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ABSTRACTS

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Residents
Title: Self-reported Pain Associated with Different Types NiTi Archwires: Blinded Randomized Clinical Trial
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Objectives: The composition of the different types of archwires produce a wide array of forces on the periodontal ligaments and teeth. These types of forces can elicit physiological responses perceived as pain. The purpose of this study was to compare the amount of pain at specific time points experienced by orthodontic patients after initial archwire placement among three types of nickel-titanium archwires: stabilized martensite (conventional NiTi), active austenite (superelastic NiTi) and active martensite (thermoelastic NiTi).

Methods: This study was a randomized, prospective, triple-blinded, controlled clinical trial, with COMIRB approval (protocol number 18-1737). After consenting, 42 patients undergoing orthodontic treatment at the Department of Orthodontics clinic, School of Dental Medicine, University of Colorado who met inclusion/exclusion criteria were randomly assigned to one of 3 groups (A, B or C) corresponding to 0.016" Nitinol (3M Unitek, Monrovia, CA), 0.016" 27° CuNiTi (Ormco, Glendora, CA) or 0.016" 35° CuNiTi (Ormco, Glendora, CA), respectively.

The primary outcome for this study was the patient’s discomfort levels at various timepoints using a visual analog scale (VAS). The participants used the RedCAP app to record their pain levels prior to receiving the archwire (T0), 2 hours after archwire insertion (T1), 3 hours after archwire insertion (T2), 5 hours after archwire insertion (T3), 24 hours after archwire insertion (T4), 4 days after archwire insertion (T5), and 7 days after archwire insertion (T6). The RedCAP app reminds the study participant via text to report their VAS score at each of these timepoints.

Results: Forty-two participants (median age, 16.9 years; range, 12.3 to 65.7 years; 22 females and 20 males) were randomized in a 1:1:1 ratio to either conventional NiTi, superelastic NiTi, or thermoelastic NiTi. No participants were lost to follow up. There were significant differences in mean VAS scores between the 3 groups at T2 (3 hours after archwire insertion) (ANOVA p=0.0148). Ranked analysis at p<0.05 found that superelastic NiTi produced significantly more pain than either conventional or thermoelastic NiTi groups.

Conclusions: Based on the current sample size, superelastic NiTi archwires elicit more pain than classic or thermoelastic NiTi archwires in the first week after placement of the wires in fixed orthodontic appliances.