

Treatment of Class I Malocclusion With Closed Bite Using Lingual Braces: An Esthetic Alternative To Adult Patients.

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ABSTRACT

Aims: Present case report is presented with the aim to describe the treatment of an adult patient with Class I malocclusion with closed bite using lingual braces as an alternative approach for the patients not opting labial braces.

Summary: Esthetics continues to be a primary concern for patients seeking orthodontic treatment. There are a continuously increasing numbers of adult patients seeking orthodontic therapy, but these patients often refuse the traditional labial orthodontic treatment because of social or personal or professional reasons. Invisible (lingual) orthodontics represents the only solution that does not impair the patient from an esthetic point of view. A 19 year old female patient with Class I malocclusion associated with 80% overbite (closed bite) treated by lingual Kurz-Ormco 7th generation 0.018 x 0.028 inch lingual appliance. As the patient was adult and college going, and more esthetic conscious, she choose lingual orthodontic appliance for the treatment of her malocclusion. Another

reason for choosing lingual appliance was the bite plane effect of the lingual appliance which would be helpful in bite opening. The patient was highly satisfied esthetically as well as functionally after the treatment was completed.

Keywords: Class I malocclusion, closed bite, lingual braces, bite plane.

INTRODUCTION

For the past few years, there has been increased interest developed for adult orthodontics, and everybody has been striving hard for the achieving esthetic as well as functional excellence. The 1970s was an eventful decade for orthodontics. The straight wire appliance was developed,¹ treatment demand had increased, and adult patients were seeking treatment in greater numbers. Esthetics was then and continues to be a primary concern of the patient. To address these esthetic concerns, manufacturer introduced clear brackets²; unfortunately however, staining of the bracket and the tooth, presented a significant problem. The search for improved esthetic alternatives to metal or clear plastic bracket's continued which lead to shift from labial to lingual mechanotherapy.

In 1970, when Kurz³ from USA and Fujita⁴ from Japan first began experimenting; appliance and techniques were in their infancy. Today, modern and well-developed appliances, laboratory procedures, and treatment mechanics are available. Problem like prolong treatment times and compromised results are similar to those treatment with labial appliances⁵ by an experienced practitioner and, as with any technique, can be overcome with an accumulation of experience.

Many patients, if given the choice, would opt for an appliance that will not be visible, provided the course of treatment and the quality of the results were the same as with the conventional treatment. To meet this demand, extensive research and development over the past three decade have aimed at providing a truly "invisible (lingual)" edgewise appliance⁶ or straight wire appliance.⁷ This service offered in orthodontic office allows the patients several treatment options, and provides the orthodontist with competitive advantage over colleague not offering the options for lingual orthodontics. A small but growing number of orthodontists



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have realized the tremendous advantages and rewards available when the “invisible or lingual” technique is incorporated into the practice. Present article discusses a case of Class I malocclusion with closed bite treated by Lingual mechanotherapy in Department Of Orthodontics and Dental Anatomy, Dr Z A Dental College, Aligarh Muslim University, Aligarh (UP), India.

CASE REPORT

A 19 year old female patient arrived at the university clinic for orthodontic consultation. She was referred by her general dentist with the chief complaint of “crooked teeth”. She had a well-balanced, symmetric face with competent lips (Fig. 1). Intraoral examination showed bilateral class I molar relation with cross bite of maxillary right canine (13) and maxillary left canine (23) with 80% over bite (closed bite). Root stump of right maxillary deciduous canine (52) was retained and mandibular premolars were rotated. There was crowding in maxillary and mandibular anterior region with normal overjet. Cephalometric analysis showed that the patient had class I skeletal relation with hypodivergent growth pattern (Table 1).

Treatment plan for this patient was non-extraction fixed orthodontic treatment and alignment of both the upper and lower arches with lingual appliance. As patient was adult and college going and more esthetic conscious, during the final



Figure 1: Pretreatment photographs of the patient (A-C: extraoral view; D-I: Intraoral view). A: Frontal facial view; B: Frontal view of smile; C: Oblique facial view; D: Facial profile; E: Maxillary occlusal view; F: Mandibular occlusal view; G: Right lateral view; H: Frontal view; I: Left lateral view.

treatment planning discussion session she choose lingual braces for her orthodontic correction of malocclusion. Another reason for choosing lingual appliance was the bite plane effect of the lingual appliance which would be helpful in the bite opening in this patient.

