Lower Anterior Crowding Correction by a Convenient Lingual Method

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ABSTRACT

In recent years, the increased esthetic demands of patients seeking orthodontic treatment have led to the development of various esthetic appliances and techniques. Lingual orthodontics is a major expression of this necessity. Several techniques and appliances have been introduced during the years, but they usually require special equipment and manipulation to be applied to patients. In this report, we present an easy, convenient, and effective lingual method for the management of specific simple cases with mild-to-moderate lower anterior crowding using conventional orthodontic means.

CLINICAL SIGNIFICANCE

In selected cases, the presented method may provide a viable simple solution for correcting a common orthodontic problem, the lower anterior crowding, while satisfying patients' increased esthetic requirements.

(J Esthet Restor Dent 25:96–100, 2013)

INTRODUCTION

Esthetic considerations of patients, especially young adults, have become a crucial factor in selecting orthodontic treatment during the last decades. This has led to the widespread use and development of various esthetic labial appliances[1] and lingual orthodontic systems.[2] Nowadays, orthodontists can satisfy almost any esthetic demands of patients using labial esthetic or in more challenging cases, lingual nonvisible appliances.[1,2]

Lingual appliances are in general more expensive and less convenient for the patient and/or the doctor.[2,3] Most lingual systems require special equipment, training, and application protocols compared with conventional ones. Therefore, such treatment approaches are usually more time-consuming and more expensive for the patient and the doctor. To overcome these limitations, less sophisticated approaches have been developed, including lingual brackets that control tooth movements only in two dimensions.[4] Third-order bents that allow torque control cannot be applied with these systems, and this makes them suitable for more simple class I cases where there is no need for absolute control of tooth movements. However, although these approaches produce satisfactory results when used in proper cases[5] and are less complicated compared with regular lingual systems, they still require special equipment and more complicated laboratory and/or clinical stages to be applied.[4,6,7]

In this report, we present a simple, effective, and inexpensive way for alleviating lower incisor crowding

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 DOI 10.1111/j.1708-8240.2012.00529.x

in specific simple cases when there is no opportunity or need for conventional lingual or labial orthodontic treatment. This protocol can be easily applied using regular orthodontic equipment and materials, and allows for solving a common orthodontic problem with minimum effort and discomfort by the doctor and the patient, respectively.

TECHNIQUE DESCRIPTION

1 Take the anterior part of a 0.014–inch NiTi wire and determine its length by calculating the intercanine distance as if teeth were straightened and placed in the planned/desired position (Figures 1A and 1B)

