Segmental intrusion with mini-screw implant anchorage: A radiographic evaluation

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Introduction: The orthodontist’s ability to intrude and control supraeruption of multiple teeth is fundamental for effective and efficient treatment outcomes. To better understand segmental intrusion with fixed anchorage, we evaluated the effects of various forces on the amount of intrusion, root resorption, and mini-screw implant (MSI) stability. Methods: The sample included 8 mature beagle dogs, 20 to 24 months old. Intrusive forces were applied for 98 days by using a cast Vitallium appliance (Vitallium; Dentsply, York, Pa) incorporating the maxillary first, second, and third premolars as segments on each side. To accurately control the forces applied, 2 MSIs, 1 anterior and 1 posterior, were placed at the level of the first and third premolars of each segment. The sample was randomly divided into 2 groups; group 1 (n = 4) was assigned to have constant intrusive forces of 50 g anteriorly and 100 g posteriorly; the forces for group 2 (n = 4) were opposite those of group 1. Standardized periapical radiographs were taken at 14-day intervals to evaluate segmental intrusion and root resorption. Multivariate statistical procedures were used to model the treatment changes. Results: All MSIs remained stable throughout the experiment. Small but significant (P < 0.05) amounts of root resorption (0.6 mm or less) occurred at the apices, Statistically significant (P < 0.05) amounts of intrusion were obtained for the segments of group 1 (1.2 mm anterior, 1.5 mm posterior). Only the anterior aspect of the segment of group 2 was intruded significantly (0.9 mm). Conclusion: Segmental intrusion can be achieved successfully and reliably with immediately loaded MSIs and relatively light forces (190 g). Force distribution plays an important role in determining how the segments were intruded.