

Developing Facial Symmetry Using an Intraoral Device: A Case Report



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Note: Dr. Belfor and Dr. Singh developed and have a U.S. Patent pending on the Homeoblock™ appliance, the device described in this article.

ABSTRACT

This case report introduces a new intraoral device, the Homeoblock™ appliance (Orthovisage Inc; New York, NY), which produces cosmetic facial enhancement without an invasive procedure. Furthermore, this particular case demonstrates widening of the arch form and smile, and reduction of the buccal corridor without reducing tooth structure. Indeed, robust geometric analysis was undertaken to confirm the clinical findings, which localized and quantified the facial regions in which changes produced by the intraoral device were identifiable. This new intraoral protocol may be used in cosmetic dental practice as an alternative to surgery or other invasive procedures to enhance facial esthetics.

This report demonstrates that an intraoral device can also produce significant facial changes, with increased symmetry and, presumably, facial volume, in the adult.

CASE REPORT

This case study reports facial changes that are consistent with increased facial symmetry and, perhaps, facial volume. A 38-year-old male with no relevant negative medical history requested treatment to improve his smile. On examination it was found that the upper arch was crowded, with an absence of the second bicuspid and the lateral incisors in a cross-bite relationship. Extraoral and intraoral photographs, as well as panoramic and cephalometric radiographs, showed no adverse findings. Alginate impressions were taken for study models and a Homeoblock device was fabricated. The device consisted of Adam's clasps on the first molars, a palatal expansion screw, a Hawley labial bow from cuspid to cuspid, flap springs for the anterior teeth, and a bite block on the left (Fig 1).

On insertion, the patient was instructed to wear the appliance every evening and throughout the night. Once a week the expansion screw was advanced by one full turn (= 0.25 mm), which is about half the width of the periodontal ligament space. The patient reported for clinical adjustments and observation every three weeks; intraoral photographs were taken at each visit. The active treatment time was approximately 24 months, after which a retainer was provided. At the end of active treatment, extraoral and intraoral photographs were taken, as well as alginate impressions for study models. The extraoral facial photographs were assessed for morphometric changes, using MorphoStudio® software (www.orthovisage.com).

RESULTS

Clinically, it was evident that changes occurred not only in the dental arch but also on the face

(Fig 2). These changes included an increased symmetry of the eyes and the upper lip (Fig 3), and the reduction of the nasolabial groove on the left side of the face after treatment with the Homeoblock appliance. Figure 4 demonstrates the widening of the smile and reduction of the buccal corridors, which was achieved without any reduction of tooth enamel. Thus, the upper arch increased in symmetry, and the alignment of the anterior teeth was significantly improved (Fig 5).

Changes in facial appearance were also assessed using geometric morphometrics. The changes in the face were captured graphically (Fig 6), indicating a 30% increase in local size extending from the lateral canthus of the right eye to the angle of the mandible, and extending across the nasal and oral regions. A similar increase was found extending from the angle of the mandible across the face on the left side, allied with a 15% decrease in size from the left philtral crest to the oral commissure on

that side. In contrast, a 30% increase in relative size was localized in the mental region, using the pseudo-color scale. Other regions of the face, colored green, indicated areas where no increase or decrease in local size was identifiable. These pseudo-color changes indicate an esthetic increase of the buccal corridors.

... by remodeling the maxilla and mandible using a functional device, dentists can widen the smile and provide enough room to align teeth in adult Class I and Class II malocclusions.

DISCUSSION

This case report indicates facial changes achieved through the use of a non-surgical functional appliance, which indicates that dentists may be able to alter facial appearances using this new protocol. The idea of using dental appliances is not new; the first removable dental appliances date back to the 1880s. Kingsley¹



Figure 1: The Homeoblock™ appliance.

