



THE MANAGEMENT OF CLASS II MALOCCLUSION WITH FORSUS APPLIANCE - A CASE REPORT

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ABSTRACT Skeletal class II malocclusions with mandibular deficiency are treated with different types of functional appliances. Fixed functional appliances have been widely used in the present clinical scenario for non-compliant patients who report late with minimal residual growth left or no growth. This article presents a case of class II malocclusion treated with a pre-adjusted edgewise appliance supplemented with a forsus appliance (3M Unitek Corp, California, USA). The use of this appliance minimizes patient cooperation factor and makes treatment time less.

KEYWORDS : Functional appliance, Forsus appliance, pre-adjusted edgewise appliance, skeletal class II malocclusion.

INTRODUCTION

Class II malocclusion counts for approximately 15% of all the malocclusions. It is a condition in which the mandibular first molars occlude distal to the normal relationship with the maxillary first molars. It can be further typed into - dental and skeletal. A dental class II malocclusion is associated with a normal skeletal jaw relationship. Those class II molar relationships with retrognathic mandible relative to other craniofacial structures are termed Class II Skeletal Malocclusions.^{1,3}

Functional appliances may be removable or fixed. Fixed functional appliances are termed intermaxillary noncompliance class II correctors. The Forsus appliance is the most frequently used semirigid and hybrid type of fixed functional appliance. This device is used when the patient reports late after the pubertal growth spurt or during the late stages of puberty.^{4,6}

Forsus appliance is a combination of an inter-arch push-spring and a push rod with optimum strength and flexibility. The spring attaches to the distal of the maxillary first molar while the push rod can be placed either distal to the canine or 1st premolar bracket. This push spring produces about 200 gm of force when fully compressed initiating forward movement of the mandible.^{7,8}

This case presents the clinical efficacy of Forsus appliance for the treatment of skeletal class II malocclusions at the age of 26 years who reported with the chief complaint of forwardly placed upper front teeth.

Case report

A 26-year-old male patient reported a chief complaint of forwardly placed upper front teeth. The general health of the patient was good with no significant medical history. Extraoral examination revealed a symmetric and mesoprosopic facial type and mesocephalic head form. Soft tissue profile indicated a convex profile with positive VTO and competent lips. (Figure 1). Intraoral examination revealed upper anterior teeth proclination with a large overjet of 8 mm and, deep and complete overbite of 5 mm. He had a class II incisor and canine relationship, and bilateral Angle's class II end-on molar relationships (Figure 1).

Radiographic assessment and analysis

The panoramic radiograph demonstrated fully developed permanent dentition in all the quadrants with adequate bone support. (Figure 1). Lateral Cephalogram showed CVMI-Stage V with Cephalometric findings showing a skeletal Class II pattern with ANB of 7° (Figure 1; Table 1).

Diagnosis

The patient was diagnosed with skeletal Class II jaw relationship with Angle's Class II Division 1 malocclusion.



Figure 1: Pre-treatment extra-oral, intra-oral photographs and radiographs

Treatment objectives

Treatment objectives were the correction of class II relationships, proclination, overjet and overbite, and facial profile improvement.

Treatment plan

Treatment involved non-extraction fixed mechanotherapy using a pre-adjusted edgewise appliance (MBT prescription - 0.022 slot) to level and align both arches followed by mandibular advancement using a forsus appliance.



Figure 2: Mid-treatment intra-oral photographs with Forsus Appliance

Treatment progress (Figure 2)

Initial leveling and aligning were done using 0.014" Nickel Titanium archwires followed by 0.018 Nickel Titanium archwires. After initial leveling for 4 months, 0.017 × 0.025 Nickel Titanium archwires were placed followed by 0.019 × 0.025 stainless steel archwires with labial root torque in the lower arch. Then the forsus appliance was installed to position the mandible forward and restrict the growth of the maxilla which reduced the facial convexity and helped to achieve a class I molar and canine relation bilaterally. This device was given for 6 months. After active treatment, it was removed and class II elastics (light force) were given for retention for one month followed by settling of occlusion for another month. Fixed appliance was debonded after 14 months which is comparatively lesser duration and removable retainers were given.

Treatment results (Figure 3, 4; Table 1)

Cephalometric findings showed decreased ANB (3°) resulting in

forward positioning of the mandible with soft tissue profile improvement. Angle's class I molar relationship was achieved and the overbite was reduced to 2 mm, overjet to 3 mm. The patient was under observation for 1 year after debonding.



Figure 3: Post-treatment extra-oral and intra-oral photographs



Figure 4: Post-treatment radiographs and superimposition

DISCUSSION

Class II Division 1 malocclusion is a common malocclusion among the Indian population. Either maxillary prognathism or mandibular retrognathism results in class II malocclusion. In the case of non-growing individuals, camouflage or surgery are the treatment options.¹⁻⁴ Exceptionally in cases of non-compliant patients with less or no residual growth left, fixed functional appliances are being used.⁵ These functional appliances are given especially when there is positive VTO with a convex profile, and no or very mild spacing or very mild crowding dentition.⁶ In the present case, SNA decreased by 3°, and SNB increased by 1° showing forward repositioning of the mandible and high-pull headgear-like effect in the maxilla along with dental correction. This might be due to the distalization of the maxillary arch and partial proclination of lower incisors with labial root torque as in other case studies.⁷

The normal overjet and overbite were achieved. Even with adequate bend back of archwire, the effect of Forsus on mandibular anterior teeth could not be eliminated. According to some authors, this proclination effect may be eliminated using mini-screws, larger dimension archwires with labial root torque.⁸

The soft tissue profile was improved with an increase in nasolabial angle. The lip relation was improved with a decrease in mento-labial sulcus depth.

CONCLUSION

The combination of an orthodontic fixed appliance with Forsus induced significant skeletal and dental changes in lesser treatment duration. The mandibular incisors, in particular, remained stable after treatment.

Table 1: Comparison of pre-treatment and post-treatment cephalometric findings

Variables	Pre-treatment	Post-treatment
SNA (82° ± 2°)	86°	83°
SNB (80° ± 2°)	79°	80°
ANB (2°)	7°	3°
Wits Appraisal (0-1 mm)	3 mm	1mm
FMA (25°)	27°	26°
SN-MP (32° ± 2°)	29°	28°
Y-axis (59° ± 3°)	58°	56°
Bjork's sum (396° ± 6°)	398°	393°
Jarabak Ratio (62 – 65%)	58%	58%
Maxillo – Mandibular difference	23 mm	22 mm
IMPA (90°)	96°	98°
Max 1 – NA (22° ± 4°; 4mm)	28°; 7 mm	25°; 5 mm
Mand 1 – NB (25° ± 4°; 4mm)	21°; 4 mm	23°; 4.5 mm
Inter-incisal angle (131° ± 2°)	112°	121°

Nasolabial angle (102° ± 8°)	96°	108°
Upper lip – E line (- 4 ± 2 mm)	-0.5 mm	-1 mm
Lower lip – E line (- 2 ± 2 mm)	-1 mm	-0.5 mm
Overjet (2-4 mm)	8 mm	3 mm
Overbite (2-4 mm)	5 mm	2mm

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