

# Miniplates anchorage on open-bite treatment

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## Abstract

**Objective:** The case report presented describes an orthodontic treatment supported by miniplates of an adult female patient who presented severe anterior openbite, clockwise rotation of the mandible, biprotrusion and the absence of labial sealing. After extraction of first molars and maxillary and mandibular dental retraction, associated with vertical control provided by the miniplates, the anterior openbite was corrected with a little anti-clockwise rotation, resulting in a significant improve on facial appearance. **Objective:** This case report confirms the efficiency of titanin miniplates as temporary anchorage, especially in situations where great corrections are needed, involving a vertical problem.

**Key-words:** Miniplates. Anchorage. Molar extraction. Open bite. Biprotrusion.

## INTRODUCTION

Among the newest technological resources introduced in the orthodontic practice, the temporary anchorage devices stand out<sup>2,5,11,14,17</sup>. Miniscrews in many forms as titanium miniplates, have allowed amplify the corrective capacity in compensatory treatment, as even more control on conventional mechanics<sup>1,3,4,9</sup>. Particularly the severe skeletal openbite treatment was very favored with these new resources<sup>3,7,17</sup>.

The skeletal anterior open bite (SAOB) can involve excessive alveolar vertical development, a short mandible branch, a high mandible plane angle, so as a high anterior facial height, frequently

associated with the absence of passive labial sealing<sup>7</sup>. Many orthopedic-orthodontic methods have been related for its correction (high-pull headgear, bite-blocks with or without magnets, intruder and other variations). However, in front of the modest results of these methods, mainly in adults, the majority of cases need help from orthognatic surgery for their effective correction<sup>7,17</sup>.

Through help of temporary anchorage devices, miniscrews and miniplates, the capacity of correction of these cases increased reasonably. Literature has presented many cases of SAOB treated successfully using these new treatment techniques<sup>3,7,17</sup>. Furthermore, the stability over

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those corrected cases seems to be promising<sup>16</sup>.

Although miniscrews have improved in their failure rate<sup>6,8,9,11,12,13</sup>, the anchorage miniplates show, up this moment, higher percentage of success<sup>3,10,16,17</sup>. Beside, miniplates are placed at a great distance from the dental roots, allowing great liberty of movement, not demanding the replacement of the anchorage device.

The present article shows a case report of SAOB using miniplates as anchorage for orthodontic correction.

### CASE REPORT

A female patient attended to the Orthodontic clinic of the Specialty Program in Orthodontics of the State University of Maringá, complaining of dental and facial aesthetics. Orthodontic records were obtained, including lateral radiograph, panoramic, periapical radiographs, extra and intra-buccal photographs and plaster casts (Fig. 1, 2, 3).

The patient showed SAOB with its typical characteristics (negative vertical trespass, high anterior facial height, a high mandible plane angle, absence of passive labial sealing) associated to an

excessive biprotrusion, Class III relation and absence of the maxillary first molars and maxillary left third molar.

Two treatment proposals were shown. The first included the association with orthognathic surgery for effective skeletal correction, allowing posterior maxillary impaction and correction of the maxillary incisors inclination. In the mandible, would be accomplished a sagittal reduction osteotomy, as an advance genioplasty, with vertical reduction. Previously to the surgery an orthodontic fixed appliance would be utilized for lower discompensation (with previous indication of extraction of lower first molars) and segmented maxillary leveling.

The second treatment option included the compensatory correction, through help of four anchorage miniplates (to allow suitable biprotrusion correction and vertical control), and also the indication of extraction of lower first molars.

In front of the options offered, the patient preferred the treatment without orthognathic surgery, authorizing the treatment with clear consent.

The titanium plates design used were drawn



FIGURE 1 - Pre-treatment radiograph records (lateral, panoramic and e periapicals X-rays).



FIGURE 2 - Pre-treatment extra oral photos.



