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Final Report: Study # 07-07-03 "Sterilization of dental handpieces in the SteriMaster steam sterilizer"

OBJECTIVE

The objective of this study was to determine if dental high-speed handpieces can be sterilized in the SteriMaster 134°C wrapped cycle at one-half the normal cycle time.

METHODS

The methods used are described in the attached protocol. In general, four different brands of high-speed dental handpieces were inoculated internally on their turbine fins and turbine chambers with at least one million spores of *Geobacillus stearothermophilus* in 10% sheep blood and 50 mg/mL of hydroxyapatite and dried overnight at room temperature. The handpieces along with a *G. stearothermophilus* spore strip were packaged in paper/plastic peel pouches and placed into the sterilizing chamber of the SteriMaster steam sterilizer. After operating the wrapped cycle at one-half the normal cycle time (half-cycle), the end-cap and the turbine of each handpiece were aseptically removed and submerged, along with the entire handpiece body, in Trypticase-soy broth. After incubation for 7 days at 56° C the cultures were analyzed for growth. Negative cultures and positive cultures were confirmed as described in the protocol. Positive controls (inoculated but not processed through the sterilizer) and negative controls (not inoculated) were performed. The culture medium was validated as describe in the protocol.

RESULTS

The culture medium supported the growth of about 10 uninjured spores of *G. stearothermophilus*. The uninoculated but incubated culture medium did not show any growth.

The concentration of spores (suspended in the 10% sheep blood and 50 mg/mL hydroxyapatite) used in the study was confirmed to be 1.35×10^8 CFU/mL. Since the volume of inoculum per handpiece was 10 microliters, we confirmed that at least one million spores (about 1.35×10^6) was placed inside each test handpiece.

The positive controls all showed growth of the spores (Table 1). The negative controls showed no growth (Table 2). None of the spore strips present in each handpiece package showed any growth of spores.

Table 3 shows the results from processing Star, Midwest and KaVo handpieces through the 2.5 minute half-cycle with two handpieces per package and two packages per run.

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