

# TREATMENT OF CLASS II IN ADULTHOOD BY FORSUS FRD DEVICE

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## SUMMARY

**Objectives.** Scientific research data show that the Forsus FRD seems to have a great potential in the correction of Class II in childhood. The conclusions reached by the various Authors seem to support the hypothesis of an exclusively or mainly dentoalveolar correction, as the skeletal correction seems to have no – or little – appreciable results. In the light of such provided by different Authors, the potential of dentoalveolar compensation in adult patients with mild skeletal class II was investigated.

**Materials and methods.** At the UOC (Complex Operative Unit) of Orthodontics at "G. Eastman" Hospital Rome, 3 cases of skeletal class II mild (ANB <5 °) in adult patients were selected. They were treated with fixed multibracket appliance and Forsus EZ2 module. Cephalometric tracings were compared at the beginning and at the end of the treatment in order to assess the skeletal and dentoalveolar changes.

**Results.** The occlusal correction was achieved through a dentoalveolar compensation characterized by the flaring of the lower teeth.

**Conclusions.** Forsus FRD equipment is an excellent compromise for the correction of mild Class II, even during the post development age. The resulting correction is appreciated at dental alveolar level with a mesial movement of the incisors and molars.

**Key words:** II Class Correction, Forsus FRD Device.



## Introduction

Noncompliance in the treatment is one of the greatest challenges for the orthodontists. One third of the population is affected by Class II malocclusion, which is also one of the most frequent sagittal problem (1).

The most common characteristic of Class II malocclusion is the mandibular retraction. It is advisable to treat malocclusion with the functional orthopedics jaw treatment in growing patients. The primary mechanism of treatment is the mandibular advancement (2). A wide range of devices has been proposed in order to treat noncompliant patients, amongst which the most popular are: Herbst appliance, MARA (Mandibular Anterior Repositioning Appliance), Jasper Jumper, Eureka Spring (3-6).

One of the newest and most widespread appliance for

the fixed functional therapy is the Forsus Fatigue Resistance Device (FRD). It is a semi-rigid fixed functional appliance, made up of three or two pieces, which forms a telescoping system incorporating a steel coil spring. Forsus EZ module (3M Unitek, Monrovia, Calif) is the easiest presentation of 3M trading house, whose easy installation allows us to save chair time. Data show that it is more comfortable than other fixed appliances and does not require the patient cooperation.

Jones, Bushang, et al. assessed the therapeutic changes induced by Forsus from the treatment of Class II with elastics. They found no significant differences between the two approaches, with the exception of the patient's compliance when using the elastics (7).

Gunay et al. analysed the results achieved using Forsus during 6 months of treatment, by comparing a

group of adolescent patients with a control group of untreated patients with Class II malocclusion. They reported that Forsus corrected the discrepancy through dentoalveolar changes (8).

Franchi, Alvetro et al. assessed the skeletal, dental and soft tissues corrections achieved by Forsus appliance. Forsus FRD proved effective and the changes induced are mainly skeletal in the upper jaw and dentoalveolar in the lower jaw (9).

Aslan et al. analysed the effects of Forsus when used with the miniscrew anchorage (FRDMS) by comparing them with a group of patients treated with the conventional Forsus FRD treatment and a control group of untreated patients with a class II malocclusion. No significant skeletal differences between FRDMS and FRD were detected. The correction of the overjet and of the molars was totally dentoalveolar. The unfavorable labial tipping effect of mandibular incisors was minimized through the use of the miniscrews (10).

Recently, Ghislanzoni, Cacciatore et al. assessed the treatment and post-treatment dentoskeletal effects of FRD in growing patients, through a retrospective controlled clinical study. They demonstrated the effectiveness of Forsus for Class II correction, especially for dentoalveolar corrections. An assessment, carried out 2 years after the end of the treatment, shows that the results achieved are stable (11).

As stated in the above-mentioned articles proving the effectiveness of fixed functional appliances, all Authors agree that a mandibular incisors' protrusion is achieved.

Celikoglu et al., in a case report, demonstrate the possibility of treating Class II malocclusion with mandibular retrusion with Forsus appliance with the anchorage of miniplates inserted in the mandibular symphysis. The Authors demonstrated and reported that this is the new effective protocol for the malocclusion correction, without any protrusion of the mandibular incisors, even though a concrete skeletal modification is achieved (14).

Our purpose is to demonstrate therapeutic effectiveness of Forsus in adult patients, with mild Class II malocclusion ( $ANB < 5^\circ$ ) and explore his potential for on dentoalveolar correction.

