SEBHA UNIVERSITY JOURNAL OF JOURNAL OF MEDICAL SCIENCES VOL.17 NO. 1 2022
DOI: 10.51984/JOMS.V17I1.1900

مجلة جامعة سبها للعلوم الطبية
Journal of Medical Sciences

Journal homepage: www.sebhau.edu.ly/journal/index.php/joms

Maxillary crossbite correction with a rapid palatal expansion followed by a corrective orthodontic treatment

*Atef Omar Abosalah Eissa[1], Ahmed Omar Abousalah Eassa[2], Abdulsalam. E.E. Ibrahim[3]

[1] Department of Orthodontic, Sebha dental College, Sebha University, Libya
[2] Teaching assistant of Oral and Maxillofacial Surgery department, Sebha dental College, Sebha University, Libya.
[3] Oral and Maxillofacial Surgery department, Sebha dental College, Sebha University, Libya

Keywords:
Haas expander
transverse maxillary deficiency
posterior bilateral crossbite

ABSTRACT

This case report presents the orthodontic treatment of a Libyan girl , aged 14 years 4 months with a Class lll malocclusion with severe transverse maxillary deficiency (anterior sever crowding ,canines buccally eruption and posterior bilateral crossbite)(Figure 1) and correction using Haas expander and fixed orthodontic appliance(Figure2). The treatment goals were to correct the posterior crossbite and anterior crowding and restore the normality of the dentition and occlusion. In phase I, the patient was treated with a modified Haas-type palatal expander, which provided a clinically significant palatal expansion and increased the maxillary arch perimeter with favourable conditions for orthodontic treatment with fixed appliances in phase II. A removable wraparound type appliance and a bonded lingual canine-to-canine retainer were used as retention. Although the literature has reported a high rate of relapse after palatal expansion, after 2 years 9 months of post treatment follow-up, the occlusal result was stable and no skeletal reversals could be detected.

علاج سن مطمورة بعد ازالة تشوهة عظمي وسحب السن

*عاطف عمر ابوصلاح[1] و أحمد عمر أبوصلاح[2] و عبدالسلام امحمد الحاج ابراهيم[3]

[1]قسم التقويم الاسنان، كلية طب الاسنان، جامعةسبها، ليبيا
[2]قسم جراحة الفم والفكين، كلية طب الاسنان، جامعة سبها، ليبيا
[3]قسم جراحة الفم والفكين،كلية طب الاسنان،جامعة سبها، ليبيا

الكلمات المفتاحية:
موسع Haas
نقص عرضي للفك العلوي
عضة ثنائية خلفية خلفية

الملخص

نبذة مختصرة يقدمتقرير الحالة هذا العلاج التقويمي لفتاة ليبية تبلغ من العمر 14ءعاما و 4 أشهر مصابة بسوء مع نقص حاد في الفك العلوي المستعرض (الازدحام الأمامي الحاد ، والثورانClasslllإطباق وجهاز Haas الشدقي للكلاب والعضة المتقاطعة الخلفيةالخلفية) والتصحيح باستخدام موسع تقويم الأسنان الثابت. كانت أهداف العلاج ميتصحيح العضة المتقاطعة الخلفية والتكدس الأمامي واستعادة الحالة الطبيعية للأسنان والانسداد. في المرحلة الأولى ، تم علاج المريض بموسع حنكيءوالذي وفر تمددا حنكيًءا مهماسريريًا وزاد محيط القوس العلوي بظروف ، Haas معدل من نوع مواتية لعلاج تقويم الأسنان بأجهزة ثابتة في المرحلة الثانية. تم استخدام جهاز من النوع الملفوف القابل للإزالة وجهازالتجنيب اللغوي المترابط بين الكلاب والكلاب كاحتجاز. على الرغم من أن الأدبيات قد أبلغت عن ارتفاع معدل الانتكاس بعد توسيعالحنك ، إلا أنه بعد عامين و 9 أشهر من متابعة ما بعد العلاج ، كانت نتيجة الإطباق مستقرة ولا يمكن اكتشاف أي انعكاسات في الهيكل العظمي

Introduction

The posterior crossbite is one of the most frequent malocclusions in orthodontics [1], and its possible etiologies include prolonged retention or loss at an early age of deciduous teeth, crowding, cleft palate, genetic factors, tooth-size arch-length discrepancies, abnormalities in tooth morphology, eruption sequence, thumb sucking habits, and mouth breathing during critical growth periods [2] .

