

ANTI-AGING MEDICINE AND ORTHODONTIC APPLIANCE THERAPY TREATMENT: AN INTERDISCIPLINARY APPROACH

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Introduction

Anti-aging is a branch of medicine focused on how to prevent, slow or reverse the effects of aging thus helping people to live longer and healthier lives. Recently, however, more evidence-based medicine has led to anti-aging becoming a multi-billion dollar industry with over 12 billion dollars spent in the USA alone. The recent medical literature and evidenced-based medicine shows that as we age, there seems to be loss of fat volume in some areas of the face, as well as a change in the morphology of the facial skeleton. Facial soft-tissue augmentation, by injection, has become increasingly popular as a minimally invasive option for patients seeking cosmetic facial enhancement. Replacing depleted soft tissue has allowed for a more comprehensive approach to total facial rejuvenation. It has been demonstrated that orthodontic treatment, with an intra-oral orthopedic dental appliance, (The Homeoblock™) enhances facial symmetry producing soft tissue changes consistent with improved facial esthetics.¹ This appliance can be added to the treatment protocol of facial injection to create a relatively non-invasive interdisciplinary approach to mid-face enhancement.

Abstract

It is the purpose of this article to demonstrate how the placement of dermal fillers for the reduction of lines/wrinkles and depressions in the face, in conjunction with orthopaedic / orthodontic appliance therapy, can produce desirable facial soft tissue enhancement. Via a case study we can demonstrate that the volumetric changes, achieved by this combined treatment approach, can produce a desirable result, namely a more youthful appearance.

Case study

A healthy woman, in her mid sixties, presented for treatment with a strong desire to improve her facial appearance. Her oral hygiene was good and there was no active periodontal disease. She exhibited headache symptoms and clinical examination showed a disc displacement, with reduction, on her right side with a maximum jaw opening of 38 mm. Her centreline was displaced two millimeters to the right and lined up when she opened less than 10 millimeters, indicating that she had a mandibular displacement to the same side. A Homeoblock appliance, with a 5 mm. bite block on the right side, (to decompress her TMJ) was fabricated and delivered. When she closed on the bite block,

her occlusion freed up and the muscles realigned the mandible so that her centreline now lined up correctly. Her headache symptoms were relieved in three weeks and her maximum opening was improved to 42mm. The patient continued Homoeoblock™ treatment for nine months. Intra-oral and extra-oral photos were taken to monitor treatment, as well as 3D stereo photogrammetry. Extra oral 3D digital photos were taken with a 3dMD facial capture system. A 3dMD/Kodak facial capture system and stereo photogrammetry were used to generate a clinically accurate digital model of the patient's facial surface. It uses a technique of stereo-triangulation to identify external surface features viewed from at least 2 cameras. This approach incorporates projecting a unique, random light pattern that is used as the foundation for triangulating the geometry in 3-D. The capture takes less than 2 milliseconds per frame. The data is processed creating a highly precise <0.5-mm RMS, root mean squared of the distance measured, creating a digital model of the patient that is ready for immediate clinical use. Stereo photogrammetry, for quantifying facial morphology, was introduced in the Journal of Dentistry in 1996.² It was concluded that "stereo photogrammetry is a suitable 3D registration method for quantifying and detecting development changes in facial morphology"

Fig 1

Pre-treatment face and anterior, intra-oral photos (note deep dental overbite):



Fig 2
The Homeoblock™ appliance



Fig. 3
The pre-treatment face, and at 6 months and at 9 months and finally, a morphometric evaluation of the change.



Evaluating the patients face, over the nine months of Homeoblock™ treatment, for her tempero-mandibular dysfunction showed a change in the morphology of the face. Morphometric analysis was performed by superimposing before and after 3D images and using finite element modeling. Thousands of triangular reference points are used to establish the change. The blue area is no change and the red, to orange areas, show an increased dimension up to 2.9 millimeters. We see an increased volume above and under the eyes, the zygomatic region, the upper lip and the marionette and the pre jowl areas. Viewing the facial photos we see a reduction in the lines, wrinkles and depressions.

After nine months the patient's facial changes prompted her to go forward with injections of dermal fillers. She was given 1ml of Restylane ® for lip enhancement and two 1.3 cc corrections with Radiesse™ in the pre-jowl marionette area and along the inferior border the mandible, and the inferior and lateral borders of the zygoma.

Fig. 4

Figure 4 shows the morphological facial changes in the lips, zygoma and jowl area after the placement of 1ml. Restylane® and placement of 1.3 cc Radiesse™ . Note the deeper red to orange color in the areas where the injections were placed.

