

Lingual Orthodontics simplified : Incognito -customization perfected

Haroutioun Dedeyan,
Ameet V. Revankar¹

Private practice dedicated to orthodontics, ESLO active member, Incognito treatments clinical advisor and study club leader, Budapest, Hungary, ¹Department of Orthodontics and Dentofacial Orthopedics, SDM College of Dental Sciences, Dharwad, Karnataka, India

Abstract

Esthetic orthodontics is the need of the hour, fuelled by the increasing number of adult patients seeking orthodontic treatment. Alternatives to labial appliance include clear aligners and lingual appliance. Conventional lingual treatment is laborious in terms of laboratory setup and manual dexterity of the operator, coupled with less than optimum treatment results. Customization of the appliance to meet varied requirements of each patient due to highly variable lingual morphology within and amongst patients is the key to successful treatment in lingual orthodontics. Efforts at bracket base customization using intra-oral jigs and laboratory setups are fraught with unavoidable errors affecting treatment outcome. With the advent of computer-aided design and computer-aided manufacturing (CAD/CAM) technology the Eldorado of true customization is now a reality. This paper introduces the Incognito Appliance System based on custom-made brackets and custom-made series of pre-bent wires using state of art CAD/CAM manufacturing procedures.

Key words: Incognito, lingual appliance, setup models

INTRODUCTION

The quest for invisible orthodontics with lingual appliances is not a new realm in orthodontics. Efforts have been on since the mid 1970's to treat patients using fixed lingual orthodontic appliances.^[1-4] The early frenzy associated with this technique was dampened by the biomechanical challenges posed by the appliance which translated into ergonomic difficulties and taxed the skills of even the most dexterous operator. This led to widespread disgruntlement with the appliance.^[5] The key to lingual treatment is bracket base customization which clinicians tried to incorporate in the stock bracket bases using setups,^[6] laboratory devices for torque/angulation^[7] and intra-oral jigs.^[8] However, these methods were fraught

with inaccuracies despite the labor intensive procedures, resulting in unsatisfactory treatment outcomes. These drawbacks are overcome with true bracket customization using computer-aided design and computer-aided manufacturing (CAD/CAM) technology. Early efforts in CAD/CAM bracket designing have led to the refinement in this treatment modality.^[9-11]

The Incognito Appliance System (3M Unitek, Monrovia, CA) is the pinnacle of CAD/CAM customization.

The manufacturing process of the Incognito Appliance System differs fundamentally from any other lingual appliance or laboratory procedures. The whole appliance is made using state-of-the-art CAD/CAM technology. The set-up model is scanned (currently digital modeling using patented - digital setup lab is available which eliminates the need for physical models) with a 3D scanner and the brackets are designed on the computer. The bracket/archwire system consists entirely of individualized components. The bracket bases and bodies, the position of the bracket body on

Access this article online

Quick Response Code:



Website:

www.apospublications.com

DOI:

10.4103/2321-1407.117378

Address for correspondence:

Dr. Ameet V. Revankar, Department of Orthodontics and Dentofacial Orthopedics, SDM College of Dental Sciences, Dharwad - 580 009, Karnataka, India. E-mail: drameetr@gmail.com

the bases, the bracket-slot orientation (ribbonwise), the direction of the archwire insertion (vertical/horizontal) and the archwire geometry are individually adjusted to each tooth, the malocclusion and to the orthodontist's prescription.

Rapid-Prototyping-Technology is used for the actual manufacturing of the lingual brackets. Indirect bonding with a single bonding tray is possible for the entire arch. Direct bonding is feasible too, thanks to extended individual bases. Furthermore, bending archwires is one of the most difficult part in orthodontics. In this system, computer operated bending of archwires using robots are used to manufacture precise-shaped archwires. Even super-elastic archwires can be precisely shaped. This helps solving three major problems in lingual orthodontics:

- Patient discomfort during the phase of adaptation: The appliance is designed as flat as possible, not much higher as a bonded retainer; this significantly improves the patient's comfort
- Inaccuracies during re-bonding: The customised bracket base covers the major part of the lingual tooth surface and therefore allows a direct re-bonding without the need for any other positioning aids
- Difficulties in finishing: Inaccuracies of the slots due to production and resulting variations in the torque play are from now on a part of the past, thanks to Incognito. Measuring rates show divergences of not more than 0.008 mm between the slots. The precise-shape archwires also make high standard finishing easily achievable.

CASE REPORTS

The following text describes brief case report of two patients treated with the Incognito Appliance System.

Case 1

A 28-year-old female subject with a previous history of extraction orthodontic treatment reported with a chief complaint of irregularly placed upper and lower front teeth. Her medical history was unremarkable and her temporomandibular joint function was within normal range. She exhibited a well balanced facial profile [Figure 1]. The intra-oral examination exhibited angles Class I molar relationship bilaterally with mild crowding in the upper and lower anteriors, increased overjet and overbite [Figure 2]. She had been orthodontically treated earlier with extraction of all first premolars. It was diagnosed to be a case of realpse following orthodontic treatment.

Treatment objectives

The requirements included resolution of crowding, reduction of overjet and overbite to attain a stable occlusion.

Treatment alternatives

The following treatment approaches were considered:

1. Labial appliance systems - metallic
2. Labial appliance systems - ceramic
3. Clear aligners
4. Lingual appliance systems customised - Incognito.

