# Class II Division 2 Subdivision Malocclusion in an Adult Patient treated with the Forsus Fatigue-resistant Device placed Unilaterally


## Abstract

Treatment of Class II subdivision malocclusion is challenging, and orthodontists frequently struggle to determine the choice of treatment. Several treatment modalities have been proposed for correcting these types of malocclusion. Thus, the aim of this case report is to present dentoalveolar and facial outcomes achieved using an unilateral Forsus fatigue-resistant device combined with fixed appliances in an adult female patient presenting with Class II subdivision malocclusion. Treatment outcome was effective producing dental esthetics and functional positive stable results after 3-year, 2-month follow-up.


**Keywords:** *Adult patient, Class II, Forsus, subdivision*


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## Introduction

Class II subdivision represents 50% of all Class II malocclusions, with responsible primary factor being a deficient mandible caused by either a reduced height of the ramus or a reduced length of the mandibular body on the side of the Class II.[1] Other studies have reported that the unilateral Class II malocclusion is primarily caused by the distal eruption of the permanent mandibular first molar in relation to the permanent first maxillary molar on the Class II side[2] or due to a premature unilateral loss of a permanent first mandibular molar.[3]

Several treatment modalities have been suggested: extraction of one maxillary premolar on the Class II side, extraction of three premolars if the patient's profile tolerates it,[4] Class II elastics and midline elastics,[5] and orthognathic surgery.[6] However, another treatment modality suggests to use the Forsus fatigue-resistant device (FRD)[7] assembled at the chairside and used in combination with complete fixed orthodontic appliances.

Thus, the aim of this case report is to present the dentoalveolar and facial outcomes achieved using unilateral Forsus combined with fixed appliance therapy in an adult female patient with Class II, division 2 subdivision malocclusion.

## Case Report

A 33-year, 8-month-old adult female patient presented with Class II subdivision malocclusion. Clinical examination showed that the patient

lost her maxillary right first permanent molar and her mandibular left first molar [Figure 1a, f and g]. Maxillary and mandibular incisors were retroclined and retruded with an overbite of 100%, with maxillary midline being deviated 0.5 mm to the right from the facial midline and the mandibular midline being shifted 3 mm to the left from the facial midline [Figure 1b-d]. Panoramic X-ray confirmed the loss of maxillary right first permanent molar and mandibular left first molar followed by mesial inclination of maxillary right second molar and mandibular left second molar to the edentulous area, respectively [Figure 1e].

The objectives were to correct the unilateral Class II relationship, eliminate dental crowding, level deep curve of Spee, coincide maxillary and mandibular midlines, obtain ideal overbite and overjet, and maintain soft-tissue profile.

Numerous treatment alternatives could be used in this case. Leveling and alignment of deep bite and correction of unilateral Class II malocclusion using Class II elastics and midline elastics, involving extractions

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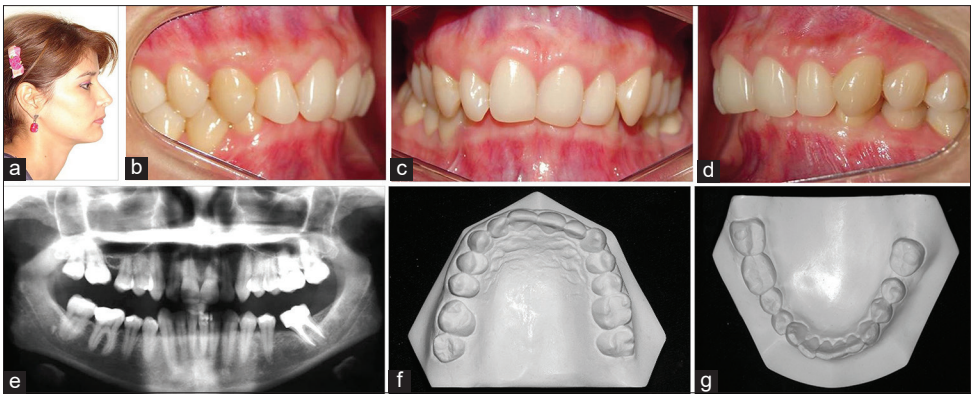


**Figure 1: Pretreatment facial, intraoral and dental casts photographs, and panoramic radiographs (a-c) Class II, division 2 profile and malocclusion, (d-g) Loss of maxillary right first permanent molar and mandibular left first molar followed by mesial inclination of maxillary right second molar**

or not. Nonetheless, high patient cooperation would be required. Alignment, deep bite opening, and correction of unilateral Class II malocclusion using skeletal anchorage with miniscrew to distalize maxillary left molars.[8] Alignment, deep bite opening associated with extraction of maxillary left first premolar to correct the unilateral Class II malocclusion. This approach produces good results if patient's profile tolerates it. Alignment and deep bite opening as well as correction of the unilateral Class II malocclusion using the FRD, a fixed functional device placed unilaterally in combination with comprehensive fixed appliances 0.022" slot MBT brackets prescription (3M Unitek) would be another viable solution.

