

## Maxillary Molar Distalization with Distal Propeller Appliance: A Case Report

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### Abstract

Treatment of mild to moderate Class II relationships with good facial profile can be possible without extraction of bicuspids with a correct diagnosis. Distalization of upper molars may be used for obtaining a correct Class I relationship between molars and cuspids without bicuspid extractions. One among the effective noncompliance molar distalization appliance, is the Intraoral "Distal Propeller Appliance". This case report illustrates correction of Class II malocclusion in a 16 year old patient using the Distal Propeller Appliance in which molar was distalized effectively without increasing the overjet or worsening the facial profile.

**Keywords:** Molar distalization, Non-compliance, Distal propeller appliance.

### Introduction

Among different non-extraction treatment modalities for correction of Class II malocclusion, maxillary molar distalization is an important therapeutical armament in everyday orthodontic practice.<sup>(1)</sup> Class II molar relationship could be a result of early loss of an upper second deciduous molar during the mixed dentition period that would allow the mesial drift of the permanent first molars, which might block the eruption of some permanent teeth, especially the upper canines as they are the last one to erupt mesial to the molars.

Various appliances have been proposed in the literature for maxillary molar distalization, however patient compliance has become an important factor in selection of appliance. Different appliances that do not require patient compliance have been developed to drive maxillary molars distally.<sup>(2,3)</sup> However, the flexible nature of the appliances and the loose joint between distalization appliance and the attachment on molar may lead to the tipping and rotation. In order to overcome the undesirable effects of the previously designed molar distalization appliances, the rigid "Distal Propeller" appliance has been designed with the aim to distalize the molars bodily and without rotation.

### Steps for appliance fabrication

Bands were adapted to the maxillary first molars and first premolars on either side, and transferred them to the working model and an 11mm hyrax screw was adapted. The arrow marks on the hyrax screw can be kept either to the right or left side. The distal legs of the hyrax screw were soldered to the molar bands and the mesial legs of the hyrax screw were soldered to the premolar bands and also incorporated in the acrylic for the palatal anchorage.

### Case Report

A 16 year-old male patient presented to the department with chief complaint of irregular teeth. Patient had Class-II Div-1 malocclusion with End on molar relationship on both sides with moderate crowding with respect to upper and lower anteriors. Skeletally he had Class I jaw bases, overjet of 5 mm, overbite 2 mm and straight profile. (Fig. 1 and 2)



Fig. 1: Right lateral view



Fig. 2: Frontal view

Cephalometric measurements as mentioned in Table 1, revealed mild Class-II skeletal relationship with favourable growth pattern of the mandible. Non-extraction treatment was planned.

Table 1: Comparison of cephalometric findings

	Pre-treatment	Post-distalisation	Post-treatment
SNA (°)	81°	81°	81°
SNB (°)	79°	79°	79°
ANB (°)	2°	2°	2°

I-NA (°)	27°	29°	28°
I-NA (mm)	6	6.5	6
I-NB (°)	26°	26°	28°
I-NB (mm)	3	3	3
FMA (°)	24°	25°	25°
IMPA (°)	102°	102°	107°
FMIA (°)	54°	53°	48°
Wits appraisal (mm)	2.5	2.5	2.5

The “Distal Propeller” appliance was placed to move the maxillary first molars distally. (Fig. 3) The patient was advised to open the screw ¼ turn in every 5 days. The patient was recalled in every four weeks for check-up.



Fig. 3: Left lateral view

After 3 months, Class-I molar relationship on both sides was achieved, Overjet was 7mm and overbite was 2mm at end of distalization.

The appliance was removed and a Nance acrylic button was cemented on the same day. Alignment of both the arches was carried out using MBT 0.022 slot pre-adjusted edgewise appliance. (Fig. 4, 5). Total treatment duration was 12 months. Normal overjet and overbite of 2mm was achieved at the end of fixed orthodontic therapy.



Fig. 4: Maxillary occlusal view



Fig. 5: Mandibular occlusal view

The cephalometric superimposition is shown in (Fig. 6).

The superimposition shows a net distalization of maxillary molars of 4.3 mm and 4.1 mm when measured at mesial cusp and mesial apex respectively. The minimum difference between these two measurements indicates bodily dental movement with minimal distal tipping.

**Discussion**

One of the important goals of molar distalization is to obtain bodily tooth movement of the molars with minimal rotation and distal inclination. For over a decade, various innovative noncompliance intraoral molar distalization appliances have been described.<sup>(4,5,6)</sup>

In the current case, the correction of the End on molar relation with crowding in upper anteriors and alignment of ectopic canines was achieved by use of Distal propeller appliance. Correction achieved by this appliance was almost by bodily distal movement of molars. This could be due to the rigidity of the appliance and the solid joint between appliance and molar attachment. The amount of anchorage loss by this appliance was less when compared to the anchorage loss by other conventional appliances. Most of the conventional molar distalization appliances cause downward and backward rotation of the mandible. However, the effect of this appliance on the rotation of the mandible was negligible. The other advantage of this method of molar distalization is that the amount and rate of tooth movement is controlled. This appliance is also easy to fabricate and insert, and is also well tolerated by the patient.

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