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Case Report

A Novel Method of Altering the Buccal Segment Relationship

Stefan Abela[1], Michael Cheung[2] and Huw G Jeremiah[3]

[1]*Post CCST Specialist Registrar, Norfolk and Norwich University Hospital NHS Foundation Trust, Norwich*

[2]*Specialist Orthodontic practitioner, Slough, UK*

[3]*Consultant in Orthodontics, Adden brookes Hospital, Cambridge NHS Foundation Trust Hospitals, Cambridge, UK*

***Corresponding Author:** Dr Stefan Abela, Outpatient Department, Norfolk and Norwich University Hospital Colney Lane, Norwich, NR4 7UY.

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Abstract

Aims: This paper presents a novel way of altering buccal segment relationships in the maxillary arch with a very practical and non-expensive patient-compliant method, primarily utilizing intra-oral elastics.

Materials: Four successful cases are presented utilizing this technique. The first case details the successful management of a 29-year-old Asian female, the second case details the successful management of 15-year-old caucasian female, the third case describes the management of a 16-year-old caucasian male and the fourth case describes the management of a 24-year-old caucasian female.

Results: All the presented cases had the buccal segment relationship altered utilizing this innovative technique. The buccal segments corrected were half a unit class II and was also utilizing to correct asymmetric buccal segment relationships.

Discussion: The suggested technique represents a new and innovative way of assisting the clinician (to) correct buccal segment relationships. This technique does not require any patient cooperation apart from the class II inter maxillary elastic wear.

Conclusion: This technique should be available to the clinician when correcting unilateral or bilateral class II buccal segment relationships.

Keywords: *Buccal segment; Molar relationship; Fixed appliances; Intra-oral elastics; Orthodontics; Treatment mechanics*

Introduction

Molar correction is an important part of routine orthodontic treatment and its classification is usually based on the type of treatment mechanics utilized, during the treatment [1]. This could either be patient-compliance dependent or patient-compliance independent.

Molar relationship is typically altered in the correction of class I and class II malocclusions without significant skeletal involvement [2].

Headgear is the classical method of distalising molars [3], as it can be used for asymmetric molar distalisation [4]. Its use however, has declined over the past decade due to unsatisfactory clinical results [5], patient compliance and safety issues. Safety features of headgear are described very well in the literature [6,7].

Alternative methods include;

1. Pendulum appliance [8]
2. Jones jig appliance [9]
3. Distal Jet appliance [10]

4. Keles slider [11]
5. Repelling magnets [12]
6. Compressed springs [13]
7. Molar distalising bows [14]
8. Herbst Appliance [15]
9. Temporary anchorage devices [16]
10. Forsus™ appliance [17,18]
11. Advan Sync™ 2 [19]

Clinical interest in the above appliances has varied over the last two decades however appliances that do not require patient compliance have been favoured. Techniques that do not rely on patient cooperation are more reliable and effective [16].

Recent literature has incessantly focused on the success of bone-anchored devices in the retromolar area for antero-posterior movement of molar teeth [20,21].

Adverse effects of molar distalising techniques include tipping of the first molars however advantages include treatment completion on a non-extraction basis and better patient acceptability.

The aim of this paper was to investigate and introduce a very effective and practicable method of altering the buccal segment relationship using intermaxillary elastics.

Method

A standard sequence of progressive alignment arch wires were was followed until all the teeth in both the labial and buccal segments were fully leveled and aligned. The sequence consisted of round nickel titanium arch wires followed by rectangular forms of the same type. The final insertion was completed with rectangular stainless steel wires which prevented the occurrence of any potential rotations of the wire in the slot or molar tubes. A 0.019" x 0.025" stainless steel wire lessened tipping of the molars as there is less slop in the bracket system. The upper wire can be sectioned mesial to upper first molar tubes or second premolar. The sectioned wire can then be cinched upwards (Figure 2c). OrthoCare (UK) Limited, 3/16", 4 ½ oz, 4.8mm, 126 grams intermaxillary elastics were placed from the lower second molar hooks to the cinched wire in the upper arch. The intermaxillary elastics had to be worn full time including eating and sleeping with the elastics in situ. The appearance of a gap, with full compliance, at the rate on average of 1mm per month, should be witnessed. The aim was to alter the molar relationship to a ¼ unit III position for good buccal inter digitations. The upper first molars may be slightly extruded and tipped a result (Figure 2d on the left buccal segment). A 0.018" stainless steel continuous wire may be inserted to level and intrude the upper first molars. Intra maxillary power chain can be used from the upper second molar to the loop (or a Kobayashi hook on the upper canines) to retract the labial segment to close the gap created. The patient's use of Class II intermaxillary elastics is ideally continuous with the main aim being that of reinforcing anchorage.

Case Report 1

A 29-year-old Asian female, R.K. with a clear medical history presented with a class III incisor relationship on a class I skeletal base complicated by a class II buccal segment relationship bilaterally and a shift of the lower centre line to the left by two millimetres in relation to the facial midline. The patient's past dental history included extractions of upper first premolars.

The treatment plan consisted of extractions of lower right and lower left second premolars and upper and lower fixed appliances. Treatment commenced in April 2006 and the process of sequential arch wire changes was finalized by placing a 0.019 x 0.025-inch stainless steel arch wire in both the upper and lower arches. The upper arch wire was sectioned mesial to the upper second premolars and cinched upwards. Class II intermaxillary elastics, OrthoCare (UK) Limited, 3/16", 4 ½ oz, 4.8 mm, 126 grams were placed on a full-time basis in January 2007 and correction of the molar relationship was completed by July 2007.

