

Forsus Fixed Functional Appliance-A Reliable Approach for Class II Correction – A Case Report

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ABSTRACT

Functional appliances that tend to change the neuromuscular environment of the orofacial area are aimed to improve occlusal development and/or craniofacial skeletal growth. In a certain orientation, they impart the natural forces to the alveolar bone and teeth. When it comes to handling Class II discrepancies, fixed functional equipment is essential. Mandibular advancement, better occlusal relationships, and improved face aesthetics are all made possible by these appliances. They can be used in patient with almost completed pre-pubertal growth, at the early phase of permanent dentition yet being able to leverage the natural growth potential, with very little requirement of patient compliance. This case underscores the effectiveness of a non-invasive alternative to correction of Class II discrepancy in a 14-year-old male patient with concerns about his unpleasant appearance, delivering predictable results while significantly improving patients' profile, oral function and self-confidence.

Key words: Fixed functional appliances, class II discrepancy, mandibular advancement, natural growth potential, case report

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INTRODUCTION

Mandibular disto-occlusion² refers to a Class II discrepancy due to a receded mandibular position. Functional treatment tends to correct these discrepancies to bring about a harmonious change in the patient profile. Usually, the removable appliances tend to be bulky, demand patient compliance for success of treatment, and can cause absence of tactile sensation during appliance wear, soft tissue irritation, deglutition and speech problems etc. These issues challenge acceptance of these appliance among young patients.⁶ Hence in 1990 Emil Herbst introduced his Herbst appliance which is a fixed functional appliance, but whose usage was popularized by Pancherz.^{3,4}

In the recent years, several fixed functional appliances have been introduced in the field to

achieve improved outcomes in non-compliant patients. Hence these appliances are known as "Non-compliant Class II correctors". These appliances are smaller in size, better adaptation leading least difficulties in deglutition, speech, mastication etc making them more acceptable by patients.⁶

Case Report

A 14 year old boy reported to the department with a chief complaint of having an unpleasant facial appearance. While examining his extra oral features, it is noticed that the patient has an apparently symmetrical face, with a convex profile, competent lips, a normal nasiolabial angle and the meto-labial sulcus was shallow with a receded chin. (fig1)

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Figure 1- Pretreatment Extraoral photographs.

The examination of his intra-oral structures revealed a whole permanent dentition in both the upper and lower arches except the 3rd molars with a Class II canine and molar relation bilaterally. A

coinciding upper and lower midline with the facial midline and an overjet measuring about 8mm. (fig2)



Figure 2- Pretreatment Intraoral photographs

Cephalometrically the patient presented with a Class II skeletal base due to retrognathic mandible. It also revealed that the patient was in Cervical Vertebral Maturation Index (CVMI) stage V. The skeletal values suggest a normodivergent growth

pattern revealed by an average value of Frankfurt mandibular plane angle and Jarabak ratio of 27deg and 64% respectively. The cephalogram depicts average position of upper and slightly proclined lower incisors. (fig3)



Figure 3 – Pretreatment Lateral Cephalogram and OPG

Treatment Objectives

- Correction of the retrognathic mandible
- To achieve a Class I molar and canine relation bilaterally
- Correction of overjet

- To achieve a pleasing patient profile

Treatment Options

Option 1: Surgical treatment which involves advancement of the mandible once the patient is 18

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years.

Option 2: Extraction of the upper premolars and retraction of the upper anteriors to close the extraction spaces.

The patient was not willing to undergo surgery nor any extractions, the use of FORSUS appliance was suggested.

Also, as the patient is in the verge of growth completion to attempt a skeletal advancement of the mandible, the FORSUS appliance was opted.

Treatment Progress

Stage I – Fixed orthodontic mechanotherapy with

0.022slot MBT. Levelling and Aligning of both the arches is achieved.

Followed by use of FORSUS

Stage II – Finishing and detailing

Treatment Progress

Treatment started with bonding both the upper and lower arches with 0.022 X 0.028 slot MBT brackets. Initial levelling and aligning was achieved with a sequence of 0.014 NiTi, 0.016 NiTi, 16X22 Niti, 17X25 NiTi and finally 19X25 SS arch wires. (fig4)



Figure 4 – Post levelling and aligning

After complete alignment, fixed functional therapy was started. A Forsus fatigue resistant device was given to correct the mandibular position in order to

achieve a Class I molar and canine relation and a pleasing patient profile. (fig 5)



Figure 5 – Intra oral photographs with Forsus appliance

After about 6 months of treatment with the Forsus appliance, settling was initiated. Post settling, a vacuum formed retainer was given, with a schedule of full time wear for 6months and another 6 months of night time wear.

Treatment Results

All the planned treatment objectives were achieved at the end of treatment that lasted for 15months in duration. Skeletally the mandibular position was corrected, normal overjet and overbite was achieved. Also, a Class I molar and canine relation was achieved. The patient profile was also improved. (fig 6)

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Figure 6 - Post treatment extra oral



Figure 7 - Post treatment Lateral Cephalogram and OPG



Figure 8 - Post treatment intra-oral photographs

DISCUSSION

Treatment of a Class II malocclusion has always posed a challenge to the treating orthodontist, particularly when the cases visit the dental office during the retardation stages of growth.⁹

Immaculately, treatment of a Class II retrognathic mandible is with removable functional appliances for cases during their circumpubertal growth. Best results are attained if treated during this period.⁹

But the success of the removable functional appliances is dependent on patient compliance. These removable functional appliances when worn poses certain difficulties in patients like difficulty in chewing, difficulty in speech etc.

So, when a patient with a retrognathic mandible during the deceleration periods of growth fixed functional appliances are a treatment of choice. These functional appliances harness both the natural growth potential and neuromuscular forces

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of the adjacent structures to bring about mandibular advancement.

The Forsus appliance, introduced by William Vogt⁵ in the year 2001, is a semi-rigid telescopic device that consists of separate parts that are assembled chair side prior to insertion in the patient's mouth. It mainly consists of a rod and spring module. the appliance is used in conjunction with fixed mechanotherapy.⁵ The appliance comes in multiple dimensions – 22mm, 25mm, 29mm 32mm, 35mm and 38mm according to the dimensions of the push rod measured from the distal end of the upper molar tube to the distal part of lower canine.

According to a study by Lorenzo Fanchi et al¹⁰, the success rate of a forsus appliance to correct the mandibular position is about 87.5%. This was due to a significant restraint on the maxilla, a significant increase in mandibular length leading to a significant improvement in the maxilla-mandibular sagittal relationship. Dentally there was reduction in overjet, proclination and slight intrusion of the lower incisors, and movement of lower molars both in mesial and vertical direction. In this case patient presented with a class II relation due to a retrognathic mandible, increased overjet. After taking into consideration, the patients age, growth status and a positive VTO, a non extraction treatment approach with the use of fixed functional appliance was planned. Forsus fatigue resistant appliance was the appliance of choice for this patient. No patient compliance was expected and hence these are non-patient compliant appliances. The appliance resulted in a successful correction of a retrognathic mandible, leading to a conversion of the patient's profile to a pleasing one.

CONCLUSION

Functional appliances do have a pivotal role in correcting Class II malocclusions which require mandibular advancement. Harnessing the natural growth potential eliminates the need for extractions or a surgery in later period of life. The Forsus appliances has been proved to bring about significant, effective and efficient management of Class II malocclusions. Its ability to improve skeletal, dental as well as soft tissue makes it a treatment of choice in contemporary orthodontic practice.

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