



## RESEARCH ARTICLE

### TREATMENT OF A NON-GROWING PATIENT WITH CLASS II DIVISION 1 MALOCCLUSION USING A FIXED FUNCTIONAL APPLIANCE: A CASE REPORT

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#### ARTICLE INFO

##### Article History:

Received 29<sup>th</sup> August, 2016  
Received in revised form  
07<sup>th</sup> September, 2016  
Accepted 23<sup>rd</sup> October, 2016  
Published online 30<sup>th</sup> November, 2016

##### Key words:

Class II malocclusion,  
Non-growing patient,  
Fixed Functional appliance,  
Forsus, FRD.

#### ABSTRACT

The patient was a 18 year old girl with a Class II Division 1 malocclusion, a large overjet and a horizontal growth pattern. Treatment started with a fixed appliance therapy followed by a fixed functional appliance.

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**Citation:** Sandesh S. Baralay, Vivek, P. Sonawane, Satish B. Baralay, Udit A. Khare and Sameer S. Patil. 2016. "Treatment of a non-growing patient with Class II division 1 malocclusion using a fixed functional appliance: A case report", *International Journal of Current Research*, 8, (11), 41195-41198.

## INTRODUCTION

Class II malocclusion is the most prevalent sagittal problem in orthodontics, as it affects almost one third of the population (Proffit et al., 1998). One of the recommended therapeutic approaches to Class II malocclusion in growing patients is functional jaw orthopedics through the primary mechanism of jumping of bite and mandibular advancement (McNamara et al., 2001). For the sagittal advancement of the mandible, fixed devices that do not require the patient's co-operation and that can be worn with fixed appliances have been made. They overcome two major limitations of removable functional appliances i.e. the need for patient co-operation and the inability to be used along with multibracket therapy in order to shorten treatment duration (Tulloch et al., 2004). Several appliances have been used over the years for this purpose and many of them have been investigated in the literature. The Eureka Spring efficiently corrected Class II malocclusions without causing any increase in the vertical dimension (Stromeyer et al., 2002). The Jasper Jumper appliance produced similar outcomes. It improved both the profile and skeletal imbalance in growing Class II patients (Kucukkeles et al., 2007 and Jena et al., 2010).

Reported the correction of Class II malocclusion with the help of the Mandibular Protraction Appliance-IV. Another such appliance namely the Forsus also known as the Forsus Fatigue Resistant Device [FRD] has become increasingly popular. It is a semi rigid appliance using a nickel-titanium coil spring and can be assembled chair-side. The FRD is attached to the maxillary first molar and onto the mandibular archwire, distal to either the canine or first premolar bracket. The appliance acceptance by patients is relatively good after some initial discomfort and functional limitations that generally reduce with time (Bowman et al., 2013). The appliance is routinely used in growing individuals with Class II malocclusion. Here a 18 year old non-growing patient with Class II Division 1 was treated with the Forsus FRD appliance in conjunction with the multibracket fixed appliance therapy and the resultant changes in the structures were observed.

## CASE DESCRIPTION AND RESULTS

A 18 year old girl reported with a chief complaint of poor esthetics due to proclined upper anterior teeth. The patient presented with a Class II molar & canine relationship bilaterally with an overjet of 6mm and had a slight convex facial profile. There was no facial asymmetry and the lips were competent. In the intra-oral assessment, the oral hygiene was good.

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Fig. 1. Pretreatment facial and intraoral photographs

