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Lingual orthodontic treatment of generalised spacing in an adult patient - A case report

[1]Dr. Arkajit Goswami, Consultant Orthodontist, West Bengal.

[2]Dr. Md. Golam Hasan, PGT, Dept of Orthodontics & Dentofacial Orthopaedics, Dr R Ahmed Dental College & Hospital, Kolkata.

[3]Dr. Anwesha Dey, PGT, Dept of Orthodontics & Dentofacial Orthopaedics, Dr R Ahmed Dental College & Hospital, Kolkata.

[4]Dr. Soumen Khan, Consultant Orthodontist, West Bengal.

Corresponding Author: Dr. Arkajit Goswami, Consultant Orthodontist, West Bengal.

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Abstract

With the increasing number of adult patients seeking orthodontic treatment, the demand of Esthetic or invisible orthodontics are also rising. Lingual orthodontic technique is quite an efficient method of correcting malocclusion without any visible brackets and wires placed labially.

In this case an adult patient with generalised anterior spacings with a tongue thrust habit was treated with lingual brackets following Bacci Bonding System (BBS) and customized wires. With precise indirect bonding technique and controlled force application all the spaces were successfully closed providing the patient a better smile esthetics. The tongue thrust habit also got intercepted due to lingual brackets. Although having some drawbacks like increased chair side time and soft tissue irritation, lingual orthodontics still can produce satisfactory results with additional benefit of invisibility.

Keywords: Lingual technique, invisible orthodontics, adult patients, generalised spacing

Introduction

After introduction of lingual approach in the field of orthodontics, a completely new technique has evolved that made orthodontist shift their working area from labial to lingual side[1]. Due to increasing social awareness and Esthetic demands of the patients, the application of lingual orthodontics today is found to be among all age groups starting from young adolescents to adults[2-5]. Since its introduction, Fujita's mushroom arch wire and Kurz's lingual bracket system has gone through many modifications to become more patient and clinician friendly[6,7].

Although having some drawbacks in terms of soft tissue irritation and increased chairside time, lingual treatment is still effective in certain conditions. Adult patients having spaced dentition often seek ortho dontic treatment with a demand for invisibility.

The lingual approach provides an alternative with the benefit of invisibility and with an added advantage of controlling existing tongue thrust habit which is often found in patients with generalised spacing.

Case Report

A 24 years old male patient reported with a chief complaint of spacing in upper and lower dentition which he wanted to get corrected but emphasized upon having invisible braces. Extraoral examination (Fig 1) revealed straight facial profile with a mesprosopic facial type. Lips were competent with an inter-labial distance of 1mm. Face was apparently symmetrical.

Intra-oral examination (Fig 2) revealed the presence of spacing in upper and lower anterior region extending up to mesial side of first premolars in both the arches. Patient was having an edge-to-edge bite with mild mesial- in rotation in 31 and 41. Both upper and lower incisors were Proclined. The arch forms were squarish for both the maxilla and mandible. Among other significant findings patient was having a tongue thrust habit. Cephalometric analysis (Table 1) showed patient was having class III skeletal base with severe horizontal growth pattern. His upper and lower incisors were Proclined and the lower lip was slightly protrusive.

Fig 1: Pre-treatment extraoral photos

Fig 2: Pre-treatment intraoral photos.

Problem list

Skeletal problems

1. Class III skeletal base.
2. Horizontal growth pattern

Dental problems

1. Generalised spacing in upper and lower anterior
2. Severe proclination in upper and lower incisors
3. Mild rotation in 31 and 41
4. Edge to edge bite

Soft tissue problem

1. Protrusive lower lip
2. Tongue thrust habit.

Treatment Objectives

1. To close all the spaces in upper and lower arch
2. To correct the inclination and align the upper and lower anterior in the basal bone
3. To reduce lower lip protrusion
4. To establish proper overjet and overbite
5. To intercept tongue thrust habit.
6. To improve the smile and aesthetics and overall appearance.

Treatment Plan

Considering the Esthetic demand of the patient and the existing tongue thrust habit lingual orthodontic appliance was chosen which would fulfil both the requirements. Simplified indirect bonding technique (Bacci Bonding System or BBS)[8] and 0.018" slot DTC ORG lingual brackets (Orth systems) were used for the treatment. As

there was sufficient space, the correction of incisor proclination could be done in non-extraction treatment. It was planned that after initial consolidation of the anteriors the space closure would be done in rigid ss wire using light force to avoid excessive torque loss.

Treatment progress

At first mouth preparation was done by removing all the irregularities from the tooth surface especially lingual surfaces to allow proper bracket placement. Then alginate impressions were taken, and a study model was made from type IV plaster. Thereafter orientation lines were drawn on the cast followed by bracket height selection according to BBS[8]. After applying separating medium, brackets were placed in the cast in their respective positions with proper amount of composite resin minimizing flush. (Fig 3) Transfer trays were made from hot glue that allowed easy placement and retrieval without much residue left on tooth surface. After removing trays from the casts, they were properly cut with the scissors and any resin residue left on the bracket base was removed by sand blasting with aluminium oxide (50 micron).