The rapid palatal expansion (RPE) is often used to expand the maxilla in patients with crowding and clasping dentition positively impacting the treatment of related deficiencies [3, 4]. Specifically, this

*Corresponding author:
E-mail addresses: Ate.eissa@sebhau.edu.ly , (A. O. A. Eassa) Ah.eassa@sebhau.edu.ly ,(A. E.E. Ibrahim) Abd.elhaj@sebhau.edu.ly
Article History : Received 8 January 2021 - Received in revised form 15 march 2022 - Accepted 16 May 2022

technique may be used to correct transverse and sagittal crossbite, generating space in the dental arch and, consequently, solving cases of borderline crowding [5]. The RPE is extremely useful for the treatment of Class III patients and cases of real and relative maxillary deficiencies [6]. The bands are considered the most effective devices for RPE in young patients because they produce therapeutic effects that are not only limited to the correction of crossbite or the increase in arch width [5, 7]. Posterior crossbite and anterior crowding and crossbite do not have a spontaneous correction and should be treated with maxillary expansion as early as possible, after an accurate diagnosis with the patient in centric relation [8] Figure 1: Pre-treatment intraoral photographs. Angle Class lll malocclusion. Almost complete maxillary crossbite (only the upper central incisors not included in the maxilla crossbite). Accomplished with the patient compliance in using the appliance. This paper aims to describe the great palatal expansion obtained after RPE, in permanent dentition, with the modified Haas palatal expander in a patient with almost complete maxillary crossbite

Case Report

A 14.4-year-old female patient was referred by his general practitioner. On examination, the following factors were revealed: anterior crowding, buccally canine's eruption with maxilla collapsing and andposi bilateral crossbite. Lack of space for lateral incisors eruption in normal position. (Figure 1).

Treatment objectives:

The purpose of phase I was to correct crossbite and indirectly increase the maxillary arch perimeter. The patient and parents were instructed that an undesirable growth pattern could occur.

Treatment Alternatives:

In phase I, the promptly correction of complete crossbite was advised, since the patient complied with the placement, use of the expanders, and especially the oral hygiene. The Haas, HYRAX, quad-helix, and bonded expander types were explained to the patient and her father.

Treatment progress

The choice was the Haas-type fixed palatal expander [3] Both maxillary first permanent molars were banded and the expander (Figure2) , Midline diastema with clinical signs of the suture opening. Real disjunction of the suture. (a) After three weeks and 52 screw activations. After retention. The diastema returned to the initial dimensions in the retention phase of the screw. The expander was cemented in the permanent molars and acrylic extension on the premolars and canines regions. The orientation about care (food, hygiene, and activation) was explained after the palatal expander had been fixed (Figure 2). Activation of expansion was performed with 2-quarter turns (0.5 mm) per day until the desired overexpansion was achieved, evaluated by the diastema opening and posterior transverse relationship on clinical observation. There was a very clinically significant opening of the diastema between the maxillary central incisors of 5.0 mm after three weeks and 52 screw activations. The diastema returned to the initial dimensions at the retention phase (Figure 2). The expander was maintained as a retainer for a period of 6 months.

Treatment Results:

In phase I,(Figure2) the RPE made the correction of the posterior crossbite . There was also a clinically significant space gain in the maxillary dental arch allowing the alignment of the lateral incisors into the occlusion line.

