



Maxillary Protraction With Face Mask: a Case Report

KEYWORDS

Class III, Maxillary protraction, Face mask, RME

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ABSTRACT *The incidence of skeletal class III malocclusion is rather small in the population, but it is one of the most difficult malocclusions to treat. The term prognathism referred to an overdeveloped mandible and was frequently misused to describe true Class III malocclusion. Both anteroposterior and vertical maxillary deficiency can contribute to a Class III malocclusion, resulting in a prognathic appearance of the jaws, dentition, and soft tissue profile.*

Face-mask therapy was first described more than a century ago, and since the late 1960s it has been used with increasing frequency for the correction of Class III malocclusion. In this article we report a case of a class III malocclusion treated with reverse pull facemask along with RME (Rapid maxillary expansion) followed by FR III (Frankle regulator) for retention.

INTRODUCTION:

The term *prognathism* referred to an overdeveloped mandible and was frequently misused to describe true Class III malocclusion. Contemporary studies have found Class III to be composed of pure mandibular protrusion (19.1% to 45.2%), pure maxillary retrusion (19.5% to 37.5%), or a combination of mandibular protrusion and maxillary retrusion (1.5% to 30%). Delaire (1978) developed the orthopedic facemask to stimulate maxillary development. It was initially used to correct clockwise rotation of the maxilla and later as a method to treat maxillary retrusion. Petit 1983 modified the basic concept of Delaire by increasing the amount of force generated by the appliance and decreasing the total treatment time. The principle of maxillary protraction is to apply tensile force on the circummaxillary sutures and thereby stimulate bone apposition in the suture areas; in doing so, the maxillary teeth become the point of force application, and the face (forehead, chin, zygoma) or occipital area becomes the anchorage source. The commercial design is relatively simple consisting of a framework, or single midline rod, to which is connected a forehead pad and a chin pad. Elastics running between the intra oral anchorage system and the extra-oral appliance produce the necessary force for maxillary traction. Maxillary protraction generally requires 300-600 grams of force per side, depending on the age of the patient.

CASE REPORT:

Seven years old male patient reported to orthodontic clinic with chief complaint of difficulty in closing mouth and speaking because of forwardly placed lower incisors.

In extraoral clinical examination we noticed patient was mesocephalic, mesoprosopic with incompetent lips, acute nasolabial angle, increased lower anterior facial height. He had concave profile, anterior divergence, prominent chin, high clinical FMA. Intraoral examination suggested patient had bilateral class-III molar relationship, reverse overjet of 3mm, bilateral posterior crossbite. normal inclination of up-

per incisors and retroclined lower incisors.

Cephalometric findings were skeletal class III jaw base relationship. retrognathic maxilla, hyperdivergent jaw bases, vertical growth pattern, normal inclination of upper and retroclined lower incisors, increased lower anterior facial height and protrusive lower lip.

Considering the patients chief complaint, profile of the patient, retrognathic maxilla and growth status; it was decided to treat this case with-

Phase 1: RME: to correct posterior crossbite

Reverse pull face mask (Petit): to protract maxilla

FR-III: for retention

Phase 2: reassess the case after phase 1 therapy and treat with fixed mechanotherapy if required.

PRETREATMENT PHOTOGRAPHS



Figure 1 -Pretreatment photographs.

POSTTREATMENT PHOTOGRAPHS



Figure 2 – Post-treatment photographs.

TREATMENT SEQUENCE:

At the start of treatment RME cemented and activation started. After 2 weeks of activation face mask delivered and continued for 5 months. FRILL delivered for maintenance phase and continued for six months.

Superimposition showed following results:

Facial axis changed from -1 to -2 degrees Point A has shifted downward and forward by 2mm Mandibular incisors are supraerupted Maxillary incisors are proclined and molars are mesialised

DISCUSSION:

In 1944, Oppenheim reported that it is impossible to move the mandible backward, but that it is possible to bring the maxilla forward to compensate for mandibular overgrowth when treating Class III malocclusions. Face-mask therapy was first described more than a century ago, and since the late 1960s it has been used with increasing frequency for the correction of Class III malocclusion.

According to Ellis and McNamara 1984 and Sue et al 1987, maxillary retrognathism is present in 62% to 67% of all class III patients. The orthodontist must first decide, whether to protract with a clockwise moment on the maxilla, a counterclockwise moment, or no moment.¹

Keles examined the effect of varying the force direction on maxillary protraction. In group 1, they applied the force intraorally from the canine region with a forward and downward direction at a 30° angle to the occlusal plane. In group 2, the force was applied extraorally 20 mm above the maxillary occlusal plane. Group 1 the maxilla advanced forward with a counter-clockwise rotation. In group 2 anterior translation of maxilla without rotation. The maxillary incisors were proclined slightly in group 1, but in contrast they were retroclined and extruded in group 2, so this

method can be used effectively on patients who present as class III combined with an anterior open bite.²

The good clinical efficacy of maxillary protraction therapy is apparently based, for the most part, on dental effects, while its skeletal effects still remain doubtful. Sung & Baik AJODO 1998 showed that mean changes of maxillary length in protraction group ranged from 1.2 mm to 1.5 mm compared with 0.5 mm to 0.9 mm in the untreated group.³

Many studies have confirmed a true skeletal effect resulting from treatment with face mask. Increase in SNA angle, as much as $+3.71^\circ$, Increase in nasion to A-point, as much as $+3.30$ mm and increase in maxilla to cranial base, 3.39 mm and forward movement of ANS of 2mm have been reported.⁴ Silva et al AJODO 1998 suggested that the ratio of maxillary anterior displacement to mandibular retroposition was almost 1:1.⁵ Nartallo-Turley AO 1998 showed significant anterior movement of orbitale (2.0 mm) and the key ridge (1.1 mm) in a group of patients aged 3.9 to 10.8 years.⁶ Maxillary protraction caused the upper airway dimensions to increase in patients with a retrusive maxilla.^{7,8}

To disrupt the maxillary sutural system, rapid palatal expansion for 8 to 10 days has been recommended for patients with no deficiency in the transverse dimension.⁹ Baik AJODO 1995 compared 47 patients treated with face-masks and rapid palatal expansion with 13 patients treated with facemasks and labiolingual removable appliances and found significantly greater forward movement of Point A in the expansion group. Similar results were obtained in a Finite Element Study by Pawan Gautham. Kim et al AJODO 1999 evaluated facemask therapy in a meta-analysis study and reported that the results of protraction with or without expansion were similar, but the average duration of treatment was longer in the nonexpansion group.¹⁰

Takada et al EJO 1993 have reported that face mask treatment is most effective in prepubertal patients (mean age, 7.8 years) and pubertal patients (mean age, 10.3 years) and becomes less effective after late puberty.¹¹ Baccetti et al and Kapust et al AJODO 1998 have recommended an even earlier age to start the treatment, that is, the former have reported that an effective outcome was achieved in the group whose average age was 6.9 years of age, and the latter in the group ranging from 4 to 7 years of age.^{4,9}

Aggressive over-correction of the Class III skeletal malocclusion, even toward a Class II occlusal relationship, appears to be advisable, with the establishment of positive overbite and overjet relationships essential to the long-term stability of the treatment outcome.¹²

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