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International Journal of Current Research
Vol. 7, Issue, 08, pp.19674-19677, August, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

CASE STUDY

TREATMENT OF CLASS III MALOCCLUSION WITH NITI EXPANDER AND CLASS III ELASTICS: A CAMOUFLAGE

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ARTICLE INFO

Article History:
Received 31st May, 2015
Received in revised form
06th June, 2015
Accepted 23rd July, 2015
Published online 31st August, 2015

Key words:

Camouflage,
NiTi expander,
Class III elastics.

ABSTRACT

Angle's Class III malocclusion is a dental discrepancy in a sagittal view that may appear or not with an important 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, may be done by compensatory tooth movement, in simple cases, or through an association between 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 the malocclusion was within the camouflage limits so this approach for treatment was decided. Upper arch was constricted and a bilateral posterior cross bite was seen. 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 full intercuspation was achieved, profile of the patient improved with positive overjet and overbite.

***Citation*:** Dr. Eshan Awasthi, Dr. Akhilesh Belchandan, Dr. Sunita Shrivastav and Dr. Ranjeet Kamble, 2015. "Treatment of class III malocclusion with NITI expander and class III elastics: a camouflage", *International Journal of Current Research*, 7, (8), 19674-19677.

INTRODUCTION

The prevalence of skeletal Class III malocclusion varies among races. In the white population the incidence has been reported to be 1% to 5%, and in the Asian populations it is up to 14%. (Massler & Frankel 1951; Thilander & Myrberg, 1973, Iri & Nakamura, 1975, Baccetti *et al*., 2005, Cozza *et al*., 2004). This malocclusion is considered one of the most difficult to treat (Kama *et al*., 2006). Nongrowing patients with skeletal Class III malocclusion could be treated by orthognathic surgery or orthodontic camouflage treatment. In severe cases, surgical procedures should be performed to correct the skeletal and dental discrepancies, as well as to improve facial esthetics and harmonize the profile (Chew, 2005). In borderline cases where camouflage is possible and is a valid option, the treatment should camouflage the dental and skeletal discrepancies to an extent that could satisfy facial esthetic and functional concerns of the patient as much as possible (Hiller, 2002). Dentoalveolar compensation, or camouflage treatment, can be a viable alternative for non-growing patients with milder Class III discrepancies (Deguchi *et al*., 2003).

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The current case describes camouflage approach of an adult male patient with a Skeletal Class III using Class III elastics and maxillary arch expansion using NiTi expander.

Case report

A 19-year-old male patient reported in our orthodontic clinic, with the chief complaint of poor esthetics due to forwardly placed lower jaw.

Extra-oral examination, the patient had an apparently symmetric face with leptoprosopic face form and competent lips. On profile examination patient had a mild concave facial profile. The smile of the patient was symmetric and non consonant with 100% maxillary incisor display on smiling. (Figure 1a)

Intra-oral examination – revealed all teeth in upper & lower arch are present till 2nd molar. V shaped upper & U shaped lower arch. The gingival health was satisfactory. Class III molar & canine relationship on right side & Class I canine & molar relationship on left side (Figure 1b)

Functional examination, patient showed normal speech pattern, nasal breathing and a typical swallowing pattern. The path of closure of mandible was normal.

Figure 1a. Pre treatment extraoral and intraoral frontal

Figure 1b. Pre treatment intraoral

Examination of study casts showed apparently symmetrical arches with a Class III molar & canine relationship on right side & Class I molar, canine relationship on left side. There was 1mm overjet and edge to edge overbite.

Cephalometric analysis revealed that patient was in CVMI stage VI (completion) and had Class III skeletal bases with high angle case and, proclined upper & lower incisors. The soft tissue analysis revealed a protrusive upper lip and lower lip with an acute nasolabial angle (Figure 4).

