Case Report

Face Mask with ALT RAMEC- A Case Report

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Abstract
Early intervention is associated with better patient compliance will provide better orthopedic response in skeletal class III malocclusion. However, treatment in the mixed or permanent dentition can produce favorable results, so The collaborate use of rapid maxillary expansion and facemask has been a contemporary technique for the maxillary protraction in growing patients with Class III and there is a assumption that the rapid maxillary expansion opens the circumaxillary sutures and facilitates maxillary protraction. It has been reported that the amount of maxillary protraction was 5–6 mm in 5 months under the protocol of alternate rapid maxillary expansions and constrictions (Alt-RAMEC) and was significantly more than rapid maxillary expansion. It was because Alt-RAMEC opened the circumaxillary sutures more extensively than rapid maxillary expansion. This article highlights the combined use of facemask with Alt-RAMEC to treat midface deficiency in growing patients.

Keywords: Skeletal class III, growing patients, Alt-RAMEC.

Introduction
Alternate rapid maxillary expansion and constriction (ALT-RAMEC), The ALT-RAMEC protocol was developed by Liou and Tsai¹ in 2005 for disarticulating circummaxillary sutures without overexpansion.

The Alt-RAMEC protocol helps in opening of the maxillary sutures more extensively than conventional expansion. Several authors in the last 5 years investigated the outcomes of the Alt-RAMEC protocol combined with facemask (ALT-RAMEC/FM) in Class III patients; data derived from these surveys stated that there is a significant
difference between the two treatment protocols. Isci et al2 Found a greater maxillary advancement with the activation–deactivation protocol than the conventional RME/FM protocol.

**Case History**
A 12-year-old female reported with chief complaint of forwardly placed lower front teeth. On extraoral examination, she had a straight facial profile characterized by a maxillary retrusion. Intraoral examination revealed an anterior crossbite with a reverse overjet of 2 mm & overbite of 3 mm (Fig: 1). There is no anteroposterior centric relation discrepancy on closure & the transverse width was within normal limits. The maxillary & mandibular midlines are centered in the face. The molar relationship is Class III on left side & super class III on right side & there is mild spacing in both the maxillary and mandibular arches with unerupted lower left second premolar. patient had SNA, SNB of 76° & 78° with an ANB angle of -2°, upper incisor to NA was 24° & lower incisor to NB was 30°, increased mandibular length with average to horizontal growth pattern (SN–Go Gn = 28°, FMA = 22°), therefore patient was dignosed as skeletal class III. Treatment plan was to correct the maxilla in both transverse and sagittal plane. ALTRAMEC was chosen because of the evidence that it opened the circummaxillary sutures more extensively than rapid maxillary expansion3

**Treatment progress**
Initially expansion was done with hyrax for one week i.e., the sagittal split screw was activated twice a day with 90° turns (Fig: 2a). After one week of expansion, the split screw was reactivated for a week of compression. Since the maxilla was not too narrow, the ALT-RAMEC protocol was conducted for eight weeks with the fourth constriction phases.

After eight weeks of Phase I treatment, the maxilla was sufficiently expanded with normal transverse relation, and facemask(Petit) (Fig: 2b) therapy was given for six months, protraction force of 400g was applied on each side from elastics which are connected to the facemask with downward and forward force vector having an inclination of 20°–30° to the occlusal plane. Patient was instructed to wear the facemask for 8 hours per day. Traction was continued for 8 months until sufficient clinical movement of the maxilla has achieved to improve the midface esthetics. (Fig: 2c)

A fixed orthodontic treatment was initiated with pre adjusted Edgewise appliance (slot = 0.022 x 0.028-in), and 0.014, 0.016, 0.018, 0.025- inch NiTi & 19x25ss wires were used for leveling & alignment. (Fig: 3) After leveling & alignment, finishing and detailing was done with 0.16 SS wires in the upper and lower arches. Setting elastics were given to improve the intercuspation. The treatment was completed in 20 months and fixed bonded retainer was placed in the upper and lower arches. After the treatment, there was marked maxillary forward movement was seen with improvement of profile. Anterior crossbite was corrected and proper overbite and overjet were established. Post treatment Lateral cephalogram suggested improvement in the profile (Fig: 4) & retention was carried out with bionator. (Fig: 5)
Fig. 1: 12 year old female patient with Class III malocclusion with subdivision on right side before treatment.

