The effect of cleaning and sterilization on the torsional properties of protaper rotary Nickel Titanium endodontic instrument

(AN IN VITRO STUDY)

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Abstract

This study was conducted to evaluate the effect of the number of cycles of cleaning using NaOCL solution of different concentration and sterilization using autoclave and dry heat oven on the torsional properties of rotary nickel titanium instruments.

A total of ninety rotary protaper finisher F3 instruments were divided into 3 groups:

-Group 1 comprises of ten instruments were subjected to neither cleaning nor sterilization cycles and assigned as the control group.

- Group 2 were subjected to five cleaning and sterilization cycles respectively. It comprises of forty instruments, twenty of them soaked within 1% NaOCL and the other twenty were soaked within 5.25% NaOCL, ten of each these twenty instruments, were sterilized with autoclave while, the other ten instruments were sterilized with dry heat oven.

- Group 3 were subjected to ten cleaning and sterilization cycles respectively. It comprises of forty instruments, twenty of them soaked within 1% NaOCL and the other twenty were soaked within 5.25% NaOCL, ten of each these twenty instruments, were sterilized with autoclave while, the other ten instruments were sterilized with dry heat oven.

Then, all instruments were subjected to a clockwise torsional load until fracture, the torsional moment and angular deflection at fracture were calculated. The fractured instruments thereafter, examined to detect the signs of distortion. The results show a significant reduction in the torsional strength after cleaning and sterilization cycles regardless the concentration of NaOCL, type and number of sterilization cycles.

For the angular deflection, there was a highly significant reduction, where, the number of cycles was the most influencing factor for reduction of the angular

deflection whereas , the concentration of NaOCL and the type of sterilization were show no significant influence on the angular deflection.

The examination of the fractured instruments show a signs of plastic deformation of the spirals, unwinding, reverse winding, reverse winding with tightening of the flutes of the instruments or a combination of all these signs.