Case Report

Open Access

CrossMark

Hybrid and "Invisible" treatment of class I malocclusion in patient with low grade of cooperation

Abstract

Currently, the orthodontist must find a better combination between two or more techniques and thus adapt them in favor of the resolution of the malocclusion. This article describes the treatment of a patient (Class I malocclusion) with hygiene problems and low motivation to wear removable appliances for a long time. The case was solved with a hybrid combination of lingual appliances and clear aligners. The results were obtained in just nine months and demonstrated that it is possible to consider using this approach in more complicated malocclusions, considering the advantages and disadvantages of each technique.

Keywords: technology, dental aesthetics, lingual orthodontics

Volume 13 Issue 3 - 2022

Henrique Bacci
Master and Specialist in Orthodontics; Private Clinic in Ribeirão Preto, Brazil

Correspondence: Henrique Bacci, M.Sc , Faculty of Dentistry, São Leopoldo Mandic, Av. Braz Olaia Acosta, 727, Sl 504, Jd Califórnia, Ribeirão Preto, São Paulo, Brazil,
Email bacci@henriquebacci.com.br

Received: July 15, 2022 | **Published:** July 28, 2022

Introduction

In the last years, the interest in aesthetic orthodontics treatment is increasing expressively. In this context, the clear aligners have been highlighted as one of the most studied types of treatment indicated for many kinds of malocclusions.[1–4] Although the importance of this modality of treatment has been increased, the full cooperation of the patients is the most important obstacle to getting the desired correction.[5,6] In patients with low compliance, treatment times increase, and the outcome may be compromised.[7] For this reason, fixed appliances can be an ideal option to achieve the more complicated movements and if necessary in order to reduce the active participation of the patient in the treatment results.[8] On the other side, patients treated with aligners have greater satisfaction and better periodontal health during orthodontic treatment than patients treated with Fixed Appliances.[9]

The purpose of this article is to demonstrate the treatment of a patient with characteristics of low grade of collaboration. She has a Class I malocclusion and was treated using both "invisible" appliances and, a hybrid plan of treatment. Lingual Orthodontics was used to solve the initial problems and Clear Aligners, to finish the case. The results showed that it is possible to get excellent results with this combination of the therapies in a short time of treatment, with the minimum collaboration of the patient. Additionally, the hybrid therapy with lingual orthodontics and aligners can be considered to treat more complicated cases, especially when the patients show problems that could not be solved easily only with removable appliances.

Diagnosis

The patient J.L.B.F, a 26-year-old female presented with a Class I malocclusion and a Class II profile (Figures 1–8). She was in the permanent dentition with the maxilla and mandibular both constricted. There was a lack of space for the accommodation of anterior teeth, especially in the lower jaw. Her primary concern was the anterior lower misalignment. Tooth 33 was in labial inclination and in cross bite with the antagonist jaw. Also, the lower incisors showed excessive labial inclination. In the intrabucal frontal view, the lower occlusal plane was inclined, resulting in an open bite on the anterior left side. In the initial appointment, the patient presented marginal gingivitis and poor oral hygiene was it showed, as we can view in the intraoral pictures. The patient refused all types of labial braces. Although removable appliances could be the best option due to their hygiene advantages, the patient evidenced that she did not have enough motivation to use clear aligners, for a long time. After adequacy of the periodontal condition, it was decided with the patient that the Lingual Appliance could be elected due to its aesthetic condition and independence of direct cooperation necessary to get the necessary movements.

Figure 1–8 Initial pictures of the patient J.L.B.F. Note the poor oral hygiene, gingival inflammation, and the initial state of malocclusion.

Treatment goals

Improve the periodontal conditions;

Alignment and leveling of the arches;

Correct the arches shapes, the torque of tooth 33, the lower occlusal plane, and the lower midline.

Virtual planning and laboratory phase of lingual orthodontics

Initially, the patient was submitted to periodontal basic treatment. After that, the files of the patient (digital pictures, panoramic x-ray, and Stl files of the jaws) were uploaded for the Exceed Lx Service (www.exceed-ortho.com) (Figure 9–15) and the virtual placement of the lingual brackets (Octopus Lingual Braces– Aditek, Brasil) was requested.

Figure 9–15 Initial pictures of the patient J.L.B.F., after the basic periodontal treatment. The digital files above were sent to Exceed Service.

