Case Report

A 10 year old male patient reported to the orthodontics department with a chief complaint of forwardly placed lower jaw. Family history was positive. On clinical examination he had mixed dentition, i.e., First transitional period. Facial evaluation shows lack of development of the middle third revealing a developing skeletal Class III malocclusion (Figure 1-3). Intraoral examination revealed a forward shift of mandible, with a marked mesial molar relationship and a crossbite of the four permanent incisors, thus characterizing a functional Class III malocclusion (Figure 4-8). Study models reflected the intraoral problems. Cervical vertebral maturation index showed CVMI stage I revealing 80-100% of growth remaining (Figure 9). A panoramic radiograph (Figure 10), revealed the presence of all permanent teeth either erupted or in several developing stages. Careful evaluation of the lateral cephalogram confirmed a Class III malocclusion, with an acute nasolabial angle and a normodivergent growth pattern.

Following the confirmation of a Class III malocclusion through the cephalometric analysis, clinical differential diagnosis was accomplished by verifying the occlusion pattern at either the intercuspal position (IP) or at the centric relation (CR). The patient showed a crossbite at the maximal habitual intercuspal position with a forward shift of the mandible and, at CR, no retroposition of the mandible with crossbite still seen between the upper and lower incisors. This clinical condition confirmed a developing skeletal Class III malocclusion, which greatly favours the orthopaedic correction at the early growing stage. The patient was at mixed dentition stage, with greater potential for growth, so the main goal of the treatment was to correct the anterior crossbite, while correcting the functional forward deviation of the mandible, and allowing the maxilla to be in a forward position in relation to the mandible, to achieve a normal development (Table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre Treatment</th>
<th>Post Treatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNA</td>
<td>76°</td>
<td>79°</td>
<td>3°</td>
</tr>
<tr>
<td>SNB</td>
<td>79°</td>
<td>78°</td>
<td>1°</td>
</tr>
<tr>
<td>ANB</td>
<td>-3°</td>
<td>1°</td>
<td>-4°</td>
</tr>
<tr>
<td>Witts Appraisal</td>
<td>-4</td>
<td>0</td>
<td>-4</td>
</tr>
<tr>
<td>UI to Maxillary plane angle</td>
<td>108°</td>
<td>111°</td>
<td>3°</td>
</tr>
<tr>
<td>LI to Mandibular Plane angle</td>
<td>93°</td>
<td>91°</td>
<td>2°</td>
</tr>
<tr>
<td>Inter Incisal Angle</td>
<td>127°</td>
<td>130°</td>
<td>3°</td>
</tr>
<tr>
<td>Upper anterior Facial Height</td>
<td>48mm</td>
<td>48mm</td>
<td>---</td>
</tr>
<tr>
<td>Lower Anterior facial Height</td>
<td>63mm</td>
<td>67mm</td>
<td>4mm</td>
</tr>
<tr>
<td>facial Height Ratio</td>
<td>43.2%</td>
<td>41.7%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Lower Incisor to POG Line</td>
<td>7mm</td>
<td>5mm</td>
<td>3mm</td>
</tr>
<tr>
<td>LL to Ricketts E-Plane</td>
<td>3mm</td>
<td>2mm</td>
<td>1mm</td>
</tr>
</tbody>
</table>

Table 1. Pre and post treatment cephalometric value chart showing the treatment changes
Problem list includes, class III skeletal pattern with a retroprossion maxilla, anterior cross bite, class III molar relationship, upper midline shift, protrusive lower lip and concave profile.

Treatment plan: The proposed treatment protocol comprised of two stages, the interceptive and the corrective phases. In the first phase, a petite facemask with bondable splint type RME (Figure 11-13), was used for 14hrs/ day for a period of 8 months. RME was activated for 1 week with 90 degree of activation twice daily. Extra oral elastics(1/2 inch) delivering 350-500 gms of force were used in 15-20 degrees downward direction to the occlusal plane to avoid open bite as a consequence. The appliance was intended to produce an orthopaedic forward movement of the maxilla along with restriction on the forward growth of the mandible. After the cross bite got corrected the patient was advise to wear the face mask for night time for a period of 5-6 months to provide stability to orthopaedic corrections achieved.

