

Maxillary protraction with a bonded facemask appliance: Case Report

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Abstract

The correction of class III malocclusion is a real challenge. The treatment of the condition should be initiated as soon as the condition is noticed. The bonded protraction appliance in conjunction with a facemask appliance is one of the ways of treating this condition. The case report presents one such case which was successfully treated using the appliance in tandem with a Petit reverse pull facemask.

Key Words: - Class III malocclusion, Bonded Appliance, Facemask

Introduction

The early treatment of the Class III malocclusion has been a real challenge. The multifactorial nature and the difficulty of predicting the growth pattern of the craniofacial complex contribute to this dilemma.¹

A vast majority of patients with Class III malocclusion present with maxillary deficiency that may or may not be associated with mandibular prognathism.²

Clinicians who might advise not treating the Class II patients until the late mixed or early permanent dentition often advise treating the Class III malocclusion as soon as it is identified.³

Most patients with developing Class III malocclusions display antero-posterior and vertical maxillary deficiency with a normal to slightly protruded mandible and average to deep overbite.⁴ The early interception favours the normal development of the dentition, avoiding disruptions in facial growth and development that is consolidated with advancing age.¹

Patients of Class III malocclusion are managed well with maxillary expansion and facemask therapy. The correction occurs by a combination of skeletal and dental movements in both the vertical and antero-posterior planes of space.⁵

Case Report

A 10 year old male was seen in the Department of Pediatric Dentistry Kothiwal Dental College and Research Centre, Moradabad, India. Extra-oral examination revealed a concave facial profile characterized by maxillary retrusion (figure 1). Intraoral examination revealed a dental crossbite in both the anterior and posterior regions anterior crossbite with a reverse overjet of - 4 mm and (figure 2).



Figure 1: - Pre-operative View

Temperomandibular joint function was normal with no pain on palpation, no clicking, popping, or crepitus noise, and a normal range of motion. Cephalometric analysis indicated a skeletal Class III pattern due to a retrusive maxilla (figure 3).



Figure 2: - Intraoral View



Figure 3: - Preoperative Cephalogram

Treatment Plan

The patient was concerned about his dental and facial aesthetics. Two treatment plans were discussed with the patient and his parents. The first option was to delay treatment until growth was completed and then use orthodontic treatment in combination with orthognathic surgery to advance the maxilla. The second option was to use a facemask to correct the anterior crossbite and improve facial aesthetics. The patient chose to proceed with the latter because of a desire to improve his dento-facial appearance. The patient was informed that although facemask treatment may be able to correct the crossbite, it did not eliminate the possibility that orthognathic surgery may eventually be needed to correct the jaw discrepancy.

Upper and lower alginate impressions were made and a wire meshwork was fabricated in the maxillary arch with 0.9 mm round wire, with hooks in the canine region for the facemask. A hyrax expander was soldered in the premolar and first molar region and a posterior bite plane was fabricated with acrylic onto it, to simultaneously uncross the bite.

Treatment Progress

The suggested treatment was conducted by the rapid maxillary expansion, followed by maxillary protraction with the use of a face mask. The entire appliance was cemented with luting glass ionomer cement (figure 4a). The patient was instructed to give 2 quarter (0.5mm) turns per day for the first week and one quarter turn (0.25mm) per day thereafter. The patient was recalled every 15 days for check-up. After palatal expansion was achieved the hyrax expander was blocked with acrylic and maxillary protraction was started. A Petit facemask (Ormco Corporation, Glendora, Calif) was fitted with elastics on each side (figure 4b). The force was directed from the canine area, 30 degrees from the occlusal plane, to counteract the anticlockwise rotation of the palatal plane. Patient was instructed to wear the facemask for 12 hours per day. Traction was continued for 12 months until sufficient clinical movement of the maxilla had been achieved to improve the mid-face aesthetics. The evaluation was conducted every month with the acrylic bite blocks being trimmed from the occlusal aspect to allow the mandibular molars to erupt.



Figure 4: - a) Appliance cemented
b) Petit Reverse Pull Facemask

Treatment Result

After active treatment, nearly all skeletal and dental objectives had been achieved. The anterior crossbite had been corrected; the sagittal discrepancy was improved significantly. The maxilla had moved forward, SNA angle had decreased from 84° to 82°, SNB from 92° to 89° and ANB from -8° to 6° (table 1) (figure 5).



Figure 5: - Pre and Post Cephalometric Tracing

Table 1: - Pre and Post Cephalometric Changes

	PRE-TREATMENT	POST-TREATMENT	NORMAL VALUES
SNA	87	82	82 +/- 2 deg
SNB	93	89	80 +/- 2 deg
ANB	6	6	2 +/- 2 deg
OPA	5	5	14 +/- 3 deg
MPA	24	30	32 +/- 4 deg
U.L-NA	35	34	22 +/- 4 deg
L.L-NB	11	6	4 +/- 2 deg
U.I-L.I	138	145	131 +/- 3 deg

Discussion

A major reason for instituting early anterior crossbite correction was to avoid the complications often associated with it, such as gingival recession labial to lower incisors,^{6,7} excessive incisal wear, increased chances of temporomandibular joint dysfunction,⁸ a growth pattern that worsens with age,⁹ compromised dental and facial aesthetics and associated negative psychosocial effects.

Palatal expansion was initiated first, the benefits seen were the expansion of a narrow maxilla and correction of posterior crossbite which led to an increase in arch length, bite opening and loosening of circummaxillary sutures which initiated a downward and forward movement of the maxilla as also shown by Haas and Baik^{3,4} and resulted in reduction in SNA from 84 to 82

We used a bonded RPE appliance which offered several advantages including reducing the number of appointments, serving as posterior bite blocks to facilitate correction of anterior crossbite and reducing buccal crown tipping during expansion due to the rigidity of the appliance framework.¹⁰ Our patient reported a positive reaction to maxillary expansion and protraction with correction of the scissor bite, improvement in mid facial aesthetics and positive overjet and overbite (figure 5), which is in agreement with Kapust *et al*, Westwood *et al*, Franchi *et al* and Baik who have all demonstrated that patients treated with facemask therapy showed a favourable response in comparison to untreated Class III cases.³



Figure 6: - Post operative Cephalogram

Conclusion

Facemask therapy is an effective method to treat Class III malocclusion in the mixed dentition. The use of palatal expansion in conjunction with maxillary protraction helps to “disarticulate” the maxilla and initiates cellular response in the sutures, allowing a more positive reaction to protraction forces enhancing the overall function and esthetics (figure 7).



Figure 7: - Intraoral View after Correction

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