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Class I bimaxillary proclination treated by sliding mechanics- A case report

Medical Science

KEYWORDS : Class I Bimaxillary proclination; NiTi coil spring; Sliding mechanics

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ABSTRACT

17-year old female presented with severe bimaxillary proclination, edge to edge bite, incompetent lips with upper peg shaped lateral incisors. First premolars extraction was planned to correct proclination of anterior teeth and achieve lip competency. Retraction of the upper and lower anterior reduced dental proclination, lip incompetency and lip strain. Post treatment incisors inclination was improved and peg shaped lateral incisors were restored. As the incisors were retracted, lip competency, nasolabial angle and mentolabial sulcus depth improved.

INTRODUCTION

Bimaxillary proclination is a condition characterized by proclined upper and lower incisors and an increased procumbency of the lips. It is seen commonly in Asians[1-3]and African American[4–7] populations. Due to negative perception of proclined dentition and lips in most cultures, many patients with bimaxillary proclination seek orthodontic care to decrease this procumbency[8]. The etiology of bimaxillary proclination is multifactorial and consists of a genetic component as well as environmental factors, such as mouth breathing, tongue and lip habits, and tongue volume. The goals of orthodontic treatment in bimaxillary proclination include the retraction of maxillary and mandibular incisors with a resultant decrease in soft tissue procumbency and convexity. This is commonly achieved by the extraction of four first premolars followed by the retraction of anterior teeth using maximum anchorage mechanics.[9,10]

CASE PRESENTATION

17-year-old girl reported with a chief complaint of forwardly placed upper and lower front teeth. The patient showed a tongue thrusting habit. No relevant medical history was present. The patient had a straight profile with orthognathic maxilla and prognathic mandible. She had procumbent and everted upper and lower lips, and excessive lip strain on closure (Fig 1). Her dentition was characterized by a Class I malocclusion with bimaxillary dental proclination (Fig 2). She showed spacing with upper and lower anterior teeth, with incisors in edge-to-edge bite, with peg-shaped maxillary lateral incisors with midlines coinciding. The panoramic radiograph showed presence of 32 teeth with no evidence of bony loss.

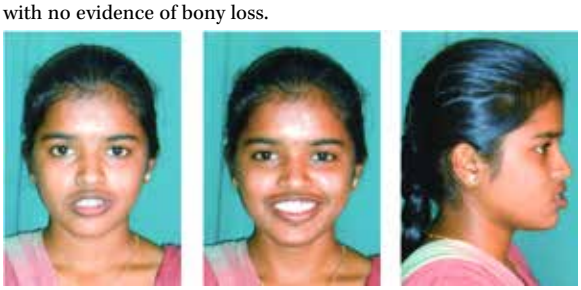

Fig 1: Pretreatment facial photographs

Fig 2: Pretreatment intra oral photographs

Fig 3: Pretreatment lateral cephalometric radiographs

The lateral cephalometric radiograph showed Wits appraisal of –2 mm and ANB angle of -1°, indicative of Class III skeletal jaw bases. (Fig 4) As evidenced by the SN-mandibular plane angle of 31°, suggestive of average growth pattern. The patient had proclined maxillary and mandibular incisors with UI-NA 11 mm/36° and L1-NB 10 mm/31°. (Fig 3)

Table 1. CEPHALOMETRIC FINDINGS			
VARIABLE	STANDARD	PRE-TREATMENT	POST-TREATMENT
SKELETAL			
SNA	82° ± 2°	81°	81°
SNB	80° ± 2°	82°	82°
ANB	2°	-1°	-1°
GO GN – SN	32°	31°	31°
WITS APPRAISAL	0 mm	-2 mm	-2 mm
DENTAL			
U1 – SN	102°± 2°	130°	106°
U1 – NA	4 mm / 22°	11 mm / 36°	5 mm / 24°
L1 – NB	4 mm / 25°	10 mm / 31°	4 mm / 26°
IMPA	92° ± 5°	105°	97°
SOFT TISSUE			
NASOLABIAL ANGLE	90-110 mm	78°	96°
U LIP – S LINE	0 mm	4.5 mm	1.5 mm
L LIP – S LINE	0 mm	5 mm	2 mm

TREATMENT OBJECTIVES

The primary objective was to correct bimaxillary dental proclination along with interception of the tongue thrusting habit. Simultaneously, sufficient space was to be maintained to build up the peg-shaped lateral incisors. Treatment objectives for the occlusion were to maintain the molar neutrocclusion, to achieve ideal overjet, overbite and achieve canine guidance with anterior disclusion.

TREATMENT PLAN

Extraction of first premolars was planned to reduce the dental proclination and to achieve lip competency. Habit reminding appliance was considered necessary for interception of tongue thrusting habit. Because the maxillary and mandibular incisors were excessively proclined and the patient exhibited lip strain on closure, group A anchorage was needed to retract the incisors and prevent mesial movement of the maxillary and mandibular molars. Bolton's discrepancy was 3 mm in upper arch.