After the extraction of root stump of 53, Kurz-Ormco 7th generation⁸ 0.018 x 0.028 inch lingual appliance was placed. Laboratory procedure for indirect bonding was done using Kesling diagnostic setup and HIRO indirect bonding technique with little modification (Fig. 2).⁹ The treatment started with alignment and leveling of the upper and lower arches with 0.016 inch super elastic Nickel Titanium (SE-NiTi) mushroom shaped arch wires. The anterior bite planes were inbuilt in upper brackets which were extremely helpful in bite opening without using additional removable appliance. This

Table 1: Pre-treatment and post-treatment cephalometric analysis data.

Parameters	Norml Value	Pre-Treatment	Post-Treatment
SKELETAL			
ANB (Steiner)	(3.12±1.8°)	2°	2°
MM bisector	(-5mm)	4mm	4mm
FMA	(23.83±2°)	19°	23°
Sn-Go Gn (Steiner)	(32-35°)	25°	29°
Bjork Sum	(394°)	385°	389°
DENTAL			
Maxillary 1 to NA (Linear)	4.92±2.05mm	3.5mm	4mm
Maxillary 1 to NA (Angular)	24.02±5.82°	12°	24°
Mandibular 1 to NB (Linear)	(6±1.7mm)	3mm	4mm
Mandibular 1 o NB (Angular)	(27±4.3 °)	20°	25°
SOFT TISSUE			
Upper Lip ‘ S’ Line	(0 mm)	-4°	-2°
Lower Lip ‘S’ Line	(0 mm)	-2°	-2°



Figure 2: Our laboratory procedure for indirect bonding of lingual appliance (A-F). A: Maxillary and mandibular working models; B: Models with long axis marked; C: Complete setup; D: Bonding of bracket to the maxillary working model using transfer arch wire; E-F: Trays for indirect bonding was made using pressure molded machine.

appliance was also helpful in cross bite correction of 13 and 23. The built in anterior bite plane of this appliance cause unlocking of 13 and 23 at the initial stage of treatment which is essential for cross bite correction. A 0.016 inch NiTi arch wire which displaces the 13 and 23 labially, was helpful in the alignment of 13 and 23. Finally light “E” chain traction was applied to the 13 on the buccal side bonded button made up of composite material from the buccal tube of 16. The alignment was continued with 0.018 x 0.025 inch SE NiTi mushroom shaped archwires (Fig. 3). Finally, the orthodontic correction was completed with 0.018 x 0.018 inch TMA archwires.



Figure 3: Stage intraoral photograph of same patient treated by Invisible braces (A-C: extra oral view; D-I: Intraoral view). A: Frontal facial view; B: Frontal view of smile; C: Oblique facial view; D: Facial profile; E: Maxillary occlusal view; F: Mandibular occlusal view; G: Right lateral view; H: Frontal view; I: Left lateral view.

Treatment results showed significant improvements in the patient’s smile (Fig. 4). There was a remarkable improvement in the occlusion and facial balance (Table 1, Fig. 5). Pre- and post- treatment orthopantomogram (OPG) showed proper alignment and root paralleling (Fig. 6) The maxillary canines crossbite was entirely corrected and a solid class I, well inter-



Figure 4: Pre-treatment (A) and post-treatment (B) extra oral frontal photograph of patient showing excellent improvement in smile esthetics.

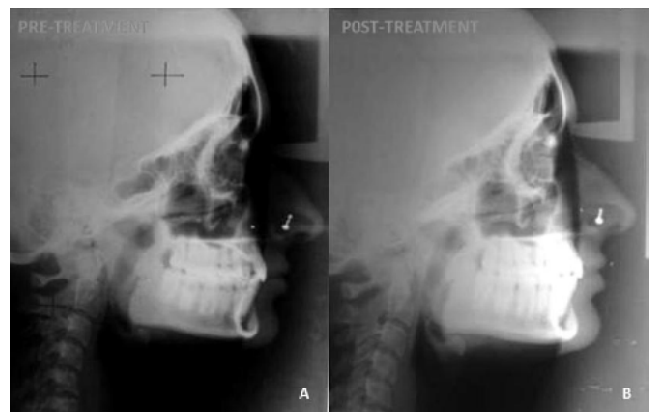


Figure 5: Pre-treatment (A) and post-treatment (B) cephalogram.

