



Prospective cephalometric study of the effects of maxillary protraction therapy associated with intermaxillary mechanics

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Abstract

Objective: The early diagnosis and treatment of skeletal Class III (Pattern III) is still a much debated topic in orthodontic literature. Maxillary protraction associated with rapid maxillary expansion is the most popular and widely researched approach, producing the best results in the shortest period of time. This study aimed to evaluate the gradual changes that occur in the dentofacial complex in children with Pattern III growth treated with maxillary protraction associated with intermaxillary mechanics. **Methods:** The sample consisted of 10 patients with Pattern III, whose mean age was 8 years and 2 months at the beginning of treatment, consecutively treated with a modified Haas expander, modified lingual arch, intermaxillary elastics and Petit facemask for maxillary protraction during a 9-month period. Four lateral cephalograms were taken of each patient, one at the beginning of treatment and the other three at regular 3-month intervals (T1, T2, T3 and T4). Cephalometric measurements at each of the four times were compared using ANOVA variance for repeated measures and supplemented by Tukey's multiple comparisons test. **Results:** It was observed that the most significant skeletal changes occurred in the first 3 months of treatment. After that period the changes remained constant until the end of treatment. There were few dental compensations and the vertical changes which occurred showed reduced clinical significance. **Conclusions:** The therapy used in this study accomplished not only the correction of overjet but also improvements in the sagittal relationship of the basal bones and in soft tissue esthetics.

Keywords: Prognathism. Palatal expansion technique. Extraoral traction appliances. Malocclusion.

Editor's summary

Despite the low prevalence of Class III malocclusion compared to other malocclusions, its salient facial characteristics lead to the need for early therapeutic approaches. The treatment of

this malocclusion represents a major challenge to the orthodontist in their clinical practice due to its complex control and difficulty in predicting the morphogenetic growth pattern of the patient into adulthood. Among the modalities for

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early treatment of Class III malocclusion, maxillary protraction is the most widespread and studied protocol in the orthodontic literature. The authors' proposal with the present work was to evaluate the effect of maxillary protraction associated with the use of intermaxillary mechanics by using Class III sagittal elastics. To this end a cephalometric study was carried out with a sample of 10 patients, 6 females and 4 males, consecutively treated with the modified Haas expander followed by the use of a Petit facemask for maxillary protraction for a period of 9 months. The facemask was used associated with Class III oriented elastics anchored on the expander and on a modified Nance lingual arch. The dental, skeletal and soft tissue changes were evaluated through

lateral cephalograms obtained at four different times: T1) beginning of treatment, before the installation of appliances; T2) after 3 months of treatment; T3) after 6 months of treatment; and T4) after 9 months of treatment, immediately before the removal of the appliances. After data collection, statistical tests were applied. The results showed that the most significant skeletal changes occurred in the first 3 months of treatment, and then these remained constant until the end of treatment. Few dental compensation and vertical changes occurred, showing low clinical significance. Thus, the authors conclude that the therapy not only achieved overjet correction, but also an improvement in sagittal relationship between the bone bases and in the facial esthetics.



FIGURE 1 - Orthodontic appliances used in the present study.

Questions to the authors

1) What were the real gains obtained by adding the elastic-oriented therapy with Class III facemask?

Our idea was to evaluate the effects of intermaxillary forces incorporated into the maxillary protraction therapy by means of RME and Petit facemask, as some authors reported in the literature the use of intermaxillary forces in order to maximize the skeletal effects of maxillary protraction¹⁻⁴. These authors suggest that by increasing the force applied to maxillary protraction, the displacement

of the maxilla is increased. Thus, we seek to enhance this effect in growing patients without the need of skeletal anchorage resources or ankylosis of deciduous canines. With this purpose, a lingual arch reinforced by vestibular hooks was used, and hooks on the distal of the Haas expander for using Class III elastic that applied 200 to 350 grams, 24 hours a day. However, by comparing our findings with the results described in the literature, it is observed that the therapy used here could not significantly increase the desired effect in orthopedic interceptive

Pattern III treatment. However, in some very cooperative patients, a greater skeletal effect was obtained⁵. This proves that the patient's cooperation is essential to obtain good results with maxillary protraction⁶ and the use of higher strength levels for these patients can be quite beneficial.

2) The use of intermaxillary elastics could not increase the effect of orthodontic therapy?

This was one of our initial questions when we started this research, in addition, of course, to evaluating the dental and skeletal effects induced by maxillary protraction therapy during this treatment (with cephalometric evaluations every 3 months). Thus, the results made it clear that the concomitant use of facemask and intermaxillary therapy, as proposed in the current article, does not maximize the dentoalveolar participation in

the treatment; but it was also not possible to significantly enhance the skeletal effects of the therapy. However, our major finding was that, among the incremental effects occurring during treatment, virtually all significant skeletal changes occurred in the first 3 months of treatment, and thereafter they remained fairly constant until treatment end.

3) Do you intend to continue this research line? What are your future studies?

Yes, our intention is to continue studying ways to treat the Pattern III in growing patients. Unfortunately, as we have no Pattern III patients longitudinal control group, we intend to increase the sample presented and compare it with other different maxillary protraction methods, as the isolated use of facemask, chin-cup with hooks (Skyhook), among others.

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