Figure 1a and 1b below illustrate the pre- and post-optreatment effects, whilst figure 1c illustrates the alteration following completion of treatment.

Figure 1a: *Pre-treatment photographs.*

Figure 1b: *Post-treatment photographs.*

Figure 1c: *Comparison of pre- and post-operative treatment effects on the buccal segment relationship.*

Case Report 2

A 15-year-old Caucasian female, M.A. presented with a class I incisor relationship on a class I skeletal base complicated by moderate crowding in both the upper and lower arches. In addition she presented with half unit class II molar relationship on the right side and full unit class II molar relationship on the left. The treatment plan consisted of extractions of the upper first premolars and the lower secondpremolars followed by upper and lower fixed appliances. Treatment commenced in April 2009 and the upper 0.019 x 0.025-inch stainless steel archwire was sectioned and cinched upwards in September 2009. Class II intermaxillary elastics, OrthoCare (UK) Limited, 3/16", 4 ½ oz, 4.8 mm, 126 grams were placed on a full-time basis. Molar correction was completed in September 2010.

Figure 2a illustrates the pre-treatment photographs whilst figure 2b illustrates the molar correction utilising the technique recommended by the authors.

Figure 2a: *Pre-treatment photographs.*

Figure 2b: *Treatment photographs illustrating molar relationship alteration and technique of archwire sectioning for application of intermaxillary elastics*

Figure 2c: *Treatment photographs illustrating intermaxillary elastics from lower 7s to upper cinched wire*

Figure 2d: *Treatment photographs illustrating intermaxillary elastics from lower 7s to upper continuous stainless steel wire with loops as well as intra maxillary elastics from upper 7s to loop to close space*

Figure 2e: *Post-Treatment Photographs.*

Figure 2f: *Comparison of pre- and post-operative treatment effects*

Case Report 3

A 16-year-old Caucasian male, M.B. presented with a class II division 2 incisor relationship on a class I skeletal base complicated by an asymmetric molar relationship. The molar relationship was half unit class II on the right side and class I on the left side. The treatment plan consisted of upper and lower fixed appliances on a non-extraction basis. Treatment commenced in April 2007 and the upper 0.019 x 0.025-inch stainless steel arch wire was sectioned and cinched upwards in January 2009. Class II intermaxillary elastics, Ortho-Care (UK) Limited, 3/16", 4 ½ oz, 4.8mm, 126 grams were placed on a full-time basis. Molar correction was completed in March 2009.

Figure 3a illustrates the pre-treatment photographs whilst figure 3b illustrates the molar relationship change utilizing the technique recommended by the authors.

Figure 3a: *Pre-treatment photographs.*

Figure 3b: *Treatment photographs illustrating molar relationship alteration and technique of arch wire sectioning for application of intermaxillary elastics.*

Figure 3c: *Pre- and post- treatment alteration of the molar relationship.*

Case Report 4

A 24-year-old Caucasian female, S.K. presented with a class II division 2 incisor relationship on a class I skeletal base complicated by a lower centre-line shift to the left in relation to the facial midline. In addition she presented with half unit class II molar relationship

on the right side and a class-I molar relationship on the left. The treatment plan consisted of upper and lower fixed appliances on a non-extraction basis. Treatment commenced in October 2008 and the upper 0.019 x 0.025-inch stainless steel arch wire was sectioned and cinched upwards in March 2009. Class II intermaxillary elastics, OrthoCare (UK) Limited, 3/16", 4½ oz, 4.8mm, 126 grams were placed on a full-time basis. Molar correction was completed in May 2009.

Figure 4a illustrates the pre-treatment photographs whilst figure 4b illustrates the molar correction utilizing the technique recommended by the authors.

Figure 4a: *Pre-treatment photographs.*

Figure 4b: *Treatment photographs illustrating the alteration of the buccal segment relationship*

Figure 4c: *Pre- and post- treatment alteration of the molar relationship.*

Discussion

This method of patient-compliant molar distalisation utilizing intermaxillary elastics has produced excellent results and eliminated the need of headgear. The individual variation in patients' response can't be overcome.

The advantages with this technique are as follows:

a. Compliance is easier than headgear or other adjunct appliance
b. It is non-invasive
c. Relatively quick, molars distalised within 3 to 6 months

The disadvantages are as follows:

1. Works less well in adult male patients
2. May extrude and tip the molars, but extrusion can be corrected
3. Upper 3rd molars may need to be extracted
4. May debond molar tubes when wire is turned up after sectioning

The success of this method is further supported by recent evidence. A systematic review conducted by Flores-Mir., *et al*. suggests that there is minimal effect of second and third molar eruption stage on the magnitude of first molar distalisation [22].

Cases requiring full unit correction will result in longer treatment times as bodily movement would be the preferred method as opposed to molar tipping [23].

Having identified a clinical successful technique, future studies could focus on the radiological evidence of molar distalisation and eventually carrying out a clinical trial comparing this method with other established methods.

Conclusion

This article has demonstrated that it is possible to change the buccal segment relationship utilizing inter maxillary elastics following sectioning and cinching back of rectangular stainless steel arch wires. It also demonstrated that this is possible in cases requiring unilateral and bilateral correction.

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