WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Non Extraction Treatment of Class II Malocclusion with Forsus™ fatigue - resistant device (FRD) - A Case Report

Dr .A .Jebila Pringle[1], Dr S.Satheesh Babu[2]

[1]Department of Orthodontics, Sree Moogambikai Dental College, Tamilnadu, India.
[2] Babu Dental Care & Department of Oral Pathology, Sri Venkateshwaraa Dental College, Puducherry, India

ABSTRACT

Among the different combinations of skeletal and dental discrepancies, mandibular retrusion is one of the most common skeletal discrepancies that can create skeletal class II. Because the amount of growth left in the pubertal growth spurt is modest, treating skeletal malocclusion in late adolescence is the most difficult. In these circumstances, skeletal class II malocclusion is treated with a functional orthopedic appliance that needs patient compliance. The ForsusTM fatigue-resistant device (FRD) is a fixed functional appliance that can be employed in teenagers with non-compliance issues. We present a patient who experienced mandibular retrognathia at the end of a growth spurt and was successfully treated with the Forsus™ FRD in this case report.

Key words: Class II malocclusion, Forsus™ fatigue-resistant device (FRD), Fixed functionalappliance.

Introduction

Class II malocclusion, which can be a skeletal or dental malocclusion, is one of the most prevalent presenting malocclusions in orthodontics. Class II malocclusion affects 9.34 percent of the population in South India. Mandibular retrusion is more prevalent than maxillary prognathism in skeletal class II malocclusion[2]. According on the parameters related with the problem, such as anteroposterior discrepancy, age, and patient compliance[3], Class II malocclusion can be treated in a variety of ways. Correction of skeletal class II with mandibular retrognathia traditionally requires detachable or fixed functional orthopedic equipment, and the effectiveness of treatment is reliant on the patient's participation. Fixed functional appliances are more advantageous during the late pubertal growth spurt when the quantity of growth remaining is reduced.

Fixed functional appliances pull the mandible forward, causing adaptational development in the mandibular condyle and glenoid fossa remodeling, leading in a considerable increase in effective mandibular length, culminating in correction of mandibular retrognathism and face convexity[4].

A universal spring module, a L pin, and a push rod in various diameters make up the ForsusTM fatigue-resistant device (FRD). The L pin[5] connects the push rod to the lower arch wire distal to the canine teeth, and the spring to the headpiece tube. When the patient's mouth shuts, the push-rod has a built-in stop that compresses the spring. The maxillary molars, as well as the mandibular Incisors [6], are thus subjected to equal and opposite forces by the spring. The result is a propensity for the maxillary molars to distalize and the mandibular incisors to flare.

Case report

A 14-year-old boy came to the clinic with a concern about his top front teeth being too far forward. Extraorally, the patient showed no visible facial asymmetry, a convex mesoproscopic facial form, posterior divergence, and a deep mentolabial sulcus with a low clinical FMA. On advancement of the mandible, the patient had a positive visual treatment goal. Intraorally, the patient had a class II division 1 subdivision malocclusion with a 6 mm overjet and a 4 mm deepbite, as well as a 2 mm shift of the lower dental midline to the right. (Photo 1)

