

Non-Extraction Orthodontic Treatment of Impacted Maxillary Central Incisor with Molar Distalization

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ABSTRACT

Several doctors now choose intraoral distalizing systems since they reduce dependency on the patient and are under the orthodontist's control due to issues with patient compliance. These intraoral devices are schematically composed of an anchorage unit and an active unit, which often consists of premolars or deciduous molars and an acrylic Nance button. Various force-generating devices for molar distalization have been proposed, including repelling magnets, coil springs on continuous archwire, superelastic nickel-titanium archwire, coil spring on a sectional archwire (Jones Jig, distal jet, and Keles slider), springs in beta titanium alloy (pendulum with distal screw, K-loop, intraoral bodily molar distalizer) and vestibular screws combined with palatal nickel-titanium coil spring (first class) appliances. For molar distalization, the pendulum is a noncompliance gadget that is frequently employed. According to Ghosh and Nanda's research, the pendulum appliance results in an average molar distalization of 3.4–5.7 mm. In orthodontics, molar distalization is a more prevalent and non-compliant approach of malocclusion repair. It is frequently utilised to make room in the maxillary dental arch and to fix the class II connection in both the permanent and deciduous dentition. This is especially desired in cases when the difference between the arches is less than 8 mm and there is little dental protrusion. A case report of 11 years female reported in department with chief complaint of space in front teeth and unpleasant smile. Patient was diagnosed with skeletal II and dentoalveolar class I with impacted right central incisor with arch length discrepancy of – 5mm in maxillary arch. Molar distalization was planned using pendulum appliance and molars were distalized 5mm in right and 4mm in left side of maxillary arch. Space created by distalization of molars will be utilize for alignment of impacted central incisor after surgical exposure followed by orthodontics traction.

Keywords: Distalization maxillary molar, Pendulum appliance; Impacted central Incisor; Surgical exposure.

INTRODUCTION

To extract or not to extract is one of the debates surrounding orthodontic treatment. In cases of extreme crowding, protrusion, and arch discrepancy, extraction is done to create room for the remaining teeth to be aligned. The need for extraction has decreased in situations of mild to moderate arch discrepancy due to advances in mechanotherapy and modifications in treatment concepts. Modern concepts are as conservative as they can be, for instance, rarely extracting data. In the past ten years, maxillary molar distalization non-extraction treatment for class II patients has gained popularity. The patient must cooperate in order to use traditional molar distalization devices like additional oral traction, Cetlin detachable plates, and Wilson distalization arches.

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For molar distalization, the pendulum is a noncompliance gadget that is frequently employed. According to Ghosh and Nanda's research, the pendulum appliance results in an average molar distalization of 3.4–5.7 mm. In orthodontics, molar distalization is a more prevalent and non-compliant approach of malocclusion repair. It is frequently utilised to make room in the maxillary dental arch and to fix the class II connection in both the permanent and deciduous dentition. This is especially desired in cases when the difference between the arches is less than 8 mm and there is little dental protrusion.

Another sign of molar distalization is an end-on or full class II molar relationship caused by maxillary protrusion, as well as impacted, unerupted, or high labially erupted maxillary cuspids or an ectopic eruption of either the first or second bicuspid.

In order to accommodate an impacted tooth without having to remove the bicuspid, molar to distalization was also carried out. Pendulum appliance was created by Dr. James J Hilgers in 1992, is an appliance that uses a big White acrylic button in the palate for anchorage, together with 0.032 "TMA spring that produces light continuous force to upper first teeth. Moreover, the spring can be rotated and expanded to move the maxillary first molars. The following instance is being treated with non-extraction orthodontics using a pendulum appliance.

CASE REPORT

A case report of 11 yrs female reported in department of orthodontics with chief complaint of space in front teeth and unpleasant smile. Natal and prenatal history reveals nothing significant. Mesomorph body type with normal posture and gait. She presented with a mesoprosopic facial type with convex profile, competent lips. (Figure 1, 2A-B). She is in permanent dentition with presence of all teeth except impacted right central incisor and second third molars yet to erupt. Molars, canine are in angle's class I relation with overjet and overbite of 2 mm. Mild

retroclination of both upper and lower incisors with skeletal class II with ABN angle of 5 degree and average growth pattern having mandibular plane and Y axis of 27 degree and 61 degree. Treatment plan is carried out by distalization of molar with pendulum appliance to create a space for impacted right central incisor along with fixed mechanotherapy for alignment. In this case 5mm in right side and 4mm in left side molars distalization was achieved in 6 months. Cephalometric evaluation done after the distalization of molars shows approximately 3mm of bodily movement of maxillary molars with slight tipping due to the reciprocal anchorage some extent of mesial movement of premolars with proclination of left central incisor from 23 degree to 30 degree and linear distance from 0 to 5mm. Upper incisor to SN plane angle also change from 115 degree to 120 degree and slight increase in over jet and mild change in mandibular plane angle. There is no change in patient profile till now. Intraoral and extra-oral photograph along with radiograph shown in (Figure 3 to Figure 6).