Diagnosis: Skeletal Class III malocclusion with prognathic mandible & vertical growth pattern. Angle`s Class III subdivision on left side

Problem List

- Mild concave facial profile
- Skeletal Class III due to prognathic mandible.
- Constricted maxillary arch.
- Palatal crossbite bilaterally.
- Upper & lower proclination
- Decreased overjet & overbite
- Class III canine & molar relationship on right side

Treatment Objectives

- To improve facial profile
- To correction proclination of upper & lower arch (along with lower arch crowding)
- To achieve normal Overjet and Overbite
- To correct Class III canine & molar relationship on right side

Treatment progress

Case was treated with fixed mechanotherapy. An MBT 022 in appliance was bonded to upper and lower arch. Upper arch was expanded using Niti expander and initial leveling and alignment was carried out with wire sequence 014 in, 016 in, 16 x 22 in Niti. 16 x 22 in SS , 17 x 25 in Niti, 17 x 25in SS, 19 x 25 in SS, 21 x 25 in SS. A lower labial root torque was given in 19 x 25 in SS and Class III elastics were continued (Figure 2).

Figure 2. Niti expander and Class III elastics

RESULTS

At the end of the treatment a bilateral Class I molar and canine relationship was achieved with normal overjet and overbite. Posterior intercuspation was established with improvement in profile.

