

PALATAL EXPANSION WITH SIX BANDS: an alternative for young adults

Expansão palatina com seis bandas: uma alternativa para adultos jovens

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Abstract

OBJECTIVE: To present a case of correction of transverse maxillary deficiencies with posterior crossbite. **METHOD:** Opening of the midpalatal suture using a tooth-and-tissue-borne expander. **RESULTS AND DISCUSSION:** Rapid maxillary expansion (RME) is the preferred procedure in growing patients because it allows stability with respect to the amount of bone expansion and it avoids teeth expansion. In adults it is frequently associated with failure. However, in individuals past their growth spurt where the midpalatal suture and adjacent circumaxillary articulations have become more rigid, surgically assisted rapid maxillary expansion is recommended. The original Haas expander appliance consists of bands fitted to the first molars. Increased anchorage with bands on the second premolars enhances the orthodontic effect and can be used successfully in patients beyond their skeletal growth spurt. **CONCLUSION:** A non surgical alternative for treating transverse maxillary deficiency with skeletal crossbite in patients after their growth spurt, using a modified Haas palatal expander with six bands is presented.

Keywords: Palatal expansion. Young adults. Haas expander. Orthodontics.

Resumo

OBJETIVO: Apresentar um caso de correção de deficiência transversa maxilar com cruzamento posterior. **MÉTODO:** Abertura da sutura mediana palatina utilizando-se expansores dento-muco suportados. **RESULTADO E DISCUSSÃO:** A expansão rápida da maxila é o procedimento nos pacientes em crescimento porque proporciona estabilidade com relação ao montante de expansão óssea, evitando expansão dentária. Em adultos, o procedimento é frequentemente falho. Entretanto, em indivíduos que já terminaram o

crescimento, onde a sutura palatina mediana e as articulações adjacentes relacionadas com os maxilares tornaram-se mais rígidas, a expansão rápida assistida cirurgicamente está indicada. O expansor Haas original consiste de bandas adaptadas aos primeiros molares. CONCLUSÃO: O aumento da ancoragem com bandas nos segundos pré-molares proporciona o efeito ortodôntico e pode ser usado com sucesso em pacientes após o estirão de crescimento, com a utilização de um expansor palatino Haas com seis bandas.

Palavras-chave: *Expansão palatina. Adultos jovens. Expansor Haas. Ortodontia.*

INTRODUCTION

Posterior crossbite is one of the most frequent malocclusions in Orthodontics (1). Possible etiologies include prolonged retention or premature loss of deciduous teeth, crowding, palatal cleft, genetic factors, arch deficiencies, abnormalities in tooth anatomy or eruption sequence, oral digit habits, buccal respiration during critical growth periods, and a malfunctioning temporomandibular joint (2, 3).

To determine the treatment plan for cases involving posterior crossbite, it must be decided whether the posterior crossbite is a true skeletal dysplasia or a problem involving only the dentoalveolar structures. Betts et al. (4) stated that the posterior crossbite does not confine itself to dental dysplasias but is more often related to an underlying skeletal problem (3).

The correction of transverse maxillary deficiencies proceeds through opening of the midpalatal suture. Maxillary expansion was described by Angell (5-7) and the clinical protocol was established by Haas in 1961 (7).

Rapid maxillary expansion is extremely advantageous for the treatment of Class III, cases of real and relative maxillary deficiency, and cases of inadequate nasal capacity exhibiting chronic nasal respiratory problems (8).

The procedure has been used effectively in children and adolescents to obtain more stability related to the amount of bone expansion and avoidance of tooth expansion. In adults, it is frequently associated with failure. This may be due in part to the anatomy of the maturing face; the midpalatal suture and adjacent circummaxillary articulations become more rigid and begin to fuse in the mid-twenties. In order to overcome the

resistance of the adult sutures to expansion, 'surgically assisted' rapid maxillary expansion has been advocated (5, 9 -12).

The original Haas expander appliance consists of bands fitted to the first molars and first premolars. In some cases, the second premolars are also banded. Lingual extensions are soldered to the bands and an acrylic splint is placed in the palate. The advocates of tissue-borne fixed appliances believe that they cause a more parallel expansion force on the two maxillary halves and that the force is more evenly distributed on the teeth and the alveolar processes (7,8m 13-17). The tooth-and-tissue-borne expander apparently has the ability, in adults, to expand the posterior dentition with its alveolar housing by bending the alveolus and perhaps by opening the midpalatal suture, with subsequent bone remodeling (11).