The virtual setup with the lingual brackets was placed and was approved by the Orthodontist. The files containing the "u-pockets" (corresponding to the compensatory pads), (Figures 16 & 17) were sent to the professional by the service. After that, the models were printed in high-resolution resin and the lingual brackets were physically positioned on the site indicate from de "u-pockets". A thermoformed plastic material was used to produce the transfer trays to follow the indirect bonding procedure.

Figure 16 &17 Files produced by the Exceed Service with the lingual "u-pockets"

Clinical procedures

The lower and upper teeth were aligned and leveled in only six months (Figures 18–23). The upper arch was treated with a lingual thermo activated arch wire .016"x .016" and .016"x .016" steel to finalization. To the lower jaw, initially, was used a thermo activated arch wire .014, and after, a thermo activated arch wire .016"x .016" and steel .016"x .016", to finalize.

Figure 18–23 Lingual orthodontic appliances (intrabucal occlusal view, 06 months of treatment)

The patient started to demonstrate a recurrent periodontal issue (gingival inflammation) after five months of the treatment. From this point, it was explained to the patient that the treatment could be finished with a short set of aligners. Considering the better motivation demonstrated by the patient, the braces were removed and, immediately, a digital record of the arches (intraoral scanner) was obtained. The Stl. files were uploaded to an aligners software (Arch form, www.archform.com) generating a set with 12 aligners. In three additional months, the treatment was finished. Upper retention was made (a Clear Aligner with 0.75mm thick, for continuous use no less than three months) and a lower anterior lingual bar was bonded. The total treatment time was 09 months (Figures 24–29). The initial and final smile can see in (Figures 30 & 31).

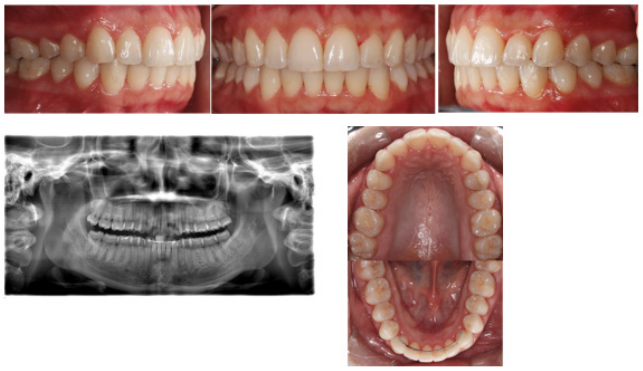

Figure 24–29 Final of hybrid treatment (lingual and aligners). Total of treatment time: 09 months

Figure 30& 31 Initial and final smile of the patient J.L.B.F

Discussion

The Lingual Technique is the most aesthetic way of orthodontic treatment in adults.[10] Until now, the literature shows some inconsistency in the study of the patient adaptation with the lingual braces. Some findings indicate that patients treated with labial and lingual appliances rate similarly the overall pain they experience during treatment.[11] Other work mentioned that the pain and quality of life during initial therapy of lingual patients can be better than other kinds of therapies, including the clear aligners.[12] The prior information to the patient about fear of the initial discomfort and protection of the tongue in the first days of treatment may be essential. The author did not find any problem with the initial adaptation to the lingual appliance, in the patient of this study. On the other side, the patient showed some hygiene difficulty (resulting in gingival inflammation) during the active treatment.

The CAD-CAM laboratory process contributes to the reduction of the mistakes in the placement of the brackets.[13] Even so, it is important to note that it is related to some minor mistakes in the placement of brackets, using the CAD-CAM process. For example, the recent literature did not find practical differences in the treatment using digital indirect bonding in labial orthodontics. In this respect, no differences were found regarding total treatment time, the number of appointments and arch bends necessary for the finalization.[14,15] In

Lingual Orthodontics, the individualization of the base of the brackets is fundamental. For this reason, the CAD-CAM methodology of the placement of the lingual brackets can be more important than the labial technique. This patient, it was used an outsourced CAD-CAM service to plan the digital final position and the placement of the lingual brackets. The models were printed, as well as the thermoformed trays were manufactured by the orthodontist himself. The short time of the treatment with the lingual appliances (only six months) demonstrated a good precision of the placement of the brackets. On the other side, some extra bends of the arches were necessary to get a better alignment of the teeth. Also, a procedure using a short phase of clear aligners was important to get the minor detailing of the finalization.

