

IN BRIEF

- Assembled Siqveland matrix bands are contaminated with blood.
- Current pre-cleaning methods cannot remove blood from assembled bands.
- Siqveland matrix bands should be discarded after use on one patient.
- Blood can be removed from retainers after removal of the matrix band.
- Immersion in enzymic detergent followed by processing in an instrument washer is the most effective method of pre-cleaning for Siqveland matrix retainers.

Decontamination of Siqveland matrix bands

An investigation of the decontamination of Siqveland matrix bands

C. L. Whitworth,¹ K. Davies,² N. O. A. Palmer³ and M. V. Martin⁴

ABSTRACT

Objectives

This study investigated blood contamination of artificially and clinically contaminated Siqveland matrix bands and retainers. A modified version of the recognised Kastle-Meyer test for blood was used to compare the efficacy of enzymatic agents, a washer-disinfector and an instrument washer for pre-sterilisation cleaning of Siqveland matrix bands and retainers.

Methods

Assembled Siqveland matrix bands were contaminated either artificially with horse blood or clinically during dental treatment. Contaminated assembled matrix bands and retainers were subjected to immersion in an enzymatic agent, automated processing in a washer-disinfector or instrument washer, or a combination of pre-soaking and automatic cleaning. Residual blood contamination from each band and retainer was measured and compared to the volume of blood recovered from an unprocessed control group of contaminated assembled matrix bands or retainers.

Results

Residual blood was recovered from every clinically contaminated assembled Siqveland matrix band and retainer. The volume of blood recovered from assembled Siqveland matrix bands ranged from 0.13–7.1 µl and from retainers, following removal of the matrix band, from 0.001–1.523 µl. The most effective method of pre-sterilisation cleaning for artificially contaminated assembled matrix bands was processing in the washer-disinfector. Conversely, the most effective method for cleaning clinically contaminated assembled matrix bands and retainers was pre-soaking in an enzymatic agent followed by a heavy-duty cycle in an instrument washer.

Conclusions

It is not possible to clean assembled Siqveland matrix bands using any method currently available to dental practitioners. Matrix bands should be discarded after use on one patient. Once the band is removed, all detectable blood can be removed from the retainer by pre-soaking in an enzymatic detergent followed by processing in an instrument washer.

EDITOR'S SUMMARY

The nature of a dentist's work means that infection control procedures are a necessity in daily practice. It therefore follows that the better informed we are about the decontamination methods required for the wide variety of different instruments and appliances used in the dental surgery, the better armed we will be to adopt the most effective infection control measures in all circumstances.

This paper by Whitworth *et al.* investigates the decontamination of commonly-used Siqveland matrix bands and retainers, comparing the efficacy of several different cleaning methods. Their conclusions are clear and informative: it is not possible to clean assembled matrix bands by any of the methods available to dentists and matrix bands should therefore be discarded after use on one patient. The retainer can then be effectively decontaminated by first soaking in enzymatic detergent and then cleaning in an instrument washer.

In addition to providing clear and unambiguous information for practitioners, enabling them to make sure their decontamination procedures are sufficient, the paper also raises other interesting points. The finding that cleaning methods may perform differently on clinically contaminated instruments than on artificially contaminated ones is of particular note and makes the paper valuable not just to practitioners but to all those involved with infection control in dentistry. Such work adds substantially to our understanding of decontamination of dental instruments, and will help to improve both present and future infection control procedures.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 202 issue 4.

Rowena Milan,
Journal Editor

DOI: 10.1038/bdj.2007.148

FULL PAPER DETAILS

¹General Dental Practitioner, Hoghton Street Dental Practice, 22 Hoghton Street, Southport, PR9 0PA; ²Senior Biomedical Scientist, ³General Dental Practitioner/Part-time Lecturer, ⁴Senior Lecturer, University of Liverpool, Clinical Dental Sciences, Liverpool, L69 3GN

*Correspondence to: Mrs Christine Whitworth
Email: cwblackadder@btinternet.com

Refereed Paper

Accepted 19 April 2006

DOI: 10.1038/bdj.2007.142

British Dental Journal 2007; 202: E12

AUTHOR QUESTIONS AND ANSWERS

Why did you undertake this research?

It is important for dental practitioners to understand the cross-infection danger posed to both patients and the dental team from contaminated instruments. In this research, our aim was to find the amount of blood contaminating used Siqveland matrix bands and to evaluate the efficacy of newer automated pre-sterilisation cleaning methods in the removal of blood from these instruments. It became clear that it was not possible to remove all blood from assembled matrix bands. This confirmed previous findings that matrix bands should be single-use. To allow safe reuse of these instruments, it was necessary to determine whether the retainer could be successfully decontaminated. The results of this research are of practical importance to general dental practitioners. The evidence that the retainer can be successfully decontaminated enables dentists to continue using these popular instruments, knowing that they will not pose a cross-infection risk and avoiding the cost of more expensive disposable alternatives.

What would you like to do next in this area to follow on from this work?

As an NHS practitioner, my interest in research into the practicalities of instrument decontamination has valuable personal implications. Recent advice from the Spongiform Encephalopathy Advisory Committee recommends that these items should be regarded as single use. I am involved in a project to determine levels of residual protein on contaminated endodontic instruments and on those that have been subjected to the various decontamination methods currently available to dental practitioners. The results of this project will determine whether it is possible to remove protein from these instruments and if so, to identify the most effective method of pre-sterilisation cleaning. Infection control is a vital part of every practitioner's care for their patients, but without research evidence it is impossible to evaluate the risks.

COMMENT

The ability of cleaning regimes within general dental practices to efficiently clean dental instruments has been brought into question over the last few years. The presence of biofilms and blood borne pathogens including hepatitis B and C and HIV on dental instruments makes it imperative that all biological material is removed prior to the sterilisation cycle.

Cleaning instruments manually can be a health risk, with a number of instruments in the dental practice having sharp ends or edges that can result in puncture wounds, and the efficacy of manual cleaning can be subjective. This current work using a modified Kastle-Meyer demonstrated that residual blood was recovered from every clinically contaminated assembled matrix band and retainer that was cleaned in an automated processor.

The authors have identified techniques capable of effectively cleaning the matrix band retainer, ie by presoaking in an enzymatic detergent followed by processing in an instrument washer. However, it is clear that practitioners need to take note that none of the cleaning strategies investigated was capable of decontaminating assembled matrix bands!

An important aspect of this manuscript was the finding that cleaning methods may perform differently when processing clinically soiled instruments in comparison to those that were soiled using an artificial contaminant – perhaps the manufacturers of automated washers should take note of this finding?

The emergence of variant Creutzfeldt-Jakob disease has raised the importance of infection control measures in surgery. The resistance of the prion protein to standard disinfection procedures has also identified that cleaning prior to sterilisation is such a profoundly important step in the disinfection cycle of this disease.

Fundamentally this current work reinforces other studies that there are a number of instruments within the dental practice that are difficult to clean and that disposable, single use replacements would eliminate any risk should it exist. The failure of automated processors to decontaminate matrix bands in this study certainly supports the view that instruments such as matrix bands should only be single use and should be discarded after use on one patient.

J. Walker, Health Protection Agency,
Porton Down, Salisbury