in conjunction with rapid maxillary expansion. Treatment was completed within a three-month timeframe and exhibited enduring stability.

Keywords: Class III malocclusion, face mask, rapid maxillary expansion

Introduction

Addressing class III malocclusion in growing patients presents a complex challenge in contemporary orthodontic practice. Extensive literature outlines various treatment modalities, incorporating both orthopedic and orthodontic interventions. These encompass intraoral and extraoral appliances, such as the facial mask (FM),^[1] the functional regulator-3 appliance of frankel^[2],removable mandibular retractor^[3],chincup^[4], splints, class III elastics^[5], and mandibular cervical headgear.^[6,7,8]

As per McNamara^[10] and Turley^[11], rapid maxillary expansion (RME) could augment the protraction efficacy of the face mask by perturbing the maxillary suture system. It is widely acknowledged within the orthodontic community that treating mid-face deficient class III patients is advisable before the age of 7 to 8 years^[12].

Rapid maxillary expansion (RME) combined with facial mask (FM) therapy represents the prevailing orthopedic treatment protocol for class III malocclusion ^[13]. The dental and skeletal alterations elicited by this therapeutic protocol stem from its concurrent influence on both maxillary and mandibular structures. The ideal timing for initiating orthopedic intervention for class III malocclusion is associated with early treatment intervention, either during the prepubertal or pubertal stages of development ^[14].

Characteristics of class III malocclusion include:

- 1. A class III molar relationship
- 2. An edge-to-edge incisor relationship or anterior crossbite
- 3. Narrow and short upper arch paired with a broad lower arch, often leading to posterior crossbites
- 4. Pseudo class III malocclusion, distinguished by occlusal prematurity prompting habitual anterior

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positioning of the mandible, potentially manifesting as a forward path of closure.

Skeletal features of class III malocclusion include:

- 1. A short or retrognathic maxilla
- 2. A long or prognathic mandible
- 3. A combination of the abovementioned features.

Etiology of class III malocclusion may include:

- 1. Class III malocclusion frequently demonstrates significant hereditary predispositions.
- 2. Anteriorly positioned tongue
- 3. Abnormal incisal guidance (pseudo class III).

Indications and contraindications of early class III treatment^[15,16]

The objectives of early interceptive treatment may include:

- 1. Halting the advancement of irreversible soft tissue or skeletal alterations.
- 2. Enhancing occlusal functionality.
- 3. Addressing skeletal discrepancies for improved harmony.
- 4. Streamlining phase II comprehensive treatment and reducing the necessity for orthognathic surgery.
- 5. Enhancing facial aesthetics to promote positive psychosocial development in children.

Treatment of Developing Class Iii Malocclusion

It is imperative to carefully consider the management approach for developing Class III malocclusion, weighing the options of initiating treatment or awaiting further dental development and growth. While Class III malocclusion may manifest during the developmental phase of dentition, a decision must be made regarding the optimal timing for intervention or deferral. The timing of early treatment plays a pivotal role in achieving favorable outcomes. Some research suggests that treatment should commence in patientsunder 10 years of age to optimize orthopedic effects. Conversely, other studies indicate that patient age has minimal impact on treatment response and outcomes. Currently, there is insufficient strong evidence to conclusively support the benefits of early intervention.

The primary objectives of early intervention include fostering an optimal growth environment and enhancing occlusal harmony, such as rectifying crossbites and enhancing facial aesthetics. Therefore, initiating interceptive treatment for Class III malocclusions is advisable when it mitigates oral tissue damage and prevents or minimizes the need for future orthodontic and surgical interventions.

Turpin devised a set of criteria encompassing both positive and negative indicators to aid in the decisionmaking process regarding the management of Class Ш malocclusions. developing Campbell subsequently reviewed these guidelines to determine the appropriate timing for intercepting Class III malocclusions. Turpin advocated for early interceptive treatment in cases demonstrating favorable characteristics outlined in the guidelines. Conversely, individuals exhibiting negative indicators were advised to defer treatment until growth completion. Additionally, Turpin advised patients of the potential necessity for future surgical intervention, even following successful early interceptive treatment.

Case Report

An 8-year-old male patient presented to our department with a chief complaint of anterior crossbite. The patient had an unremarkable dental and medical history, with no identified habits. Upon extraoral examination, the patient exhibited a concave profile, anterior divergence, and an acute nasolabial angle. Functional assessments yielded normal results.

Intraoral examination revealed normal soft and hard tissues, with a constricted maxillary arch and a broad

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mandibular arch. Molar, canine, and incisor relationships were classified as class III bilaterally, accompanied by a 2 mm reverse overjet and a 5 mm overbite, along with anterior crossbite. Additionally, the patient presented with a retrognathic maxilla and a prognathic mandible, demonstrating an average growth pattern, with labially tipped mandibular incisors.

The treatment objectives encompassed several key goals:

- 1. Intruding and proclining the upper incisors.
- 2. Retroclining the lower incisors.
- 3. Achieving a class I canine relationship.
- 4. Establishing ideal overjet and overbite.
- 5. Attaining ideal aesthetics.

The patient underwent treatment utilizing a combination of a face mask and rapid maxillary expansion (RME) until achieving a 2 mm positive overjet. The expansion screw was activated by one turn (0.25 mm/turn) daily until the desired amount of expansion was attained. The face mask was adjusted to securely fit on the patient's forehead and chin. Elastics (5/16 inch by 14 ounces) were applied from hooks positioned 2-3 cm anterior to the lips to intraoral attachments situated on the expansion appliance, approximately at the gingival level of the canine teeth. The elastics exerted a bilateral force of 600-800 g. Following one month of orthopedic correction, the pre-adjusted edgewise appliance was initiated.

Pre-Operative Image





Frontal view



Left profile



Right profile



Treatment outcomes revealed notable enhancements in maxillomandibular relations over the treatment duration, primarily attributed to the increase in the Sella-nasionpoint A (SNA) angle. The Sella-nasion-point B (SNB) angle exhibited no significant alterations during protraction. Dental measurements indicated a tendency of upper incisor flaring during the treatment, while lower incisors demonstrated significant up righting. There were no significant changes in upper or lower molar angulations observed during treatment.

Post Operative Images



Pre-Operative



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Post Operative



Discussion

This case report presents the outcomes of early-stage treatment for patients with class III malocclusion using an effective orthodontic approach involving rapid maxillary expansion (RME) combined with maxillary protraction.

Class Ш combination therapy represents а comprehensive non-surgical treatment approach tailored addressing developing for skeletal class III malocclusions. integrating By orthodontic and orthopedic techniques, this treatment strategy aims to enhance the patient's occlusion and facial profile effectively. In appropriately selected cases, this therapeutic approach can serve as a viable alternative, meeting the patient's preference to avoid surgical intervention or premolar extraction.

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