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Rate of mesial translation of mandibular molars using implant-anchored mechanics

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ABSTRACT

Retromolar dental implants served as anchorage to close first molar extraction sites in five adult patients. Rates of unidirectional space closure for mandibular second molars were assessed with periapical radiographs superimposed on anatomical landmarks and retromolar anchorage implants. Regression analysis revealed that mesial displacement of the midroot area of the leading root was less variable ($r=0.97$) than for other landmarks on the same teeth: crown ($r=0.83$), alveolar crest ($r=0.82$) or apex ($r=0.90$). When mesial root movement (uprighting) was the principal feature of the initial mechanics (4 of the 5 patients), mesial movement of the apex was about 0.60 mm/mo for the first 8 months and then decreased to about 0.34 mm/mo as the trailing (distal) root of the second molar engaged the relatively dense bone formed by the leading (mesial) root. During the last year of space closure, radiolucent foci were noted 1–2 mm ahead of the distal root. These data suggest: (1) sustained orthodontic translation is a physiological manifestation of bone modeling and remodeling throughout the adjacent alveolar process, and (2) rate of mandibular molar translation is inversely related to the apparent radiographic density of the resisting alveolar bone.

KEY WORDS: Orthodontics, Space closure, Rate of tooth movement, Implants, Anchorage, Radiographic analysis, Bone.

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