In phase II, after the maxilla expansion had done , standard 0.022-in edgewise fixed appliance was recommended and the classic sequence of corrective treatment was applied with biomechanical control to distalization of the upper premolars and canines to create the enough space to lateral incisors and canines to be in occlusion line . In the alignment and levelling stages, a Class III intermaxillary elastic on the left side and vertical elastics in the canine region. The lingual arch was removed after the individual distalization of the premolars. Retraction and coordinated finishing arches were used. After removal of the fixed appliance, a removable wraparound type appliance in the maxillary arch and a wire segment were bonded lingually from canine to canine. The results of the alignment, levelling, and intercuspation: Post treatment intraoral photographs. Good intercuspation and adequate overjet and overbite. And proclination of the maxillary incisor. The patient had vertical growth favouring the stability of the occlusion. The functional and occlusal results were fully maintained at 1.5years of post treatment follow-up. All (Figure3)

Dissucion

In the present case report, the patient had bilateral skeletal posterior crossbite, and a modified Haas-type expansion appliance was indicated. Early correction of posterior crossbite has been recommended in order to prevent inadequate skeletal transversal growth. This clinical case did not present any difference between centric relation and maximum intercuspation confirming the differential diagnosis of complete maxillary crossbite, so the modified Haas expansion appliance was appointed [6]. Early age correction of posterior crossbite is recommended in order to prevent improper skeletal growth and to ensure the stability of the results. The RPE performed in this clinical case was carried out permanent dentition and reached maximum expansion with stability of the transverse dimension. The RPE promoted skeletal and dental positive effects enabling the correction of a transverse maxillary deficiency. Indirectly, it also corrected the anterior crossbite as noted by Haas, 1961 [9], on the projection of point "A," with an increased SNA angle and an increased facial convexity angle, even if temporarily, causing the correction of the anterior crossbite. The choice of a great magnitude screw was another aspect of the clinically magnificent maxillary expansion. The maintenance of the Haas-type appliance as retention for 6 months can be considered as one of the stability factors as seen in this clinical case. Although the correction of functional unilateral posterior crossbite can be achieved effectively at an early age with the quad-helix appliance [10] and treatment with the Haas type expander, both are dependent on the cooperation of the patient and are in symbiosis with the diagnosis [11]. The success of the treatment is highly dependent on the degree of patient cooperation and motivation to accept unpleasant things, such as allowing adaptation, taking impressions, setting the expander, and properly brushing the teeth. They are also equally effective on the stability of the correction of posterior crossbite in increasing width and intermolar angulation [12]. In this clinical case, the activation was a 2-quarter turn a day. In theory, RPE applies a force on the posterior teeth, without giving enough time for the tooth movement to occur, so that the force is transferred to the sutures, resulting in a larger opening of the suture than teeth inclination [13]. The slow palatal expansion has advantages and disadvantages [14, 15]. Both, rapid and slow palatal expansion protocols cause buccal displacement of the first permanent maxillary molars, with more body displacement in the group with slow maxillary expansion, while more inclination in the group with RPE. Vertical and horizontal bone losses were noted in both groups; however, the slow expansion group had a great bone loss [14]. Despite the bonded expander and occlusal splint and the banded modified Haas type used in this clinical case, the response might be different. The vertical response of the posterior teeth appears to be greater in cases where the expansion was carried out without the occlusal stop [16]. This may also have favored the alignment and leveling of the lower teeth minimizing protruded maxillary incisors. The functional and esthetic results were fully achieved due to a combination of factors such as the significant arch length perimeter, vertical and sagittal proportional growth, and patient compliance.

Conclusion

The rapid palatal expansion using a modified Haas-type expander and the appropriate screw promotes positive skeletal (orthopedic) and dental (orthodontic) effects, affording, thus, the correction of almost complete maxillary cross bite . Favorable conditions have been provided for orthodontic treatment in permanent dentition with full braces obtaining function, facial and dental aesthetics, and the stability of the results.