FIGURE 3 - Pre-treatment interiorly photos.

originally for orthognatic surgery osteosynthesis and modified into anchorage dispositives. The figures 4 and 5 illustrate the miniplate fixing procedure. It can be observed that in the upper quarters the most occlusal chain unit of the miniplate was not correctly vertically distant from the orthodontic wire line, therefore later it was eliminated. Faber et al.<sup>3</sup> recommend that the most occlusal chain unit should be positioned 6 to 8mm far from the orthodontic wire line, emerging in alveolar mucosa. The tissue repair after miniplates placement was suitable, with tolerable symptoms, being the suture removed after five days. Anti-inflammatory and antibiotic were prescribed, as well as 0.2% clorhexidine rinses.

The figures 6 to 8 show the lateral radiograph, panoramic, periapical radiographs, pointing out the miniplates position.

Notices in figure 9 that the last chain unit from the upper plates were removed, allowing a suitable distance to the orthodontic wire. In the lower arch, the retraction of seconds pre-molars was began, anchored on the miniplates.

The alignment and leveling was conducted until rectangular wire, when hooks were joint for anterior retraction, associated to vertical control (especially maxillary), through the positioning of elastomeric chains in the miniplates. As an auxiliary upper anchorage, with the purpose of avoiding arch expansion (due to vertical vector), a palatal



FIGURE 4 - Maxillary miniplates surgical procedures.

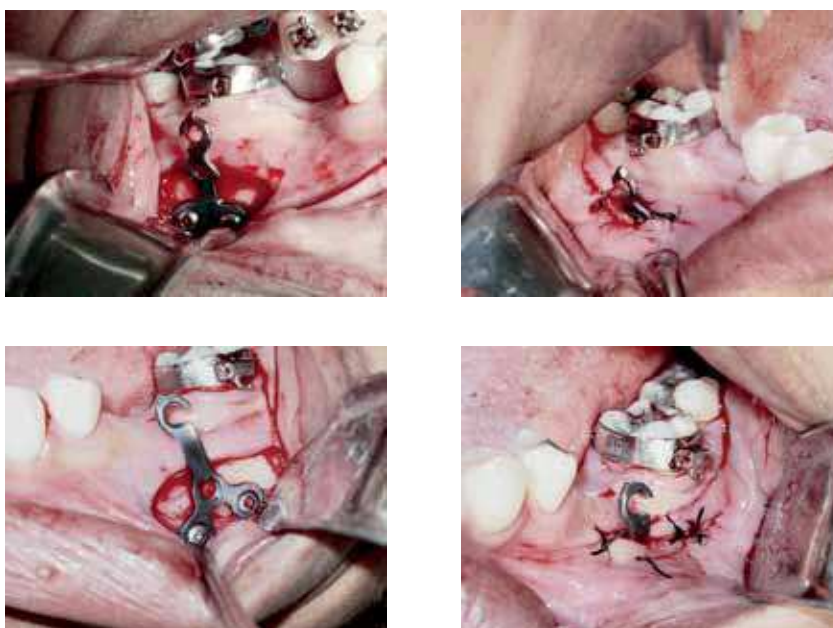


FIGURE 5 - Mandibular miniplates surgical procedures.





FIGURE 6 - Panoramic X-ray after miniplates installation.



FIGURE 7 - Lateral head radiograph after miniplates installation.

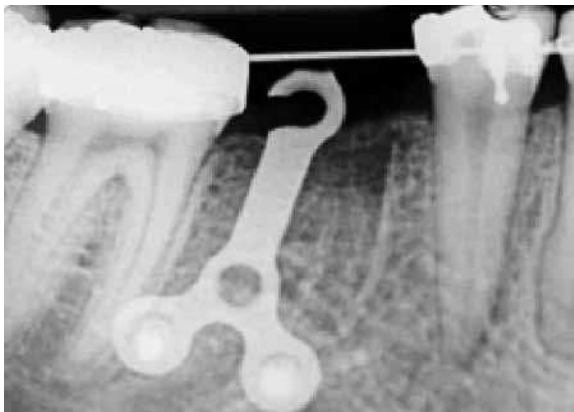


FIGURE 8 - Posterior region periapicals X-rays after miniplates installation.



