NONEXTRACTION TREATMENT OF AN ADULT WITH CLASS II DIVISION 2 MALOCCLUSION WITH AUTO ROTATION OF MANDIBLE

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ABSTRACT

This case report describes the treatment of an adult with Class II division 2 malocclusion. The patient had class II molar and class II canine relationships, retroclined upper incisors, excessive deep bite and severe crowding. The patient was treated by incisor protrusion. Auto rotation of mandible was noticed after initial levelling and aligning of maxillary arch. An optimal molar and canine relationship was achieved in 14 months.

KEYWORDS: Class II Division 2 Malocclusion, Auto Rotation, Class II Elastics, Deep Bite, Non Extraction

INTRODUCTION - Epidemiologic investigations have shown that in a population 2-5% of individuals have Class II division 2 malocclusion.1,2 Class II Division 2 malocclusion, is characterized by triad of signs which are deep bite retroclined maxillary incisors and a posteriorly positioned mandibular dental arch.3, 4 Keeping the above characteristics into consideration, first step in our treatment should be dental decompensation by proclination of incisors, thereby unlocking the mandible that in turn may permit advancement and modification in the path of closure of the mandible. Treatment will be continued by using class II mechanics will be used that aids in the correction of skeletal and dental relation.5

HISTORY AND DIAGNOSIS

15 year old post-pubertal female patient reported to Sri Hasanamba Dental College and Hospital, Hassan, Karnataka, India, with a chief complaint of irregularly placed upper front teeth and want it to be corrected.

Her pre-natal and post-natal history was reported to be normal. Past Medical and dental history were unremarkable. Extraoral examinations showed convex profile with
prominent chin and shallow mentolabial sulcus. Her lips were incompetent (Figure 1). Intraorally she had end-on molar and end on canine relationships in the right and left segments (Figure 2). Maxillary dental midline was centred relative to facial midline but it was found that the mandibular dental midline was deviated to the right by 2 mm with respect to facial midline. The maxillary arch was U shaped with 4 mm crowding (Figure 3). In mandibular arch there was 1.5 mm spacing in the anterior region (Figure 4). The panoramic x-rays showed no caries and no pathologies. All permanent teeth were present and all 3rd molars in the root formation stage (Figure 5).

Cephalometric examinations showed skeletal class II base with normal maxilla and retrognathic mandible with an ANB angle of 6°. Lower anterior facial height was in normal values with average skeletal pattern. Effective maxillary and mandibular lengths were normal with increased articular angle indicating the posteriorly directed condyle. Dentally, it was diagnosed as Angle’s class II division 2 malocclusion with normal overjet, increased overbite with retroclined maxillary and mandibular incisors in relation to cranial and apical bases. (Figures 6-7).

TREATMENT OBJECTIVES

Effective maxillary length was normal and articular angle was increased which indicated the posteriorly positioned condyle. The patient’s nasolabial angle was found to be obtuse. Keeping the above findings into consideration it was planned initially to level and align the upper arch with continuous mechanotherapy to evaluate the mandibular autorotation. Treatment objectives included correction of molar and canine relations, correction of deep bite and correction of crowding by proclining the incisors.

TREATMENT PLAN

Correction of minor crowding can be corrected by proclination of upper incisors in cases with good soft tissue balance. Articular angle was also increased indicating the anteriorly inclined condyle. Keeping the above parameters taking into consideration it was decided to implement nonextraction line of treatment. We instructed the patient to do lip exercises to reduce the lip incompetency.

TREATMENT ALTERNATIVES

First treatment option was mandibular surgery followed by the extraction of right and left mandibular first premolars for crowding and coordination of dental arches by expansion and upper incisor proclination. Because of prominent chin, after mandibular surgery genioplasty could be necessary. The patient was not willing for surgical treatment.

Second treatment option was camouflage line of treatment with the extraction of upper first premolar and lower second premolars. With this treatment alternative it will be easy to relieve crowding in the upper arch, remaining space after relieving the crowding has to be closed by retracting the maxillary anteriors by using group A anchorage. The lower extraction space should be closed by protracting the mandibular molars to end in the class I molar relationship. This treatment alternative requires retraction of the maxillary anteriors which might worsen the profile. Mesialising the mandibular molar into the extraction space will be difficult which needs complicated mechanics and procedures like corticotomy.

Third treatment option was extraction line of treatment with the extraction of upper first premolars in the upper arch. By this treatment alternative it will be easy to relieve crowding in the upper arch but it need absolute anchorage in the upper arch to
maintain the molar in class II relation, which will probably leads to dishing of the profile.

Fourth treatment option was distalization of maxillary molars by extracting the 2nd molars to relieve the crowing. This was excluded by keeping the class II skeletal base into consideration.

**TREATMENT PROGRESS**

After evaluation of the diagnostic records; the patient history and the decision of the patient non-extraction orthodontic correction was chosen as the treatment strategy. Then, upper arch was bonded initially, levelling and aligning was done using the 0.12 Ni-Ti wire followed by 0.016 Ni-Ti. Once the initial alignment is done with Ni-Ti wires, position of the mandible was evaluated. Later, lower arch was bonded, levelling and aligning was started with 016 Ni-Ti. After 0.016 Ni-Ti, 0.019x0.025 Ni-Ti and 0.019x0.025 stainless steel wires were placed for both upper and lower arches. At stainless steel stage, slight amount of autorotation was noticed which was appreciated clinically by change in molar relation from 4mm endon to 2mm endon relation on both sides and was confirmed cephalometrically. Later class II elastics (3.5 Oz) were given for the remaining correction of molar relationship. The elastic force was gradually withdrawn after the achievement of class I molar relationship keeping the stability into consideration. After the correction of molar relationship with class 2 elastics of 3.5 Oz force, patient was instructed to wear 2 Oz elastics (24 hours wear) for one month followed by one more month during night time followed by night time wear in alternate days. Class I molar and canine relationships were achieved. After 14 months from the beginning of treatment, appliance was debonded.

