

Mini-screws, a viable adjunct along with Incognito lingual appliance: A case series

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Abstract

Invisible orthodontics have been around for too long, and with the advent of computer-aided design/computer-aided manufacturing technology appliances such as Incognito™ has made the whole treatment experience more pleasant and aesthetic. However, even in lingual orthodontics, biomechanics play the most important role, and the use of temporary anchorage devices (TADs) has made the whole treatment more effective and efficient. This article focuses on cases where TADs in lingual appliances play a critical role in the treatment of various malocclusions.

Key words: Biomechanics, Incognito™ lingual appliance, temporary anchorage devices

INTRODUCTION

Lingual orthodontics has definitely come of age; its acceptance by both profession and the patient population continues to grow internationally. The success of lingual orthodontics is largely dependent on the advances in technology related to appliance design and laboratory protocols, the growth in the number of adult patients seeking orthodontic treatment and the attitudinal changes of orthodontists.^[1]

The advent of computer-aided design/computer-aided manufacturing technology in lingual orthodontics allows clinicians to provide patients invisible treatment options, which are accurate and more predictable. The Incognito™ lingual appliance has positioned itself as an excellent choice from among vast galaxy of lingual systems available.^[2]

Incognito™ (3M Unitek, Monrovia, CA, USA) combines

individualization of bracket bases, slots, and arch wires to create fully customized lingual orthodontic appliances. Bracket bases are individualized to the tooth anatomy and initial position of the tooth in the dental arch. Bracket slots are customized to produce ideal tooth movement, and wires are formed to minimize the overall thickness of the appliance in the mouth.^[3,4]

Incognito™ is the only fully customized lingual orthodontic treatment available. Main advantages include optimum esthetic appearance, great accuracy in final results,^[5] less incidence of white spot lesions,^[6] less discomfort over other lingual systems,^[7] and relatively easy and precise direct rebonding of accidentally debonded brackets because of good adaptation of the custom bracket bases. Disadvantages include the potential for error in bracket positioning during fabrication of the indirect bonding tray and need to reorder any lost bracket or fractured wire.

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A selection of the appliance is just a part of the treatment as even today in the 21st century with all the latest development the role of biomechanics can never be neglected. Hence irrespective of the appliance selection biomechanics still play the most vital role as far as tooth movement, force levels, force vectors, and anchorage control is concerned.

There have been varying views as far as anchorage control with the lingual appliance is concerned, as the theory of Alexander *et al.*^[8] that disocclusion of the posterior teeth due to the bite plane built into the maxillary incisor brackets of the lingual technique decreases resistance to anchorage loss, other studies do not support those findings.^[9]

Just as temporary anchorage devices (TADs) have changed the story of anchorage control in labial appliances, so is the case even in the lingual appliances. Two cases are presented herewith, showcasing the range of conditions that the appliance can address along with TADs keeping the biomechanics in consideration.

CASE REPORTS

Case 1

A 24-year-old female patient presented with the chief complaint of protrusive lips. She had just extracted four first premolars by another Orthodontist and came to my office, asked for a lingual appliance for her orthodontic treatment.

Clinical examination revealed excessive dental protrusion, lip protrusion, and mild maxillary crowding, with Class I molar relationship, 5 mm overjet and 1 mm overbite. Cone-beam computed tomography (CBCT) showed four first premolars were extracted. Lateral cephalometric analysis indicated a skeletal Class I malocclusion [Figure 1a-h].



Figure 1: (a-h) Pretreatment extraoral and intraoral photographs

Treatment plan

Extraction of all first premolars on both arches. Upper and lower arch Incognito™ lingual appliance with TADs in the upper arch.

Treatment progress

Incognito™ lingual brackets were bonded with 0.016 CuNT initial wires in both arches [Figure 2a and b]. After 7 months of leveling with 0.018" and 0.016" × 0.022" individual CuNiTi wires, upper and lower 0.016" × 0.024" stainless steel archwires were the place to carry out an anterior retraction. After 6 months retraction, lower extraction spaces were closed and two miniscrews (A1, 2 mm diameter, 10 mm length) were placed bilaterally in the palatal alveolar bone of the first molars [Figure 3a, and b]. The extraction spaces were closed with 8 months after TADs installation. The final detailing of the occlusion was accomplished using 0.018" × 0.018" individual titanium molybdenum alloy (TMA) archwires [Figure 4a-h]. Total active treatment time was 25 months.

