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Eight -year clinical follow-up of a Case treated with Forsus™ Fatigue-Resistance Device (FRD) on a noncompliant severe class II malocclusion adolescent patient.

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Abstract

The present case report describes the management of severe class II malocclusion in adolescent patient with Forsus™ Fatigue-Resistance Device (FRD) .As this appliance is fixed there is less dependence on patient compliance and the remaining growth after the pubertal growth spurt can be harbored effectively. Hence this growth modulation minimizes the necessity of extraction of permanent teeth. The Forsus™ FRD is not as rigid as the previous fixed functional appliances and hence it is comfortable for the patients. There are lots of questions about stability of class II correction with growth modulation. Hence the present case report shows that the results achieved at the end of treatment were stable even after eight years.

Keywords: Adolescents, Angle class II, Division 1, fixed functional appliances.

Introduction

Class II malocclusion is considered as most frequent problem presenting in orthodontic practice. It may also involve craniofacial discrepancies, which can be adjusted when patients are adolescent. Usual treatment options in growing patients include extraoral headgears, functional appliances and fixed appliances with intermaxillary elastics and/or teeth extractions.[1]Noncompliance has been a major concern for orthodontists for more than 40 years.[2]

Forsus™ Fatigue Resistant Device (FRD) is an innovative noncompliance appliance which consists of a three piece, telescoping nickel-titanium spring that is attached to the headgear tube of maxillary molar band via an L-pin. The spring assembly is connected to the mandibular arch by a push-rod, which attaches directly onto the mandibular archwire either distal to the canine bracket or distal to the first premolar bracket.[3] Forsus Fatigue Resistant Device(FRD) is an interarch push spring that produces about 200g of force when fully compressed.[4]

Case Report

A 14-year-old male patient reported to our department with the chief complaint of forwardly placed upper and lower front teeth.

Clinical examination (Fig. 1): Patient's height and weight was normal for his age.

Fig. 1: Pretreatment extraoral and intraoral photographs

Extraoral examination: In the frontal view, patient exhibited mesofacial form with decreased lower facial height and competent lips. Profile examination displayed convex profile (Visualized Treatment Objective was positive) with obtuse nasolabial angle and deep mentolabial sulcus. Frontalsmile showed complex smile line.

Intraoral examination: Revealed proclination of upper and lower arches with spacing of 11mm and 2.5 mm in the anterior regions respectively. ClassII molar and canine relationship bilaterally, with increased overjet of 12.5 mm and overbite of 3.5mm.

Radigraphic examination: (Fig. 2) panoramic radiograph showed the presence of all permanent teeth. Upper and lower 3rd molar crown is seen. Cephalometric analysis: (Table 1) Revealed Class II skeletal base with reduced mandibular Length, Low mandibular plane angle, decreased lower facial height. Dental analysis showed proclined upper and lower incisors along with an increased overjet and overbite with obtuse nasolabial angle. Hand wrist radiograph by Stage -5 MP3cap Rcap PPI cap. (Bjork, Grave and Brown). Cephalometric landmarks were digitized into the computer and repositioning of the jaw was done.

