



Camouflage of Class III Malocclusion by the Maxillary Protrusion and Retrusion Of The Mandible Using a Removable Functional Appliance Model: Case Report

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Received Date: October 03, 2022; **Accepted Date:** November 02, 2022; **Published Date:** November 08, 2022

Citation: Wilfredo Molina Wills, Researcher at the University Latina of Panamá, Camouflage of Class III Malocclusion by the Maxillary Protrusion and Retrusion Of The Mandible Using a Removable Functional Appliance Model: Case Report, J Clinical and Medical Research and Studies. 1(2).

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Abstract

The objective of this case report was to present the camouflage of class III malocclusion with functional forces using a type 4 morpho-functional inducer. **Methods:** The patient was a 10-year-old Latin girl. Patient in front and profile was carried out. The position of the left and right superciliary arches, the position of the orbital cavities, and the position of both labial corners were evaluated. Similarly, the type of profile of the patient, the degree of concavity, the position of the lower lip concerning the upper lip, and the position of the chin concerning the nose and forehead were evaluated. In the lateral cephalometric analysis, the sagittal position of the maxilla and mandibular was evaluated through the SNA and SNB angles as well as the level of discrepancy obtained by the ANB angle. SNA before treatment was 79 degrees and SNB 87 and ANB -3 Results: after treatment, the SNA angle varied to 86 degrees, the SNB to 84, and ANB to 3 degrees. The linear measurement between the projection of points A and B to the Frankfort plane before treatment was - 2mm and after + 2 mm. The incisive angles changed to camouflage. The upper incisor angle before treatment was 122 degrees and after 118. The lower incisor angle before treatment was 96 degrees and suffered a decrease of 1 degree. **Conclusion:** The treatment of class III in skeletal using morpho-functional inducers in well-diagnosed cases and young patients is an alternative that allows obtaining favorable results that allow avoiding surgery.

Keywords: malocclusion class III; removable appliances ; functional forces

INTRODUCTION

Although class III treatments with surgery and orthodontics have been documented, major controversies seem to present themselves with the early treatment of this anomaly, especially in mixed dentition (1). However, the use of intraoral devices at these ages such as inclined planes (2) or other functional devices such as the therapeutic benefits of morphofunctional inducers have also been published(3)

Dentofacial deformities of class III characterized by midfacial deficiency or mandibular prognathism are difficult to manage nonsurgically. There are three main treatment options for skeletal class III malocclusion: growth modification, dentoalveolar compensation, and orthognathic surgery. Growth modification should be commenced before the pubertal growth.

It has been suggested that a majority of subjects with a class III malocclusion display maxillary retrusion . Similarly, it has been reported that two-thirds of skeletal class III malocclusions are due to maxillary retrognathism or a combination of maxillary retrognathism and mandibular prognathism, (4)

The compensatory movement of incisors to produce non-surgical camouflage in class III skeletal cases has been considered by some authors. The vestibular inclination of the upper incisors and the lingual inclination of the lower ones have been part of the compensatory mechanisms in the treatment of class III, (5).

Orthodontic camouflage is a viable alternative for the treatment of mild to moderate skeletal discrepancies of the maxillary structures, correcting malocclusion and at the same time the skeletal problem. Pseudoclass III are problems with skeletal pattern is harmonic class I, but with a vestibular position of the lower teeth, (6) treatment may involve stimulation and guidance of maxillary growth by orthopedic forces in some cases of class III malocclusion.

In non-surgical treatments, traction methods have been used for cases of maxillary deficiency. These methods are intended to modify and reorient the growth of the maxilla and with a facial

impact, (7). Maxillary protraction therapy is based on the cellular response that occurs at the level of the sutures, in many cases there is a favorable response to orthopedic forces using non-surgical treatments, (8).

Early treatment in the case of class III with the use of retrolabial shields can influence the bone remodeling of the premaxilla, (9). Decreased nasomaxillary growth is a development problem that gives rise to a class III maxillo-mandibular relationship, which produces large compromises aesthetic and functional.

Early intervention with orthopedic maxillary protraction provides a nonsurgical alternative. A combination of maxillary protraction and rapid maxillary expansion has been used to treat young Class III patients with maxillary deficiency. The results of clinical studies have indicated that the application of an orthopedic force to the cranio-facial complex during the early phase of growth can contribute to the treatment of class III malocclusion (10). Moreover, in the early stages of the pubertal phase in many cases, the treatment consists of protruding the premaxilla and producing a posterior rotation of the mandible.

