Management of Bimaxillary Protrusion in Hyperdivergent Case; A Case Report

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ABSTRACT

Introduction: The aim of orthodontic treatment in an a bimaxillary protrusion case is to obtain a esthetically pleasing face with harmonious soft tissue profile, stable occlusion and pleasant smile. The etiology of bimaxillary protrusion is multifactorial involving both genetic and environmental causes. enviornmental factors like mouth breathing, tongue and lip habits and tongue volume. following case report is describing the management of

Case report: The following case report is management of class I bimaxillary protrusion malocclusion in a hyperdivergent case with extraction of all first premolars. The effective management of space without losing anchorage is itself a big chalange.the results produced a pleasant facial profile with attainment of good occlusion.

Conclusion: Upper and lower anterior were retracted and lip strain was reduced. The lip incompetency and nasolabial angle was improved.

Keywords: Management of Bimaxillary, Protrusion in Hyperdivergent Case

INTRODUCTION

bimaxillary protrusion is a malocclusion characterized by proclined upper and lower incisors giving a convex facial profile. Management of bimaxillary protrusion in a hyperdivergent case requires an efficient anchorage system. This anchorage system should provide effective stability of anchorage unit with minimum discomfort to the patient. This can be managed by efficient use of mechanics along with devices like transpalatal arch, nance palatal arch and sometimes temporary anchorage devices which provides an efficient absolute acnchorage in such cases.[1] The etiology of bimaxillary protrusion is multifactorial involving both genetic and environmental causes. enviornmental factors like mouth breathing, tongue and lip habits and tongue volume.[2] The goals of orthodontic treatment in an adult bimaxillary protrusion patient with hyperdivergent growth pattern requires retraction of maxillary and mandibular incisors along with control of vertical dimension of face for esthetic soft tissue profile. This is commonly achieved by he extraction of four first premolars followed by retraction of anteriors teeth using maximum anchorage mechanics.

CASE REPORT

19 year old girl reported to the department of orthodontics, Z. A. Dental college, Aligarh with chief complaint of forwardly placed upper and lower front teeth. No relevant medical history was present. The patient had a convex profile with orthognathic maxilla and retrognathic 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 1). She showed mild crowding in upper and lower anterior teeth, with 5mm of overjet, 50% overbite with midlines coinciding. The panoramic radiograph showed a permanent dentition with third molar buds present in all the four quadrant with no evidence of bony loss. The lateral cephalometric radiograph showed skeletal class II bases with ANB of 5° and wits of 3mm. The patient had an hyperdivergent growth pattern with FMA of 30°.The patient had proclined maxillary and mandibular incisors with U1-NA 9mm/30° and L1-NB 9mm/35°.[figure 2][Table 1]

Treatment objectives

The primary objective was to correct bimaxillary dental proclination and achievement of optimum soft tissue balance along with control of vertical dimension. Treatment objectives for the occlusion were to maintain the molar neutrocclusion, to achieve ideal overjet, overbite and achieve canine guidance with anterior disocclusion.

Treatment plan

Extraction of first premolars was planned to reduce the dental proclination and to achieve lip competency. 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 2 mm in mandibular anterior region.

Treatment progress

MBT appliance 0.022 × 0.028″ slots was used for bonding in the upper and lower arch with banded first molars. A nance palatal arch in maxilla and lingual arch in mandible was placed on banded first molars to enhance the anchorage. Extraction of upper and lower first premolars was done to avoid round tipping. 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

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Figure-1: Pretreatment extra-oral and intra-oral photographs

Figure-2: Pretreatment radiographs

Figure-3: Intrusion of upper anteriors with rickets intrusion arch

Figure-4: Post-treatment extra-oral and intra-oral photographs

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. 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

