ORTHOPEDIC EXPANSION TO MANAGE CONSTRICTED MAXILLARY ARCH

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INTRODUCTION

The maxillary expansion is accomplished by a combination of skeletal (Orthopedic) expansion and dentoalveolar (orthodontic) expansion. Orthopedic expansion involves separation of the mid palatal suture while orthodontic expansion results in buccal tipping of the maxillary posterior teeth. The proportion of skeletal and dental movement is dependent on the rate of expansion and the age of the patient during the treatment [1,2]. The goal of palatal expansion is to maximize the skeletal movement and minimize the dental movement, while allowing for physiological adjustment of the suture during separation [3].

The incidence of posterior cross bite in American children is approximately 70% [4] while such prevalence studies are not available about the children of Pakistan. Issacson and Wertz [5] thoroughly studied rapid palatal expansion and according to them forces maximize separation of mid palatal suture by overwhelming the suture before any dental movement or physiological sutural adjustment. They also noted that the traumatic separation of the mid palatal suture may induce patient's discomfort. Moreover rapid palatal expansion also requires patient or parent co-operation in appliance activation and laborious laboratory procedures in fabrication of the appliance are involved.

CASE REPORT

An 11 years old girl reported to the department of orthodontics, AFID Rwp on 3rd March 2001 with the chief complaint of poor appearance of her front teeth (fig. 1&2).

Fig. 1: Poor appearance of front teeth.

Fig. 2: Proclination of upper anterior teeth.

Fig. 3: Treatment in progress.

History revealed strong habit of thumb sucking while clinical examination revealed class II skeletal pattern with increased

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anterior facial height and Frankfort mandible plane angle. There was anterior open bite with constricted palate and bilateral posterior cross bite. Lips were full, averted with normal length and there was more gingival exposure on smiling. OPG confirmed mixed dentition; 1st permanent molars were erupted whereas 2nd and 3rd molar were un-erupted.

Cephalo-metric analysis showed SNA to be 82^0 and SNB 76^0. The ANB value was 6^0 and over Jet 7mm indicating moderate class-II skeletal pattern. Wits analysis confirmed this observation with an AO-BO distance of 3mm and the lower incisor – APO =- 1. Interincisal angle was 124^0. Space analysis revealed a requirement of 3mm in lower and 5mm in upper arch. The aims of the treatment were to correct the anteroposterior and transverse discrepancies, leveling and aligning of arches, correction of over jet, overbite, and elimination of the habit.

Non-extraction modality of the treatment was adopted upper and lower edgewise appliances with rapid palatal expander, and for distalization headgear was prescribed. (fig. 3)

The total duration of the treatment was planned about 18 months. The patient was instructed to observe strict oral hygiene measures. With rapid palatal expander transverse discrepancy was corrected. Anteroposterior relationship was improved by distalization of upper first molars. Appliance also eliminated habit, over jet was reduced and anterior open bite was closed (fig. 4&5). The active treatment was followed by a phase of retention.

DISCUSSION

Rapid palatal expansion has been used for more than a century as a treatment for maxillary constriction [6].

Such specialized treatment not only resulted into correction of transverse dimensions but the mandible was also carried forward to its normal position resulting in spontaneous correction of class II malocclusion [7].

Fig. 4: Post treatment appearance.

Fig. 5: Follow up photograph.

Hass noted that most class II patient present mandibles functional retrusion [8]. These needed expansion of maxillary arch to obtain a permanent orthopedic effect on the maxilla by releasing the mandible to move anteriorly. Class II malocclusion due to deficiency in the maxillary arch width can be favourably corrected by rapid palatal expander [9].

This procedure induces forward positioning of mandible in moderate class II cases, Wendling [10] reported that by expanding maxillary arch, it is possible to release the mandible to move forward, thus creating an excellent condition for the mandible to grow to its full extent, helping in class II correction [11].

After rapid expansion, an initial downward and forward movements of the maxilla together with a downward and backward rotation of the mandible occur which in fact have a negative effect on class II correction. During the retention period, a slight forward position of mandible is observed. The expansion in the transverse dimension seems to lead to positive anteroposterior mandible changes and to the mandible being carried forward to its normal position [12-14].

All the goals of treatment in this case were achieved. The transverse anteroposterior and vertical dimensions appear to be properly corrected and stable, whereas posterior interdigitation, over jet and overbite are excellnt. Dentofacial aesthetic was markedly improved and molar relationship was class I by achieving a proper mandible position.

CONCLUSIONS

Rapid palatal expansion has proven to be an effective method of treatment to widen the maxilla as well as to assist in anteroposterior correction of Mandible. This type of treatment is comfortable for patient and is cost effective.

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