Another important aspect in the treatment of class III is the control of sagittal growth of the mandible. In this case, the arches of the Eschler type fulfill the function of fixing the mandible in a position of functional posture that has been previously established through a constructive bite relationship and in the same way, cause a posterior rotation of the mandible.

The objective of this study was to evaluate the clinical results of the class III treatment with a removable appliance model of morphofunctional inducer type 4.

CASES REPORT

Case

The patient was a 10-year-old Latin girl whose chief concern was anterior crossbite and an anesthetic smile due to the position of the lower incisors. The lower incisors cover the vestibular area of the lower ones up to the middle third. The vestibular area of the lower



incisors was observed elongated and with gingival recession. The left lip commissure was higher to the right and was located lateral to the inner pupillary line. The right superciliary arch was higher than the left. She had a 2 mm anterior crossbite and impaired facial balance.

ETIOLOGICAL FACTORS AND DIAGNOSTIC ELEMENTS

Hereditary factors related to malocclusion were not obtained. The frontal facial photographs showed a prognathic mandible and a Class III appearance (fig 1). The profile picture (fig 2) showed that the projection of the line joining the points Chin and lower lip was located ahead of the tip of the nose. Slightly concave profile, thick and prominently lower lip. The upper lip looks relatively short and the chin is slightly elongated. Before treatment the line of the lip corners is inclined with the right side being the lowest.

Intraoral evaluation

The pretreatment intraoral photographs (Figs 5, 6 and 7) showed Class III molar and canine relationships, 2.1 mm anterior crossbite. Cephalometric analysis (Fig 8) revealed a Class III skeletal pattern. The incisal edge of the lower incisors covered until the middle third of the superiors. The top of the left lower canine was related to the Centre axis of the left upper incisor Crown. Similarly, was a detour of the dental midline towards the right side was observed.

Cephalometric analysis before and after treatment
The ANB angle of -3 and the SNB angle of 87 indicated a prognathic mandible. The projection of the points A and B respectively on the Frankfort plane suggest a linear relationship - 2 mm, confirming the skeletal nature of the malocclusion. Based on these findings, this patient's malocclusion can be said to be due primarily to a skeletal difference between the maxilla and the mandible, which resulted in dental tipping and extrusion on the anterior areas.

Lip and commissural line analysis before and after treatment
The lip position before and after the treatment was evaluated with the following results: before the treatment the prominence of the lower lip over the upper lip was observed and in the same way, the line of the lip corners had a lower position on the right side of the patient. After the treatment, the lower lip occupied a harmonious position concerning the upper one and the line of the lip corners had been balanced.

Treatment Objectives With Removable Appliance And Using Functional Forces

The main objectives were: protrusion of the maxilla, avoid the longitudinal growth of the mandible, stabilizes the occlusion plane, and adjust the canine and molar key and retraction of the mandible. Similarly, correction of the anterior crossbite, establish normal overjet and overbite and coordinate the arch forms and improving the better possible Patient's facial profile.

TREATMENT PROTOCOL AND RESULTS

The Class III malocclusion and prognathic mandible was treated with removable functional appliance. This appliance has the following elements: Maxillomandibular arch, upper retro labial shields, upper acrylic plate, expansion screw, dorsal arches with rubber tubes, and a guide plane. retrusion of the maxilla was treated by activation of the upper retro labial shields of the device which were maintained with a separation of 2 millimeters from the vestibular mucosa of the premaxilla. The treatment period was of 4 months to achieve satisfactory results for elimination of the previous anterior crossbite, the expansion screw was activated every 3 weeks to eliminate the bilateral posterior crossbite that the patient had and the guide plane helped the protrusion of the upper incisors to eliminate the anterior crossbite. The patient showed improvement and increased soft tissue balance during and after treatment. The retrusion of the mandibular was guided by the maxillomandibular arch that remained located at the level of the gingival third of the vestibular area of the lower incisors. Similarly, a class I molar and canine relationship was achieved, as well as the balance of bilateral occlusion in the premolar and molar zone. Cephalometric evaluation before treatment showed an SNA angle of 79 degrees and an SNB of 87. After treatment the SNA angle was 86 degrees and the SNB was 84. The projection perpendicular to the Frankfort plane of points A and B before treatment showed a linear measurement of -2mm and after treatment of + 2 mm. These angular and linear measurements show the presence of a true class III as well as the correction achieved after treatment.

shape with smooth surface. The particles are observed aggregated might be due to the sticky nature of polymer. In particle size analysis,



Fig 1: The photograph shows the prominence of the lower lip and the inclination of the line of the lip commissural which is lower on the right side.