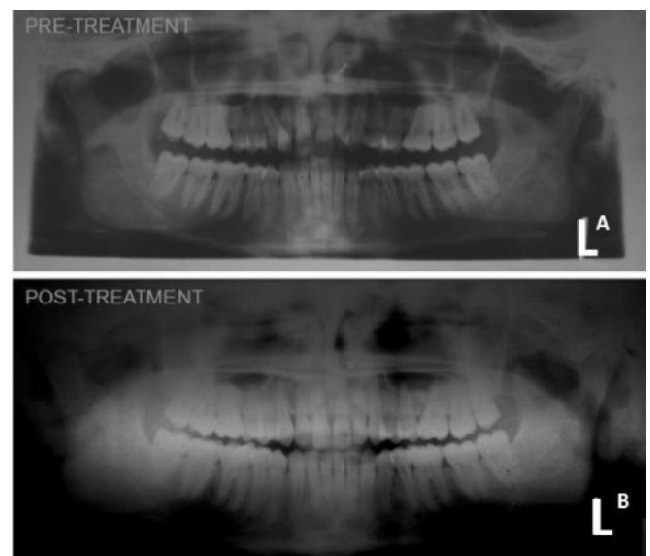


Figure 6: Pre-treatment (A) and post-treatment (B) Orthopantomogram (OPG)

cusped occlusion with proper overjet and overbite was achieved (Fig. 7). The teeth were then retained with fixed lingual retainers and the whole treatment took 17 months to complete. The patient was very pleased with the treatment results. She stated on many occasions that the lingual appliance was the only reason she was willing to undergo treatment.

DISCUSSION

As mentioned earlier, the progress of adult orthodontic treatment requires a constant balance between the esthetic and function and must take account patient expectations.¹⁰ The practioner involved in adult orthodontics must adapt his therapeutic tools to these needs for the entire treatment span in order to be sure of patient acceptance and satisfaction.¹¹ Esthetic expectations are now universal and involve younger patients, including both male and female adolescent. All patients- and not only adult- attach importance to their



Figure 7: Post-treatment photograph of the patient (A-C: Extra oral view; D-I: Intraoral view). A: Frontal facial view; B: Frontal view of smile; C: Oblique facial view; D: Facial profile; E: Maxillary occlusal view; F: Mandibular occlusal view; G: Right lateral view; H: Frontal view; I: Left lateral view.

appearance and for social or work reasons would probably refuse traditional orthodontic treatment with labial brackets.¹² Lingual (invisible) orthodontics, plays a fundamental part in achieving dental alignment and represents the best solution for meeting the need of the patients without the risk of damaging biomechanical efficiency. Infact in some kind of malocclusion, it increases efficiency.

In present case of class I malocclusion with closed bite on class I skeletal base with hypodivergent growth pattern, bite opening is extremely difficult task with conventional labial mechanotherapy. Lingual orthodontics has added advantages in bite opening because of inbuilt feature of bite plane on maxillary anterior brackets. The upper anterior bite plane determine the big difference between the lingual techniques and labial one, especially when using Kurz-Ormco 7th generation lingual brackets.¹³ This bite plane will allow the intrusion of the incisors and a limited extrusion of the molars. Bite plane can help the orthodontist to solve severe cases of deep-bite with very little efforts. There may also be speech problems after the application of the appliance¹⁴. In general, these problems do not last for more than a month. In order to make adaptation easier, it is best to start the therapy with only one of the two arches. During the initial phase of the therapy, it may be useful to cover the lingual appliance with

orthodontic wax or silicon in order to make the patient feel more comfortable.

CONCLUSION

The decision taken by adults to commit them to orthodontic treatment is a more complex matter than for the younger age groups, as they have the demands of their work and broader social needs to consider. Of those who would accept all other aspects of treatment there is a group that is not prepared to display their orthodontic appliances. Therefore, the lingual orthodontics has become the aesthetic solution for meeting the needs of these adult patients as an esthetic alternative to conventional orthodontic treatment.

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