TREATMENT PROGRESS

MBT appliance 0.022 × 0.028″ slots (Ormco, Glandora, CA) was used. Lingual buttons were bonded on the palatal aspect of maxillary anterior as a habit reminder. A transpalatal arch in maxilla and lingual arch in mandible was placed on banded first molars to enhance the anchorage. Alignment and leveling was accomplished with following sequence of arch wires: (a) 0.016″ heat activated nickel-titanium arch wires (b) 0.018″ stainless steel arch wires and (c) 0.017×0.025″ stainless steel wires. The arch wires were cinched distal to molar to avoid maxillary and mandibular incisor proclination. After aligning and levelling, the maxillary and mandibular dentition was consolidated on 0.017×0.025″ stainless steel wire. Space was maintained for peg shaped upper lateral incisors to restore it with composite resin. The en masse retraction was accomplished by sliding mechanics using 9 mm NiTi coil spring on 0.019×0.025″ stainless steel wire. The NiTi coil spring delivered 150 grams of continuous force without any permanent deformation. Composite resin build up was done on peg shaped upper lateral incisors. A 0.021×0.025″ titanium molybdenum alloy wire was placed for two months. Finishing and detailing was carried out by 0.021×0.025″ braided stainless steel wire. Upper and lower retainers were placed and case debonded. The treatment was finished in eighteen months. The patient was given a maxillary and mandibular anterior bondable lingual retainer. The patient is being recalled every six months for check up.

TREATMENT RESULT

The change in the patient's facial esthetics was the most impressive part of her treatment. With extraction of the first premolars, 6 mm retraction of upper and lower anterior was achieved. Her lip incompetency was reduced; nasolabial angle and mentolabial sulcus improved (Fig 4). The peg shaped lateral incisors were restored with composite resin.

Fig 4: Postreatment facial photographs

Fig 5: Postreatment intraoral photographs

Fig 6: Posttreatment panoramic and lateral cephalometric radiographs

The tongue thrusting habit has been eliminated and ideal overjet and overbite was established. The molar relation and vertical dimension were maintained during orthodontic treatment. Post treatment intraoral photographs and lateral cephalogram (Figs 5-6) showed that the maxillary and mandibular incisors were inclined appropriately. The soft tissue chin thickness improved as the lip strain was reduced. The panoramic radiograph (Fig 6) showed adequate root parallelism in both upper and lower arches.

DISCUSSION

Bimaxillary proclination is common among various ethnic groups, the most affected population being Asians and Ameri-

cans of African descent. It is characterized by severe proclination of anterior teeth of both the arches, with a resultant increase in lip procumbency[1-3, 11-13]. The treatment protocol includes extraction of first premolars to correct dental proclination and to reduce lip incompetency. Drobocky and Smith revealed that almost all patients treated with extraction of first premolars have an average reduction of 3.4 mm and 3.6 mm in upper and lower lip procumbency in relation to Rickett's E-line[14]. When premolars are extracted to correct the malocclusion, the treatment plan must account for closure of extraction space. The main challenges confronted by the orthodontist are anchorage maintenance, since mesialization of the posterior segment may compromise retraction of anterior teeth. Various investigators have reported a range of mesial molar movement of 0 to 2.4 mm when canine retraction is combined with the use of adjunctive appliances to control anchorage[15-21]. Group A anchorage has been considered vital in such cases. It is provided by various means including headgear and implants, etc[22]. In our case, we used transpalatal arch given by Goshgerian; it is economical, easy to fabricate, and the most reliable method to augment anchorage. MBT appliance was used in this case for the following reasons:

MBT appliance incorporates reduced anterior tip in comparison to Andrews' prescription which provides less strain on the anchorage.

MBT appliance has increased buccal root torque for upper molars in comparison to Andrews' prescription which provides more anchorage and prevents overhanging of upper palatal cusps.[23]

Tongue thrusting habit can be considered one of the chief causes for bimaxillary protrusion in this case. According to the equilibrium theory, light but sustained pressure by the tongue against the teeth is expected to have significant effects on the dentition. Tongue thrust swallowing itself has too short a duration to have an impact on the position of the teeth. If a patient has a forward resting posture of the tongue, the duration of this pressure, even if very light, could affect tooth position. If the postural position is normal, the tongue thrust swallow has no clinical significance.[24]

CONCLUSION

Case was treated by four first premolars extraction. Upper and lower anterior were retracted and lip strain reduced. The lip incompetency and nasolabial angle was reduced. The patient smile was improved with positive smile arc. Bolton's discrepancy was corrected by restoring peg shaped lateral incisors into normal sized lateral incisors

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