

## CASE REPORT

### BILATERAL DISTALIZATION USING PENDULUM APPLIANCE: A CASE REPORT

<sup>1</sup> Kumaran V, <sup>2</sup> Aanand Kumar A, <sup>3</sup> Sathish Kumar S, <sup>4</sup> Vignesh Prasad SM

<sup>1,4</sup> Assistant professor

<sup>2</sup> Professor & HOD

<sup>3</sup> Professor,

Department of

Orthodontics,

JKK Nattraja dental

college and hospital

Kumarapalayam,

Namakkal -638183

Tamilnadu, India.

#### ABSTRACT

Treatment of class II malocclusion with proclination can be possible without extraction, if a correct diagnosis is attained. The present article describes the orthodontic treatment in a 11 years old male patient diagnosed with Angle's class II division 1 malocclusion on an underlying class II skeletal base, with proclination and lower dental midline shifted towards right side in relation to upper dental midline. Treatment plan of this case using pendulum appliance for bilateral distalization of the upper first molars following fixed mechanotherapy to achieve Class I molar relation and retraction of the upper incisors. The desired treatment result is achieved which satisfied the patient for the fulfillment of his expectation. **Key words:** Molar Distalization , non-extraction, pendulum appliance.

#### INTRODUCTION:

Dental proclination is one of the most commonly occurring malocclusion which comes under the classification of Angle's class II division 1 malocclusion. This type of malocclusion has a strong genetic influence. Molar distalization is one of the treatment methods for correcting class II relation of molars to class I relationship.

Various appliances are used in achieving class I molar relation. They are extra oral traction, removable appliances, sliding jigs with class II intermaxillary elastics, Herbst appliances, Implant supported devices, Advansync, Pendulum appliance etc.<sup>1-4</sup>. Distalisation of molars with pendulum appliances uses the special type of anchorage – palatal anchorage.

#### Access this article online

Quick Response Code:



Website:  
[www.jiadsr.org](http://www.jiadsr.org)

#### Address for correspondence:

**Dr V.Kumaran M.D.S.,**

**Assistant professor**

JKK Nattraja dental college and hospital

Kumarapalayam, Namakkal -638183

Tamilnadu, India.

### **PENDULUM APPLIANCE:**

Pendulum appliance given by Hilgers in 1992<sup>[1]</sup> has a large acrylic Nance button that covers the mid portion of the palate. The acrylic pad is connected to the dentition by means of occlusal rests that extend from the lateral acrylic pad and are bonded to the occlusal surfaces of the upper first and second premolars. Springs are directed posteriorly and is made of 0.032-inch TMA wire, extending from the distal aspect of the palatal acrylic to form a helical loop near the midline and then extend laterally to insert into lingual sheaths on bands cemented on the upper first molars. The appliance is activated and inserted into the lingual sheaths, they produce a distalizing force against the upper first molars that moves the molars distally. Hilgers estimates that these springs deliver approximately 200 grams to 250 grams<sup>[5]</sup> of force per side to the maxillary molars in the swinging arc movement. The springs also may have adjustment loops that can be manipulated to increase molar expansion, molar rotation, or distal root tip.<sup>6</sup>

### **CASE REPORT:**

A 11-year-old male patient who was concerned about the appearance, needs treatment for correcting forwardly placed upper front tooth region reported to the department of Orthodontics. On extra oral examination he was presented with class II skeletal base, convex profile and straight divergence face showing average growth pattern (Fig:1)

Intra oral examination revealed Angle's class II division 1 malocclusion, class II canine relation with overjet of 7 mm and overbite of 6 mm. The upper dental midline coincides with the facial midline whereas the lower dental midline shifted towards right side in relation to upper (Fig:2).

Panoramic examination reveals no pathologic conditions and there is evidence of

calcification of 28 & 38(as in Fig:3). Cephalograms were taken and cephalometric analysis synthesized as class II skeletal base with orthognathic maxilla and retrognathic mandible, average growth pattern, reduced lower facial height with proclined upper and lower incisors (as in Fig:4). As the patient is in growing age, special investigation of hand wrist radiograph was taken and showed the equal width of epiphysis in diaphysis i.e., stage 3. (shown in Fig:5)

### **TREATMENT OBJECTIVES:**

#### **To correct:**

The class II skeletal base.