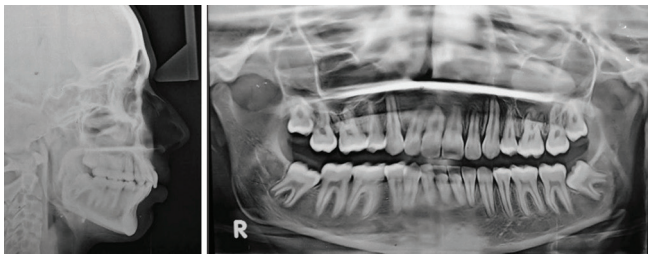

Figure-5: Post-treatment radiographs

Cephalometric values	Pre-treatment	Post-treatment
SNA	83°	82°
SNB	78°	78°
ANB	5°	4°
N ⊥ to A point -4.46 mm	-3mm	-4mm
N ⊥to B point -11.03 mm	-13mm	-13mm
FMA (23.83±2°)	30°	30°
SN-MP (32-35°)	41°	41°
Mx 1 to NA: 4.92±2.05mm	9mm	6mm
Mx 1 to NA: 24.02±5.82	30°	23°
Md 1 to NB (6±1.7mm)	9mm	6mm
Md 1 to NB (27±4.3 °)	35°	26°
IMPA (101°)	103°	98°
Upper lip (-4mm)	2mm	-2mm
Lower lip (-2 mm)	2mm	-1
Nasolabial angle	92°	98°

Table-1: Cephalometric values

coil spring delivered 150 grams of continuous force without any permanent deformation. The retraction in upper arch was discontinued when 2mm of space was left. This space was used for Correction of deepbite by rickets intrusion arch.[figure 3] 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 checkup.

Treatment result

The change in the patient's facial esthetics was the most imposing part of the treatment. With extraction of the first premolars, 6 mm retraction of upper anteriors was achieved. Correction of crowding,lower incisors inclination and 4mm retraction was achieved in lower anterior. The soft tissue revealed esthetic smile, reduced lip incompetency with improvement in nasolabial angle and mentolabial sulcus. Ideal overjet and overbite was established. The molar relation and vertical dimension were maintained during orthodontic treatment. Post treatment intraoral photographs and lateral cephalogram (Figure 4) 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 (Figure 5) showed adequate root parallelism in both upper and lower arches.

DISCUSSION

Bimaxillary proclination is characterized by severe proclination of anterior teeth of both the arches and is common among various ethnic groups, like Asians and Americans of African descent.[3] The facial analysis shows a convex profile with a resultant increase in lip procumbency. The treatment protocol includes extraction of first premolars to correct dental proclination and to reduce lip incompetency. According to Drobocky and Smith the patients treated with first premolar extraction show an average reduction of 3.4 mm and 3.6 mm in upper and lower lip procumbency in relation to Rickett's E-line.[4]

With extraction of premolars, the treatment plan must account for closure of extraction space which requires adequate anchorage maintenance, since mesialization of the posterior segment may compromise retraction of anterior teeth. It has been reported that when canine retraction is done with some adjunctive appliance for anchorage control only 0 to 2.4 of molar mesialisation is observed.[5] Group A anchorage has been considered effective in such cases. Absolute anchorage may be provided by various means including headgear and implants, etc.[6] In our case, we used nance palatal arch as it is economical, easy to fabricate, and the most reliable method to augment anchorage. Management of deepbite was also important, which requires either extrusion of posterior teeth or intrusion of anteriors or relative intrusion which involves combination of intrusion of anteriors and extrusion if posteriors. In hypodivergent cases correction of deepbite with molar eruption is desired, however in hyperdivergent cases with deep overbite requires upper and lower teeth intrusion. Leveling by intrusion can be skilled with continuous archwires that bypass the premolar and segmented archwires with auxiliary depressing arch.[7] Anchor bends in Begg's technique and Rickett's utility arch are example for the continuous method.[8,9] Burrstone three piece intrusion and mini-implant assisted intrusion are an example for the segmented method. Since the patient was hyperdivergent, extrusion was avoided and upper anteriors were intruded with rickets intrusion arch. Ebru Senisik[10] and Esen Aydogdua[11] observed 0.31mm/month of intrusion by utility arch. Frank J. Weiland (1996)[12] concluded that for intrusion low forces of segmented arch technique is better than continuous arch technique.

CONCLUSION

The above case was treated by extraction of four first premolars. Upper and lower anterior were retracted and lip strain was reduced. The lip incompetency and nasolabial angle was improved. The patient smile was improved with positive smile arc.

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