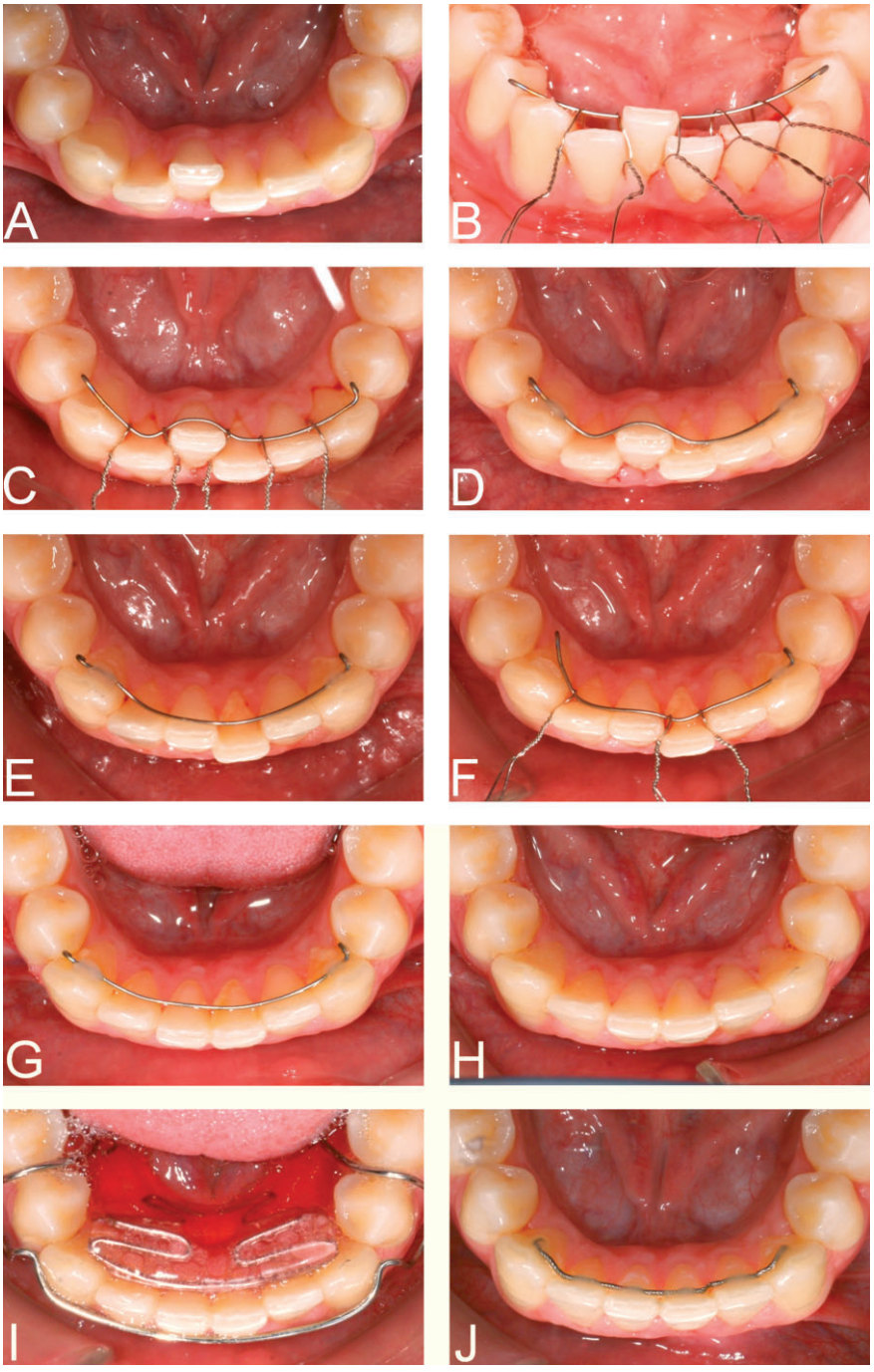

FIGURE 1. Detailed description of a convenient lingual method for lower anterior crowding correction applied in a representative case. A, Pretreatment condition of the lower anterior arch. B–G, Step by step presentation of the application of the technique. H, Result achieved after 4 months of treatment. I, Hawley mushroom retainer used for one additional month for further correction of the problem. J, Final result and placement of a 0.0215 multistranded stainless steel wire retainer bonded to the lingual surfaces of all front teeth.

 DOI 10.1111/j.1708-8240.2012.00529.x

2 Burn the wire at both edges and bent it in order to obtain a more favorable bonding condition and not to harm patient's tongue (Figure 1B)
3 Put one 0.010-inch steel ligature wire surrounding each interpoximal contact between anterior teeth, while also tying the NiTi wire (Figure 1B)
4 Fasten the wire tightly with the ligatures at all interproximal points to activate it (Figure 1C)
5 Bond the wire with conventional composite resin only to the lingual surfaces of the canines, and afterwards remove all ligatures (Figure 1D); then the wire is active
6 After 2 months (Figure 1E), debond the wire from just one side, reactivate it as described in steps 3 to 5 (Figure 1F) and bond it again
7 Another 2 months later if you achieved a satisfactory result (Figure 1G), remove the wire (Figure 1H); otherwise, reactivate it as described in step 6
8 If there is need for more finishing adjustments, you may at this stage administer a Hawley appliance (spring type retainer) with an anterior mushroom spring (Figure 1I) for one additional month of full-time wear.
9 Finally, when the desired result is achieved, place a 0.0215 multistranded stainless steel wire retainer bonded to all anterior teeth to prevent relapse (Figure 1J)[8]

DISCUSSION

In the presented case, a 19-year-old patient was referred to the University of Athens graduate orthodontic clinic. His chief complaint was his lower incisor crowding and irregularity (Figures 1A and 2A). He reported that he had previously received orthodontic treatment; however, 2 years post-retention, he experienced significant relapse (Figure 1A). The patient did not want to be retreated in both arches with fixed appliances (for both economic and convenience reasons), could not attend monthly appointments, and wanted to solve the problem as soon as possible without compromising his facial appearance.

Initially, the patient was given a Hawley type appliance with an anterior mushroom spring for full-time wear.