As mentioned, since the initial appointment, this patient did not show a good motivation to use removable appliances. The initial phase with lingual appliance was important to create an incentive for the patient, as long as she was showing better aesthetics of the smile. In this technique, the results did not depend on the direct participation of the patient to get the more difficult movements and the appliance is "virtually invisible". On the other side, hygiene can be complicated for some patients. In the case in the study, the substitution by the clear aligners was essential to get easier hygiene for the patient and achieve the minor movements of finalization.

Conclusion

The patients who present low cooperation potential frequently represent an obstacle to achieving the best results, in Orthodontics. For that, sometimes, the Orthodontist must find a better combination between two or more techniques and so, adapt them in favor to solve the malocclusion. In the case of this article (a Class I malocclusion), the problems of hygiene and low motivation to use removable appliances for a long time were solutions with a hybrid and strategic combinations between the lingual appliances and clear aligners. It is possible to think to use this approach in more complicated malocclusion, precisely weighting all possible outcomes, advantages, and disadvantages in each technique.

Acknowledgments

None

Conflicts of interest

The author declares no conflicts of interest.

References

1. Zhang B, Huang X, Huo S, et al. Effect of clear aligners on oral health-related quality of life: A systematic review. *Orthod Craniofac Res*. 2020;23(4):363–370.
2. Robertson L, Kaur H, Fagundes NCF, et al. Effectiveness of clear aligner therapy for orthodontic treatment: A systematic review. *Orthod Craniofac Res*. 2020;23(2):133–142.
3. Putrino A, Barbato E, Galluccio G. Clear Aligners: Between Evolution and Efficiency-A Scoping Review. *Int J Environ Res Public Health*. 2021;18(6):2870.
4. Upadhyay M, Arqub SA. Biomechanics of clear aligners: hidden truths & first principles. *J World Fed Orthod*. 2022;11(1):12–21.
5. Tuncay OC, Bowman SJ, Nicozisis JL, et al. Effectiveness of a compliance indicator for clear aligners. *J Clin Orthod*. 2009;43(4):263–268.
6. Timm LH, Farrag G, Baxmann M, et al. Factors Influencing Patient Compliance during Clear Aligner Therapy: A Retrospective Cohort Study. *J Clin Med*. 2021;10(14):3103.
7. Al-Abdallah M, Hamdan M, Dar-Odeh N. Traditional vs digital communication channels for improving compliance with fixed orthodontic treatment. *Angle Orthod*. 2021;91(2):227–235.
8. Phan X, Ling PH. Clinical limitations of Invisalign. *J Can Dent Assoc*. 2007;73(3):263–266.
9. Azaripour A, Weusmann J, Mahmoodi B, et al. Braces versus Invisalign®: gingival parameters and patients' satisfaction during treatment: a cross-sectional study. *BMC Oral Health*. 2015;15:69.
10. Sharif MO, Waring D, Malik OH. Lingual Orthodontics: The future? *Int J Orthod Milwaukee*. 2015;26(3):49–52.
11. Wu AK, McGrath C, Wong RW, et al. A comparison of pain experienced by patients treated with labial and lingual orthodontic appliances. *Eur J Orthod*. 2010;32(4):403–407.
12. Antonio-Zancajo L, Montero J, Albaladejo A, et al. Pain and Oral-Health-Related Quality of Life in Orthodontic Patients During Initial Therapy with Conventional, Low-Friction, and Lingual Brackets and Aligners (Invisalign): A Prospective Clinical Study. *J Clin Med*. 2020;9(7):2088.
13. Bacci H. The new orthodontics is aesthetics and digital: will you be ready, doctor? *Orthod Sci Pract*. 2017;10(37):11–17.
14. Kim J, Chun YS, Kim M. Accuracy of bracket positions with a CAD/CAM indirect bonding system in posterior teeth with different cusp heights. *Am J Orthod Dentofacial Orthop*. 2018;153(2):298–307.
15. Hegele J, Seitz L, Claussen C, et al. Clinical effects with customized brackets and CAD/CAM technology: a prospective controlled study. *Prog Orthod*. 2021;22(1):40.