After molar distalization, premolar canine and lateral incisors were retract to create a space for impacted central incisor by maintaining the midline. Impacted central incisors position was high up in the alveolar bone with a thick layer of soft tissue covering the crown in a approximately vertical direction .It was decided to do surgical exposure of impacted tooth and then bond a bracket on labial surface of the tooth and bring down normal position. (Figure 7 to 9)



Figure 1: Extra oral photograph.



Figure 2A: Intra-oral photograph



Figure 2B: Intra-oral photograph.



Figure 3: Orthodontic appliances



Figure 4: Orthodontic appliance

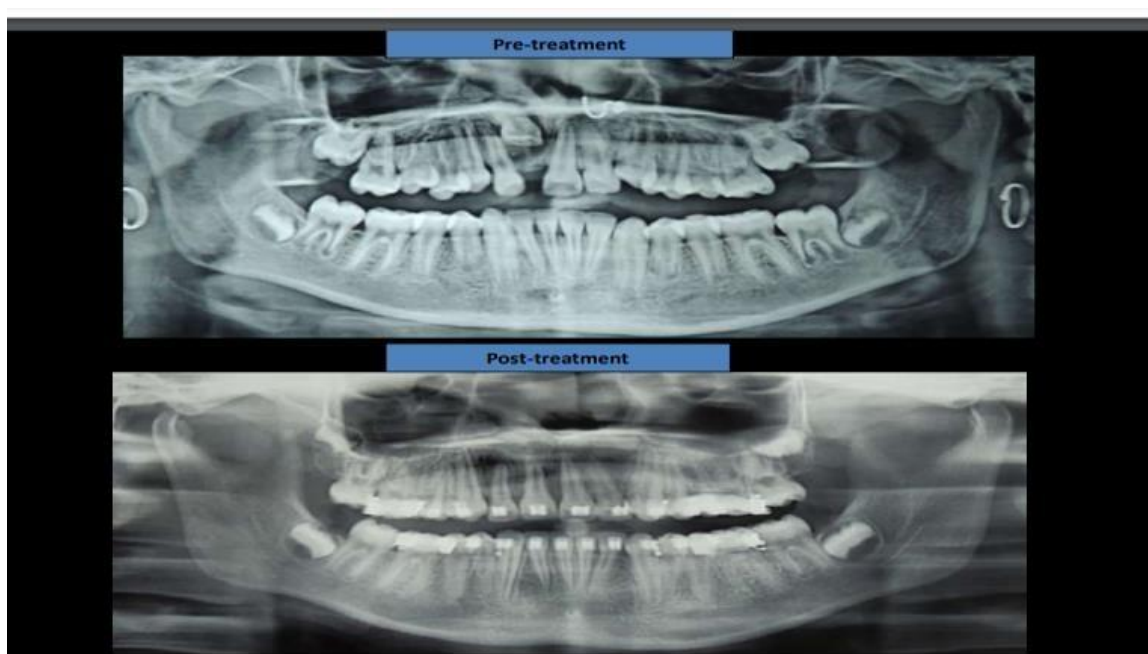


Figure 5: Pre-treatment and post treatment OPG.

