

Class III Camouflage Treatment with Fixed Anchorage



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Introduction

Skeletal Class III malocclusions in adults can be corrected with orthognathic surgery or by means of “*orthodontic camouflage*”, depending on the severity of the malocclusion and the patient's demand for facial esthetics^(1,3).

“*Orthodontic camouflage*” is done by proclining the upper incisors and retroclining the lower incisors. In order to have a good smile esthetics, it is crucial to achieve a correct exposure of the upper incisor, with the right torque and height^(3,4). Therefore, the best option is to retrocline the lower incisors, avoiding, if possible, excessive proclination of the upper incisors⁽⁴⁾. When lower incisors are with correct or negative torque, the use of intermaxillary Class III elastics is not recommended to avoid a proclination effect on the upper incisors. In this kind of cases, we should consider extractions⁽⁵⁾ or the use of skeletal anchorage with Temporary Anchorage Devices (TADs) to achieve a distalizing force applied to the lower arch to be able to retrocline even more the lower incisors.

As an example of this “*orthodontic camouflage*” with retromolar TADs, Figure 1 shows a case of a patient with an edge-to-edge malocclusion. It was very important in this case to distalize the lowers and avoid proclination of the upper incisors, because the patient's main concern was to correct the lower lip protrusion. Initial records (Figures 1.A, 1.B, 1.C, 1.J, 1.K, 1.L) show a flat facial profile with lower lip protrusion and the edge-to-edge malocclusion. In the final records (Figures 1.D, 1.E, 1.F) it can be appreciated how the lower lip was improved as well as the position of the lower incisors. Figures 1.M and 1.N show that this case was treated with 3M™ Incognito™ lingual braces and lower retromolar TADs.



Fig. 1 A. Initial profile



Fig. 1 B . Initial ceph radiograph



Fig. 1 C . Initial quarter profile smile



Fig. 1 D. Final profile



Fig. 1 E. Final ceph radiograph

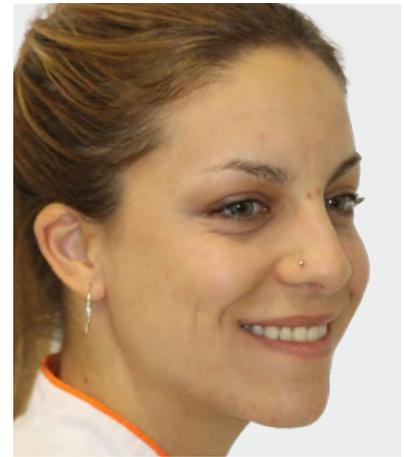


Fig. 1 F. Final quarter profile smile



Fig. 1 G. Initial intraoral right



Fig. 1 H. Initial intraoral front



Fig. 1 I. Initial intraoral left



Fig. 1 J. Final intraoral right



Fig. 1 K. Final intraoral front



Fig. 1 L. Final intraoral left



Fig. 1 M. Final pano radiograph



Fig. 1 N. Placement of lower lingual brackets and TADs

CASE REPORT

Figure 2 below shows a patient with a more severe Class III malocclusion, whose treatment followed the premises described before.

Diagnosis

A 24-year-old male patient whose chief complaint was “not being able to chew well” without concern for his facial esthetics.

- Skeletally, the patient had Class III malocclusion (Witts -8mm, ANB -3°, Facial convexity -4mm), brachyfacial pattern (facial axis 97°, facial cone 64°), normal upper incisors and retroclined lower incisors (IMPA 84°). (Figure 2 E)
- Facially, the mandible was deviated towards the right and the patient had a Class III facial appearance with insufficient malar bone projection. (Figure 2 A-D)



Fig. 2 A



Fig. 2 B



Fig. 2 C

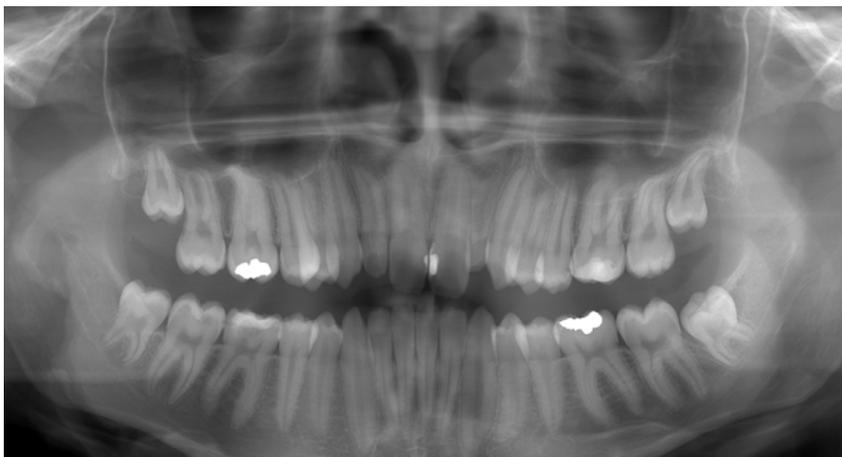


Fig. 2 D



Fig. 2 E

- Intraorally, the patient was Class III in molars and canines. He had anterior and upper right second premolar crossbites. The lower midline was deviated towards the right and he had a 2/3 overbite. The upper arch length discrepancy was moderate, with microdontia of the upper left lateral (Figure 2 F-J).