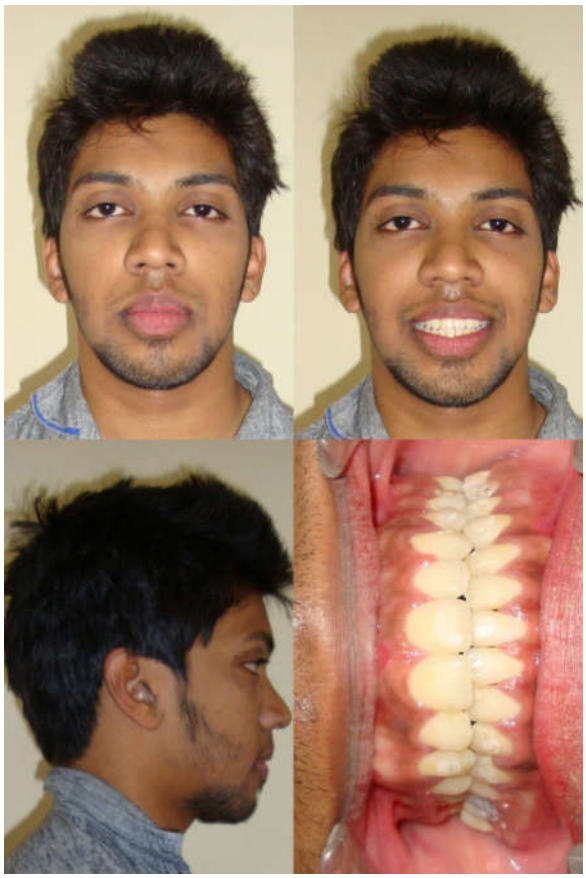

Figure 3a. Post treatment extraoral and intraoral frontal

Figure 3b. Post treatment intraoral

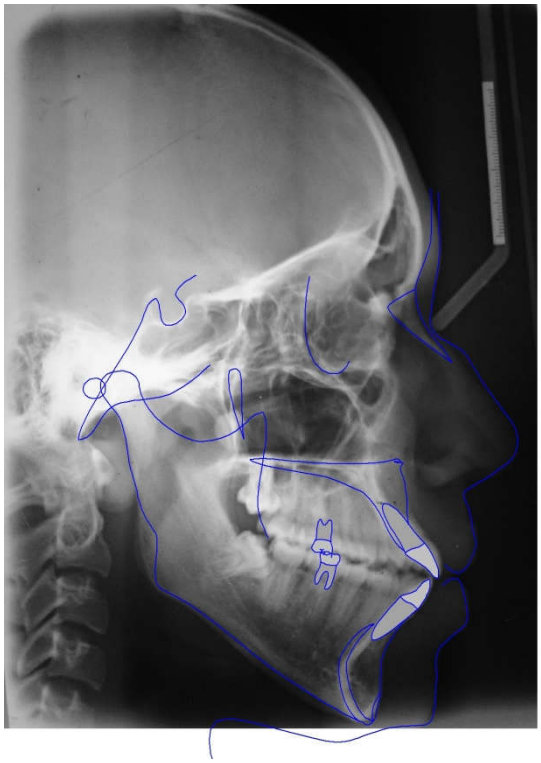

Figure 4. Pre treatment lateral cephalogram

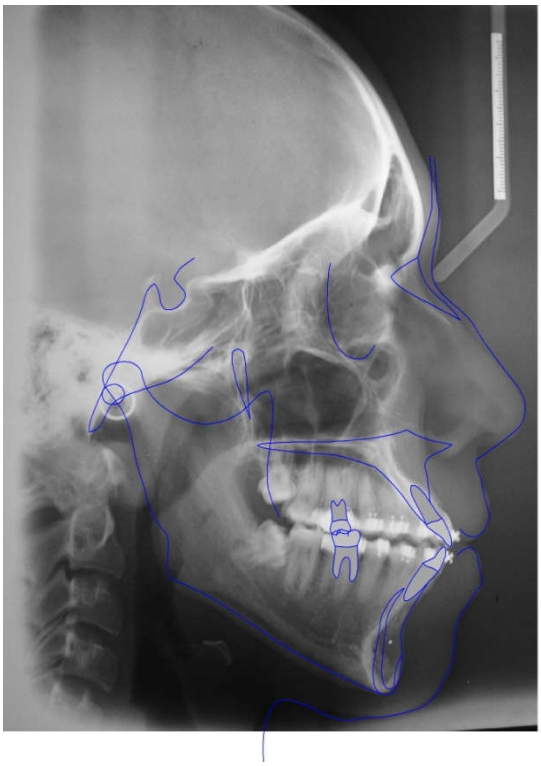

Figure 5. Figure 4. Post treatment lateral cephalogram

Intermolar and intercanine width increased due to expansion (Figure 3a-b). Cephalometrically SNA increased by 1° and SNB reduced by 1°. ANB changed by 2°. Y axis opened by 3° and FMA by 2°. Lower incisor showed retrusion with reduction in IMPA by 6° whereas upper incisor showed proclination by 2°. Lower lips also showed slight retrusion with respect to E line (Table 1) (Figure 6).

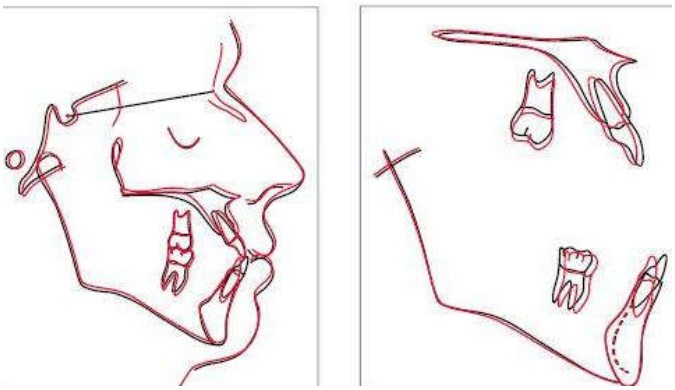

Figure 6. Cephalometric superimposition

Table 1. Cephalometric changes

Measures	Normal	Pre treatment	Post treatment	Difference
SNA	82	80	81	1
SNB	80	83	82	1
ANB	2	-3	-1	2
Y axis	59	64	67	3
FMA	25	31	33	2
IMPA	90	100	94	6
1-NA	22	38	40	2
1-NA	4	10	11	1
1-NB	25	36	30	6
1-NB	4	12	10	2
E line	-4/-2mm	-2mm/1mm	-2/0mm	0/1

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 (Marcio *et al*., 2012). 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 (Marcio *et al*., 2012).

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 (Benyahia *et al*., 2012, Burns *et al*., 2010). In current case although the cephalometric variables showed the Class III to be of severe type there was a distinct soft tissue masking. This led to opting for a camouflage approach. The 1st objective was to relieve the posterior palatal cross bite. This was done with the help of NiTi expander.

The advantage of NiTi expander is light continuos force with pre-activation and no frequent activation required. After initial levelling, alignment and expansion Class III elastics were placed and were continued till a positive overjet and overbite was achieved. Post treatment 3rd molars were extracted and permanent retainer were given.

Conclusions

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

Acknowledgement

Our sincere thanks to Dr Narendra Sharma and Dr Abhilasha Goyal for their help. We do not have any conflict of interest and no source of funding.

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