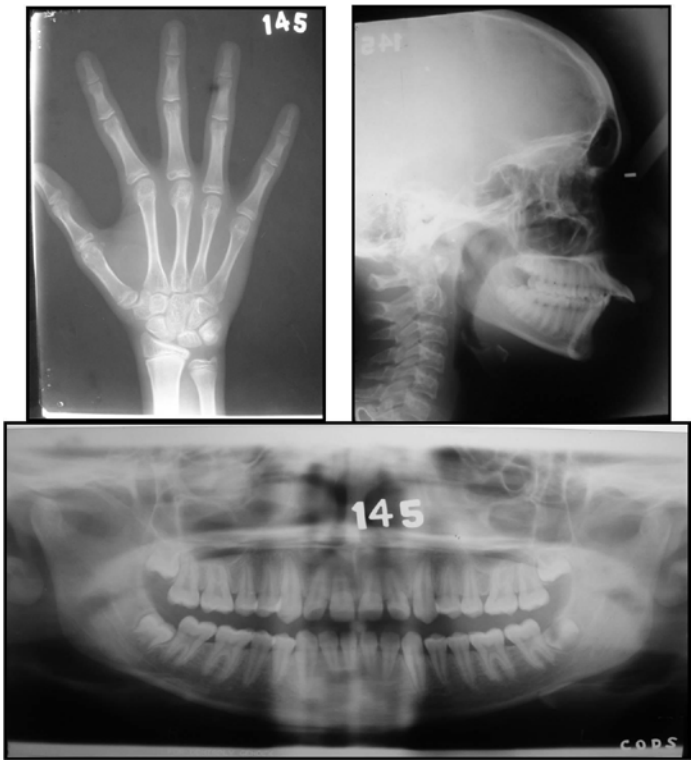

Fig. 2: Pretreatment radiographs

Predicted outline of post treatment facial profile was generated using video imaging program Dolphin 11.0. (Fig. 3) we live in digital era hence the purpose of this was

to guide the patient visually as to the predicted treatment outcome.

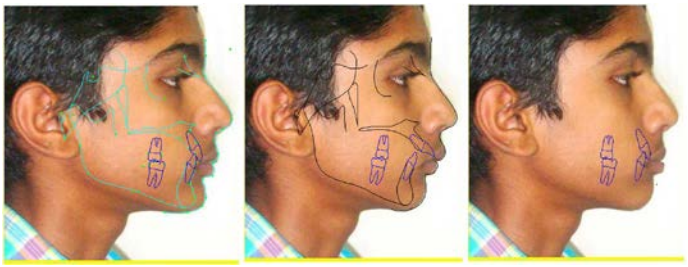

Fig. 3: Dolphin Imaging

Patient was diagnosed as Angle's class II division 1 malocclusion with class II skeletal pattern due to mandibular retrusion having hypodivergent growth pattern with increased overjet and deep overbite. Goal was to reduce the overjet, overbite, and correct the molar relationship to Class I on both sides, using nonextraction approach. It was decided that bilateral Forsus™ (FRD) would provide the mechanics needed.

Treatment progress

Treatment began with 022" slot MBT prescription. Upper and Lower second molars were also banded. Initially 0.016" round nickel titanium archwire was used for leveling and alignment of both arches for 4 weeks. Later, with 0.019 " X 0.025 " NiTi, 0.021" X 0.025 " NiTi wire and then stabilized 0.021 X 0.025" stainless steel wires could be passively placed. Individually both the arches were consolidated from molar to molar with figure of eight ligature tie and active bendback were placed in archwire distal to molar. Additionally labial root torque was incorporated into anterior segment of lower archwire. Forsus™ (FRD) (3M Unitek) was placed on both sides for a period of 10 months (Fig. 4). Appliance was inserted from distal part of the head gear tube on the maxillary molar to the arch wire distal to mandibular canine.

Fig. 4: Intraoral photographs with Forsus™ (FRD)

Post functional forsus showed normal maxillary and mandibular skeletal bases with ANB 2^0. (Fig. 5, 6)

Fig. 5: Postfunctional extraoral and intraoral photographs

Fig. 6: Postfunctional radiographs

Finishing and detailing followed for 4 months after the molar correction. After 20 months of treatment, the fixed appliance was debonded. Post treatment (Fig. 7, 8) upper and lower fixed bonded canine to canine retainer were placed since patient had spacing along upper & lower wraparound retainer were also given for retention. Superimposition of cephalometric tracings (Fig. 9)

