Case Report

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# Management of Crowded Class III Malocclusion with Mandibular Deviation Using Nitanium Expander

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## ABSTRACT

**Background**: Angle's Class III malocclusion is a dental discrepancy in a sagittal plane that may or may not be associated with a skeletal discrepancy. Facial esthetics may be affected by this skeletal discrepancy, and it is one of the most common complaints of patients who seek orthodontic treatment. Class III treatment in adults can be done by compensatory tooth movement in simple cases or in combination with orthodontics and orthognathic surgery in more severe cases. This article describes an adult male patient with skeletal and dental class III malocclusion. The severity of malocclusion was within the camouflage limits, so camouflage treatment was decided. The upper arch was constricted, and a bilateral posterior crossbite was seen. The upper arch was expanded using NiTi expander. Class III elastics were used to attain optimum overjet, Class I molar and canine relationship. At the end of the treatment, the profile of the patient improved with positive overjet, overbite and full intercuspation was achieved.

**Keywords:** Nitanium expander, camouflage, Rapid maxillary expansion.

## INTRODUCTION

Constricted maxillary arch is a common problem encountered in orthodontics. Timely treatment of such transverse discrepancies by maxillary expansion is recommended to re-establish proper function. The treatment modalities are Slow maxillary expansion (SME), Rapid maxillary expansion (RME) and surgically assisted maxillary expansion. SME produces less tissue resistance around the circummaxillary region, improving the bone formation in the intermaxillary suture and reduces the limitations of RME[1].

Nickel Titanium (NiTi) alloys have twin benefits of *shape memory* and *transition temperature.* Dr W. Arndt introduced the Nitanium Palatal Expander (NPE) which delivers a constant, uniform, slow and continuous force for maxillary expansion.

## CASE REPORT

A 17-year-old male patient reported to the orthodontic department with the chief complaint of poor esthetics due to irregularly placed upper front teeth. On extra-oral examination (fig 1), the patient had an apparently symmetric face with leptoprosopic face form and competent lips. On profile examination, the patient had a mild concave facial profile. The smile of the patient was symmetric and non-consonant. Intra-oral examination (fig 2) revealed all the teeth are present in upper arch till the second molar except the left second premolar which was extracted due to caries and in the lower arch all the teeth are present till the second molar with the gingival health being satisfactory. Hard tissue examination showed class III molar relationship on left side, class I molar relationship on right side, class II

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canine relation bilaterally, upper and lower anterior crowding with crossbite present in relation to 15 & 35 and 24 & 35, 36 and clinically missing upper second premolar (fig 4) on the left side. On Functional examination, patients showed oronasal breathing, and a marked deviation of mandible to the right side was noted.

Fig 1: Pretreatment extraoral photographs.

Fig 2: Pretreatment intraoral photographs.

Fig 3: Pretreatment study models.

Fig 4: Pretreatment OPG showing missing left upper second premolar.

Fig 5: Pretreatment cephalogram showing retrognathic maxilla and prognathic mandible.

Examination of study casts showed constricted maxillary arch with a Class III molar relationship on left side & class I molar relationship on the right side. There was decreased overjet and overbite. Lateral cephalogram revealed that the patient was in CVMI stage VI indicating growth completion. Cephalometric analysis (Fig 5) showed class III skeletal bases with the retrognathic maxilla, prognathic mandible with average mandibular plane angle and proclined upper & lower incisors. The soft tissue analysis revealed a protrusive lower lip with an average nasolabial angle.

Diagnosis:

Skeletal Class III malocclusion with retrognathic maxilla, prognathic mandible & average growth pattern with Angle`s Class III subdivision on right side.