The proclination of upper and lower anterior.

To derotate 35 and 45

#### **To attain:**

Ideal overjet and overbite.

Class I molar relation on both sides.

Class I canine relation.

Ideal soft tissue profile.

### **TREATMENT PLAN:**

As the patient is in growing stage two phase treatment was planned. Phase I with bonded pendulum appliance which helps in distalization and creates space for the correction of molar relation. Phase II with pre-adjusted edgewise appliance.

#### **PHASE I TREATMENT:**

Treatment proceeded with the bilateral distalization of the upper first molars with the aid of pendulum appliance. The appliance is activated to achieve the class I molar relation.

#### **PHASE II TREATMENT:**

After achieving the class, I molar relation the upper and lower arches were coordinated with the prescription of MBT consisting of 0.022 slot with anchorage from Nance palatal

button. Treatment consisted of 12 visits over a period of 12 months. After the co-ordination of the arches removable retainers of upper Begg retainer and lower fixed lingual retainer given for retention.

### TREATMENT RESULTS:

Cephalometric values of pre and post treatment reveals improvement in the facial profile. The upper incisors were retroclined by  $3^{\circ}$  from  $33^{\circ}$  to  $30^{\circ}$ . Correction of molar relationship resulted from distalization of first molar by 4mm and maxillary incisors retracted by 3mm. No change in the position of the mandibular molars and the incisors are retracted by 2mm.

### DICUSSION:

Molar distalization is one of the routinely used treatment modality for gaining space to correct crowding, proclination, class II molar relation.<sup>7</sup> The presented case here has undergone two phase orthodontic treatment. The favorable results obtained through Hilgers pendulum appliance are desired position of the upper first molars which creates space for retraction of the upper incisors and subsequent soft tissue changes thus enhancing the facial profile. The major advantage of the appliance is inexpensive, easy to fabricate and activate, does not require patient cooperation. Improper activation results in unwanted rotation and torqueing of maxillary molars<sup>8</sup>. For fabrication of the appliance the upper first premolars and first molars are banded. Lingual sheaths are welded to the bands of the molar to insert the end (as in Fig:6). As per Hilgers criteria, the appliance is pre-activated by bending the springs to  $90^{\circ}$  and on insertion it loses its one third of bend and activated to  $60^{\circ}$ . On activation the molars are distalized at the rate of 1 mm per month<sup>9</sup> for a period of 6 months. The ends are inserted into the lingual sheath and secured by tying using elastics or ligature

wire. The appliance is activated at equal intervals to achieve the desired result (Fig: 7&8)

The indications<sup>11</sup> of pendulum appliance are:

- First phase of orthodontic treatment for unilateral or bilateral distalization of maxillary first molar teeth for correction of Class II molar relationship in non-compliant patients.
- Space regaining in cases of mesial drift of upper first molars due to early loss of primary molars;
- Non-extraction treatment of mild-to-moderate crowding.

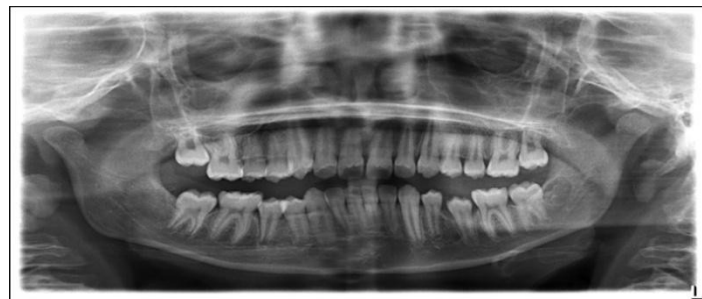
On comparing the pre and post treatment cephalometric values (in Table:1) The maxillary upper incisors are retracted by 3mm and the maxillary molars are distalised by 4mm. The treatment consisted of 6 visits over a period of 6 months and each month the appliance is activated to gain 1mm of space. Distalisation of 4mm achieved in 4 months to compensate for the relapse, further distalisation of 2mm done. Later, the treatment is proceeded with second phase pre- adjusted edgewise appliance of MBT prescription with 0.022 slot (in Fig :9). Aligning and levelling started with 0.016" Niti (as in Fig:10) and progressed till 0.017" \* 0.025" SS. Posts were placed and retraction proceeded by placing 10mm closed coil Niti spring in upper arch (as in Fig 11). 0.017" \* 0.025" SS with curve of spee is given in the lower arch. class II elastics given to achieve class I molar relation. Settling done using 0.019"\*0.025" SS. Finishing and detailing proceeded with 0.014" SS. All the treatment objectives were met and retention appliance consisting of upper Begg retainer and lower fixed lingual retainer given.



