



Pendulum as unilateral distalizer: A Case Report

¹ Dr. Aameer Parkar, ² Dr. Chetan Patil, ³ Dr. Smarika Jain, ⁴ Dr. Vivekanand Panzade

¹ Assistant Professor, ² Professor And Head Of Department, ³ Consultant Orthodontist,

⁴ Post Graduate student

^{1,2,4} Department Of Orthodontics, Yogita Dental College And Hospital, Khed, Maharashtra, India

⁴ BBC medical, Mahaveer Marg, Bazar Peth, Srivardhan, Raigad, Maharashtra.

***Corresponding Author:**

Dr. Aameer Parkar

Department Of Orthodontics, Yogita Dental College And Hospital, Khed, Maharashtra, India

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract:

Adult patients with class II malocclusion can be treated routinely by extraction therapy. In the recent decades there was increasing popularity towards non-extraction treatment. Distalization of maxillary molars is one of the prime treatment modality to correct mild to moderate class II malocclusion cases with esthetically acceptable profile. A 19 year old post pubertal male patient came with the chief complaint of irregularly placed upper and lower front teeth. On examination the patient presented with a straight facial profile with potentially competent lips. On clinical and radiographic examination the patient was diagnosed as Angle's Class II Subdivision malocclusion with proclined maxillary anterior teeth with an overjet of 2 mm and overbite of 2 mm and class I skeletal base with horizontal growth pattern. Treatment was started with non-extraction treatment plan. Unilateral distalization of molar on right side was planned using pendulum appliance and finishing the case in class I molar and canine relation with optimal overjet and overbite. As 5.0 mm of maxillary molars were distalized on right side, class I molar relation were achieved within span of four months without altering the patient's existing profile.

Keywords: Nil

Introduction:

Class II malocclusion is one of the most frequent problems in orthodontics, and distalization is considered one of the conservative ways to treat such cases. Nonextraction treatment of class II malocclusion has become very popular in the last decade.¹

Distalization is a conservative method that is utilized in orthodontics to gain space by moving posterior teeth distally. It may be combined with other space gaining strategies, such as expansion, or can be used alone. Many methods have been used for distalization. These methods differ significantly in their place, whether to be extraoral or intraoral, site

of action in upper and/or lower arch, and cooperation needed by the patient if it is removable or fixed.¹

Indication or contraindication for molar distalization is given by the patient's characteristics and the degree of movement intensity that needs to be performed. It is important to bear in mind that due to its own characteristics, mouth opening is performed on the condylar axis, so that if we need to distalize one or several molars we must consider the following effects:

- Distalization produces a downwards and backwards mandibular rotation, in a clockwise direction.

- It increases facial convexity angle.
- It increases anterior facial height, particularly the lower third.
- Distalization increases the mandibular plane angle with respect to the base skull.²

Indications for performing unilateral or bilateral molar distalization are very specific:

- Class I with crowding and slight or non-severe protrusion.
- Dental Class II caused by mesialization of the upper molar due to loss of space either by early loss of the temporary second molar or loss of anchorage during some phase of orthodontic treatment.
- When deciding on the extraction of the second permanent molar either by caries or by another cause, with anterior crowding and/or ectopic canine.²

The orthodontist depends on the use of traditionally used devices for molar distalization. This is the reason why the use of intraoral devices is preferred since they are not dependent on the patient's cooperation. Most commonly used is the Hilgers Pendulum³ and its variants.⁴ A Pendulum spring is deemed to be effective in cases with unilateral molar distalisation as well as it can regain space on one side without putting undue strain on other parts of the upper arch.³ The objective of this appliance is to move the teeth bodily minimizing the risk of root resorption.

Case Report:

A 19-year-old male presented to the department of orthodontics and dentofacial orthopaedics with the chief complaint of irregularly placed upper front teeth and desired correction.

On clinical extraoral evaluation, he had a convex profile with posterior divergence, shallow mentolabial sulcus, acute nasolabial angle, and competent lips with 0 mm interlabial gap. On smile evaluation smile arc was nonconsonant. There were no abnormalities in the temporomandibular joint and muscles of mastication on functional examination(fig1.1-1.3).