Fig.2a: ALT-RAMEC with hyrax appliance.

Fig.2b: Petit facemask therapy.
Fig. 2c After facemask therapy

Fig. 3 Strap up was done with 016 niti for both the arches
Fig. 4: After facemask therapy

Fig. 5: Retention with bionator
Comparison of pre and post cephalometric values are presented in the table below (table I)

Table I: Cephalometric values

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre Treatment</th>
<th>Post facemask</th>
<th>Post Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNA degree</td>
<td>76</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>SNB degree</td>
<td>78</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>ANB degree</td>
<td>-2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>N perp.to POINTA</td>
<td>-4</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>NB to pog mm</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>FMA degree</td>
<td>22</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>LAFH mm</td>
<td>56</td>
<td>60</td>
<td>61</td>
</tr>
<tr>
<td>Angle of inclination degree</td>
<td>85</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>U1 to N-A mm</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>U1 to SN degree</td>
<td>108</td>
<td>116</td>
<td>117</td>
</tr>
<tr>
<td>U1 to NA degree</td>
<td>24</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>L1 to N-B mm</td>
<td>6</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>L1 to N-B degree</td>
<td>31</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Inter incisal degree</td>
<td>110</td>
<td>114</td>
<td>115</td>
</tr>
<tr>
<td>L1 to MP degree</td>
<td>101</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>L1 to A Pog mm</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>S-line mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper lip</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Lower lip</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Discussion

Class III patients have an unfavorable facial appearance, which may affect their psychological status. Therefore, the improvement of facial esthetics is an important factor in patients. Facemask therapy is routinely used along with Rapid maxillary expansion (RME) to take advantage of the expected stimulation of the midpalatal sutures. It has been stated that facemask therapy should be initiated at early ages because sutures will close and only dental changes rather than skeletal changes are attained in older age. Hence the ALT-RAMEC protocol was developed for disarticulating circummaxillary sutures without overexpansion. Liou’s ALT-RAMEC protocol was designed to maintain this sutural stimulation over a longer period, thus achieving greater intensity of maxillary protraction.

The treatment of our patients with facemask and ALT-RAMEC protocol is to get more positive reactions to the protraction force. Baik et al. reported that more amount of maxillary advancement is achieved when the facemask was applied in conjunction with ALT-RAMEC whereas Burstone and Marcotte concluded that forward movement of the maxilla was small and rarely more than 1–2 mm.

In the present case, SNA had increased 4°, suggesting that significantly greater increase in the sagittal position of the maxilla with respect to cranial base. Westwood et al. In a study on the effects of conventional RME/FM therapy for Class III malocclusion found similar results inducing significant improvement in anterior movement of the maxilla (SNA +1.6°). The maxillary palatal plane angle was tipped 2° in an anticlockwise direction despite the 30° downward and forward pull of the facemask to counteract such a rotational effect. This is acceptable when protraction is carried out along the occlusal plane below the center of resistance of the maxilla. Long term studies with protraction facemask have shown that this effect is common with the palatal plane and returns to normal inclination in few years after completion of maxillary protraction.

Increase in the FMA angle and lower anterior face height increased by 4° & 4 mm respectively, and the results are similar to those reported by other investigators and is caused by the downward movement of the maxilla and downward and backward rotation of the mandible. In the present case, forward movement of the maxilla, associated with slight mandible rotation, resulted in a reduction of profile concavity, the
soft tissue effects were more marked for the upper lip than for the lower lip. Forward movement of the upper lip resulted from maxillary protraction with mild maxillary incisor proclination. Lower lip position did not change after treatment. Ngan et al\(^1\) observed changes in soft tissue profile accompanied by forward movement of the upper lip and backward movement of the lower lip, various soft tissue changes combined to improve the patient’s class III profile. In this case patients profile has become more convex due to forward movement of the upper lip and retraction of the lower lip. Soft tissue pogonion moved back and menton moved down as described by Kapust et al\(^11\).

With the use of facemask/ALT-RAMEC therapy, Skeletal changes has been achieved primarily as a result of anterior and vertical movement of the maxilla. Significant changes in mandible position also contributed to the class III correction. The downward and backward movement of the chin expressed in this patient is similar to results has described by Nartallo-Turley et al using palatal expansion with a facemask\(^12\).

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**Reference**