

A comparison of cyclic fatigue between used and new M_{two}[®] NiTi rotary instruments

Plotino G, Grande NM, Sorci E, Malagnino VA, Somma F, Int Endod J 2006; 39: 716-723

Aim: To evaluate the cyclic fatigue of M_{two}[®] NiTi rotary instruments after controlled clinical use in molar teeth.

Methodology: Twenty M_{two}[®] instruments of each size were selected and divided into two groups; group A consisted of 10 new instruments (control group); group B consisted of 10 used instruments. Each instrument in group B was used to clean and shape 10 root canals of molar teeth in patients. Cyclic fatigue testing of instruments was performed in tapered artificial canals with a 5 mm radius of curvature and a 60° angle of curvature. In all, 140 instruments were rotated until fracture and the number of cycles to failure was recorded. Data was analysed using one-way ANOVA, Tukey's HSD test and independent sample t-test to determine any statistical difference; the significance was determined at the 95 % confidence level.

Results: A reduction of cycles to failure between new (group A) and used (group B) instruments was apparent. A statistically significant difference ($P < 0.05$) was noted between instruments of groups A and B in all sizes with the exception of size 40, .04 taper.

Conclusions: Clinical use significantly reduced cyclic fatigue resistance of M_{two}[®] rotary instruments when compared with an unused control group. However, all the instruments had minimal instrument fatigue when discarded after controlled clinical use.