FIGURE 9 - Leveling and alignment phase, starting lower premolars retractions. Observe that last chain unit from the upper miniplates were removed. As an auxiliary upper anchorage, with the purpose of avoiding arch expansion (due to vertical vector), a palatal bar was used.



FIGURE 10 - Intermediary treatment phase. The upper anterior retraction was transitorily stood by, and lower anterior retraction was accelerated along the mandibular molars mesialization.

bar with 0.8mm was inserted on maxillary second molars (figure 9).

The figure 10 shows a treatment phase where the anterior openbite was already corrected, the arches in anterior region were in good anterior posterior relation; however the mesialization of lower first molars was less evident than the upper ones. For that reason, upper retraction was stopped momentarily (stabilized with a 0,10mm twisted steel wire) and the lower molars movement was accelerated with an elastomeric chain that passed through the miniplate and the hook until the molars.

The intermediary pictures of figure 11 illustrate a partial facial improvement, however with an increase on gingival exposure. The upper incisor protrusion correction, even with vertical control, needed this situation, as pointed out by Sarver<sup>15</sup>. As the level of open bite correction was

suitable, and with over correction, it was decided to include an auxiliary intrusion arch in the anterior segment, concomitant to the ongoing mechanic.

The figure 12 illustrates a phase near to the final spaces closure and figure 13 illustrates a sensitive improvement on patient face, influenced by biprotrusion correction with vertical control provided by miniplates. The superimposed pre-treatment lateral radiographs and finishing phase illustrate the achieved modifications (Fig. 14). The frame 1 shows the comparison of some cephalometric measures referred to this superimpose.

The figures 15, 16, 17 show comparisons between initial, intermediary and final smiling and profile pictures.

During all period of treatment the patient did not mention any relevant symptom related to the anchorage miniplates.

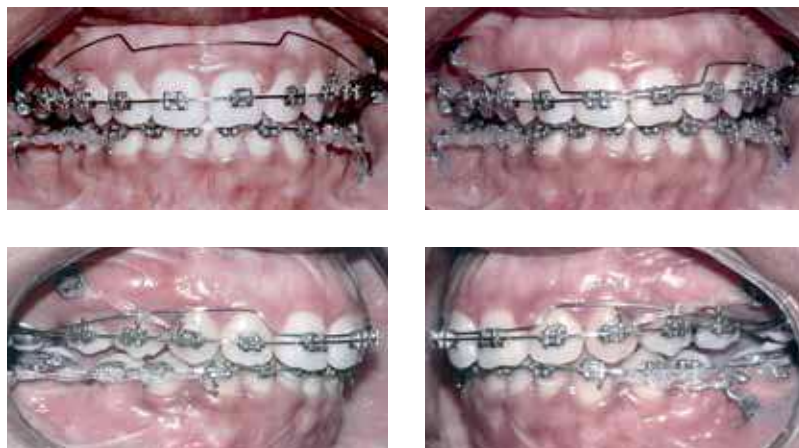


FIGURE 11 - It was include an auxiliary intrusion arch in the anterior segment, concomitant to the ongoing mechanic, in order to minimize gingival exposition.



FIGURE 12 - Ending treatment phase interiorly photos.





FIGURE 13 - Ending treatment phase extraoral photos. It is noticeable the facial profile improvement.

