

Distal movement of upper permanent molars using midpalatal mini-implant

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Editor's summary

Conventional intraoral distalizers provide effective distalization of the maxillary molars associated with their distal tipping and loss of anchorage, i.e. mesial/buccal tipping and mesial movement/protrusion of maxillary premolars and incisors. Because of that, intraoral distalizers supported by implants/temporary anchorage devices (TADs) inserted in many intraoral regions were proposed, one of them the midpalatal suture, posterior to maxillary molars. For this device, the distalization force is applied from this TAD to a transpalatal arch on the maxillary first molars by means of chain elastics, with the point of force application placed above the center of resistance of maxillary molars. The aim of the present study was to verify the biomechanical changes of maxillary molars after their distalization by means of transpalatal arch associated with TAD inserted in the posterior region of the midpalatal suture. An acrylic model was used, in which after making a groove, the acrylic teeth were fixed by wax. A 0.019 x 0.025-in stainless steel arch-wire was placed on orthodontic fixed appliance and a transpalatal arch with two hooks was cemented to the maxillary first molars. Two chain elastics from the

transpalatal arch to a TAD, inserted in the region corresponding to the midpalatal suture (posterior area), released a mean force of 300 gf. The model was immersed in water at 60 °C, for 5 minutes and six occlusal and lateral photographs were obtained before and after the immersion, to measure the tipping and rotation of the maxillary first and second molars and the quantity of the molar distalization. This experiment was performed on five models, and repeated forty times per model. Two hundred and forty photographs were obtained per model, resulting in 1200 photographs. For the evaluation of changes that occurred after the maxillary molars distalization, the paired *t* test was employed ($p < 0.05$). The results showed that the maxillary first molars moved distally 3.1 mm (right side) and 3.2 mm (left side), with distal rotation of 1° and distal tipping of 3° (right side) and 5° (left side). The maxillary second molars demonstrated greater distal rotation (3°), with distal tipping of 5°. The authors conclude that the molar distalization associated with TADs inserted in the midpalatal suture associated to a transpalatal arch did not produce anchorage loss. On the other hand, collateral effects on maxillary first and second molars were observed as distal tipping and rotation.

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