Fig. 2 F



Fig. 2 G



Fig. 2 H



Fig. 2 I



Fig. 2 J

- Functionally, the patient presented unilateral right mastication and reported discomfort in the right condyle with muscle overload. Right unilateral mastication had been maintained over time due to the anterior crossbite, which caused the mandibular deviation to the right, while the occlusal interferences made left-side unilateral mastication impossible.

Treatment plan

The patient was offered orthodontic treatment combined with orthognathic surgery as a first option, which was rejected.

A second option was to conduct lower extractions, but since the patient had a brachyfacial pattern, closing spaces would complicate finishing and stability.

Finally, the third treatment option selected was extraction of lower third molars, fixed upper and lower braces and TADs placed distal to lower left and right second molars (Figure 3).

Initially the cephalometric values indicate proclination of the upper incisors (IS Steiner angle 26° and IS-Maxillary Plane 123°). To avoid even more proclination of the upper incisors and achieve a good final smile esthetics, no intermaxillary elastics were used. In addition, the limited exposure of the upper incisor at rest and in smile was another consideration to avoid proclination of the upper incisors. The plan was to leave a



Fig. 3

space mesial to the upper left lateral due to the Bolton discrepancy caused by the microdontia of that tooth, and thus be able to center the dental midlines.

The lower incisors were retroclined (IMPA 84°) but the plan was to achieve an even greater retroclination. Therefore, the treatment option chosen was to use skeletal anchorage in the lower arch to further increase lower retroclination.

Since the patient wanted aesthetic braces, 3M™ Clarity™ Advanced braces were bonded with 3M™ APC™ Flash-Free adhesive. These braces provide good esthetics throughout treatment, resisting staining, and have a strong, precise slot and adequate sliding mechanics.

Finally, with the aim of rehabilitating the left unilateral mastication and achieving alternating bilateral mastication, from the beginning of the treatment the patient was asked to consciously chew on the left side. To help achieve this goal, the bracket of the upper right cuspid was bonded slightly more gingivally so that the extrusion of the cuspid of that tooth would hinder mastication on the right side.

Treatment progress

The upper braces were bonded first, while waiting for the lower third molar extraction surgery to heal.

The upper archwire sequence was 0.014" NiTi, 0.016" NiTi, 0.016"x0.022" NiTi, 0.019"x0.025" NiTi and finally 0.019"x0.025" stainless steel so teeth maintained the correct torque avoiding the initial proclination produced by the use of round archwires during the aligning phase.

The lower sequence was 0.014" NiTi, 0.016" NiTi, 0.016" stainless steel 0.016"x0.022" NiTi and finally 0.016"x0.022" stainless steel.

Build-ups were bonded to the upper second molars during the upper arch alignment phase to allow the correction of the anterior crossbite. The anterior crossbite interference was eliminated, and the lower jaw settled as the patient started to be able to close in a more comfortable joint position, in centric mandibular position, without having to force the mandible forward.

After 4 months of wearing braces on the upper arch, TADs were placed distally to the lower second molars with their heads at crown level to avoid excessive molars intrusion during distalization. The lower arch braces were bonded starting with a 0.014" NiTi archwire. Traction from the TADs was started from the day the lower braces were bonded. (Figure 4 A-E)



Fig. 4 A



Fig. 4 B



Fig. 4 C



Fig. 4 D



Fig. 4 E



Fig. 5 A



Fig. 5 B



Fig. 5 C



Fig. 5 D



Fig. 5 E

When you place TADs on the retromolar area, traction can be performed in many ways. Also, buccolingual placement of the TADs need to be taken into consideration to maintain or correct transverse problems in the arch (see under *Biomechanical Considerations*).

In this case, the traction exerted from the TADs was from buccal and lingual to the lower first molars, so that a space was opened on both sides and all the traction occurred during alignment with a 0.016” NiTi archwire. (Figure 5 A-E).