On intraoral evaluation, a full set of teeth except maxillary third molars were erupted. U shaped symmetrical maxillary and mandibular arches were observed. Class II molar and canine relation on the right side whereas class I molar and canine relation on the left side was seen. The oral hygiene status was satisfactory(fig1.4-1.8).

On cephalometric evaluation, SNA was 85 and SNB 84 suggestive of prognathic maxilla and mandible with class I skeletal base. Go- Gn to Sn was 18 indicating a horizontal growth pattern. The U1-NA distance of 6 mm at an angle of 30 and L1-NB distance is 5 mm at an angle of 30 revealed proclination of maxillary and mandibular incisors (fig1.9-1.10)and (table 1).

Diagnosis and treatment objective:

Skeletal class I base with Angles class II subdivision, proclined upper and lower anterior with horizontal growth pattern and acute nasolabial angle

The treatment objectives included:

- Correct proclination of upper anterior
- Correction of dental midline
- Correction of class II molar on right side
- Correction of buccally placed canine
- Maintaining class I canine and class I molar relationship on both sides
- To achieve good esthetic harmony and functional occlusion and structural balance

Treatment plan:

A non-extraction treatment plan with unilateral distalization of molar on right was planned using the pendulum appliance to finish the case in class I molar and canine relation with optimum overjet and overbite.

Treatment phase:

Treatment was started in fixed mechanotherapy in MBT prescription (0.022”X0.028” slot) starting from 0.014” round NiTi followed by 0.016” NiTi, 0.017”X0.025” SS in Upper and lower arch for levelling and alignment.

The pendulum appliance was given with 16 for distalization using a force of 200 to 250 grams. In the case hereby presented the pendulum was used for

four months in order to achieve overcorrection of the molar class. Upon appliance removal a class I molar and canine relationship and centered dental midlines were achieved (fig2.1-2.5).

Space closure and dental midline correction were achieved with closing loops. Finally, the ideal arch wires were placed to perform second and third order movements to provide a correct occlusion. The final treatment time was 3 years and 8 months (fig3.1-3.10).

After proper settling (fig4.1-4.3), debonding was done and fixed retainer was given from canine to canine (fig5.1-5.8)

At the end of treatment, Hawley retainers were placed on the upper and lower arches.

Treatment results:

Within four months the molar had distalised achieving a class I relationship. Spaces of 5 mm were produced in the right quadrants between the maxillary first molar and second bicuspid almost entirely by translation with some amount of anchor loss.

Canine was brought into the arch and class-I canine relation was established on both sides was uprighted. Upper lip prominence was decreased. Post orthopantomogram showed there was no significant root resorption (fig5.8-5.10) and (table1).

Discussion:

Byloff and Darendeliler⁵ reported that the pendulum performs a movement of 1.02 mm (+ 0.68 mm) per month with an initial strength of 200 to 250 g with a

References:

1. Yahya A. Alogaibi, Ahmad A. Al-Fraid, Manar K. Alhajrasi, Saleh S. Alkhatami, Abdulkarim Hatrom, Ahmed R. Afify, "Distalization in Orthodontics: A Review and Case Series", Case Reports in Dentistry.2022;15.
2. Ismael Villa Díaz, Lizie Díaz Yáñez, Mario Katagiri Katagiri, Use of pendulum for molar distalization: Case report, Revista Mexicana de Ortodoncia, Volume 4, Issue 1, 2016.

preactivation bends of 45 degrees^{3,6} proving that it is a simple effective appliance.

The prime advantages being the distalisation occurred with the requirement of minimal patient cooperation and single activation gave successful results.^{3,7}

The probable disadvantages of this method include the proclination of anterior teeth,^{8,9} need for patient's compliance for accurate oral hygiene, possibility of impingement of appliance components to palatal tissues. Anchorage loss is observed through premolar mesial movement and incisor mesial crown and tipping movements.¹⁰

Conclusion:

Molar distalization is one of the fundamental approaches for nonextraction therapy, especially in class II malocclusion cases. Many methods have been utilized to achieve molar distalization, including extraoral appliances and intraoral appliances, either removable or fixed.

