

## ORIGINAL ARTICLE

### Efficacy of Pendulum Appliance in Distal Change of Molars- A Clinical Study

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#### ABSTRACT:

**Background:** Treatment of Class II cases usually requires distal movement of maxillary molars to achieve Class I molar and canine relationship. The pendulum device is one of the most commonly used conventional distalizing devices. The present study was conducted to analyze the efficacy of pendulum appliance in causing molar distalization. **Materials & Methods:** The present study was conducted in the department of orthodontics. It comprised of 30 cases of class II malocclusion. In all patients, pre treatment lateral cephalogram and post treatment lateral cephalogram was taken from extraoral radiographic unit. Improvement in molar distalization was assessed using various angle measurement performed on lateral cephalogram. **Results:** Out of 30 patients, males were 10 and females were 20. The difference was non-significant (P= 0.5). U6-PTV: Upper molar to pterygoid vertical plane pre-treatment measurement was  $22.7 \pm 3.2$  and post treatment measurement was  $20.4 \pm 2.6$ . U6-FH: Upper first molar to Frankfort horizontal plane was  $44.5 \pm 3.8$  and  $44.8 \pm 3.9$ , pre-treatment and post treatment respectively. The difference was significant (P< 0.05). **Conclusion:** Pendulum appliance is effective in distalizing the maxillary molars. Greater molar distal tipping.

**Key words:** Cephalogram, Molars, Pendulum.

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#### INTRODUCTION

Treatment of Class II cases usually requires distal movement of maxillary molars to achieve Class I molar and canine relationship. In this context, sagittal expansion of the dental arch through distalization of teeth is indicated in patients with a neutro-basal jaw base relationship if the extraction of permanent teeth is to be avoided.<sup>1</sup> All appliances traditionally used for the upper molar distalization have been compliance dependent. Mainly patient concern was about the esthetics the wear time, and success of the appliance was completely dependent on patient cooperation. Compliance problems frequently occurred in the clinical application of these appliances. Hence, an increasing need was recognized in modern orthodontics for the courses of treatment and devices that do not depend on patient cooperation.<sup>2</sup>

The pendulum device is one of the most commonly used conventional distalizing devices. However, despite its efficacy in molar distalization, premolar mesial movement and anterior anchorage loss continue to represent an unpleasant problem and require additional treatment time for correction during fixed appliance therapy.<sup>3</sup>

A recent meta-analysis evaluated the efficacy of conventional versus bone-anchored anchorage, showing that both systems were effective for molar distalization but that there were differences in anchorage loss. Conventional and indirect skeletal anchorage showed a certain amount of anchorage loss at the premolars and incisors, whereas these

side effects were not seen with direct skeletal anchorage.<sup>4</sup> The present study was conducted to analyze the efficacy of pendulum appliance in causing molar distalization.

#### MATERIALS & METHODS

The present study was conducted in the department of Orthodontics & Dentofacial Orthopaedics. It comprised of 30 cases of Class II malocclusion. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study. General information such as name, age, gender etc. was recorded. In all patients, pre treatment lateral cephalogram and post treatment lateral cephalogram was taken from extraoral radiographic unit. Improvement in molar distalization was assessed using various angle measurement performed on lateral cephalogram. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

#### RESULTS

**Table I Distribution of patients**

Total- 56		
Males	Females	P value
10	20	0.5

Table I shows that out of 30 patients, males were 10 and females were 20. The difference was non-significant (P=0.5).

**Table II Comparison of measurements in pre- treatment and post treatment**

Measurements	Pre-treatment	Post treatment	P value
U6-PTV: Upper molar to pterygoid vertical plane	22.7± 3.2	20.4± 2.6	0.01
U6-FH: Upper first molar to Frankfort horizontal plane	44.5± 3.8	44.8± 3.9	0.05

Table I shows that U6-PTV: Upper molar to pterygoid vertical plane pre- treatment measurement was 22.7± 3.2 and post treatment measurement was 20.4± 2.6. U6-FH: Upper first molar to Frankfort horizontal plane was 44.5± 3.8 and 44.8± 3.9, pre- treatment and post treatment respectively. The difference was significant (P< 0.05).