## Materials and methods

### Sample

Three female patients, with an average age of 21 years, were selected. All patients were diagnosed with a mild Class II malocclusion ( $ANB < 5^\circ$ ) and treated according to the non-extraction therapy protocol. The photographs and the lateral encephalograms were taken before (T1) and after (T2) the treatment, with T1 corresponding to the beginning of the treatment and T2 corresponding to the end of overall treatment. Forsus FRD was applied at the end of the aligning and leveling phase. A fixed multi-bracket appliance (MBT prescription with 0.018" slot) was applied in combination with Forsus. A steel arch of 0.017"x 0.025" inch was applied to both arches. The Forsus FRD rods were applied on the mandibular arch, distally to the canine. The mandibular arch was cinched distally to the last molars and the elements of the lateral group were joined together, from the molar to the canine, to prevent the creation of spaces.

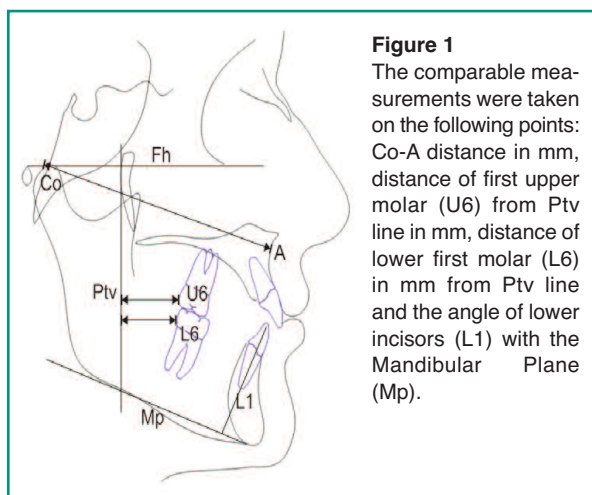
### Radiographs

All radiographs were carried out using the same radiograph, model PlanmecaPromax 2D (PlanmecaOy, Helsinki Finland) and by the same operator.

### Cephalometric analysis

Cephalometric assessments were made before and after the overall treatment. The cephalometric software used for all patients was Dolphin 9.0. The comparable measurements were taken on the following points: Co-A distance in mm, distance of first upper molar (U6) from Ptv line in mm, distance of lower first molar (L6) in mm from Ptv line and the angle of lower incisors (L1) with the Mandibular Plane (Mp) (Figure 1).

All comparable measurements taken at T1 and T2 are shown below in a standard cephalometry. The results of all cephalometric comparisons confirm the true effectiveness of Forsus for the mandibular growth.



**Figure 1**  
The comparable measurements were taken on the following points: Co-A distance in mm, distance of first upper molar (U6) from Ptv line in mm, distance of lower first molar (L6) in mm from Ptv line and the angle of lower incisors (L1) with the Mandibular Plane (Mp).

## Method errors

All teleradiographies were chosen randomly from all observations. Cephalometries were repeated and redigitalised by a second operator to compare the validity of measurements obtained.

## Results

### Case A

Measurements	T1	T2
Co-A (in mm)	83	82
U6- Ptv (in mm)	9	9
L6-Ptv (in mm)	8	9
L1- Mp (°)	90,3°	93,9°

### Case B

Measurements	T1	T2
Co-A (in mm)	87	85
U6- Ptv (in mm)	14	14
L6-Ptv (in mm)	13	15

L1- Mp (°)	87,5°	100,4°
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### Case C

Measurements	T1	T2
Co-A (in mm)	85	84
U6- Ptv (in mm)	19	18
L6-Ptv (in mm)	18	18
L1- Mp (°)	95,7°	98,8°



## Discussion and conclusions

The purpose of this study is to assess the significance of the occlusal compensation obtained by means of a fixed interarch appliance for Class II treatment in adult patients with a mild skeletal Class II malocclusion. The remarkable characteristic of this study is the analysis of patients treated consecutively by a single operator. We calculated the averages of each change obtained. The average decrease of the distance Co-A was of 1,3 mm. The position of the first Upper Molar (U6) with respect to the Ptv line is on average 0,3 mm less, while the position of the first Lower Molar (L6) is more significant, with an average advancement of 1,00 mm. The proclination of Lower Incisors (L1) has reached an average of 6,5°. Such figure could have been lower, but in case B the proclination of lower incisors was obtained previously, by means of the orthodontic multibracket treatment and not of Forsus appliance.

In conclusion:

- the protocol applied to Forsus FRD to treat adult patients with a mild class II skeletal malocclusion has proven effective;
- the protocol has proven to be a good compromise for mild Class II correction in adult patients, by achieving a dental compensation of the skeletal discrepancy;
- the effects of the appliance on the mandible were obtained by means of a mesial movement of lower incisors and of the first molars;
- in the upper maxilla the distalisation of the first

- molars was not significant;
- the A point reduction was more significant.

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