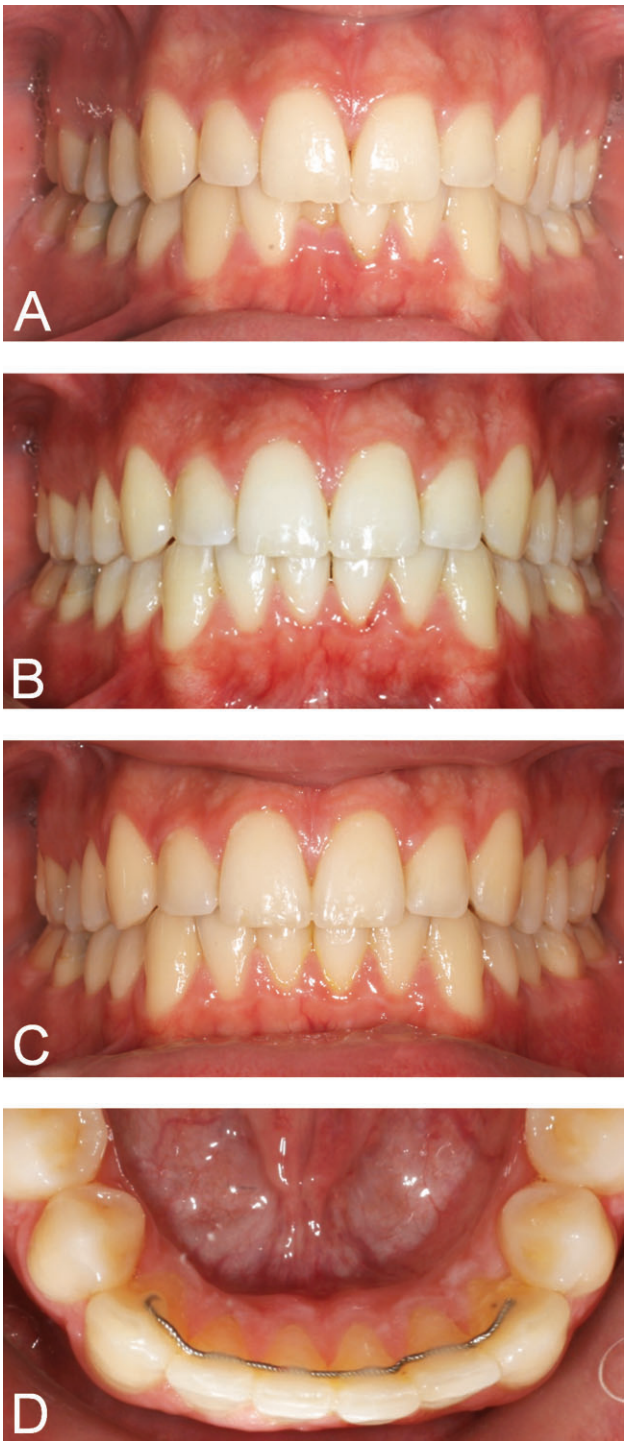

FIGURE 2. Brief presentation of a case that illustrates the performance and long-term result of a simple lingual method for lower anterior crowding correction presented in this paper. A, Intraoral photograph of a 19-year-old patient before treatment. B, Patient after 5 months of treatment. C, D, Patient 18 months after the end of treatment.

DOI 10.1111/j.1708-8240.2012.00529.x

After 4 months of use (two appointments), this appliance failed to resolve any crowding. Probably, the most important reasons for this failure were the inability to perform further interproximal enamel reduction because excessive stripping had been done in the previous treatment and the patient's poor compliance.

In order to address patient's esthetic demands and avoid dealing with compliance, we decided to use an alternative method including a lingual wire bonded just to the mandibular canines (Figure 1). This straightforward method can be effectively used in simple cases where conventional orthodontic treatment is not desirable. These cases may be patients with less than average oral hygiene, patients who cannot afford other treatment approaches, or are unable to receive fixed appliance treatment.

Considering the point of force application relative to the center of resistance, it is evident that crowding is resolved and the space is gained mainly by labial tipping of teeth. The same rationale is also valid for the Hawley appliance. Thus, in cases where labial tipping should be avoided, these options may not be applicable. These are cases with inadequate space for labial tipping (e.g., not enough pretreatment overjet) where labial tooth movement could lead to a more edge–edge incisal relationship or even to a traumatic anterior occlusion. Another contraindication exists for patients with increased risk for recession, especially those with thin gingival biotype who already have considerable labial inclination of mandibular incisors prior to treatment.[9] In such cases, interproximal reduction of anterior teeth may provide a solution to resolve crowding while avoiding excessive labial tipping of teeth.

By the proper use of the method described here, a clinician can easily offer an acceptable solution (Figures 1G and 2B) to a common orthodontic problem (Figures 1A and 2A) when there are no other valid alternatives, as in the reported case. The greatest advantage of this technique is that with such simple means, the doctor can reach treatment goals and provide a satisfactory result to the patient within a few months. With implementation of regular retention measures, the result remained stable 18 months after the end of treatment (Figures 2C and 2D).

However, it should be kept in mind that through this method, control of tooth movement cannot be sufficient for treating more complex cases. Correct diagnosis and proper case selection is mandatory for achieving satisfactory esthetics without compromising functional aspects of treatment. Thus, we suggest this technique to be applied in simple class I cases with mild-to-moderate lower anterior crowding or irregularity, and when the problem is localized only to the anterior region. For example, cases of mild-to-moderate relapse after orthodontic treatment, like the one presented, are really suitable to be treated with this treatment approach.

DISCLOSURE

The authors do not have any financial interest in any of the companies whose products are mentioned in this paper.

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This article is accompanied by commentary, Lower Anterior Crowding Correction by a Convenient Lingual Method, Vincent G. Kokich, DDS, MSD
DOI: 10.1111/j.1708-8240.2012.00530.x

 DOI 10.1111/j.1708-8240.2012.00529.x