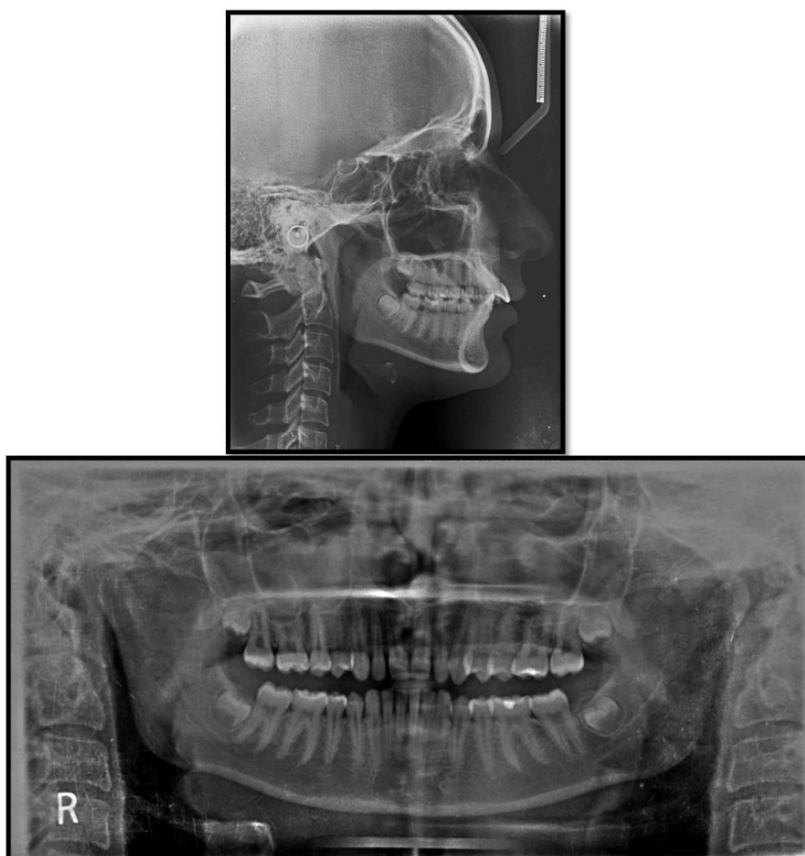


Fig. 2. Pre treatment radiographs



**Fig. 3. Post treatment facial and intraoral photographs**



**Fig. 4. Post treatment lateral cephalogram**

**Table 1. Pre and post functional appliance cephalometric measurements**

Variables	Pre-treatment	Post-treatment
Skeletal variables		
SNA (°)	83	84
SNB (°)	80	82
ANB (°)	3	2
FMA (°)	26	26
IMPA (°)	93	96
N perp- Pt. A	-2	2
Dental variables		
U1-L1 (°)	121	126
U1-SN (°)	120	113
U1-NA (mm)	7	4
U1-NA (°)	35	26
L1-NB (mm)	5	5
L1-NB (°)	21	24
Soft tissue variable		
Nasolabial angle	94	98

The cephalometric analysis confirmed a skeletal Class II jaw relationship with a prognathic maxilla and an orthognathic mandible. Additionally, the maxillary incisors were labially inclined and mandibular incisors were upright. A MBT pre-adjusted edgewise appliance with a 0.22 slot was bonded in upper and lower arch. The Forsus FRD was inserted at the end of the leveling and aligning phase of orthodontic treatment, when a 0.019x0.025 inch stainless-steel archwire was inserted in both arches. The mandibular archwire was cinched distal to the last banded molars. The rods of the Forsus appliance were placed on the mandibular archwire distal to the cuspids. The Forsus appliance was continued for 6 months. At the end of the treatment there was significant reduction in overjet and a Class I molar relationship was achieved. In the sagittal relation, in comparison to the pre-treatment measurements, the upper incisors showed retroclination (U1-NA) and proclination (L1- NB) was seen in the lower incisors. Mandibular plane angle remained the same (FMA), no skeletal changes were seen.

## DISCUSSION

The patient reported with a Class II molar relationship, which was corrected using the Forsus FRD appliance in conjunction with the multi-bracket therapy to a Class I molar relationship. In this case the effects seen were at the dentoalveolar level. These findings were similar to the results seen in the study conducted by Awasthi *et al.* (2015). The FRD revealed to be an effective tool in inducing a significant dentoalveolar correction of Class II malocclusions. Significant decreases in both overjet were recorded (6mm to 3mm), as well as a net improvement of the molar relationship to Class I. The upper incisors exhibited a significant amount of retroclination (9°) and retrusion (3mm). The lower incisors demonstrated some amount of proclination (4°). Similar results were reported by Baccetti *et al.* (Schaefer *et al.*, 2004), for the Herbst appliance and Siara-Olds *et al.* (Siara-Olds *et al.*, 2010), for the MARA. Franchi *et al.* (Franchi *et al.*, 2011), concluded that a

combination of skeletal and dentoalveolar modification were observed with a similar combination. The results achieved in the above studies were in combination with skeletal changes in growing patients. This case showed that the Forsus FRD appliance in combination with the fixed multibracket appliance resulted in dentoalveolar changes with significant correction of overjet and molar relationship.

## Conclusion

The Forsus FRD appliance in combination with the fixed multibracket appliance can be used in a non-growing patient for successful correction of Class II malocclusion. The effects seen were at the dentoalveolar level.

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