For retention; Hawley retainers were placed above upper and lower bonded lingual retainers and the patient was instructed to wear them full time for one year. Patient was called for periodic evaluation. After 7 months of retention phase post retention records were taken which relieved stable molar and canine relationship except mild rotation of the canine in the first quadrant.

**TREATMENT RESULTS**

Favourable facial changes in facial profile was observed (Figure 8). Lower lip was forwarded 2 mm according to E plane. Ideal tooth aspect was gained on full smile with 2 mm of gingival display. Intraorally, deep bite was resolved and ideal overjet and overbite relationships were achieved. Maxillary and mandibular dental midlines were coincident with facial midline and class I molar and canine relationships were established (Figures 9, 10, 11). Cephalometrically, ANB angle decreased to 4° from 6° because of change in SNB angle from 84.5 to 86.5 which indicates the autorotation of mandible. There was no change in SNA angle. There is increase in the upper lip length. Upper and lower incisors were proclined relative to cranial and apical bases, and this proclination helped in the correction of deep bite and sagittal discrepancy by allowing the mandible to move forward. The articular angle reduced from 160° to 154° (Figures 12, 13).

**DISCUSSION**

Generally we will prefer extraction line of treatment in cases of severe crowding like more than 6 mm, but it will worsen the profile if the patient is having the balanced profile. This kind of cases can be treated by proclining the anterior teeth without
worsening the profile. In a case report, Asakawa et al. treated a girl with Class II division 2 malocclusion who has 8 mm mandibular crowding without extraction. In Class II division 2 malocclusion decompensating the incisors by proclination might cause unlocking the mandible that in turn may permit advancement and modification in the path of closure of the mandible and aids in the correction of Class II skeletal and dental relation especially in young individuals. According to few studies there is no change was noticed in the position of the mandible when compared from the start of treatment with after the incisor proclination. The muscle activity was also unchanged after treatment. In contrast few studies have shown that there will be chance for the auto rotation in cases of class 2 division 2, after initial alignment and the articular angle will changes with the orthodontic treatment. According to Ackerman, proclining the anteriors was preferred over the extraction of the teeth for the correction of crowding in the patients with balances profile and with no lip strain.

For the reasons mentioned above and to improve facial profile we planned for the non-extraction line of treatment. After levelling of maxillary arch, the position of the mandible was evaluated. Change in the articular angle was observed. Recent studies had proved that the effects of the class II elastics are similar when compared to the fixed functional appliances but only difference between these two was treatment duration. Keeping the economic issues into consideration, we preferred class II elastics as class II mechanics for the correction of the molar and canine relationship.

Proclination of lower incisors was the side effect of using class II elastics which might be a factor for gingival recession. In treatment of a Class II division 2 female, Asakawa et al. also proclined upper and lower incisors significantly, but at the end of the treatment no periodontal damage was noted. According to Proffit, if Class II traction has proclined the lower incisors more than 2 mm, permanent retention is required. Usually patients are instructed to wear Hawley retainers full time for one year, at night for an additional year and later, return for periodic evaluation. The same protocol was followed in this case along with bonded lingual retainers were given for retention.

**CONCLUSION**

Correction of Class II malocclusion without extraction was achieved in 18 months. Class I molar and canine relationships were obtained; favourable changes were seen in patient’s profile, smile and aesthetics. Upper lip length was increased, Lower lip was forwarded and improvement in profile was achieved. Upper incisors were proclined so patient’s smile was fulled and these results improved her aesthetics.
COMPOSITE ANALYSIS

Table 1: Cephalometric values pre-treatment and post-treatment

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Mean</th>
<th>Pre Treatment</th>
<th>Post Treatment</th>
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<tbody>
<tr>
<td>SNA</td>
<td>82°</td>
<td>80°</td>
<td>80°</td>
</tr>
<tr>
<td>SNB</td>
<td>80°</td>
<td>74</td>
<td>76</td>
</tr>
<tr>
<td>ANB</td>
<td>2°</td>
<td>6°</td>
<td>4°</td>
</tr>
<tr>
<td>U1-NA</td>
<td>4</td>
<td>4</td>
<td>3.3</td>
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<tr>
<td>U1-NA</td>
<td>22°</td>
<td>13°</td>
<td>20°</td>
</tr>
<tr>
<td>L1-NB</td>
<td>4</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>LI-NB</td>
<td>25°</td>
<td>28°</td>
<td>29°</td>
</tr>
<tr>
<td>Inter incisal angle</td>
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<td>125°</td>
</tr>
<tr>
<td>Articular angle</td>
<td>140°</td>
<td>160°</td>
<td>154°</td>
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<tr>
<td>Lip length</td>
<td>21±1.9</td>
<td>17</td>
<td>20</td>
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Figure 1: Pre-Treatment Extra Oral

Figure 2: Pre-Treatment Intra Oral

Figure 3: Pre-Treatment Maxillary

Figure 4: Pre-Pre-Treatment Mandibular
Figure 5: Pre-Treatment OPG

Figure 6: Pre-Treatment Cephalogram

Figure 7: Pre-Treatment Tracing
Figure 8: Post-Treatment Extra Oral

Figure 9: Post-Treatment Intra Oral

Figure 10: Post-Treatment Maxillary

Figure 11: Post-Treatment Mandibular
REFERENCES


