Outline of the Thesis Class III correction using an inter-arch spring loaded module

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A THESIS

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The use of the facemask in the treatment of Class III malocclusion

The main appliance in the early correction of Class III patients is the facemask appliance. The facemask is a removable appliance that achieves its desired effect by using the forehead and the chin as anchorage. Elastics are then hooked in a down and forward vector from a maxillary appliance to the bow of the facemask. 12 ounces of force is applied bilaterally and the patient is asked to wear it for 12-14 hours per day¹¹. The main goal of this facemask is to provide skeletal correction by limiting growth of the mandible and protraction of the deficient maxillary complex in a down and forward direction. While this is thought to be the main effect, da Silva Filho⁶⁹ also notes that this appliance also rotates the mandible down and back, distalizes mandibular teeth, and mesializes of the maxillary teeth and states that this is how the correction occurs⁶⁹.

Many studies have been done to evaluate the effectiveness of the facemask in the skeletal correction of Class III malocclusions? In his study, $Chong^{70}$ agrees with Da Silva because of downward and backward rotation of the mandible⁷⁰. Nartallo⁷¹ adds that both skeletal and dental effects are involved in the correction⁷¹. Even with a dental component, Pangrazio-Kulbersh⁵⁷ established the stability of facemask treatment in comparison to a surgically corrected group⁵⁷. Another paper that studies the effects of facemask treatment is a study done by Ngan et. al⁶¹. In this paper, a method of cephalometric evaluation described by Bjork and Pancherz^{72, 73} is used to analyze changes brought about by facemask therapy. 30 patients serving as their own control were treated with RPE and facemask for 6 months. His results suggest an average forward movement of A pt., backward rotation of the mandible, proclination of maxillary incisors, and retroclination of the mandibular incisors, which led to a 6.2 mm overjet correction⁶¹. Baccetti⁷⁴, in another paper, looked at how age effects treatment outcomes with a bonded RPE and facemask. He found that in the early treatment group (6.8 years ± 0.6 years) a significant forward

movement of A point occurred, while in the late treatment group (10.3 years \pm 1.0 year) no significant A point movement was achieved. Both group showed a restriction in mandibular length, but the result was more noted in the early treatment group⁷⁴. In another of his papers, Baccetti⁷⁵ looked once again at the optimal timing for treatment with a bonded RPE and a facemask. Once again he found that the early treatment group (7.0 years \pm 0.6 years) showed a significantly more forward movement of A point than the late treatment group (8.7 years ± 1.0 years). A restriction of mandibular growth was seen in both groups with a more upward and forward direction of condylar growth. In the late treatment group, a more pronounced down and backward rotation of the mandible was seen with an increase of lower anterior facial height. Post-treatment, Baccetti found that Class III growth patterns returned in the absence of any skeletal retention appliances⁷⁵. Westwood⁷⁶, in her paper also found a return to Class III growth patterns once treatment was complete and recommends an overcorrection during facemask treatment. The results of this present study on the CS2000® appliance will be indirectly compared to the results of these papers. This will then suggest the usefulness of the CS2000® appliance in the correction of Class III facial types as indirectly compared to the facemask.

CHAPTER III: MATERIALS AND METHODS

Experimental Design and Methods

The treatment group consisted of 75 patients who were treated consecutively with the CS2000® appliance at the offices of Dr. Mike Williams in Gulfport, MS. The inclusion criteria were:

1) No previous orthodontic treatment

- 2) Patients in the early mixed to early permanent dentitions (ages 6 to 15)
- 3) Patients had a pre-treatment Wits measurement less than 0 mm
- Patients received comprehensive orthodontic treatment with CS2000® appliance
- 5) Pre-treatment and post-treatment records between 8 months and 2 years

The exclusion criteria included poor quality radiographs and missing radiographs from either time point (pre-treatment or post-treatment). The final sample size consisted of 30 patients (15 males and 15 females). The mean age of the pre-treatment starting sample was 9.6 ± 2.1 years (**Error! Reference source not found.**). The treatment record consisted of lateral cephalometric radiographs taken before treatment began with the CS2000® appliance (pretreatment, T1) and at completion of treatment with the CS2000® appliance or two years into treatment (post-treatment, T2). The average treatment time was 1.3 ± 0.3 years. Note that for a few of the patients included in the study, actual treatment with the CS2000® appliance continued beyond the T2 records. However, to control the variability in the length of treatment time, a maximum of 2 years between pre and post-treatment records was included in the inclusion criteria. Also note, once treatment with the CS2000 appliance was complete, patients continued with comprehensive braces to finalize treatment.

Overall Correction produced by the CS2000 appliance

In a final calculation of treatment effects of the CS2000® appliance, it was found that total overjet correction was 5.0mm and total molar relationship correction was 4.8mm. For both overjet and molar relationship correction, around 60% (60% and 62% respectively) were seen from skeletal changes in A pt., which protracted forward 1.5 mm and moved downward 2.5 mm.

The hypothesis tested was that The CS 2000® provides no significant sagittal, vertical, or angular changes between T1 (pre-treatment) and T2 (post-treatment) as measured by lateral cephalometric radiographs.

Conclusion

The hypothesis was rejected due to the findings of the following statistically significant variables observed:

- 1.) Significant sagittal, vertical, and angular changes were seen between the pre-treatment and post-treatment. The maxillary base was found to move 1.5 mm forward, while the mandibular base moved 1.5 mm posterior. ANB and Wits measurements improved a significant level throughout treatment as well. The maxillary incisor moved forward 2.6 mm while the mandibular incisor only move 0.6 mm forward. The maxillary molar moved 1.2 mm forward while the mandibular molar moved 0.6 mm posterior. These sagittal, vertical, and angular changes contributed to the overjet and molar relationship correction.
- 2.) The average overjet correction found a skeletal contribution of 60 % and a 40% dental contribution. The molar relationship correction found a 62% skeletal influence a 38 % dental contribution.