

Maxillary and mandibular dentoalveolar expansion with an auxiliary beta-titanium arch

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Traditionally, adult patients with mild to moderate transverse discrepancies are treated with a combination of slow maxillary expansion with palatal appliances and expanded archwires. In this case report, we describe an alternative approach for anterior crowding and excessive buccal corridors in a 20-year-old man who was treated using a beta-titanium auxiliary expansion archwire. The perceived benefit of this approach was related not only to the esthetic improvement of the smile resulting from elimination of the anterior crowding and reduction of the buccal corridors, but also to the minimal disruption of the patient's speech, which was his main functional concern. (*Am J Orthod Dentofacial Orthop* 2017;152:543-52)

Nonsurgical orthodontic treatment options for a transverse deficiency in adult patients are limited because of the lack of growth potential. Although maxillary dentoalveolar expansion is feasible in adults,¹ it has an increased risk for fenestration and gingival recession, especially in the mandible, because of the intrinsic tendency for a reduction of intermolar distance.^{2,3}

Rapid maxillary expansion in adults has been described as viable when factors such as the correct diagnosis, modification of the activation protocol, and control of dentoalveolar effects are observed.⁴ The use of the Haas appliance has been recommended when remodeling or displacement of the alveolar processes is needed in the maxilla.⁵⁻⁷ On the other hand, the use of a lingual arch or expanded archwires has been recognized for the dentoalveolar expansion of an adult mandible.

Other appliances frequently used for maxillary expansion in adults are the quad-helix and the

auxiliary expansion arch known as the jockey arch. The jockey arch appliance is easy and inexpensive to construct, and it can be incorporated into a fixed edgewise appliance. It is made from 0.040- to 0.050-in stainless steel wire and is inserted into the headgear tubes of the maxillary first molar bands.⁸ The effect produced by this appliance is dentoalveolar expansion with a certain degree of buccal crown torque, particularly in the molars, that is controlled during the treatment by incorporating buccal root torque in the main rectangular archwire.

Beta-titanium alloy has been used in different types of appliances and techniques.^{9,10} Its low stiffness and resilience allow its use in different phases of the orthodontic treatment.^{11,12} Considering the favorable mechanical properties of beta-titanium wires, we proposed to design an auxiliary overlay arch for dentoalveolar expansion in the maxillary and mandibular arches.

This case report highlights the orthodontic treatment of an adult patient using a beta-titanium auxiliary expansion archwire (TMA-EA) to achieve maxillary and mandibular dentoalveolar expansion.

DIAGNOSIS AND ETIOLOGY

A 20-year-old man came for orthodontic treatment with crowding and excessive buccal corridors as his chief complaints. His medical and dental histories showed good general health, good periodontal status, and lack of oral habits. The facial analysis indicated facial symmetry, a straight profile, lip competence, a good nasolabial

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

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Fig 1. Pretreatment facial and intraoral photographs.

angle, and balanced facial thirds. The analysis of his smile showed a consonant smile with excessive buccal corridors (Fig 1).

The dental analysis showed transverse deficiencies in both maxillary and mandibular arches.¹³ The intermolar distances were 32 mm in the maxilla and 30 mm in the mandible (Fig 2; Table I).

The clinical examination and the panoramic radiograph showed no soft tissue or hard tissue abnormalities and normal periodontal conditions, except for a calcified well-defined rounded lesion in the apical area of the mandibular right molar that was diagnosed as idiopathic osteosclerosis. The cephalometric analysis showed a skeletal Class I relationship and normal dental position (Fig 3; Table II).

TREATMENT OBJECTIVES

The primary goals of the treatment proposed were as follows: (1) transverse dentoalveolar expansions of the maxilla and the mandible, (2) correction of maxillary and mandibular crowding, and (3) esthetic smile improvement with reduction of the buccal corridors.

TREATMENT ALTERNATIVES

Based on the treatment objectives, the following treatment options were suggested: (1) nonsurgical maxillary dentoalveolar expansion and uprighting of the mandibular posterior teeth with a maxillary expander (Haas or hyrax) followed by edgewise appliance and interproximal reduction for correction of

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