Problem List

- Mild concave facial profile

· Skeletal Class III due to retrognathic maxilla and prognathic mandible

- Deviation of mandible to the right

· Constricted maxillary arch

· Anterior crossbite on right side with respect to 11 and 41

- Bilateral posterior crossbite with respect to 15,35 and 24,35,36

· Proclined upper & lower incisors with crowding

- Decreased overjet & overbite
- Class II canine relation bilaterally
- Class III molar relationship on the left side and missing 25

Treatment Objectives

- To improve facial profile
- Correction of mandibular deviation
- Correction of crossbites

· Correction of proclination

- Correction of crowding
- To achieve normal Overjet and Overbite

· To correct Class III molar relationship on left side

Treatment progress

The case was treated with fixed mechanotherapy. An MBT 022 appliance was bonded to the upper and lower arch. During the treatment, the upper arch was expanded using Niti expander (fig 6) for six months duration gaining 6mm space and lower first premolars were extracted eventually. Initial levelling and alignment were carried out with wire sequence 016 NiTi, 018 SS, 17 x 25 NiTi, 19x25 NiTi,19 x 25 SS.

Fig 6: Nitanium expander place.

## RESULTS

At the end of the treatment, intermolar and interchained width increased due to expansion and the mandibular deviation was corrected. A bilateral Class I molar relationship was achieved with normal overjet and overbite (fig 6 & 7). Posterior intercuspation was established with improvement in profile.

Fig 7: Post-treatment extraoral photographs.

Fig 8: Post-treatment intraoral photographs.

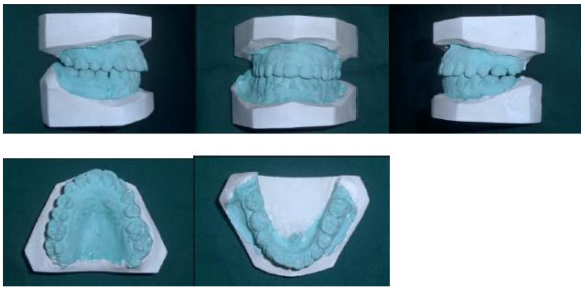

Fig 9: Post-treatment study models.

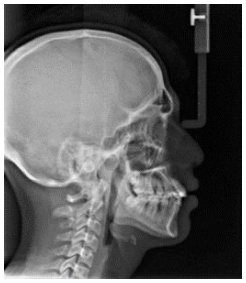

Fig 10: Post-treatment cephalogram.

## DISCUSSION

The presence of Angle's Class III malocclusion associated with skeletal maxillomandibular discrepancy is a difficult problem in Orthodontics. Depending on the magnitude of this discrepancy and the degree of impairment of facial esthetics, this problem may have negative psychological consequences in the social life of the individual, in addition to functional implications directly related to the stomatognathic system[3]. Orthodontics has several resources in for treating Class III malocclusions, ranging from beginning treatment in young individuals up to surgical-orthodontic treatment in adults. As a third alternative, in certain cases, the compensatory orthodontic treatment, also known as orthodontic camouflage, may be applied with the purpose of providing satisfactory occlusion through dental compensations, but with minor changes in facial esthetics[3,7]. Cranial base abnormalities strongly affect the interpretation of cephalometric variables in this region, particularly SNA, SNB, ANB and convexity angle. Other cephalometric parameters, correction factors and, above all, facial analysis findings contributed to making the diagnosis and developing a treatment plan. In adults, Class III skeletal patterns may often be treated with either orthodontic camouflage or orthognathic surgery[4,5,6]. In the current case, although the cephalometric variables showed the Class III to be of a severe type, there was a distinct soft tissue masking. This led to opting for a camouflage approach. The first objective was to relieve the posterior palatal crossbite. This was done with the help of NiTi expander. The advantage of NiTi expander is light continuous force with pre-activation and no frequent activation required. After initial levelling, alignment, expansion and lower premolar extractions, a positive overjet and overbite were achieved. After debonding upper and lower permanent retainer were given.

## CONCLUSIONS

Class III malocclusion with the moderate discrepancy in which camouflage is the treatment option Niti expander proves to be an effective tool for expanding the maxillary arch without any activations required and delivering continuous light force.

## CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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