

Rate of tooth movement under heavy and light continuous orthodontic forces

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Abstract:

Introduction

The aim of this study was to measure the rate and the amount of orthodontically induced tooth movement under heavy (300 g) and light (50 g) continuous forces with superelastic nickel-titanium closing coils over a defined time (12 weeks).

Methods

Fourteen patients who required maxillary canine retraction into first premolar extraction sites as part of their orthodontic treatment completed this study. In a split-mouth design, precalibrated nickel-titanium closing coil springs delivering a force of 300 g or 50 g were used to distalize the canines after an alignment and stabilization period. Intraoral and maxillary cast measurements were made at the beginning of canine retraction (T0) and every 28 days for 84 days (T1, T2, T3) to assess total space closure, canine retraction rate, canine retraction and molar anchorage loss, and canine rotation.

Results

Statistical analysis showed that the amount of initial tooth movement (T0-T1) was not related to force magnitude; however, during the T1-T2 and T2-T3 periods, increased amounts and higher rates of tooth movement were found with heavy forces. These significantly increased the rate and the amount of canine retraction, but the adverse effects of loss of canine rotation control and anchorage were concomitantly increased. Light forces provided a greater percentage of canine retraction than heavy forces, with less strain on anchorage.

Conclusions

Initial tooth movement would benefit from light forces. Heavier forces tend to increase the rate and the amount of canine retraction but lose their advantage because of unwanted clinical side effects.

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