Handpiece Contamination During Pulpotomy Therapy (6/09)

Chin JR, Westerman AE, Palenik CJ, Eckert SG. Contamination of handpieces during pulpotomy therapy on primary teeth. Pediatr Dent. 2009;31:71–75.

This *in vivo* study investigated the potential for internal bacterial contamination of low-speed handpieces by measuring clinical contamination for 24 pulpotomies on primary first or second molar teeth from 20 subjects. The investigators used microbiologic analysis to determine the extent of bacterial contamination from the patient's saliva using enriched trypticase soy agar plates and also performed analysis for the presence of blood. Microbial analysis indicated aerobic and anaerobic bacterial contamination at all three culturing sites from all 24 handpieces (100% contamination, 95% confidence intervals [CI] = 86%-100%). Aerobic and anaerobic bacteria levels (CFU/mL) were not significantly different (P = .43 overall, P > .25 for each of the three evaluated sites). Additionally, the sites also did not have significantly different CFU/mL levels (P = .13 overall, P = .63 for aerobic, P = .14 for anaerobic). The analysis showed no blood contamination at any of the three culturing sites for any of the 24 handpieces (0% contamination, 95% CI = 0%-14%). **The *in vivo* data suggest that low-speed handpieces can become bacterially contaminated during the performance of pulpotomies and, unless properly sterilized between patients, there is the potential for pathogenic microorganisms to enter, adhere, and then emit during use on subsequent patients.**

DECS Comment: While the conclusions of the study support previous studies showing that contamination of low-speed handpieces occurs[1,2] and therefore supports current recommendations of both the Centers for Disease Control and Prevention (CDC) and the United States Air Force infection-control guidelines[3,4], the authors make some incorrect statements regarding the current CDC recommendations regarding infection-control procedures for handpieces. First, as a review, the current CDC recommendations for "Dental Handpieces and Other Devices Attached to Air and Waterlines" include[3]:

- **Clean and heat-sterilize handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units between patients (IB, IC).**
- **Follow the manufacturer's instructions for cleaning, lubrication, and sterilization of handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units (IB).**
- **Do not surface-disinfect, use liquid chemical sterilants, or ethylene oxide on handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units (IC).**

Nowhere in the text of the CDC guidelines[3] does it suggest different infection-control practices for high- vs. low-speed handpieces. Both are dental handpieces and can be removed from the air and waterlines of the dental unit and therefore must be cleaned and heat sterilized between patient uses. Thus, the authors' statement that "Current recommendations allow for the outside cleaning and disinfection of low-speed handpieces between uses or protection through the application of plastic wrapping" is inaccurate.

The CDC guidelines do discuss that some components of dental instruments are permanently attached to dental unit waterlines and although they do not enter the patient's oral cavity, they are likely to become contaminated with oral fluids during treatment procedures. Examples cited include handles or dental unit attachments of saliva ejectors, high-speed air evacuators, and air/water syringe handles; these items should be covered with impervious barriers that are changed after each use. The CDC guidelines further state that if the item [that cannot be removed from the air and waterlines] becomes visibly contaminated during use, it should be cleaned and disinfected with an EPA-registered intermediate-level hospital disinfectant before use on the next patient.[3] Because handpieces, including low-speed motors, can be removed from the air and

waterlines this would not apply and the handpiece, motor, and any attachments would require heat sterilization between patients.

The authors also make a statement that routine sterilization decreases handpiece longevity. Studies have shown that heat sterilization does decrease high-speed handpiece longevity. However in clinical evaluations of high-speed handpieces, cleaning and lubrication were the most critical factors in determining performance and durability and have shown high-speed handpieces can be expected to last approximately one year or 500 cycles of use/sterilization.[5-8] Additionally, a project by DECS in 2006 showed that the Midwest Shorty® motor sustained 1000 simulated cycles of clinical use/sterilization without any degradation of performance.[9]

It should be noted that despite their inaccurate interpretation of the current CDC recommendations for dental handpieces, the authors should be applauded for this research because currently there is a paucity of quality dental infection-control research being conducted and published.

Selected References

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