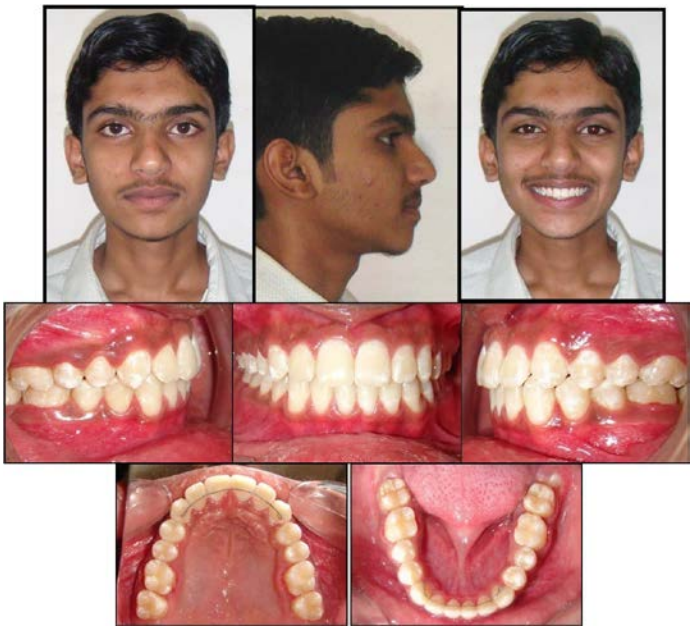

Fig. 7: Posttreatment extraoral and intraoral photographs

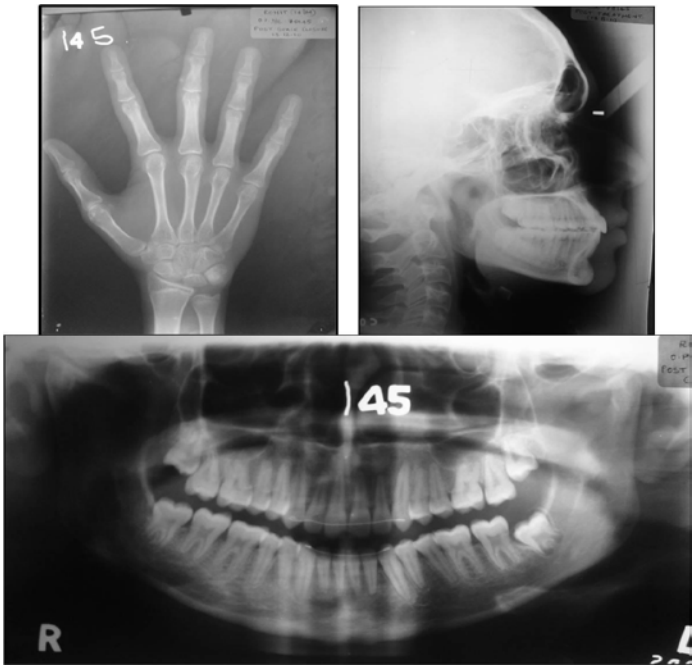

Fig. 8: Posttreatment radiographs

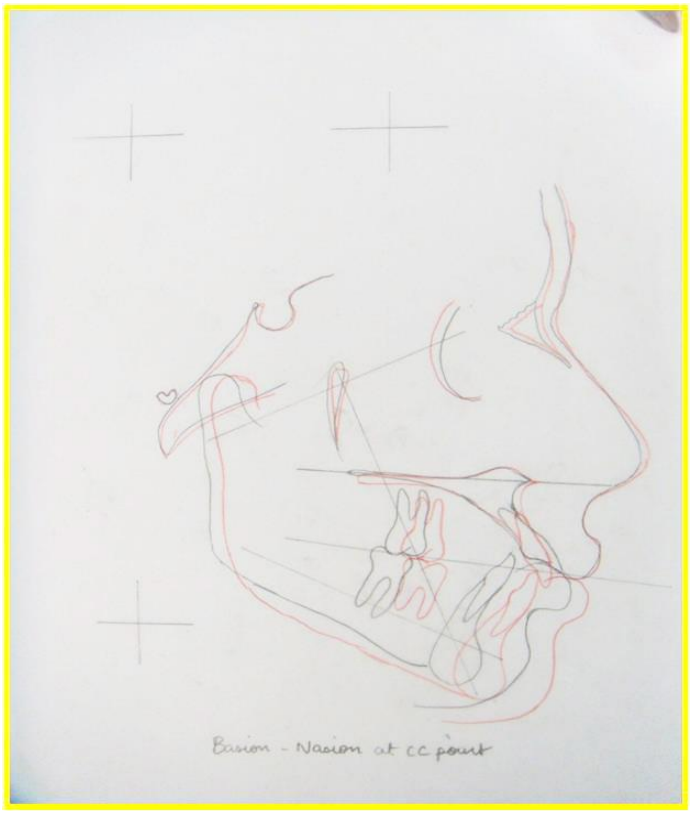

Fig. 9: Superimposition of pretreatment (tracing in blackcolor) and posttreatment lateral (tracing in red color) cephalogram

Discussion

Wide spectrum of treatment options is available for class II malocclusion. Present case reported a young adolescent patient hence we utilized the growth modulation and non compliance feature of fixed functional appliance to achieve the desired results. The case finished with class I maxillary and mandibular skeletal bases along with ANB angle reduced from 5^0 - 2^0, upright incisors, class I molar and canine relations bilaterally, ideal overjet and overbite. Patient had a straight profile at the end of treatment. ABO scoring system showed 19 deduction which is a good score post treatment.

Bacetti[5] suggests that growth modulation done after the peak of growth spurt of active growth spurt, results in greater skeletal contribution to molar correction. This is seen similar to the present case report where severe class II occlusion with 12 mm of overjet reduced to 2mm and

was very effectively treated to class I occlusion with very good posterior teeth intercuspation. Pancherz[6] has emphasized the importance of good posttreatment intercuspation for preventing the dental and skeletal relapse of class II correction. Hence at the end of treatment, good occlusion ensured the stability of the results.