Alignment was achieved using 0.014" and 0.016" nickel–titanium (NiTi) heat-activated (HA) archwires. The leveling was improved with 0.019" × 0.025" NiTi HA wires and completed with 0.019" × 0.025" stainless steel (SS) archwires. To begin unilateral full Class II correction and improve overbite, the Forsus appliance was placed approximately 2 months after 0.019" × 0.025" SS archwires had been inserted into the mouth. The FRD was placed in the headgear tube of the maxillary first molar and onto the mandibular archwire, distally to canine bracket, thereby creating a mesial force on the mandibular arch and a distal force on the maxillary arch [Figure 2a-c].

Once unilateral Class II malocclusion was corrected [Figure 2d-h], the Forsus appliance was removed and unilateral Class II elastics were placed for approximately 3 months to increase stability and to maintain correction. Finally, a segmented 0.016" SS archwire extending from the maxillary right lateral incisors to the left lateral incisors was placed and all teeth were tied together, and in the mandibular arch, the 0.019" × 0.025" SS archwire remained for proper settling of dentition using triangular elastics in the premolar and canine area.

After 3 years and 10 months of treatment, the appliances were removed, teeth were well leveled and aligned, and ideal overbite and overjet and good intercuspation were established. Midline discrepancy was corrected with well-established first molars and Class I canine relationship [Figure 3b-d], with a balanced profile [Figure 3a].

Maxillary incisors were upright and showed slight intrusion. Maxillary molars on the subdivision side presented slight distalization and intrusion due to the force vector exerted by the FRD. Mandibular molar on the left side showed marked mesial movement and slight extrusion [Figure 3b-g, and n]. Posttreatment panoramic X-ray showed well-established root parallelism and implant/crown placement for the mandibular left second molar area [Figure 3e].

After a 3-year, 2-month follow-up, the results of treatment correction have been maintained, showing stability in long-term outcome. Panoramic X-rays showed good health crestal alveolar bone with no signs of root resorption, no change in the teeth position [Figure 3h-m, 3k], and minor change in the lower facial profile [Figure 3h].

## Discussion

Treatment of asymmetric malocclusions is more intricate than symmetrical cases. In this case presentation, an adult female patient with Class II, division 2 subdivision malocclusion was treated by means of unilateral FRD appliance in conjunction with complete fixed orthodontic appliances.

When used in both young and adult patients, the Forsus appliance produces changes mainly at the dentoalveolar component, including intrusion and proclination of the mandibular incisors, extrusion and mesial movement of mandibular molars, extrusion and uprighting of maxillary incisors, and distalization and intrusion of maxillary first molars[7,9] as presented in the present case report.

In this case report, the patient had Class II subdivision malocclusion on the left side and was treated with unilateral FRD placed in the headgear tube of maxillary first molar and onto the mandibular archwire, distal to the canine bracket; this approach created a mesial force on the mandibular arch and a distal force on the maxillary arch, allowing for Class II correction. Incremental forces were created by placing 1.5-mm split crimps onto the push rod,