## DISCUSSION

Various modifications of distalizing appliances used in combination with paramedianminiscrews have been developed in recent years. Many authors have described the effects of a bone-anchored pendulum appliance (BAPA), a modified pendulum in which the palatal arms on the premolar are eliminated.<sup>5</sup> The distal jet appliance was modified into a skeletonized distal Jet appliance, in which the Nance button was eliminated but the arms on the premolar were retained; it was later modified into the distal screw appliance in which the metallic palatal arms on the premolar were eliminated. Similar devices were the skeletal frog, a modified frog appliance without arms on the premolar and without the acrylic palatal button; the intraoral miniscrew implant-supported distalization system (MISDS).<sup>6</sup>

In present study, out of 30 patients, males were 10 and females were 20. We observed that U6-PTV: Upper molar to pterygoid vertical plane pre- treatment measurement was 22.7± 3.2 and post treatment measurement was 20.4± 2.6. U6-FH: Upper first molar to Frankfort horizontal plane was 44.5± 3.8 and 44.8± 3.9, pre- treatment and post treatment respectively. This is similar to Escobar et al.<sup>7</sup>

In a study by Gupta et al<sup>8</sup>, 43 patients with Class II malocclusion were retrospectively selected for the study. Twenty-four patients were treated with the PA, and 19 patients were treated with the DS. The mean distalization time was 7 months for the PA group and 9 months for the DS group. Lateral cephalograms were obtained at T1, before treatment, and at T2, the end of distalization.. PA and DS were equally effective in distalizing maxillary molars between T1 and T2; however, the maxillary first molars showed less distal tipping in the DS group than in the PA group (3.2° vs. 9.0°, respectively).

Moreover, significant premolar anchorage loss (2.7 mm) and incisor proclination (5.0°) were noted in the PA group, whereas premolar distal movement (1.9 mm) and no significant changes at the incisor (0.1°) were observed in the DS group. No significant sagittal or vertical skeletal changes were detected between the two groups during the distalization phase.

In a study by Sarset al<sup>9</sup>, the study group comprised of 20 patients (mean age 13 ± 2 years) who had skeletal Class I and Angle's Class II molar relation. Modified pendulum appliance was given to distalize maxillary first molar and to decrease the anchorage loss both first and second premolars were banded as a single unit by soldering a 19-gauge stainless steel wire. Then both skeletal and dental changes were measured on the pretreatment and post treatment lateral cephalograms. The maxillary molar was distalized, and a Class I molar relation was achieved in 3 ± 2 months. Maxillary first molar distalized by 4.48 mm in the region of dental crown by tipping distally an average of 8.5°. Both the premolars tipped distally significantly. Thus, by this modification, the anchor loss was minimized.

## CONCLUSION

Pendulum appliance is effective in distalizing the maxillary molars. Greater molar distal tipping.

## REFERENCES

- Jing KS, Lam EW, Faulkner MG, Heo G, Major PW. Vertical bone volume in the paramedian palate of adolescents: a computed tomography study. *Am J OrthodDentofacialOrthop* 2007;132:783-8.
- Cozzani M, Gracco A, Lombardo L, Siciliani G. Why, when and how distalizing maxillary molars. *OrtognotadItal* 2007;14:21-7.
- Poggio PM, Incorvati C, Velo S, Carano A. "Safe zones": a guide for miniscrew positioning in the maxillary and mandibular arch. *Angle Orthod* 2006; 76:191-7.
- Grec RH, Janson G, Branco NC, Moura-Grec PG, Patel MP, CastanhaHenriques JF. Intraoral distalizer effects with conventional and skeletal anchorage: a meta-analysis. *Am J OrthodDentofacialOrthop* 2013;143:602-15.
- Kircelli BH, Pektaş ZO, Kircelli C. Maxillary molar distalization with a bone-anchored pendulum appliance. *Angle Orthod* 2006;76:650-9.
- Escobar SA, Tellez PA, Moncada CA, Villegas CA, Latorre CM, Oberti G. Distalization of maxillary molars with the bone-supported pendulum: a clinical study. *Am J OrthodDentofacialOrthop* 2007; 131:545-9.
- Sar C, Kaya B, Ozsoy O, Özçirpici AA. Comparison of two implant-supported molar distalization systems. *Angle Orthod* 2013;83:460-7.
- Kinzingler GS, Gül den N, Yildizhan F, Diedrich PR. Efficiency of a skeletonized distal jet appliance supported by miniscrew anchorage for noncompliance maxillary molar distalization. *Am J OrthodDentofacialOrthop* 2009;136:578-86.
- Cozzani M, Zallio F, Lombardo L, Gracco A. Efficiency of the distal screw in the distal movement of maxillary molars. *World J Orthod* 2010;11:341-5.