Once molars were in Class I and all teeth were aligned, we started to correct the lower midline discrepancy switching to a 0.016” stainless steel archwire to have less friction during sliding mechanics. To do so, on the lingual side, a passive traction was maintained on the right side (without changing the elastic chain) while and active traction was continued on the left side. On the buccal side, the power chain was fitted from one TAD to the other passing through all the braces. Both, the buccal chain and the lingual left chain, were replaced by new ones every 6 weeks. (Figure 6 A-E)

Now that the lower midline was centered, we started the finishing and detailing phase placing a 0.016×0.022” NiTi followed by a 0.16”x0.022 stainless steel wire in the lower arch.



Fig. 6 A



Fig. 6 B



Fig. 6 C



Fig. 6 D



Fig. 6 E



Fig. 7 A



Fig. 7 B



Fig. 7 C



Fig. 7 D



Fig. 7 E

The use of TADs for distalization allowed us to get a higher negative torque than the one built into the MBT™ System bracket prescription (-6° degrees). We used a 0.016" x 0.022" stainless steel archwire that did not fill the slot completely to maintain that negative torque previously achieved (Figure 7 A-E).

Treatment results

After 22 months of treatment, the case finished with molars and canines in Class I on both sides, with a correct overjet and overbite and centered dental midlines (Figures 8 A-I).

Alternating bilateral mastication was achieved. Upper right cuspid was left 0.5mm more extruded to slightly hinder right mastication, leaving a higher PMFA (Planas Masticatory functional angle) to facilitate left mastication. The cusp of the upper right canine can be grinded in future if mastication is under control.

Space was left mesial to the upper left lateral so it could be restored at a later time (whenever the patient decides to do so), and it was stabilized with a bonded fixed retainer. The patient, very satisfied with the treatment results, refused to undergo any of the esthetic treatment options that were proposed: bleaching, replacing the old filling between upper centrals, veneer of the upper left lateral, and gingivectomy of the upper right cuspid.



Fig. 8 A



Fig. 8 B



Fig. 8 C



Fig. 8 D



Fig. 8 E



Fig. 8 F



Fig. 8 G



Fig. 8 H



Fig. 8 I



Fig. 8 J



Fig. 8 K

Cephalometric changes involved only on the position of the incisors, as no skeletal changes occurred.

The angle formed by the upper incisor and the maxillary plane went from 23° to 25° , while the lower incisor went from an IMPA angle of 84° to 80° . The upper incisor could not be prevented from proclining but remained in a reasonable angle. Thanks to the retromolar TADs we were able to treat this case avoiding lower extractions and achieving retroclination of the lower incisor. (Figure 8 J-K)

BIOMECHANICAL CONSIDERATIONS

We have seen that “*orthodontic camouflage*” of skeletal Class III malocclusion can be treated by using lower retromolar TADs on the sagittal plane, but the transverse and vertical planes should also be taken into consideration.

Transverse view

The buccolingual position of the retromolar TADs distal to the lower second molars will depend on the shape of the mandibular bone in that area. Normally the insertion will be from lingual to buccal, to end more towards buccal (Figure 9) or center (Figure 10) than lingual (Figure 11). This position, as well as the site from where the traction force is exerted, is important.



Fig. 9



Fig. 10



Fig. 11

- a. If traction from the TAD is produced only from the buccal side of the arch, besides a distalizing force, a compressive force will be exerted, which will be greater the more lingually the TAD is positioned.
- b. If traction from the TAD is produced only from the lingual side of the arch, besides a distalizing force, an expansion force will be exerted, which will be greater the more buccally the TAD is positioned.

Therefore, it is advisable to pull equally from buccal and lingual, with the so-called “*double-cable mechanics*”, often used in lingual orthodontics.

Figure 12A shows a scissor bite produced by traction from the buccal side only (Figure 12B). The “*double-cable mechanics*” was not used because the TAD was located more towards buccal (Figure 12C), but still a considerable compression of the arch was produced. The solution was to pull from lingual and apply a higher force, without releasing the buccal traction (Figure 12D) and figure 12E shows how it was solved in two months.



Fig. 12 A



Fig. 12 B



Fig. 12 C



Fig. 12 D



Fig. 12 E

Vertical view

One of the objectives to obtain stable results after treatment of Class III malocclusions is to end with a 15° angle of the occlusal plane and the Frankfort plane. If the entire lower arch is distalized, the occlusal plane will rotate counterclockwise, and the lower incisors will be extruded, contrary to the stability objective. One of the solutions to offset this adverse effect is to place the TADs in the lower front area and intrude the lower incisors. Another option is to distalize from molar to molar without carrying the whole arch en-masse, but it should be noted that the lower premolars tend to extrude. To counteract this effect, build ups can be bonded on the premolars or if necessary TADs may be used to intrude them.

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