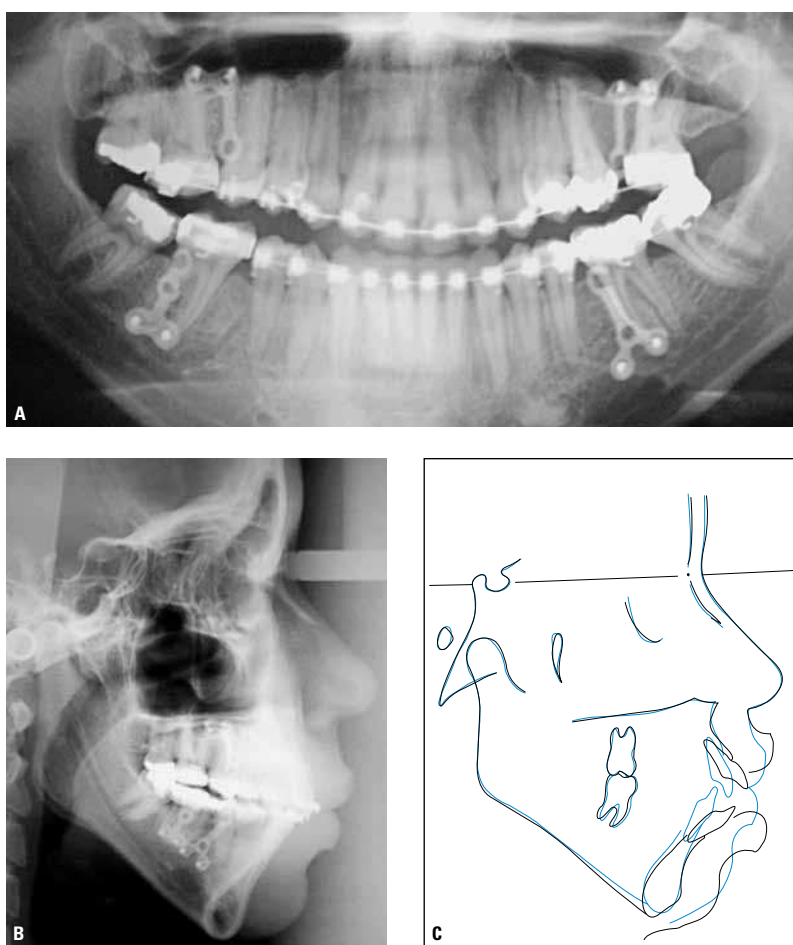


FIGURE 14 - Total cephalometric superimposition from pre to ending phases.





FIGURE 15 - Facial improvement in frontal resting aspect from starting to end phase.



FIGURE 16 - Facial improvement in frontal smiling aspect from starting to end phase.

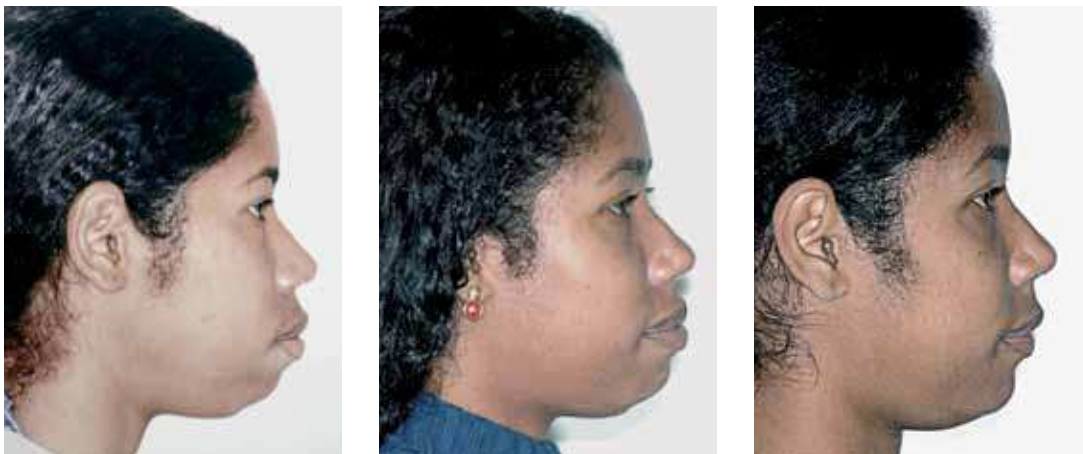


FIGURE 17 - Facial profile improvement in resting aspect from starting to end phase.

## CONCLUSION

This case report confirms the latest evidence on efficiency of titanic miniplates as temporary anchorage, especially in situations where great

corrections are needed, involving a vertical problem.

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