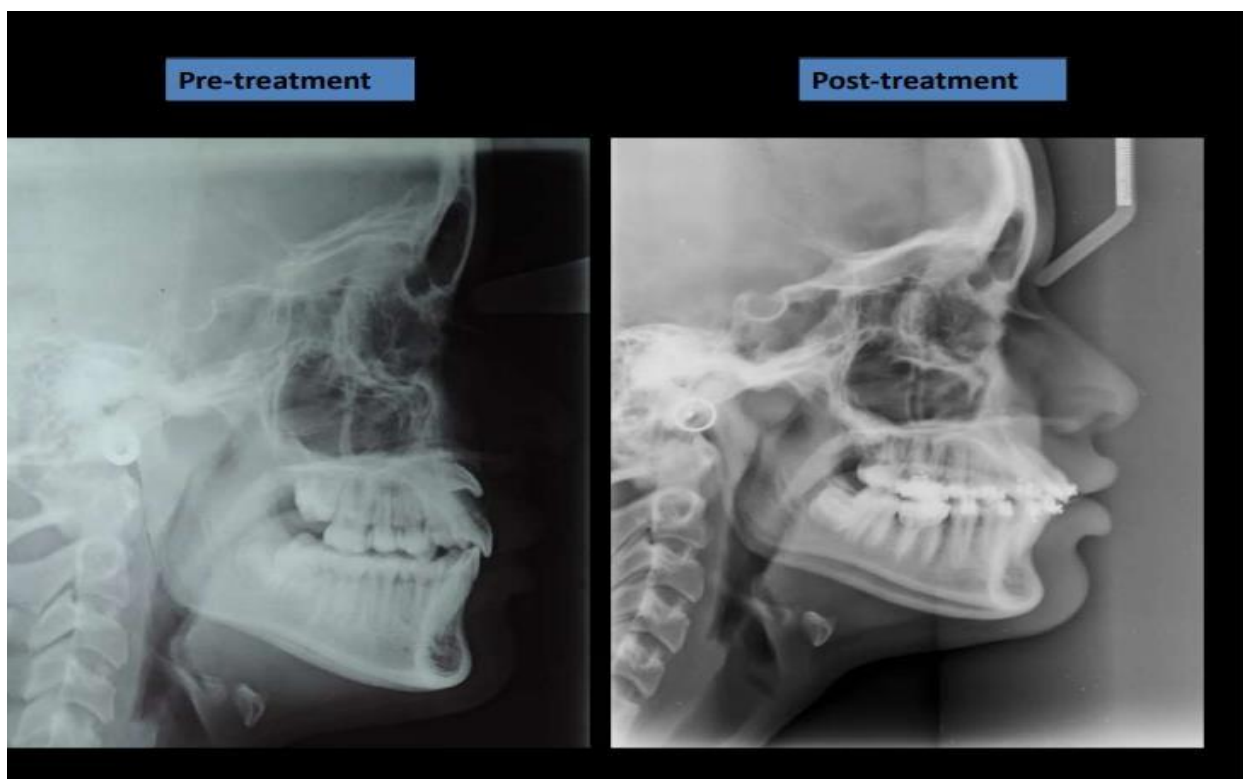


Figure 6: Pre treatment cephalogram and post treatment cephalogram

Parameter	Mean	Pre treatment	Post Treatment
Upper CI to SN plane	102°	115°	120°
Upper CI to A-Pog	+5 to -1 mm(2.7 mm)	2mm	7mm
Interincisal angle	130°-150°(134°)	127°	118°
Upper CI to NA (linear)	04mm	0mm	5mm
Upper CI to NA (angular)	22°	23°	30°
Upper incisor Protrusion	4-6 mm	0mm	7mm

Figure 7: Maxillary and Mandibular Incisor Position

Parameter	Mean	Pre treatment	Post Treatment
Lower CI to NB (linear)	04 mm	3mm	4mm
Lower CI to NB (angular)	25°	23°	27°
IMPA (Tweed)	76°-99° (90° norm)	89°	98°
Lower incisors Protrusion	1-3 mm	0mm	3mm

Figure 8: Maxillary and Mandibular Incisor Position



Figure 9: Pre orthodontic treatment and post orthodontic treatment

DISCUSSION

Orthodontists have long looked for ways to treat class II malocclusions without putting undue strain on the lower arch or requiring rigid patient compliance. Noncompliance therapies, in all their manifestations, have risen to prominence in the 1990s. Maxillary molars can frequently be shifted distally using intraoral tools with little to no patient involvement. The literature lists a variety of tools that can be used for molar distalization, including microimplants, the Pendulum, Jones-Jig appliances, Distal Jet, Jasper Jumper, and Distal Jet. 8 Pendulum is a hybrid appliance that anchors to the palate with a sizable nance acrylic button. The fundamental benefit of this appliance is the conservation of anchoring together with the light continuous force it provides on the maxillary first molar with a 0.032" TMA spring without disturbing the palatal button. This appliance's benefits were appearance, functionality, a low requirement for patient cooperation, and less chairside time for placement and reactivations.

The result obtained in this case report suggest that the pendulum is easier to fit and welded to bands in the premolars. Byloff and Darendelilero reported that the pendulum performs a movement of 1.02 mm(+0.68mm) per month with an initial strength of 200g to 250 g proving that it is a more effective apparatus in comparison with that was reported by other authors who claims that the use of cervical traction with a force of 250g of each side distalizes molars in 9 to 12 months and using a force of 680g to 770g on each side in 6 months. In this case distalization occurs within 9 months using force of about 250g with 6 weeks activation.

The effects of the pendulum appliance on molar distalization were investigated by Chris Butchart⁹ and Joseph.

When the vertical dimension and anchorage loss of the incisor and molar teeth were measured, it was discovered that distalization happened relatively quickly and that the class I molar connection was established in an average of three to four months. In the treatment of class II malocclusion, Caprioglio et al.¹⁰ compared the dentoalveolar and skeletal effects of two distinct molar intraoral distalization appliances, the pendulum and fast-back, both of which were followed by fixed appliances. The pendulum subjects outperformed the fast-back subjects in terms of distal molar movement and anchorage loss at the premolars and maxillary incisors.

CONCLUSION

The pendulum is an effective method for treating mild to moderate class II malocclusion through distalization of upper molars thus avoiding premolar extractions. In this case it was noted that molar distalization occurred in a bodily manner but there was also a slight proclination of the anterior teeth which was corrected during closure of the remaining spaces with which all the objectives were accomplished.

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