**Fig1: Extra Oral Photograph**



**Fig 2: Intra Oral photograph**



**Fig 3: Pre - operative OPG**



**Fig 4: Lateral cephalogram**



**Fig 5: Hand wrist radiograph**



**Fig 6: Pendulum appliance on insertion**



**Fig 7: 2 Months post distalization**



**Fig 8: 4 Months post distalization**



**Fig 9: Post Distalization bonding**



**Fig10: Levelling and aligning**

**Fig 11: Retraction using 10mm of closed coil NiTi spring**



**Fig 12: Post treatment photographs**



**Fig 13: Post operative lateral cephalogram**

**CEPHALOMETRIC VALUES:****Table 1:**

Variable	Standard	Pre-Treatment	Post-Treatment
Sagittal skeletal relationship			
SNA(°)	82	83	80
SNB(°)	80	79	79
SND(°)	76	75	75
ANB(°)	2	4	2
Dental base relationship			
Upper incisor to NA(°/mm)	22/4	33/6	30/4
Lower incisor to NB(°/mm)	25/4	34/6	34/4
Upper incisor to SN plane(°)	102	114	101
Lower incisor to mandibular plane angle(°)	90	94	94
Dental relationship			
Inter incisal angle(°)	131	107	107
Vertical skeletal relationship			
SN plane- Mandibular plane(°)	32.5	35	35
Facial height index (PFH/AFH %)	66/110= 63		63
Soft tissues			
Upper lip thickness(mm)	15	15	15
Total chin thickness	10-12	10	10



**REFERENCES:**

1. Marin MG. Distalización de molares. Diferentes métodos. Rev Cubana Orthod. 2001;16 (2):1027.
2. Belussi U. Destilizzattone molare Belussi. Boll Inform Ortod (Leone).1997;(56):21-4.
3. Bellincioni PL. Un dispositivo palatale per la distolizzazione. Ortodontiche Leone 1997;(56):48-51.
4. Fortini A, Lupoli M, Parri M, The First Class Appliance for rapid molar distalization. J ClinOrthod. 1999; 33 (6):322-8.
5. Byloff FK, Darendeliler MA. Distal molar movement using a pendulum appliance: Part 1. Angle Orthod. 1997;67(4):249-60.
6. Graber, Vanarsdall, and Vig. Orthodontics: Current principles and techniques, Elsevier,2009, ISBN-10: 8131216799.
7. Keim RG, Berkman C. Intra-arch maxillary molar distalization appliances for class II correction. J ClinOrthod. 2004;38(9):505-11.
8. Hilgers JJ. The pendulum appliances for class II non-compliance therapy. J ClinOrthod. 1992;26(11):706-1
9. Brock RHM. Pendulum appliance. FunctOrthod. 1994;14:4-10.
10. Ingela Karlsson and Lars Bondemark (2006) Intraoral Maxillary Molar Distalization. The Angle Orthodontist: November 2006, Vol. 76, No. 6, pp. 923-929.
11. Sujatha Paranna, Prakashchandra Shetty, Latha Anandkrishna, Anuradha Rawat, Distalization of maxillary first permanent molar by pendulum appliance in mixed dentition period, IJCPD, July-Sept 2017, 10(3), 299-301.