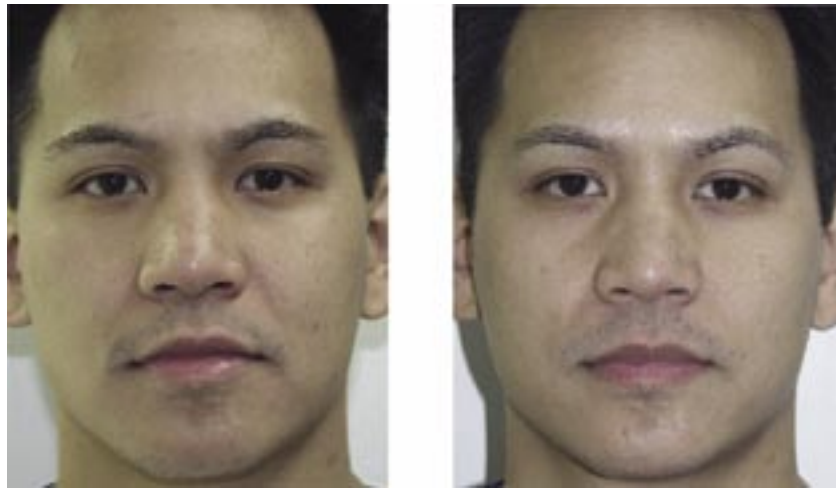


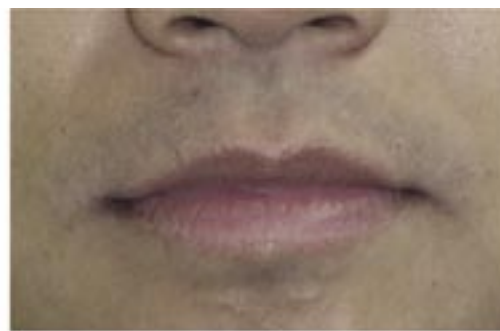
Figure 2

2a: Facial appearance prior to treatment. Note the asymmetry of the eyes and the upper lip, and the prominence of the nasolabial groove on the left side.

2b: Facial appearance after treatment with the Homeoblock appliance. Clinically, it is evident that changes occur, increasing the symmetry of the eyes, the upper lip, and the nasolabial groove on the left side.



3a



3b



3c

Figure 3

3a: The appearance of the lips before treatment. Note the asymmetry and uneven plane between oral commissures, as well as the depression of the nasolabial groove.

3b: Approximately 16 months after insertion; note the increase in symmetry of the lips and less prominent nasolabial grooves, as well as leveling of the plane between the oral commissures.

3c: Approximately 24 months after insertion; note the improved nasolabial appearance and enhanced symmetry of the lips.



Figure 4

4a: *The appearance of the smile before treatment.*

4b: *The appearance of the smile after treatment with the Homeoblock appliance. Note the widening of the smile and reduction of the buccal corridors, which was achieved without any reduction of tooth enamel.*



5a



5b



5c



5d

Figure 5

5a: *The form of the upper arch prior to treatment. Note that the lateral incisors are excluded from the arch and are in cross-bite.*

5b: *The changes in form of the upper arch after nine months of treatment with the Homeoblock appliance.*

5c: *The changes in form of the upper arch after 22 months of treatment.*

5d: *The form of the upper arch after 24 months (completion of active treatment). Note that the lateral incisors have moved into the arch and are no longer in cross-bite.*

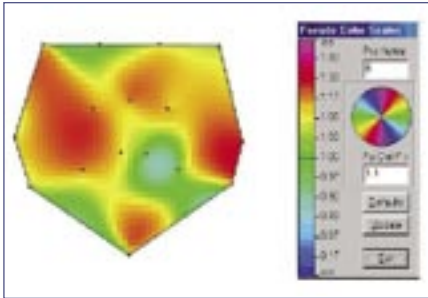


Figure 6: Graphic using geometric morphometrics (finite-element analysis)^{6,7} to compare facial form before and after treatment.

reported on the treatment of oral deformities and irregularities using removable functional appliances. Similarly, Haupl and colleagues² employed functional therapy, using intraoral devices and the muscles of mastication. More recently, orthopedic correction of condylar hypoplasia using a functional appliance was reported,³ producing remarkable changes in facial morphology in a patient diagnosed with hemifacial microsomia.

In less severe cases, clinical dental practitioners have been using functional appliances (such as Hawley appliances) for many years with good orthodontic results. This report demonstrates that an intraoral device can also produce significant facial changes, with increased symmetry and, presumably, facial vol-

ume, in the adult. This notion is consistent with the functional matrix hypothesis in a developing face,^{4,5} as bone remodels in response to functional stimuli. We can therefore hypothesize that altering the occlusal function and muscle action in adult patients, not only in children, may also produce facial changes.

Clinically, Class I and Class II malocclusions exhibit narrow maxillary and mandibular arches with crowded teeth, producing a narrow smile with dark buccal corridors. This case suggests that by remodeling the maxilla and mandible using a functional device, dentists can widen the smile and provide enough room to align teeth in adult Class I and Class II malocclusions. Simultaneously, this remodeling provides a better anatomical relationship between the teeth and their supporting structures. Accordingly, crowns and laminates can be applied with better proportion and symmetry, resulting in an enhanced cosmetic outcome. As the crowns and laminates are no longer required to correct the anatomical insufficiency of rotated teeth, their use can be more adeptly redirected to the achievement of optimal surface appearance. We are planning further studies based upon a larger sample of adult patients to

substantiate the preliminary findings reported here. *AS*

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