References

[1]- D. Allen, J. Rebellato, R. Sheats, and A. M. Ceron, "Skeletal and dental contributions to posterior crossbites," Angle Orthodontist, vol. 73, no. 5, pp. 515–524, 2003

[2]- G. Kutin and R. R. Hawes, "Posterior cross-bites in the deciduous and mixed dentitions," American Journal of Orthodontics, vol. 56, no. 5, pp. 491–504, 1969

[3]- A. J. Haas, "The treatment of maxillary deficiency by opening the midpalatal suture," The Angle Orthodontist, vol. 35, pp. 200– 217, 1965.

[4]- R. A. Wertz, "Skeletal and dental changes accompanying rapid midpalatal suture opening," American Journal of Orthodontics, vol. 58, no. 1, pp. 41–66, 1970.

[5]- J. A. McNamara Jr., "Early intervention in the transverse dimension: is it worth the effort?" American Journal of Orthodontics and DentofacialOrthopedics, vol. 121, no. 6, pp. 572–574, 2002.

[6]- O. Tanaka, B. Orellana, and G. Ribeiro, "Singular aspects to operate rapid palatal expansion procedures," Revista Dental Press de Ortodontia e Ortopedia Facial, vol. 9, pp. 98–107, 2004.

[7]- C. J. Vogel, "An interview with James A. McNamara Jr.," Dental Press Journal of Orthodontics, vol. 16, no. 3, pp. 32–53, 2011.

[8]- F. V. Celenza, "The theory and clinical management of centric positions: II. Centric relation and centric relation occlusion," The International Journal of Periodontics & Restorative Dentistry, vol. 4, no. 6, pp. 62–86, 1984.

[9]- A. J. Haas, "Rapid expansion of the maxillary dental arch and nasal cavity by opening the midpalatal suture," The Angle Orthodontist, vol. 31, no. 2, pp. 72–90, 1961.

[10]- M. Figueiredo, D. Siqueira, S. Bommarito, and M. Scanavini, "The early orthodontic treatment of posterior crossbites with attachment Quad-helix," RevistaCl´ınica de Ortodontia Dental Press, vol. 5, pp. 75–86, 2007.

[11]- O. Tanaka, H. Maruo, and E. Camargo, "A intranspon´ıvelgrandeza do diagnosticoemOrtodontia," ´ Revista de Cl´ınica e PesquisaOdontologica ´ , vol. 1, article 3, 2004.

[12]- T. Huynh, D. B. Kennedy, D. R. Joondeph, and A.-M. Bollen, "Treatment response and stability of slow maxillary expansion using Haas, hyrax, and quad-helix appliances: a retrospective study,"American Journal of Orthodontics and DentofacialOrthopedics, vol. 136, no. 3, pp. 331–339, 2009.

[13]- A. J. Haas, "Long-term posttreatment evaluation of rapid palatal expansion," Angle Orthodontist, vol. 50, no. 3, pp. 189–217, 1980.

[14]- M. Brunetto, J. Da Silva Pereira Andriani, G. L. U. Ribeiro, A. Locks, M. Correa, and L. R. Correa, "Three-dimensional assessment of buccal alveolar bone after rapid and slow maxillary expansion: a clinical trial study," American Journal of Orthodontics and DentofacialOrthopedics, vol. 143, no. 5, pp. 633–644, 2013.

[15]- R. M. A. Lima Filho and A. C. de Oliveira Ruellas, "Long-term maxillary changes in patients with skeletal Class II malocclusion treated with slow and rapid palatal expansion," American Journal of Orthodontics and

[16]- C. L. Miller, E. A. Araujo, R. G. Behrents, D. R. Oliver, and ´ O. M. Tanaka, "Mandibular arch dimensions following bonded and banded rapid maxillary expansion," Journal of the World Federation of Orthodontists, vol. 3, no. 3, pp. 119–123, 2014.

Figures

FIGURE1: PRETEARTMENT PICTURES

FIGURE2: START TEARTMENT EXPANDER CEMENTATION & FIXED APPLIANCE PUTTING

FIGURE3: POSTTREATMENT PICTURES