Fig 2: The lip commissure is balanced after treatment.



Fig 3: It is observed that the line from the chin to the lower lip projects in front of the nasal tip before treatment.



Fig 4: It is observed that the line from the chin to the lower lip is projected by the anterior nasal third after treatment.



Fig 5: It is possible to observe an anterior and bilateral crossbite



Fig 6: Palatal inclination of the upper teeth and complete cross bite are observed.



Fig 7: It is possible to observe the palatal inclination of the upper canine and incisors



Fig 8: Lateral cephalometric radiograph before treatment where mandibular prognathism and the patient's concave profile are observed.



Fig 9: Lateral cephalometric after the treatment where it is observed that the sagittal relationship of the mandible has been compensated with camouflagé and the previous inverted bite has been eliminated

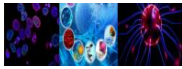


Fig 10: After treatment, the previous crossbite has been removed and there is an acceptable overbite.



Fig 11: Right laterality after treatment, Canine class I observed



Fig 12: Left laterality after treatment, Class I canine relation is observed, there is no cross bite and there is good overbite and overjet

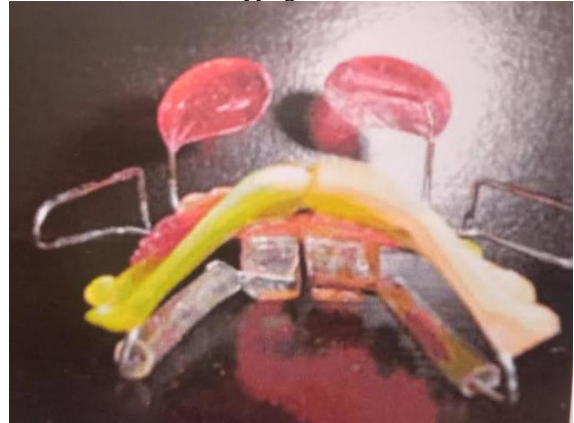


Fig (13)



Fig (14)

Retrolabial shields green arrows, acrylic plate palatine blue arrow, expansion screw violet arrow, yellow arrow telescopic tubes and rubber tubes for black arrow dorsal arches (fig 13). Red arrow dorsal arches, maxillo-mandibular arch long black arrow and for the plane guides the long blue arrow (fig 14).

DISCUSSION

The importance of the results of camouflage with this type of morpho-functional inducer is that it represents an alternative to avoid surgery in well-diagnosed cases and preferably in mixed dentition. This type of functional appliances pulls the bottom of the vestibular groove by traction of the upper lip through the use of retrolabial shields. And independently, it sagittally orients the position of the mandibular through the maxillo-mandibular arch. This is an important difference with many other functional appliances. Some studies demonstrate the efficacy of class III treatment with this type of removable device and were presented as an alternative to uncross the previous crossbite between one and 8 months of treatment (3). Some authors have presented orthodontic camouflage for mild skeletal discrepancies as a treatment option obtaining favorable aesthetic results in soft tissues and resolving malocclusion, (11). The most difficult decision between doing camouflage or surgery should be based on the need to answer whether the dentofacial aesthetic improvement achieved with surgery is worth the cost of the risk of treatment to the patient. Similarly, it is difficult to predict whether the results of surgery will be optimal, (12), for this reason, camouflage can be considered as an alternative to responding to this malocclusion.

Ethical aspects

All ethical aspects according to Helzinski's statement were observed. The authorization for this case study was granted by the College of Dentistry of the state of Mérida Venezuela.

Conflict of interest

The authors declare that there is no conflict of interest between them or with any institution.



CONCLUSION

The treatment of class III in skeletal using morpho-functional inducers in well-diagnosed cases and young patients is an alternative that allows obtaining favorable results that allow avoiding surgery. The combination of premaxilla traction and simultaneous mandibular retrusion shortens the treatment time.

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