The patient wanted a totally invisible system hence options 1, 2, 3 were not considered. It was decided

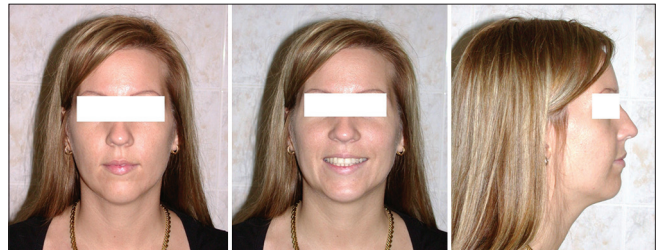


Figure 1: Pre-treatment extra-oral photographs



Figure 2: Pre-treatment intra-oral photographs



Figure 3: Setup models

to treat the case using customised lingual Incognito system.

Treatment progress

Following impressions setup models [Figure 3] were fabricated which were then shipped to Incognito for manufacturing the custom appliance. The customised



Figure 4: Intra-oral photographs with the appliance



Figure 5b: Post-treatment intra-oral photographs



Figure 7: Pre-treatment intra-oral photographs

appliance was bonded [Figure 4] to accept prefabricated custom archwires in ribbon mode. Following 13 months of active treatment the appliance was debonded. Post-treatment records [Figures 5a and b] demonstrate well balanced profile, good intercuspation with well aligned arches and ideal overjet overbite.

Case 2

A 27-year-old male subject reported with a chief complaint of irregularly placed upper front teeth. His medical history was unremarkable and his temporomandibular joint function was within normal range. He exhibited a convex profile with open nasolabial angle [Figure 6]. The intra-oral examination exhibited crowded, proclined upper anteriors with increased overjet and overbite. Molar relationship



Figure 5a: Post-treatment extra-oral photographs



Figure 6: Pre-treatment extra-oral photographs



Figure 8: Setup models

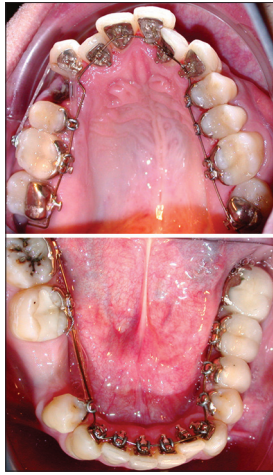


Figure 9: Intra-oral photographs with the appliance



Figure 10b: Post-treatment intra-oral photographs

was Angles Class II. Mandibular right second premolar and first molar were missing and there was a prosthesis in place of the left second premolar and first molar [Figure 7]. It was diagnosed as Angles Class II Division I mloccclusion with crowded upper anteriors.

Treatment alternatives

The following treatment approaches were considered:

1. Labial appliance systems - metallic
2. Labial appliance systems - ceramic
3. Clear aligners
4. Lingual appliance systems customised - Incognito.

The patient wanted a totally invisible system hence options 1, 2, 3 were not considered. It was decided to treat the case using customised lingual Incognito system with extraction of upper first premolars.

Treatment progress

Following impressions setup models [Figure 8] were fabricated. After delivery, the customised appliance



Figure 10a: Post-treatment extra-oral photographs



Figure 11: Intra-oral photographs with osseointegrated implant

was bonded [Figure 9] to accept prefabricated custom archwires in ribbon mode. Following 20 months of active treatment the appliance was debonded. Post treatment records show pleasing profile [Figure 10a], demonstrate good intercuspation with well aligned arches and ideal overjet overbite [Figure 10b]. A prosthesis was placed on an osseointegrated implant to replace the missing posterior teeth on the lower right side [Figure 11].

CONCLUSION

This paper briefly highlights the versatility of the Incognito appliance 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
- The vertical slot allows archwire driven derotations without using power chains
- The gold alloy, used for the new brackets, offers an alternative especially for patients showing a nickel allergy.

REFERENCES

1. Fujita K. New orthodontic treatment with lingual bracket mushroom arch wire appliance. *Am J Orthod* 1979;76:657-75.
2. Fujita K. Multilingual-bracket and mushroom arch wire technique. A clinical report. *Am J Orthod* 1982;82:120-40.
3. Kurz C, Swartz ML, Andreiko C. Lingual orthodontics: A status report. Part 2: Research and development. *J Clin Orthod* 1982;16:735-40.
4. Paige SF. A lingual light-wire technique. *J Clin Orthod* 1982;16:534-44.
5. Kurz C, Romano R. Lingual orthodontics: Historical perspective. In: Romano R, editor. *Lingual Orthodontics*. Hamilton (ON): BC Decker; 1998. p. 3-20.
6. Hiro T, Iglesia Fd, Andreu P. Indirect bonding technique in lingual orthodontics: The HIRO system. *Prog Orthod* 2008;9:34-45.
7. Gorman JC. Treatment of adults with lingual orthodontic appliances. *Dent Clin North Am* 1988;32:589-620.
8. Geron S. The lingual bracket jig. *J Clin Orthod* 1999;33:457-63.
9. Wiechmann D, Rummel V, Thalheim A, Simon JS, Wiechmann L. Customized brackets and archwires for lingual orthodontic treatment. *Am J Orthod Dentofacial Ortop*. 2003 Nov; 124(5):593-9.
10. Wiechmann D. A new bracket system for lingual orthodontic treatment. Part 2: First clinical experience and further development. *J Orofac Orthop*. 2003;64:372-388.
11. Mujagic, M., C. Fouquet, C. Galletti, C. Palot, D. Wiechmann, J. Mah. Digital design and manufacturing of the Lingualcare bracket system. *J Clin Orthod*. 2005; 39:375-382.

How to cite this article: Dedeyan H, Revankar AV. Lingual Orthodontics simplified : Incognito -customization perfected. *APOS Trends Orthod* 2013;3:116-20.

Source of Support: Nil. **Conflict of Interest:** None declared.