The advantage of choosing growth modulation mode of treatment in this case was it avoided the necessity of extraction and an orthognathic surgery at a later stage. Treatment with growth modulation in Class II malocclusion during the pubertal growth spurt induces significant favorable dentoskeletal and occlusal changes.[7] Evaluation of the patient eight years after treatment revealed no significant changes. (Fig. 10, 11)

Fig. 10: Patient eight years post treatment, extraoral and intraoral photographs

There are lots of questions about the stability of class II correction with growth modulation.[8]

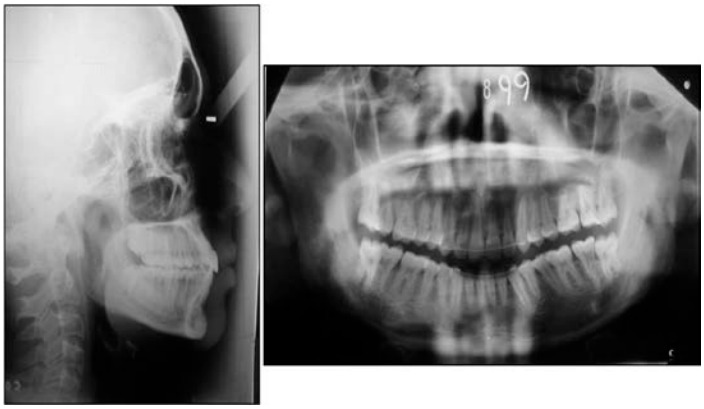

Fig. 11: Patient eight years post treatment, radiographs.

There are no long term case reports on stability of class II correction with growth modulation; hence the present case report shows that the results achieved at the end of treatment were stable even after eight years.

Conclusion

Skeletal class II correction at the end of growth period has several limitations. With proper appliance selection and precise planning we can overcome any limitations and achieve the essential goals of treatment, by stretching the boundaries of Growth Modification. The above case is one such example with a long term stability and retention of eight years.