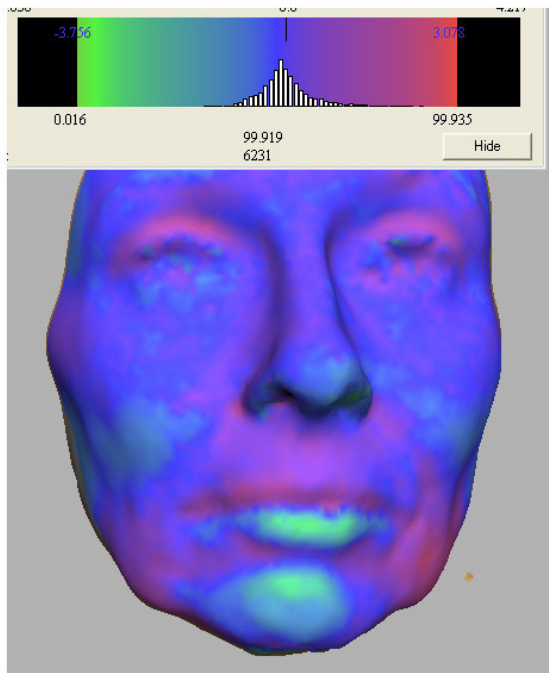
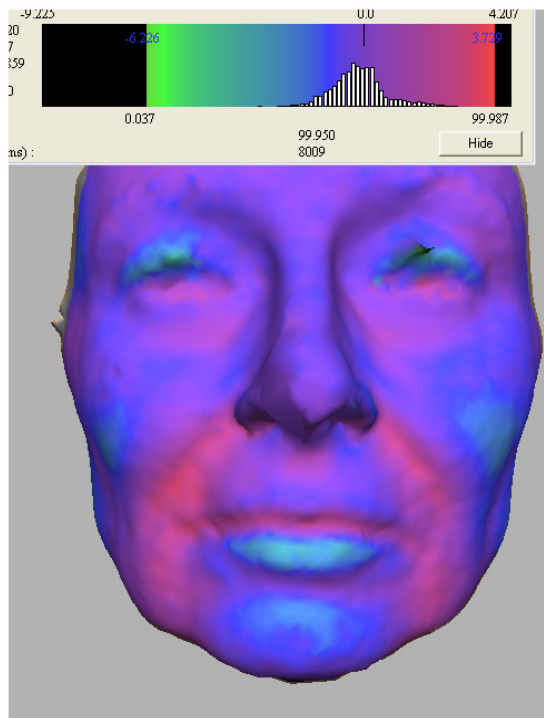


Fig. 5

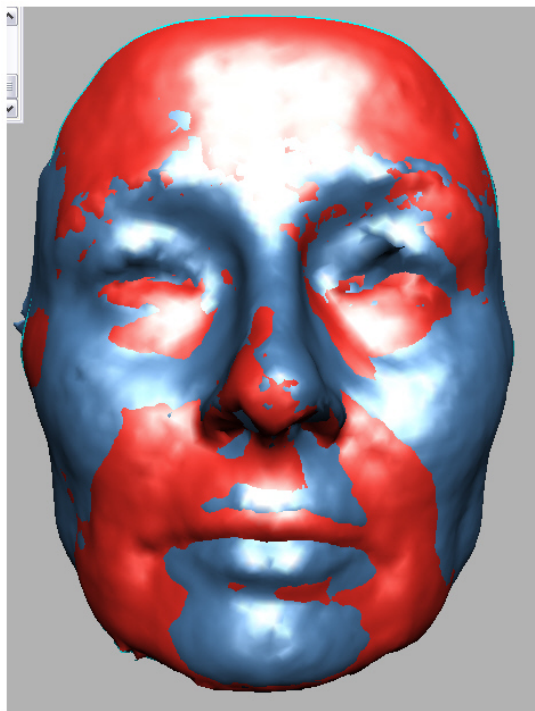
Morphometric evaluation of the final results:



Finite element analysis shows increased facial volume with a directional change of almost 4 millimeters indicated by the red to orange color.

Fig 5A

Superimposing the red after face over the blue before face we can graphically illustrate the volumetric changes that have occurred during our treatment.



There is an increase in volume in the frontal, supra-orbital, inferior orbital, zygomatic, nasal base, upper lip, naso-labial depression, marionette and pre jowl areas.

Fig 6

Before and after facial photos



Results

The after treatment face appears more youthful with better defined cheekbones and a firmer jaw line. The skin appears smoother with less lines, wrinkles and depressions.

Discussion

Facial changes related to palatal expansion are clearly outlined in Growth and Treatment a Meeting of the Minds, J.A. McNamara Jr. 2003.³ “The maxillary complex shows a change in size (and/or mass) allied with an increase in structural complexity, in association with biological processes.” “Palatal expansion presumably, switches on osteoblastic genes associated with active bone deposition and concomitant remodeling of the spatial matrix ensues.” In relation to the changes around the eyes we must recall that the maxilla forms the floor of the orbit and skeletal changes may become apparent post expansion.” Specifically, changes in orbital morphology may be reflected on the skin of the face as the lower eyelids become “fuller,” the lateral canthus becomes more horizontal.”, facial width increases, particularly at the zygomatico-maxillary sutures and the craniofacial form, putatively, not only functions better but looks more attractive.” These changes have been documented in children where palatal expansion is an every day occurrence. This paper documents the similar changes in a so called “non-growing” adult. Combining the results of palatal expansion, and the placement of dermal fillers, we see a very satisfactory improvement in facial esthetics.

References

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