Follow up appointments were scheduled until the complete correction of the anterior crossbite, totaling a treatment period of 13-14 months. Following the removal of the appliance the patient was reviewed every six months, up to the complete development of the permanent dentition, i.e., end of the interceptive phase. Lateral cephalogram (Figure 14), at the end of the interceptive phase showed the successful results of the early treatment. In this phase a marked improvement in both the facial harmony and occlusion was observed (Figure 15-20).

The second phase of treatment was started with the fixed appliance therapy (Roth 0.022 preadjusted edgewise). The upper and the lower arches were levelled and aligned. Anterior diastema was closed and the axial inclination of the teeth was improved (Figure 21-23). This phase was lasted for 13 months at the end of which Begg wrap-around retainer was given (Figure 24-31). After the cephalometric analysis (Table 1), it was found that the SNA angle continued to increase, while the SNB angle and Co-Gn, were unaltered during the interceptive phase. The measurements representing the vertical position of the mandible, FMA and SN-Go-Gn were stable. The changes in the linear and angular measurements of the upper and the lower incisors contributed to obtain a positive overjet.

Discussion
In this case Class III malocclusion was intercepted using orthopaedic appliance in the first phase of the treatment followed by fixed appliance placement in the second phase to level and align the teeth. The cephalometric analysis of the case under study demonstrated an increase in the ANB angle, mandibular growth and mandibular plane stability. The ANB was altered to the favourable value in the relationship of the jaws due to the treatment. The linear and angular measurement changes of the upper and the lower incisors helped to obtain a positive overjet.

Differential diagnosis of the patients with pseudo or true Class III malocclusions should include family history of Class III malocclusion, dental assessment of molar and incisal relation-
Early treatment of Class III malocclusion - A case report

ships, functional assessment to determine the presence of CO or CR shift on the mandibular closure, cephalometric analysis to determine the antero posterior discrepancy of the maxilla relative to the mandible and determination of the individual growth rate and direction by using the growth treatment response vector analysis (GTRV).6

The question arises as to when is the best time to start protraction facemask treatment. The main objective of early facemask treatment is to enhance forward placement of the maxilla by sutural growth. Clinically, studies have shown that maxillary protraction was effective in the primary, mixed as well as early permanent dentitions. Several studies suggested that a greater degree of anterior maxillary displacement can be found when treatment was initiated in the primary or early mixed dentition.7,8 The optimal time to intervene a Class III malocclusion is at the time of the initial eruption of the maxillary incisors.9 A long term study comparing the patients treated in the deciduous and early mixed dentition with patients treated in the late mixed dentition showed that, at the end of the phase II fixed appliance therapy, greater forward movement of the maxilla and less mandibular projection were found only in the early treatment group.10

It is accepted that Class III malocclusion exacerbates during growth, mainly starting at adolescence. Therefore in children, this malocclusion is not totally defined and the not yet established facial and occlusal features can complicate the diagnosis.11 The earlier the interceptive phase is initiated, the greater the orthopaedic effects will be to the detriment of the unavoidable orthodontic effects.12 Moreover an early benefit in terms of esthetics for the child implies, improved self esteem, considering the psychological factor.13 This case report shows that the stability of the correction of a developing skeletal Class III malocclusion would depend on correct diagnosis and early intervention which would in turn results in achieving the benefits of early treatment which includes potential for a greater orthopaedic change in a shorter period of time earlier esthetic improvements in the smile and facial profile,11,14 prevention of periodontal recession and dental wear,15,16 earlier functional improvement17 eliminating an earlier functional shift of the mandible,18 and avoiding or decreasing the chances of orthognathic surgery.

Conclusion

In conclusion, the correction of a developing skeletal Class III malocclusion would depend on correct diagnosis and early intervention which would in turn results in achieving the benefits of early treatment.

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References


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