This study intends to describe a patient after growth spurt with transverse maxillary deficiency and posterior crossbite in permanent dentition that was treated with a modified Haas expander with six bands.

CASE REPORT

A 17-year-old man was referred to orthodontic treatment by his clinician. Clinical examination and orthodontic records revealed skeletal and dental Class I malocclusion, deficiency in maxillary and mandibular arch perimeter (-7,5mm), facial asymmetry with mandibular shifting to left side by 6 mm and left unilateral crossbite with skeletal deficiency in the transverse dimension of the maxillary arch (Figure 1).



FIGURE 1 - Initial photograph and radiograph demonstrated maxillary transversal deficiency, inappropriate arch perimeter and left unilateral crossbite

The patient had been informed that surgery would probably be required to expand the palate, but this approach was refused. It was decided that nonsurgical (RME) should be performed before placing full fixed orthodontic appliances. The patient was informed of all possible sequelae, risks and benefits, including the possible disadvantages of the surgical expansion procedure if the nonsurgical (RME) procedure failed.

As part of a thorough clinical assessment, an anterior maxillary occlusal radiograph was taken to record the midpalatal suture before treatment. A maxillary-modified Haas appliance with six bands was designed for the patient to increase the anchorage. The patient was instructed to turn the screw twice a day for 3 weeks. The expansion measured was 10.5 mm, and the patient presented with a midline diastema of 3.5 mm. The left unilateral crossbite with skeletal deficiency in the transverse dimension of the maxillary arch was treated (Figure 2).

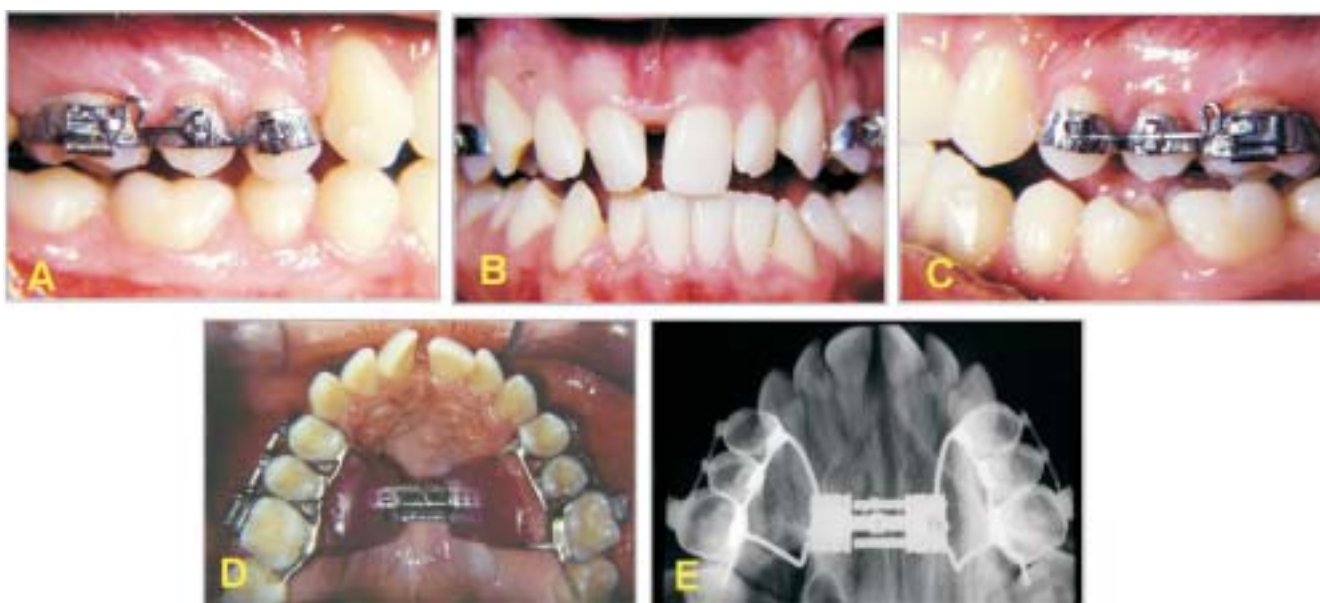


FIGURE 2 - Modified Haas palatal expander with 6 bands on premolars and first molars and an extension on second molars. Midline diastema due to the opening of the midpalatal suture. Screw stabilization for 4 months