Table1: Comparison of all 4 phases Cephalometric Parameters: pre, post functional, post treatment and post retention (8 years)

Parameters	Pre Treatment	Post Functional	Post Treatment	Post Retention
SNA angle (Degrees)	78^0	80^0	80^0	
SNB angle (Degrees)	73^0	78^0	78^0	79^0
ANB angle (Degrees)	5^0	2^0	2^0	2^0
GoGn to SN (Degrees)	30^0	30^0	31^0	31^0
Angle of Inclination (Degrees)	85^0	86^0	88^0	88^0
Lower Anterior Face Height (mm)	62mm	66mm	66mm	66mm
Eff. Max. Length (mm)	91mm	94.5mm	95mm	95mm
Eff. Mand. Length (mm)	116mm	120mm	120mm	121mm
Y-axis Angle (Degrees)	62^0	64^0	65^0	65^0
Facial Axis Angle (Degrees)	7^0	3^0	2^0	2^0
Sum of Posterior Angles (Degrees)	391^0	390^0	390^0	390^0
U1 to NA (Degree & mm)	50^0 & 19mm	35^0& 8mm	23^0& 5mm	23^0& 5mm
U1 to SN Plane	128^0	115^0	109^0	109^0
L1 to NB Angle (Degree & mm)	24^0& 7mm	25^0& 5mm	25^0& 5mm	25^0& 5mm
L1 to APog (mm)	6mm	4.5mm	3mm	3mm
L1 to Mandubular Plane Angle– IMPA (Degrees)	96^0	97^0	97^0	97^0
Interincisal Angle (Degrees)	105^0	128^0	130^0	130^0
Overjet (mm)	12.5mm	2mm	2mm	2mm
Overbite (mm)	3.5mm	1.5mm	1.5mm	1.5mm
S Line to U & L Lip (mm)	5.5 & 3mm	1 & 2mm	0 & 2mm	0 & 2mm
Nasolabial Angle (Degrees)	105^0	106^0	108^0	108^0

References

1. Moschos A. Papadopoulos. Non-compliance approaches for management of Class II malocclusion, Skeletal Anchorage in Orthodontic Treatment of Class II Malocclusion, 2015.
2. Annemieke B, Hoogstratan J, Prahl-Andresen B. On the use ofpersonality characteristics in predicting the compliance inorthodontic practice. Am J Orthod Dentofacial Orthop2003; 122:568.
3. Seniz Karacay etal. Forsus Nitinol Flat Spring and Jasper Jumper Corrections of Class II division 1 Malocclusions. The Angle Orthodontist: July 2006, Vol.76, No. 4, pp. 666-672.
4. Kulbersh V P, Berger J L, Chermak D S, Kaczynski R, Simon E S, Haerian A. Treatment effects of the mandibular anterior repositioning appliance on patients with Class II malocclusion. Am J Orthod Dentofacial Orthop 2003. 123:286–295.
5. Baccetti T, Franchi L, Toth LR, McNamara JA Jr. Treatmenttiming for twin-block therapy. Am J Orthod Dentofacial OrthopAug 2000; 118(2):159-70.
6. Hans Pancherz. The Modern Herbst Appliance. In: Thomas MGraber, Thomas Rakosi, G Petrovic Alexandre (Eds).Dentofacial Orthopedics with Functional Appliances (2nd ed), Mosby, 1997:348.
7. Baccetti T, Franchi L, Stahl F. Comparison of two comprehensiveclass II treatment protocols including the bonded herbst andheadgear appliances: A double-blind study of consecutivelytreated patients at puberty. Am J Orthod Dentofacial Orthop2009; 135(6):698-99.
8. Nelson B, Hagg U, Hansen K, Bendeus M. A long term followup study of class II malocclusion correction after treatment with class II elastics or fixed functional appliances. Am J Orthod Dentofacial Orthop Oct 2007; 132(4):499-503.