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## The effects of sterilization on the tensile strength of orthodontic wires

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### ABSTRACT

The purpose of this study was to evaluate the effect of sterilization on the tensile strength of 0.016" beta-titanium, nickel titanium and stainless steel wires. Three common methods of sterilization — autoclaving, dry heat and ethylene oxide—were evaluated in three test trials involving zero, one and five sterilization cycles. For each of the test trials, five pieces each of 0.016" TMA, 0.016" Sentalloy and 0.016" Tru-chrome stainless steel wires were sterilized using a standard autoclave. Five other pieces of each of the same wires were sterilized in a dryclave, while an additional five pieces of each of the three wire types were sterilized using ethylene oxide. The ultimate tensile strengths of the wires were then determined using an Instron Universal Testing Machine. The data were compared for statistical differences using analysis of variance. The results showed that dry heat sterilization significantly increased the tensile strength of TMA wires after one cycle, but not after five cycles. Autoclaving and ethylene oxide sterilization did not significantly alter the tensile strength of TMA wires.

Dry heat and autoclave sterilization also significantly increased the tensile strength of Sentalloy wires, but the mean strength after five sterilization cycles was not significantly different than after one cycle. Ethylene oxide sterilization of Sentalloy wires did not significantly alter the tensile strengths of that wire.

There were no significant differences in the tensile strengths of the stainless steel wires following zero, one or five cycles for any of the sterilization methods.

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