Efficacy of Various Sterilization Techniques on Diamond-Coated Dental Burs

Objective: The objective of this study was to evaluate the effectiveness of various combinations of debriding, washing, and sterilization methods on the sterilization of contaminated and inoculated diamond-coated burs. Methods: Diamond-coated burs (6856.31.018 FG Coarse Round-End Taper Diamond, Brasseler) and extracted human third molars were sterilized with a steam sterilizer (Amsco 400, Steris). The extracted teeth were abraded with the diamond-coated burs for 30 seconds with a high-speed handpiece to simulate preparation of teeth. The burs were subsequently inoculated with one of the following microorganisms: Enterococcus faecalis ATCC 19433, Staphylococcus aureus ATCC 6538, or Pseudomonas aeruginosa ATCC 15442. Forty-eight hours after inoculation, the burs were subjected to various sterilization treatments and then cultured for bacterial contamination. Twenty burs were used per treatment group per bacteria. See table below. For a positive control group, burs received no decontamination or sterilization after immersion in the bacterial suspension. Negative control groups were conducted on new, unused prepackaged burs and new uncontaminated sterilized burs and cultured for the presence/absence of bacteria. The number of CFU/mL was determined per group. Results: Except for the positive control, no CFU/mL or no growth was found for all treatment groups and for all bacterial types. For the negative control groups, none of the prepackaged unused burs or new sterilized burs demonstrated any bacterial growth. Conclusions: The contaminated and inoculated diamond-coated bur tested in this study may be successfully sterilized to eliminate the tested bacteria.

	CFU/mL (mean, st dev)		
	Enterococcus	Staphylococcus	Pseudomonas
Treatment Groups	faecalis	aureus	aeruginosa
Positive Control	2.04 x 10 ⁵	3.67 x 10⁵	3.24 x 10 ⁶
	(1.11 x 10 ⁵)	(2.14 x 10 ⁵)	(1.49 x 10 ⁶)
One standard cycle of steam autoclave	No growth	No growth	No growth
Two standard cycles of steam autoclave	No growth	No growth	No growth
Standard washer cycle followed by one cycle of	No growth	No growth	No growth
steam autoclave			
Two-second debridement with Clean-A-Diamond	No growth	No growth	No growth
stone and one standard cycle of steam autoclave			
Two-second debridement with Clean-A-Diamond	No growth	No growth	No growth
stone, one standard washer cycle, and one			
standard cycle of steam autoclave			

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