

Implant supported elastics : A novel approach to correct skeletal class II

Running title Novel method for Class II correction

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Abstract

The aim of the present case report was to present a novel technique for treatment of skeletal class II malocclusion using implant supported class II elastics. MBT 0.022 fixed mechanotherapy was employed along with a total of four power headed implants which were placed between lower 1st and 2nd molars and upper central and laterals to attach class II elastics. After seven months of implant supported mandibular advancement Class I molar relations were achieved and overjet was eliminated with a reduction in profile convexity. Based on our literature search no such technique has been reported.

Keywords: Skeletal Class II malocclusion, Implants, Class II elastics, Mandibular advancement

INTRODUCTION

Malocclusion often affects the esthetics, profile and attractiveness of an individual, leading them to seek orthodontic treatment. Class II malocclusion is one of the frequent forms of malocclusion encountered by a dentist.¹ The causative factors for a Class II malocclusion could be hereditary, trauma, diseases, local factors etc. Mandibular retrognathism is the most common cause constituting a Class II malocclusion.²

Treatment of a Class II malocclusion involves a number of approaches such as:

- Functional Appliances³ in growing children
- Fixed Functional Appliance^{4,5}
- Surgical
- Camouflage
- Growth Restriction - Maxilla

In dealing with mandibular retrognathism advancement is the most popular treatment protocol that is followed. Mandible is advanced by appliances which correct the distocclusion by increasing mandibular growth, redirecting maxillary growth, altering the glenoid fossa or the condylar growth.^{6,7,8,9}

Functional appliances can be sub-divided as removable or fixed ones (FFAs). Patient compliance, is the most important differentiating factor among them.^{10,11}

Effects of various appliances for the Correction of non-compliant class II patient has been developed such as Herbst¹², Jumper¹³ and Forsus¹⁴.

Literature has showed that the use of miniscrew assisted Herbst¹⁵ and Forsus fatigue-resistance device (FRD)¹⁶ to reduce proclination of mandibular incisors intrusive movement of maxillary molars, mesial movement of mandibular molars, retrusion of maxillary incisors.

The present case report shows the treatment of a patient with skeletal Class II malocclusion with mandibular retrusion using min-implants supported elastics. Based on our search, we found that the use of such a technique has not yet been reported.

HISTORY AND DIAGNOSIS

A 14-year old female patient came to the department of orthodontics and dentofacial orthopaedics at JSS Dental college and hospital, Mysuru with a chief complaint of irregularly placed upper front teeth and backwardly placed lower front teeth.

Extra-Oral examination

Patient was found to be mesocephalic, mesoprosopic with straight profile and competent lips (Fig.1).

Intra-Oral examination

She had Class II molar relation bilaterally with overjet of 9 mm and overbite of 6 mm. She had missing 33 and 43 with retained 73 and 83. Maxillary arch was U-shaped, grossly symmetrical with pro-

clined upper anteriors, distopalatally rotated 14 with average palatal contour. Mandibular arch was U-shaped, grossly symmetrical with proclined lower anteriors, distolingually rotated 35, mesiolingually rotated 32 (Fig.2).

Radiographs

Panoramic radiograph revealed impacted 33 and 43 with a radiolucency involving the crowns of both the impacted tooth suggestive of dentigerous cyst (Fig.3).

Cephalometric evaluation revealed a skeletal class II malocclusion(Fig.4) due to a retrognathic mandible. (Table I) CVMI showed stage 4 (deceleration stage) indicating 10-25% of growth remaining.

Treatment objectives

Treatment objectives were to correct skeletal discrepancy, level and align the arches and achieve class I molar and incisor relationship and to obtain an esthetic and functionally stable occlusion.

TREATMENT

The treatment plan decided was:

- Extraction of 33 and 43 with enucleation of the cyst. Pathology report post enucleation confirmed the diagnosis of a dentigerous cyst.
- Mandibular advancement to correct skeletal class II due to retrognathic mandible.
- To retain the deciduous 73 and 83(Patient was advised for extraction since the prognosis was poor due to resorbed roots but she refused for extraction and insisted on retaining them).

An innovative, minimally invasive and cost efficient method was adopted for bite jumping rather than the already available fixed functional appliances like forsus, herbst, MARA etc. All of the above mentioned appliances are technique sensitive, expensive and require the teeth to be levelled and aligned on 19X25 SS wire which is time consuming.

Hence, we adopted a newer technique by giving power headed 1.3x10 mm (Dentoss) implants between 12 and 13; 22 and 23 in the upper arch and between 36 and 37; 46 and 47 in the lower arch. Class II elastics were employed from these implants(Fig.5). PEA mechanotherapy using MBT 0.022 slot with variable prescription and standard torque was used. Class II correction was done hand in hand with leveling and alignment of arches. After a period of 7 months patient achieved correction of skeletal Class II malocclusion (ANB: 7°) and profile convexity(Fig.6) with class I molar relation bilaterally(Fig.7).

DISCUSSION

Several attempts are carried out everyday to correct skeletal class II malocclusion using removable or fixed functional appliances. All the appliances are expensive, time consuming and known for causing lower incisor proclination.^{17,18,19,20} Methods such as synching the wire, increased torque in lower incisor brackets have been proposed to minimize the adverse effects.

The present study a new approach that has not been previously described before have been tried. This technique reported correction of ANB angle from 7° to 3°, reduced convexity, increased mandibular growth, forward positioning of point B and preservation of hygiene. Incisor proclination was mildly increased owing to the dentoalveolar effects of class II vectors. Patient refused for extraction and hence the proclination could not be corrected. Thus, our hypothesis was that mandibular advancement can be brought about by implant supported elastics.

The treatment of Class II malocclusion with fixed functional appliance has been associated with small stimulation of mandibular growth, small inhibition of maxillary growth, and with more pronounced dentoalveolar and soft tissue changes. Patient- and appliance-related factors seem to influence the treatment outcomes, yet complementary research is required investigate the respective effects. Similarly, limitation of the present study was that long-term studies should be done to study the various parameters. Further studies are needed to prove/discuss our findings, and clinicians should consider both advantages and disadvantages of implant supported Class II elastics before using them.

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TABLES

Table 1: Mean values of the examined parameters before treatment and post advancement

Parameters	Pre- Treatment	Post-Bite Jumping
SNA	82°	82°
SNB	75°	79°
ANB	7°	3°
SN/GoGn	28°	29°
U1-SN	113°	105°
IMPA	102°	108°
U1-NA (°)	28°	23°
U1-NA (mm)	7 mm	4mm
L1-NB (°)	29°	31°
L1-NB (°)	7 mm	7mm
Co-A (mm)	84 mm	84mm
Co-Gn (mm)	103 mm	106mm

Parameters	Pre- Treatment	Post-Bite Jumping
Overjet (mm)	9 mm	3mm
Overbite (mm)	6 mm	2mm

FIGURE LEGENDS

Figure 1: Extra-Oral Photographs

Figure 2: Intra-Oral Photographs

Figure 3: Orthopantomogram

Figure 4: Lateral Cephalogram

Figure 5: Implant supported Class II elastics

Figure 6: Reduced convexity post mandibular advancement

Figure 7: Class I molar relation bilaterally