

The Impact of Autoclave Sterilization on Cyclic Fatigue of Nickel-Titanium Rotary
Endodontic Instruments

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Abstract

Objective: The present study aimed to evaluate the impact of repeated sterilization in an autoclave on the cyclic fatigue resistance for three varieties of nickel-titanium (NiTi) rotary endodontic systems in double curved simulated canal.

Materials and Methods: During this research, three distinct varieties of nickel-titanium rotary endodontic files with a tip diameter of 0.25 millimeters and a taper of 0.06 millimeters were utilized:

ProDesign Logic system, E-Flex Edge, and Endostar E3 Azure. Each type of rotary endodontic instruments

(n=24) was then randomly divided into three sub-groups: non-sterilized instruments, sterilized instruments after 3 autoclave cycles, and sterilized instruments after 5 autoclave cycles. All the files from

the various subgroups were examined to determine their ability to resist cyclic fatigue.

Additionally, the

period for fractures, the total number of cycles until failure (NCF), and the resulting fracture fragment

length for every instrument were determined. SPSS software 29 was utilized for statistical comparisons

($P < 0.05$).

Results: There were no differences among sterilized as well as non-sterilized files ($P > 0.05$).

There were

no statistically significant differences in fractured length between tested groups.

Conclusions: The resistance to cyclic fatigue of

NiTi rotary instruments was not considerably

impacted by the repeated autoclave sterilization cycles.