Case 2

A 22-year-old male patient presented with a chief complaint of malaligned front teeth. Clinical examination revealed lip protrusion, incisors crossbite and mild maxillary and mandible crowding. CBCT showed root canal treatments and full crown restorations done on the lower four molars on both sides. Lateral cephalometric analysis indicated a skeletal Class III malocclusion with mandible overgrowth and low angle growth pattern with proclination of maxillary and mandibular incisors [Figure 5a-h].

Treatment plan

Extraction of lower first molars on both sides. Upper and lower arch Incognito lingual appliance with TADs in lower Arch.

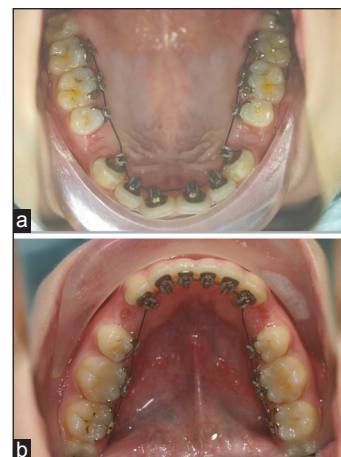


Figure 2: (a and b) Intraoral photographs with appliance

Treatment progress

Incognito™ lingual brackets were bonded with 0.016 CuNiTi initial wires in both arches [Figure 6a and b]. After 6 months of leveling with 0.018" and 0.016" × 0.022"

individual CuNiTi wires, lower 0.016" × 0.024" stainless steel archwires was place to carry out anterior retraction with TADS. Two miniscrews (A1, 2 mm diameter, 10 mm length) were placed bilaterally in the buccal alveolar bone of the lower first molars [Figure 7a-c]. The final detailing

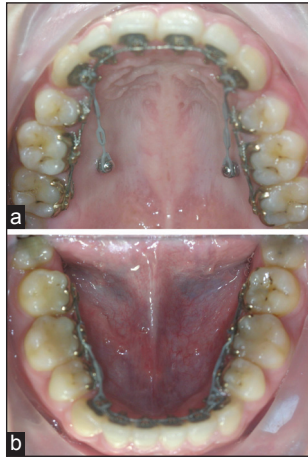


Figure 3: (a and b) Intraoral photographs with temporary anchorage devices



Figure 4: (a-h) Posttreatment extraoral and intraoral photographs



Figure 5: (a-h) Pretreatment extraoral and intraoral photographs

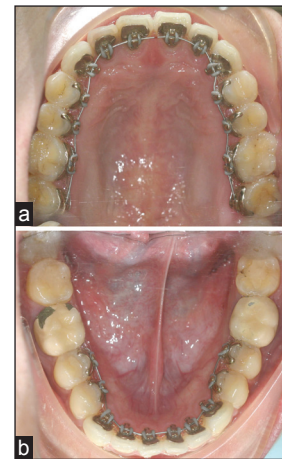


Figure 6: (a and b) Intraoral photographs with appliance



Figure 7: (a and b) Intraoral photographs with temporary anchorage devices



Figure 8: (a-h) Posttreatment extraoral and intraoral photographs

of the occlusion was accomplished using 0.018" × 0.018" individual TMA archwires [Figure 8a-h]. Total active treatment time was 23 months.

CONCLUSION

This article briefly highlights the versatility of the Incognito™ appliance along with TADs in the treatment of malocclusions with varying severity. The appliance provides the following advantages:

- The Incognito™ system disposes of the high flexibility due to the rapid prototyping process. Each single bracket series is not only individually designed for the patient, but the system also allows respecting the doctor's wishes.
- Use of TADs in the lingual appliance is just as critical as it is in the labial for various biomechanical considerations as well as anchorage control.

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Conflicts of interest

There are no conflicts of interest.

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