

Management of Skeletal Class III Malocclusion with a Combined Approach of Facemask Therapy & Fixed Orthodontic Treatment - A Case Report

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Abstract:

A case report of an adolescent girl with a skeletal Class III malocclusion is presented. The associated clinical features of skeletal Class III are presented and management of such condition is discussed. The need for early identification and intervention of the skeletal Class III malocclusion is universally accepted by dentofacial orthopaedicians. Early intervention is associated with a better orthopedic response. Thus, treatment in the mixed or early permanent dentition can produce favorable results. Overcorrection of skeletal class III is recommended because treated patients grow similar to untreated Class III patients after treatment. Functional orthopaedic treatment rendered at an appropriate age ensures desired results in most cases. The intent of this article is to discuss the non-surgical treatment of a skeletal class III malocclusion along with a rationale of orthodontic management of such patients.

Key words: Skeletal Class III malocclusion, Orthopedic force, Face mask therapy.

Introduction:

True Class III malocclusions are difficult to treat because they reflect basal bone discrepancies and there are many limitations in adopting conventional treatment mechanics in these cases. Early intervention with extraoral traction appliances can be done judiciously in such cases to a great advantage. Retrognathic maxilla ideally requires forward maxillary movement. For Prognathic mandible, mandibular growth inhibition or redirection is desirable. One important application is to move repositioned maxilla forward by means of a reverse pull headgear. Delaire reintroduced facemask therapy for maxillary protraction in 1976, more than a century after it was first described in Germany.

Class III malocclusions are usually growth-related discrepancies which often become more severe by the time the growth is complete. This factor tends to make the treatment of Class III malocclusions more complicated, and the use of somewhat unusual appliance systems is often required.

Case report:

Diagnosis & Etiology :

A 11 year-old female patient presented with a chief complain of unpleasant facial appearance while smiling and inability in cutting food with the front teeth. On extraoral examination, the patient had a concave profile, slightly retruded maxilla and the lower lip positioned ahead of upper. The nasolabial angle was obtuse and the lower face height appeared to be decreased. Intraoral examination revealed

fairly well-aligned lower arch and moderately crowded upper arch with labially placed and highly erupting canines. In occlusion, there was an anterior crossbite with a negative overjet of 3mm along with a presence of a posterior crossbite. Cephalometric evaluation confirmed the case to be a skeletal Class III malocclusion on account of maxillary deficiency.

Treatment objectives :

Because of the skeletal nature of the malocclusion and anticipated good co-operation from the patient, a non-surgical orthodontic treatment plan was recommended. Following were the treatment objectives:

1. Improvement of soft tissue profile.
2. Correction of anterior as well as posterior cross bite.
3. Achievement of well-aligned dental arches with class I canine & molar relationship.

Treatment Plan :

Orthopaedic face mask therapy to correct maxillary retrusion was planned followed by finishing and detailing using fixed appliances. Initially maxillary expansion was carried out using Jack screw expander incorporated in maxillary posterior bite plane for the disjunction of circum-maxillary sutures. A Petit type face mask appliance was then used for the protraction of maxilla. Initially the force levels were kept at 600 gms. Later, the force levels were increased to approximately 1 kg. to pull the entire maxilla in forward direction. The orthopaedic elastics were engaged to the central rod of face mask at 20 degree angulation to pull the maxilla in a forward and downward direction. The reverse pull face mask was continued for 12 months. A minimum wear of 14 hrs per day was advised. After one year of appliance wear, elastic traction was discontinued. The expansion appliance was left in place for 3 months to retain the expansion achieved. Three months later, with no sign of relapse, intraoral and extraoral appliances were discontinued.

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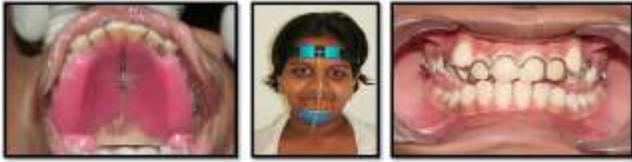


Fig.1: Extraoral And Intraoral Photographs of Patient During Face Mask Therapy



Fig.2: Intraoral Pre And Post Functional Photographs of Patient

Progress records obtained 15 months later, at age 13, showed full eruption of the permanent dentition and a stable occlusion with highly placed maxillary canines. Cephalometric analysis indicated that maxillary protraction and a positive overjet of about 3mm was achieved. In the second phase of treatment, upper and lower arch strap-up was done using 0.022" MBT pre-adjusted edgewise appliance for the detailing of occlusion. The patient was reviewed every month during the fixed orthodontic treatment (Fig. 1-4).

Discussion:

Dentofacial deformities characterized by midfacial deficiency or true mandibular prognathism are difficult to manage nonsurgically. An accurate diagnosis, which includes an analysis of the relationship between the maxilla and the mandible to determine the nature of the skeletal discrepancy is required; as the treatment, to a large extent, is based on this differential diagnosis. It is particularly important to determine whether the mandible, on closure, is in centric relation or in a 'convenient' anterior position. The practical implication is that a Class I problem can appear to be a Class III malocclusion (pseudo-Class III malocclusion) when the mandible is forced anteriorly. Even a true Class III malocclusion can appear much more serious if there is an anterior path of closure of the mandible.

Growth modulation in a growing patient is useful in improving the maxilla-mandibular relationship. The mobilization of circum-maxillary sutures facilitates forward movement of maxilla. The treatment was started as early as possible to take the advantage of the patient's pubertal growth spurt. The orthopaedic elastics were engaged to the central rod of face mask at 20 degree angulation to pull the maxilla in a forward and downward direction because it functions in the same direction as that of the direction of maxillary development. The anchorage of the face mask for the



Fig.3: Pre And Post Functional Profile Photographs of Patient



Fig.4: Intraoral Photograph During Fixed Orthodontic Therapy

maxillary advancement was taken from two areas in the orofacial region. One was the forehead; the other was the chin. Patients with skeletal class III patterns generally continue to grow in that direction after active treatment. Because the relative growth velocity of the maxilla compared to the mandible remains constant, over correction is required to ensure long-term stability. In this patient, throughout active treatment there was no increase in effective mandibular length while, effective maxillary length increased by 2 mm. The profile improvement from concave to straight was thought to be a combined effect of maxillary protraction as well as clockwise rotation of mandible which made the mandible look less prognathic.

Conclusion :

The case report demonstrates that skeletal class III malocclusion on account of a deficient maxilla can be successfully managed with the help of growth modulation by means of a face mask therapy. It also improves skeletal bases along with soft tissue profile and gives better lip competence. Careful case selection, good patient cooperation and deliberate over correction ensure long term stable results.

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