The pendulum appliance being the most traditional was effective in achieving the objectives of this case without any ill effects due to the methodology. An appropriate bodily movement of a single molar was accomplished.

1. Chung K.R., Park Y.G and Ko Su Jin (2000); "C-space regainer for molar distalization". J. Clin. Orthod; 34: 32-39.

3. Hilgers JJ. The pendulum appliance for Class II non-compliance therapy. J Clin Orthod. 1992 Nov;26(11):706-14. PMID: 1298751.
4. Sukhpal Kaur, Sanjeev Soni, Vikas Garg, Maninderdeep Kaur, Riponjot Singh. (2018). Pendulum appliance and its modifications - A review. Int. J. Curr. Res. Med. Sci. 4(3): 1-9.
5. Byloff FK, Darendeliler MA. Distal molar movement using a pendulum appliance: Part 1. Angle Orthod. 1997; 67(4):249-260.

6. Khanna B, Sharma V. An in vitro evaluation of biomechanical characteristics of the “Pendulum” appliance. *J Indian Orthod Soc* 2018;52:29-34.
7. Joseph AA, Butchart CJ. An evaluation of the pendulum distalizing appliance. *Semin Orthod* 2000;6:129-35.
8. Ghosh, J.; Nanda, RS. Evaluation of an intraoral maxillary molar distalization technique, *Am J OrthodDentofacial Orthop.*1996;110:639–646.
9. Giovannoni D, Mezio M, Caterini L, Dari M, Pacella E. Pendulum appliance: skeletal and dentoalveolar effects. A systematic review.. *WebmedCentral ORTHODONTICS* 2017;8(11):WMC005351
10. Antonarakis, G. S., & Kiliaridis, S. (2008). Maxillary Molar Distalization with Noncompliance Intramaxillary Appliances in Class II Malocclusion. *The Angle Orthodontist*, 78(6), 1133–1140.

Pre Treatment Extraoral Photographs:



Pre Treatment Intraoral Photographs:

1.4



1.5

1.6



1.7

1.8

Pre Treatment Orthopantomogram (Fig 1.9)



Pre-Treatment Lateral Cephalogram (Fig 1.10)



Midtreatment Photographs : Distalization With Pendulum :- Fig

2.1

2.2



2.3

2.4



Mid Treatment Orthopantomogram (Fig 2.5)



During Treatment Extraoral Photograph (Fig 3.1-3.3)



Intra Oral Photographs (Fig 3.4)



3.5

3.6



3.7

3.8

During Treatment Orthopantomogram (Fig 3.9)



During Treatment Lateral Cephalogram (Fig 3.10)



Settling Phase (Fig 4.1)

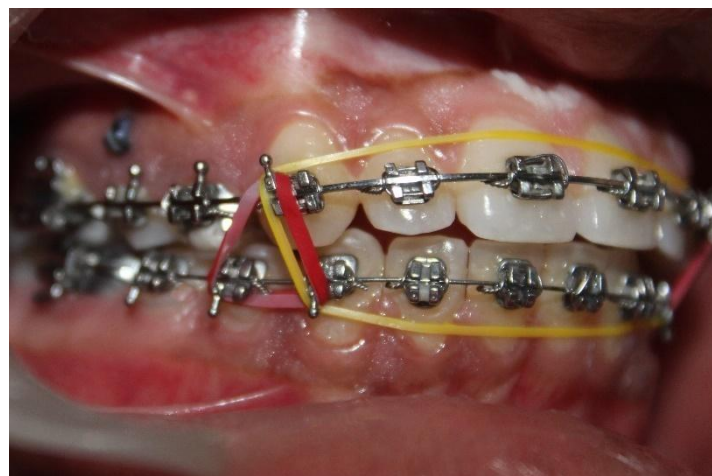


Fig 4.2



Fig 4.3



Extraoral Post Treatment Photographs

5.1

5.2

5.3



Intraoral Post Treatment Photographs (Fig 5.4)



5.5

5.6



5.7

5.8

Post Treatment Orthopantomogram (Fig 5.9)



Post Treatment Lateral Cephalogram (Fig 5.10)

