

Treatment of class II malocclusion in young patient with Forsus™ fatigue resistant device and non extraction approach: A case report

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Abstract

Treatment of Class II malocclusion in growing individuals consists of Functional therapy to displace the mandible forward, headgear to restrict or redirect the growth of maxilla or combination of both. However, both the above mentioned treatment modalities depend upon patient compliance. In a non compliant patient or in cases where more of a dento-alveolar compensation is required fixed functional appliances are used. Forsus fatigue resistant device (FRD) is one such appliance used to correct Class II division 1 malocclusion. However the side effects of mechanotherapy with fixed functional appliance have to be controlled and good intercuspation ensures stability of results achieved. This case report shows one such case of Class II division 1 malocclusion treated with Forsus in conjunction with fixed appliance.

Keywords: Class II malocclusion, Forsus, Fixed functional appliance.

Introduction

The Class II malocclusion in growing patients is common finding in orthodontic set up. Amongst the variety of components of Class II malocclusion, mandibular retrusion is most common finding.¹

Treatment approach in such cases varies from using a headgear to restrict maxillary growth, using a functional appliance or a combination of both. Removable functional appliances are heavy and depend exclusively upon patient compliance. The use of intra oral class II elastics also pose the same problem and have additional vertical effects which are detrimental to final outcome in most cases.²

To overcome such problems fixed functional appliances were introduced first by Emil Herbst, popularly known as Herbst appliance which was popularized later on by Pancherz.³ Forsus™ fatigue resistant device (FRD) has a spring component that delivers the force, which when compressed maximally produces around 200gm of force that is equivalent to using heavy intraoral class II elastics.⁴

Forsus produces more of a dento-alveolar changes as compared to skeletal changes brought about by removable functional appliances.^{5,6} Moreover, forsus produces more of lower incisor proclination and has less vertical side effects when compared to intraoral class II elastics.⁷ The duration with forsus should be minimum 6 months to bring about necessary changes in occlusion.⁸

Forsus is a fixed and hybrid type of functional appliance⁹ and is well accepted by patients apart from some initial discomfort after placement.¹⁰ It is mainly indicated in cases where dento-alveolar changes are desirable and patient has mild skeletal discrepancy.¹¹

Case Report

A 13yr old, pre pubertal female reported with chief complaint of mal-aligned upper anterior teeth. On examination patient had straight profile and competent lips (Fig. 1). No functional abnormality was noted. Intra oral examination revealed Angle's class II Division 1

malocclusion with buccal non-occlusion w.r.t. upper first premolars and erupting 45. There was generalized interdental spacing and over all mesio-distal width of crowns were less. There was accentuated curve of spee and increased overjet (Fig. 2). Since the patient had a straight profile, forward posturing of mandible would give unesthetic result (Negative VTO).

Pre-treatment records were taken including photographs, dental casts, lateral cephalogram and OPG. Skeletally in sagittal plane, patient had normally placed maxilla and mandible. Patient was in CVMI stage IV. Treatment objectives for the patient were as follows:

1. To achieve alignment in both the arches.
2. To achieve Class I canine and molar relationship with proper overjet and overbite.

Since the correction desired was dento-alveolar in nature, this case was treated with Forsus fixed functional therapy along with PEA appliance. Molar tubes were welded on buccal surface of bands on molars. Pre-adjusted edgewise brackets with MBT 0.022" prescription (Ortho Organizers, USA) was used. After alignment and leveling, a final working wire was placed: 19 X 25- stainless steel (Orthoforce; G&H Wire, Franklin, Ind) which was cinched back. MBT appliance was strapped as it has inherent -6 torque in lower anteriors which prevents the labial tipping of lower incisors due to action of functional appliance.

After achieving alignment and leveling, Forsus was delivered with appropriate length as guided by the Forsus gauge (Fig. 3). Simultaneously, buccal root torque was placed in upper posterior segments. Active functional phase lasted for 7 months after which Forsus was removed. Lingual attachments were bonded to lower premolars and cross elastics (Red 3.5 Oz) were given to correct buccal non occlusion on both sides. Inter-dental spacing were closed with power chain. At the end of treatment Class I canine and molar relationships were achieved. There were inter-dental spacing w.r.t. upper anteriors but post functional inclination of upper incisors were normal. Any further retraction of

upper anteriors to close the spaces was not desirable. Thereby composite build up restorations were done on upper incisors as MD width of these teeth were less. Gingivoplasty was done w.r.t. upper anteriors to improve the gingival contours (Fig. 4 and 5).

Corrections were retained with upper anterior inclined plane and a wrap around retainer with lower fixed bonded lingual retainer. Total treatment time was 15 months. Cephalometric progress of the case is shown in Table 1.

Table 1: Cephalometric progress (All the angular measurements are in degree and linear measurements in mm)

Cephalometric Parameter	Pre treatment	Post fixed functional	Post treatment
SNA	84	84	84
SNB	80	82	82
ANB	4	2	2
Wits appraisal	3.5	-1	0
B angle	22	30	26
W angle	54	55	59
SN-MP	15	15	16
FMPA	14	12	14
Y-axis	61	58	58
Saddle angle	125	124	124
LAFH	51	53	54
Jaraback's ratio	78.4	80	80
Mandbase	74	74	77
Ramus	51	58	55
Upper incisors-NA	24	26	21
(Linear)	3	5	3
Upper incisors-SN	103	110	103
1-Apog	3	4	3
Lower incisors-NB	17	25	24
(Linear)	1	2.5	1
Lower incisors -Apog	-3	0	-1
IMPA	97	103	104



Fig.1: Pre treatment extra oral photographs



Fig. 2: Pre treatment Intra oral photographs



Fig. 3: Forsus FRD appliance in place



Fig. 4: Post treatment extra oral photographs



Fig. 5: Post treatment intra oral photographs

Discussion

Class II malocclusion in growing individuals is a common finding in Orthodontic set up. Many treatment modalities have been established as standard depending upon the problem area. Mandibular retrusion remains the most common amongst all.¹

Variety of removable functional appliances have been used to stimulate mandibular growth, restrict maxillary

growth and bring about forward displacement of mandible. These appliances have disadvantage of being totally dependent upon patient compliance. Fixed functional appliances were given to address this issue as they can be used along with fixed appliance and does not depend upon patient compliance.

Forsus Fatigue resistant Device (FRD) has been studied extensively with its dento skeletal effects well known.⁵⁻⁸ Its effects are dento-alveolar in nature and causes minimal

maxillary restriction of headgear effect.⁵ In this case skeletal relationship of maxilla to mandible was normal thereby needing dento-alveolar changes and mild skeletal change. Skeletal change achieved is reflected in increase in SNB angle and mandibular base.

Amongst the dental changes, most common and prominent is mesialisation of mandibular dentition. It causes proclination of mandibular incisors and in that case its effects are similar to using Class II intra oral elastics.⁷ Lower incisors were retroclined to begin with making this a good case for fixed functional appliance. Lower anterior face height increased after its use as demonstrated in table 1 which was desirable as patient is a horizontal grower with short face height.

Class II malocclusion can be treated by controlling the side effects and achieving good inter-cuspation ensures stable results.

Conclusion

Proper appliance selection and biomechanics often lead to acceptable results. In the above mentioned case, fixed functional appliance proved to be useful because more of dento-alveolar changes were desired.

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Conflict of Interest

None.

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