Maxillary expansion provided better maxillary arch form with favorable conditions for corrective orthodontic treatment with first premolar extraction. A post-treatment maxillary anterior occlusal radiograph was taken to verify that the midpalatal suture had opened, and the screw was fixed in position with a 0.030" stainless

steel ligature. The patient's midline diastema self-closed completely after approximately 6 weeks and a 4-month retention phase was instituted to allow for osteogenic formation in the midpalatal suture and use of a palatal plate for 2 months in order to upright the posterior teeth (Figure 3).



FIGURE 3 - Maxillary expansion provided better maxillary arch form with favorable conditions for corrective orthodontic treatment with first premolar extraction

The palatal expansion and extraction of the right maxillary first premolars in conjunction with the edgewise fixed treatment provided the correction of incisor crowding and deviated midline.

DISCUSSION

In adults, the Haas expander has the ability to expand the posterior dentition with its alveolar housing, perhaps by bending the alveolus with bone remodeling (8, 11) Handelman (11) suggested that after the age of 18 it is often impossible to open the midpalatal suture. However, increased anchorage by bands in the second premolars and extensions in the second molars favors an increase in the orthodontic effect. This appliance can increase the possibility of opening the midpalatal suture.

The present case showed the midline diastema, emphasizing the skeletal effect of the appliance. Clinical success was judged by the evidence of the creation of a midline diastema. This result agrees with Capelozza Filho et al. (18), who attempted rapid palatal expansion in patients ranging in age from the late teens to adulthood. They found that although nonsurgical expansion failed in some subjects because of painful reactions, rapid palatal expansion in younger adults was completed successfully. Another similar study also supports the use of nonsurgical rapid palatal expansion in young adults; 82 patients under the age of 25 were assessed after successful rapid palatal expansion without surgery.

Studies (12, 19) evaluating long-term stability have also produced encouraging results. After 11 years of observation, none of the 15 patients treated (mean age of 22.3 years) experienced a recurrence of their crossbite, although the authors reported concerns regarding the level of observed gingival recession.

Ultimately the clinician must decide for each individual adult patient whether it is best to expand the maxilla with nonsurgical or surgical rapid palatal expansion. Having both viable options greatly enhances the ability to treat cases of maxillary arch deficiency (12). In cases of maxillary deficiency, the tooth-and-tissue-borne appliance containing 6 bands and extensions in second molars has the ability to increase the orthodontic effect. A force of approximately three pounds (20) is generated by every quarter turn of the screw; this force will be better distributed by the additional anchorage and may thus allow the opening of the palatal suture. It has been strongly suggested that this anchorage decreases the orthodontic effect in bone-mature patients. Although the six band palatal expander demands a longer clinical time with 2 sessions for adaptation of premolars and molar bands and a third session to place the appliance, it allows surgical expansion to be avoided (21).

Activation was performed twice a day over a period of 21 days; a real opening of the midpalatal suture was observed by occlusal radiography. After stabilization, the expander was maintained in position for 4 months, based on the osseous maturity of patient. This is one month more than essential for bone neof ormation and avoidance of dental regression as Haas (7) originally indicated in 1961.

The use of a modified Haas appliance with increased anchorage was thus shown to be effective for correcting maxillary deficiency in patients with bone maturation. These findings suggest that some precautions must be taken, including knowing the skeletal age and the patient's level of cooperation. If these factors are taken into account satisfactory results can likely be reached, with improved function and aesthetics, and a minimum of morbidity.

CONCLUSION

Opening of the midpalatal suture without surgical assistance in individuals after the growth spurt is not a predictable procedure. However, increased anchorage by bands in the second premolars and extensions in the second molars favors an increased orthodontic effect, thus creating a potentially valuable treatment for young adults.

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