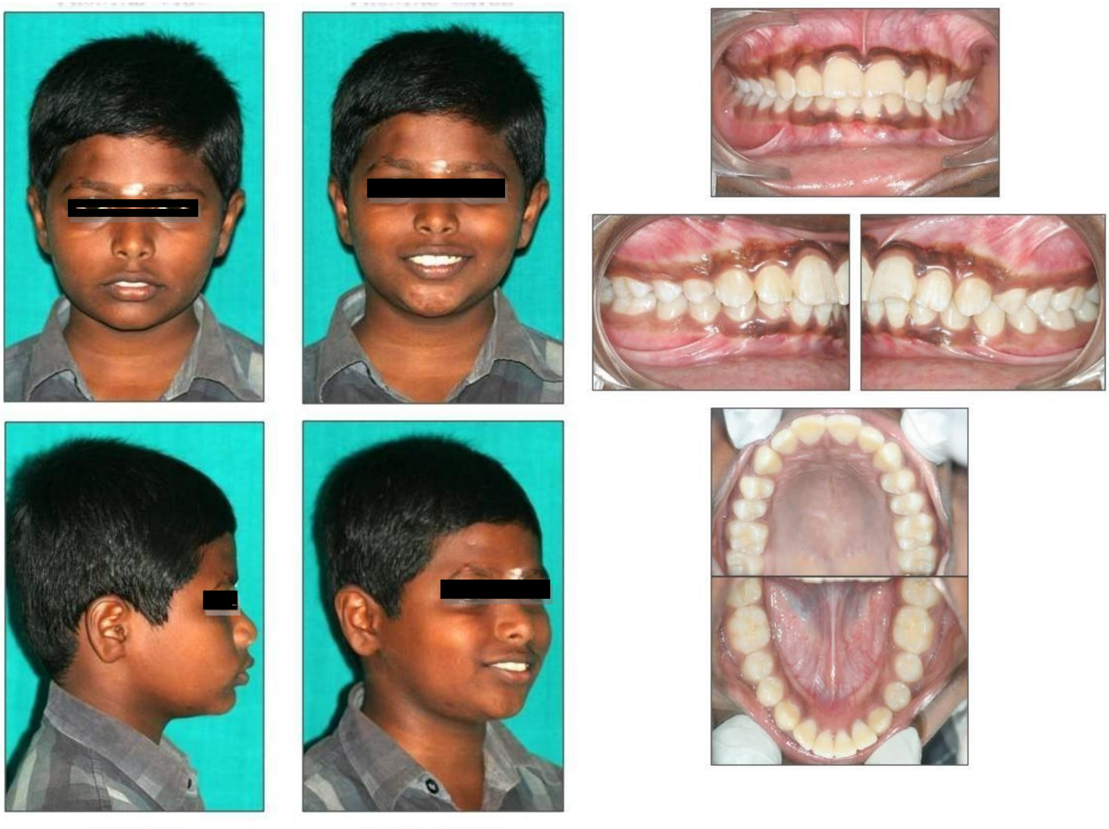

Figure 1: Pre treatment extra oral and intraoral photographs

Figure 2 : pre treatment cephalograms

The elevated ANB (7°) and wits assessment (+5 mm) on cephalometric evaluation revealed that the patient had a Class II skeletal pattern. A normal maxilla, retrognathic mandible, and chin were suggested by a normal SNA, reduced SNB, and SNPg. A horizontal development trend was revealed by the SN-mandibular plane angle (27°) and Jarabak's ratio (68%). The incisors on the upper and lower jaws were somewhat proclined.

Correcting Class II jaw bases and Class II molar relation, as well as achieving optimal overjet and overbite, were the treatment goals. The Forsus™ fatigue-resistant device was intended to be used for the patient's jaw base correction as well as dentoalveolar correction.

Treatment progress

Fixed The 0.022" X 0.028"MBT System was used to begin orthodontic therapy. Molars were banded, and for the first four weeks, a 0.014-inch round nickel titanium arch wire was used to level and align both arches, followed by 0.016" NiTi wire, 0.016" X 0.022" NiTi, and 0.017" X 0.025" stainless steel wires for one month. Stainless steel 0.019" 0.025" upper and lower. To offset the labial inclination of mandibular incisors caused by Class II corrective forces, steel wires were implanted in the lower anterior region with lingual crown torque. The mandible was positioned in a Class I molar relationship and implanted bilaterally for a 6-month period. (See Figure 3) From the distal part of the head gear tube on the maxillary molar to the arch wire distal to the mandibular canine, the appliance was placed. Following the molar repair, four months of finishing and detailing were required. The duration of active treatment was 16 months.

Figure 3: Forsus™ fatigue-resistant device.

Treatment results:

Treatment results demonstrated a significant improvement in face convexity and intraoral occlusion with bilateral canine and molar relationships after treatment. With adequate buccal interdigitation, we were able to create an ideal overjet and over bite. (Photo 4)

Figure 4: post treatment photographs and cephalograms.

When comparing pre- and post-treatment cephalograhs, the SNA value declined by 1°, while the SNB value grew by 2°, resulting in a 3° decrease in the ANB value toward the Class I skeletal pattern. Lower incisor proclination was maintained while upper incisor proclination was minimized. Forward expansion of the mandible increased the effective mandibular length by 4 mm. During therapy, the vertical mandibular proportions also rose. (See Table 1) Extrusion and mesial movement of maxillary and mandibular teeth were seen in superimposition

Table 1: Comparison of cephalometric findings.

Parameters	**Pretreatment**	**Post-treatment**
SNA (°)	82	81
SNB (°)	77	73
ANB (°)	7	3
1-NA (°)	25	20
1-NA (mm)	7	4
1-NB (°)	30	31
1-NB (mm)	5	4.5
1-1 (°)	114	122
1-SN (°)	110	102
GoGn-SN (°)	26	30
FMA (°)	23	25
IMPA (°)	102	104
Wits appraisal(mm)	5	4
Jarabak ratio (%)	68	65.6

Discussion

In non-compliance patients, fixed functional appliances are the new trendy equipment. This appliance has the advantage of being able to be utilized in conjunction with a multibracket system, reducing treatment time and allowing it to be employed in the late stages of pubertal growth spurt. In the case report cited above, we used a Forsus™ fatigue-resistant device to rectify skeletal class II due to mandibular retrusion without the need for tooth extraction. By selecting the right size of the appliance's push rod, the appliance can be customized. A combination of skeletal and dentoalveolar alterations can be seen in fixed functional equipment. However, combined orthodontic and surgical treatment of malocclusion can achieve the most optimal reduction in profile convexity[7]. Fixed functional appliance therapy had no effect on the sagittal maxillary jaw base position[8]. The diverse consequences of stationary Class II appliances have been extensively documented in the literature. The most common orthodontic treatment aims are to provide a healthy facial equilibrium, an ideal static and functional occlusion, and treatment stability [9, 10]. In the example at hand, the soft tissue profile was improved, and the occlusion was perfected.

Conclusion

The Forsus™ fatigue-resistant device approach was found to be successful in late puberty in treating ClassII malocclusions, primarily at the dentoalveolar level. Proper anchor mechanics can help to reduce lower incisor proclination.

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