Intraorally lingual surfaces of teeth were first sandblasted then etched and prepared for bonding. Brackets were transferred to the tooth surfaces with minimum amount of composite. Warm water was applied to allow easy removal of trays. Excess composite flush was removed with round bur.

Initially round 0.014" super elastic NiTi was placed in both arches followed by 0.016" super elastic NiTi (Fig 4) and 16x22 TMA wire. Final space closure was done in 16x22 ss wire (Fig 5). Adequate compensatory curves were added during retraction. Bite was kept free all along the treatment using posterior bite blocks. At the end of treatment fixed bondable retainers were placed.

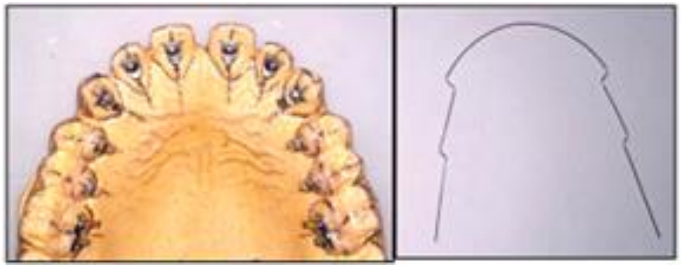

Fig 3: Indirect bonding and wire fabrication.

Fig 4: Initial round wire stage

Fig 5: Last phase of treatment

Result

After almost 18 months of treatment all the spaces were closed with significant reduction in upper and lower incisor proclination. Proper overjet and overbite was established and improvement in smile esthetics was satisfactory to the patient. (Fig 6&7)

Fig 6: Post treatment intraoral photos.

Fig 7: Post treatment extraoral photos

Cephalometric Parameters	Pre	Post
Skeletal		
SNA	85^0	85^0
SNB	86^0	86^0
ANB	-1^0	-1^0
Y axis	51^0	52^0
FMA	14^0	15^0
Wit's	-3mm	-3mm
Dental		
U1-NA	10.5mm/42^0	6mm/25^0
U1-SN	130^0	119^0
L1-NB	6mm/38^0	4mm/25^0
IMPA	116^0	100^0
U1-L1	98^0	130^0
Soft tissue		
E line to UL	0mm	-1mm
E line to LL	+2mm	+0.5 mm

Table 1: Cephalometric value comparison

Fig 8: Pre and Post treatment radiographs

Discussion

Spacing can result due to a variety of causes from natural to behavioural. Deciduous teeth develop spacing as they grow up because their jaw is getting bigger and their deciduous teeth remain the same size [9].

Children may have temporary spaces as their deciduous teeth start to fall out. This is normal and should not cause any alarm. Spacing in adult teeth is referred to as diastema. It can be localised or generalised.

Diastema appears most often in between the two upper central incisors, though they can occur between any two teeth and it can happen due to the result of discrepancy between the size of the jaws and size of the teeth most often leading to generalised spacing.

It may also be caused by missing teeth, microdontia, large labial frenum or can be habitual such as excessive thumb sucking. One of the most common Esthetic problems in adults is spacing between teeth that not only compromises their esthetics but also their social life. Adults seeking Esthetic treatment for generalised spacing is a quite common finding.

The lingual technique is always known for its superior esthetics compared to the labial technique. In the present day even with the introduction of various other appliances like clear aligners, lingual technique is still considered to be an efficient modality. One bio mechanical advantage is that in the labial technique, the point of force application is far labial to the centre of resistance and thus the tooth has a tendency to move labially, while in the lingual technique, the point of force application is closer to the centre of resistance of the tooth, thus preventing untoward labial movement[10,11]. Indirect bonding is a necessity for precision sensitive lingual orthodontics. Some demerits do exist such as transportation time, potential communication gap in

treatment prescription, progressive bonding/debonding problems, and cost factor[12].

Clinical problems, such as speech dysfunction as a result of restricted functional space for the tongue, oral discomfort due to injury or irritation of the tongue, and restriction of mastication might be present[13]. Patients considering therapy with lingual brackets should be informed of potential restrictions in oral comfort, articulation, mastication and oral hygiene, irrespective of the bracket system. Although in this case the lingual appliance helped in interception the tongue thrust habit. As in all spacing cases there is a considerable chance of relapse[14]. So the patient is advised to keep the fixed retainer for indefinite time.

Conclusion

Lingual orthodontics is a component of general orthodontics and as such it is subject to all the principles that govern correct patient selection and diagnosis. When compared with labial techniques, there are considerable differences in the biomechanics and the clinical approach. With proper planning and patient cooperation satisfactory result can be obtained.

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