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Treatment of anterior crossbite with anterior expansion screw and posterior bite plane

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Abstract

Anterior dental crossbite is commonly seen in children who have malocclusion. Early diagnosis and correction of anterior crossbite may prevent the adverse effects upon the growth and development of a child. Different techniques have been used to correct anterior crossbite in mixed dentition. The present case report describes the successful management of anterior dental crossbite with anterior expansion screw and posterior bite plane appliance.

Keywords: Anterior crossbite, Expansion appliance, Posterior bite plane, Malocclusion.

Introduction

Anterior crossbite is a malocclusion in which one or more of the maxillary anterior teeth occlude palatally to the mandibular incisors. If it occurs due to the palatal malposition of a maxillary tooth with associated labioversion of contacting mandibular teeth, then it is called dental crossbite [1].

Trauma to the primary incisor with a displacement of the permanent tooth bud, supernumerary anterior teeth, odontomas, crowded incisor, and delayed exfoliation of the primary incisors are the common etiological factors for this condition. Several treatments have been applied for the correction of anterior crossbite. The appliance needed for the correction of crossbite should be inexpensive, comfortable, and easily tolerated [2-5].

Early correction of this malocclusion will prevent further complications. Following are the case reports of patients with anterior dental crossbite and its management.

Case description

A 8-year-old female patient reported at the Department of Pedodontics and Preventive Dentistry at Inderprastha Dental college and hospital, Sahibabad, with the chief complain of irregular teeth in upper front teeth since the

time of eruption. On examination, 21 was found to be in crossbite (Fig. 1). She had a history of over-retained left primary maxillary central incisor. She presented with the class I molar relation.

Orthopantomogram (OPG) was taken to rule out the presence of any pathology in relation to the tooth in crossbite. The amount of root formation was also assessed from the OPG. The model analysis revealed that both arches had ≤2 mm of the arch length-tooth material discrepancy. So non-extraction correction with a segmental expansion was planned with Hawley's appliance with an expansion screw and bilateral posterior bite plane (Fig. 2).

The patient was instructed to activate the screw once in every alternate day by a quarter turn of the screw in the anticlockwise direction. After 4 weeks, the crossbite was corrected with adequate overjet and overbite (Fig. 3). Follow-up was done till 6 weeks to detect the retention of Hawley's appliance (Fig. 4). The appliance was removed after 6 weeks.

Figure 1: pre-operative- 21 in cross bite

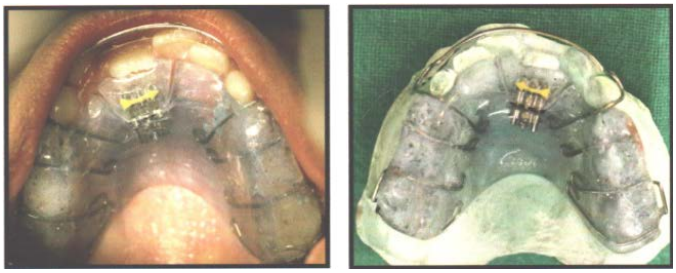

Figure 2: Hawley's appliance with expansion screw and posterior bite plane

Figure 3: follow up- posterior cross bite corrected in 4 weeks

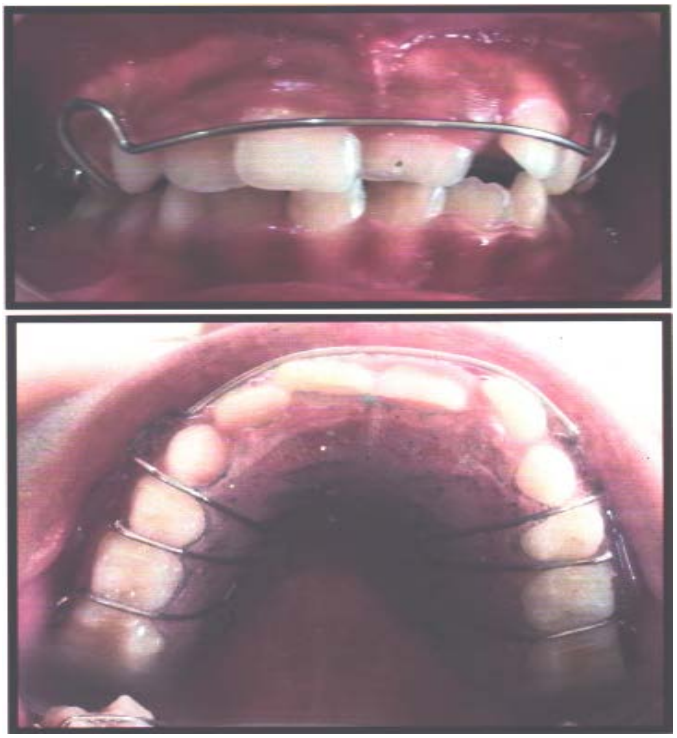

Figure 4: follow up- Hawley's appliance retension

Discussion

Anterior crossbite is the term used to define the lingual positioning of the maxillary anterior teeth in relation to the mandibular anterior teeth [6]. The prevalence of anterior crossbite is found to be 4–5% and usually becomes evident during the early mixed dentition period [2].

Anterior crossbite should be intercepted and treated as early as possible. If not treated early, it has the potential of growing into skeletal malocclusion. Crossbite of

dental origin can be treated using both removable and fixed appliance.

Anna Paulina and Lars Bond mark had done a randomized controlled trial in 2015 to compare the effectiveness of fixed and removable appliance in correcting anterior crossbite and concluded that this can be successfully corrected by either removable or fixed appliance therapy [7].

In this case, the expansion screw was used for the crossbite correction. Treatment with removable appliances will help in the maintenance of good oral hygiene. Etching, bonding, and debonding procedures can be avoided. Moreover, they reduce the chair side time. However, the success of therapy depends on good patient cooperation [8]. Since removable segmental expansion appliance is an effective method for the labial tipping of maxillary incisors, the correction was done with removable expansion screw appliance. The principle of the orthodontic screw is that its ends are threaded in opposite directions and when it is turned the metal end plates move apart. Since it is rigid, it can only be activated by only a small amount at one time, otherwise the appliance cannot be inserted. The activation was done one quarter turn every alternate day. A single quarter turn produces 0.25 mm of tooth movement producing forces ranging from 3 to 10 pounds. This compresses the teeth in the socket by 0.12mm per side, which is within the width of Periodontal Ligament (0.25mm) [9]. Such a mild reduction of periodontal ligament space will not interrupt the blood circulation and creates an ideal condition for the tooth movement and bone transformation. care must be taken not to overdo it as this can cause the appliance to be ill-fitting. Ideally, frequency of opening the screw is done every 3 –7days in slow expansion and for children it is twice a week and adults it is once a week [10].

The duration of treatment with removable appliances is reported to range from 6 to 12 weeks [11]. In this case, the correction was achieved by 4 weeks.

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