

Cross-infection control in endodontics: an update

Every patient scheduled for a dental or an endodontic procedure should be regarded as a potential source of infection, regardless of whether or not they are known to have an infection, writes Jarlath Loftus

Both patients and the media have demonstrated an increased awareness of infection control issues in dentistry. Microbial agents have been the target of infection control, but in the late 1990s a new challenge emerged. Transmissible spongiform encephalopathies (TSEs), such as variant Creutzfeldt-Jakob disease, are incurable fatal neurological diseases mediated by prions, appearing as vacuoles within the grey matter of the brain.

Current universal precautions procedures for infection control in dentistry are inadequate to resist the transmission of prions via contaminated instruments. Prions are particularly found in neural tissues and have been detected in the oral and dental tissues of animals.

In pulpctomy and pulpotomy procedures, endodontic instruments come into intimate contact with terminal branches of the trigeminal nerve. Abnormal prion proteins adhere to surfaces such as stainless steel and resist many methods of decontamination.

The Chief Dental Officer of the Department of Health in the UK recommended in April 2007 that endodontic files and

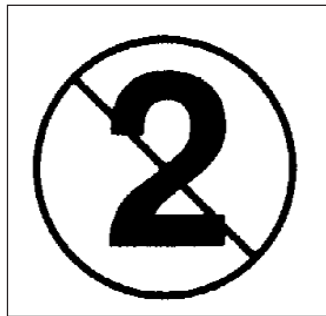


Figure 1: Labelled as single-use

reamers be treated as single-use instruments. This has obvious implications for colleagues working in Northern Ireland.

In 2007, a risk assessment review of the transmission of sporadic Creutzfeldt-Jakob disease in endodontic practice by a French group concluded that the risk is similar to death after liver biopsy or during general anaesthesia. The risk of infection is of the order of 13 per million procedures.

In the same year, Sonntag and Peters assessed the effect of prion decontamination protocols on nickel titanium rotary surfaces. They uniformly found in all groups that debris could not be removed from the files, despite ultrasonic cleaning, sterilisation and immersion in agents such as sodium hydroxide for 24 hours.

A Glasgow-based group has been pivotal in forcing us to re-think our approach to endodontic file sterilisation. In 2002, Smith and co-workers reported that 76% of files from a sample of general dental practitioners showed visible surface debris when examined under magnification, following cleaning and disinfection procedures.

In 2005 the same group looked at 25 general dental practices in Glasgow. None of the dentists used endodontic files as single-use devices. Several decontamination

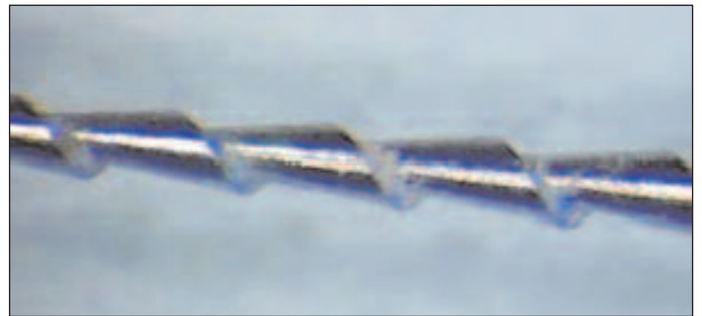


Figure 2: Following cleaning in a washer disinfectant


methods were reported, including combinations of manual cleaning, ultrasonic cleaning and autoclaving. Of 250 files tested, 75% showed some degree of visual contamination and 7% tested positive for residual blood.

The heat of sterilisation may act to fix residual debris onto the surface of a file, resulting in a vicious cycle if files are re-used on multiple occasions. As a result of this study, many manufacturers labelled endodontic files as single-use devices (Figure 1). Failure to follow manufacturers' instructions would render a practitioner liable to legal action.

In May 2008, a group in Manchester looked at whether endodontic files could be cleaned in a washer disinfectant. This is a machine like a dishwasher with a drying cycle that eliminates instrument corrosion. They found that none of the 162 cleaned files were totally free of organic debris (Figure 2).

Irrespective of prions, infected organic debris (bacteria, viruses and fungi) strongly adheres to the flutes of files, with little hope of removal, whether it is with manual brushing, a washer disinfectant or vacuum sterilisers. These instruments can not be considered sterile if the debris can not be removed.

The final argument for

single-use files is that less breakage will occur in root canals due to cyclic fatigue or work hardening. When files do separate, we can then truthfully tell our patients that they are sterile instruments. 

References

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