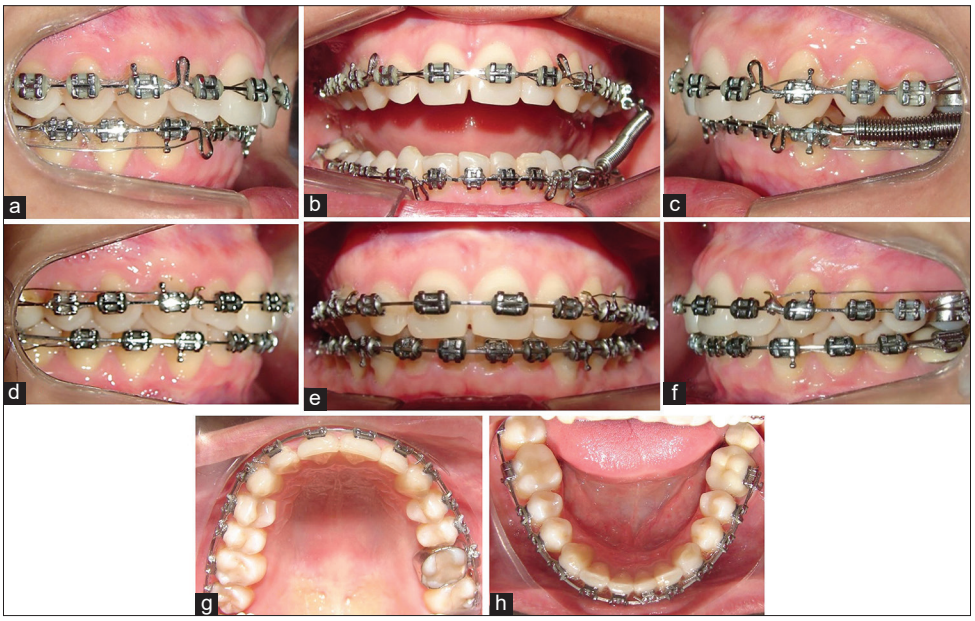


**Figure 2: (a-c): Progress intraoral photographs with the Forsus appliance attached on the left side. (d-h): Progress intraoral photographs with the correction achieved of the unilateral Class II malocclusion**

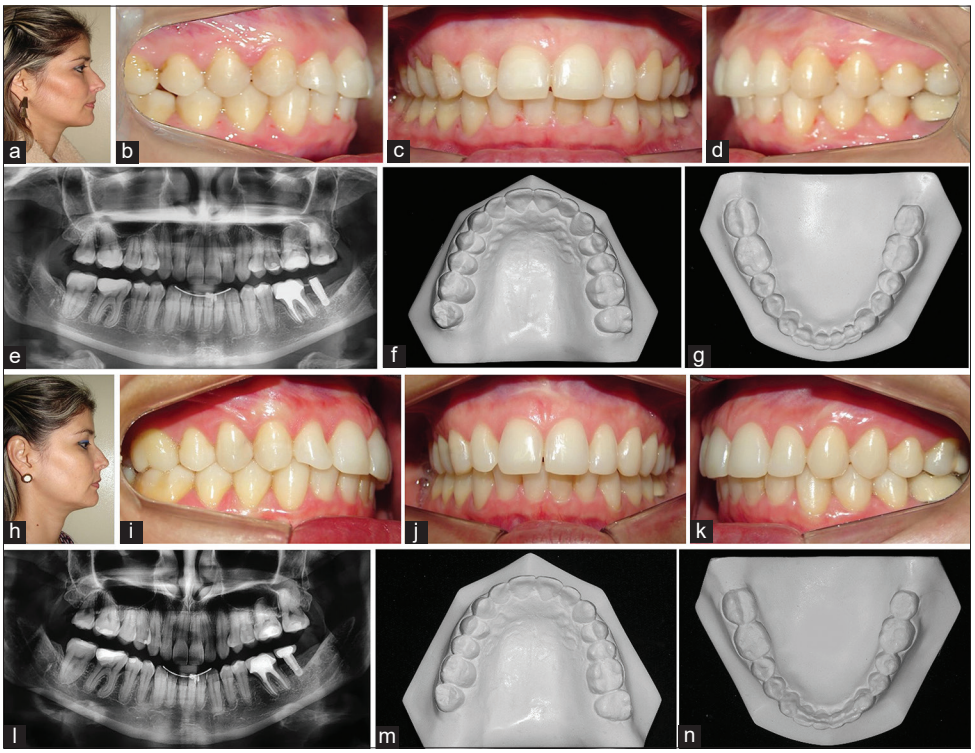


**Figure 3: (a-g): Posttreatment facial, intraoral and dental casts photographs, and panoramic radiograph. (h-n) 3-year, 2 months follow-up facial, intraoral and dental casts, and panoramic radiograph**

thus increasing pressure on the spring.[9] The Forsus showed to be more effective for correcting Class II subdivision malocclusion in a shorter treatment period with minimal patient compliance required.[10]

The use of an FRD in this case corroborates with its following attributes: easy installation, no requirement for continuous adjustments, maintenance of continued force level throughout the treatment, with activation producing approximately 200 g of force, and resulting in dentoalveolar changes in nature with mandibular incisor proclination.[11]

The correction of left side Class II relationship took only 8 months in this case. At the end of the treatment, dentoalveolar changes were observed, such as intrusion and proclination of mandibular incisors, extrusion and

mesial movement of mandibular molars, and slight distalization and intrusion of first maxillary molar. The results achieved using unilateral FRD appliance are in accordance with other studies previously published about this device.[11] Lower incisor remained proclined, due to the line of action of force exerted from the Forsus, and also because of dental compensation needed to correct a skeletal Class II (ANB, 6°).

After correction, unilateral FRD was removed and Class II elastics were inserted on the same side for 3 months to maintain stability of the results. At the end of the treatment, a good profile, a Class I molar and canine relationship, and adequate overjet and overbite with proper intercuspation and stability of the dentition were achieved.

## Conclusions

Treatment outcome using the Forsus FRD placed unilaterally in conjunction with complete fixed orthodontic appliances was effective in achieving positive results in dental esthetics and functionality with stable results after a 3-year, 2-month follow-up.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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