KENNETH S. SEROTA
DDS MMSC. FPFA. FADI

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# BIOPURE™ MTAD™

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## MTAD—TETRACYCLINE, CITRIC ACID AND DETERGENT

BioPure MTAD is a mixture of Doxycycline, Citric Acid, and Polysorbate 80 also referred to as Tween 80. It is being marketed by Dentsply/Tulsa Dental as an antibacterial root canal cleanser.

Doxycycline is a broad-spectrum antibiotic synthetically derived from oxytetracycline. Citric Acid is a "replacement" for EDTA and optimizes the removal of the smear layer. Tween 80 is a detergent that acts as a surfactant to facilitate the penetration of the citric acid and doxycycline into the complex anatomic vagueries of the root canal space. Most of the other irrigants used in endodontics due to their high surface tension do not readily penetrate into these areas.

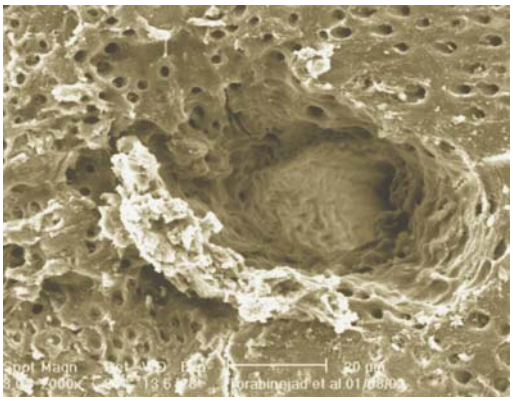
The system comes as a powder & liquid and must be mixed just prior to use. There are 2 sizes available. A single dose comes as a 5 ml powder/liquid combination and a multicanal size is available (20 ml).

Residual uncontaminated, unused solution can be refrigerated up to 48 hours. I do not see it as a complete replacement for EDTA. Both are effective synergistically for removal of the calcified component of the smear layer. I disagree with the instructions recommending 1.3% bleach; 5.25% sodium hypochlorite is optimal. Concentrations of bleach less then 2.5% in all probability do not dissolve necrotic debris. As well, the use of 2% Chlorhexidine is proving increasingly integral to overall disinfection success based on current literature and its addition to the protocol is advised.

New devices in prototype development include negative pressure differential vacuum irrigation units which in combination with BioPure MTA may eliminate all residual debris from the canal and render it completely sterile. As well, there is an endodontic attachment for the Mark III HealOzone unit, I am currently evaluating to determine its efficacy. In conjunction with resin sealers, the near total elimination and entombment of residual microflora may further accentuate success rates beyond current levels.

## IMPORTANT TIPS

- There is a low risk of allergic reaction with patients that are sensitive to tetracyclines
- Not recommended for patients who are pregnant, nursing, or under the age of 8 years
- MTAD should be the last liquid in the rootcanal space for maximum effectiveness.



Removal of the smear layer from the surface of an instrumented root canal with 5.25% NaOCl as a root canal irrigant and MTAD as a final rinse have resulted in the opening of many dentinal tubules and a large lateral canal (original magnification X5000).

endodontic solutions

This newsletter and other material are on the Digital Library of www.endosolns.com. Anyone can download material from the archive. In time, I hope that many will use the ID endosolns and the PASSWORD comprehensive care to upload their own material to share on the site.

Questions, comments or concerns:

Kenneth S. Serota
416.271.7795
905.270.3357
kendo@endosolns.com

## EFFECT OF MTAD ON E FAECALIS CONTAMINATED ROOT CANALS OF EXTRACTED HUMAN TEETH

**Journal of Endodontics**

Shabahang S, Torabinejad M.

*Sept 2003 29(9): 576-9*

The purpose of this investigation was to compare the antimicrobial effect of MTAD (a mixture of a tetracycline isomer, an acid, and a detergent) with that of NaOCl with and without EDTA. Eighty-five extracted human teeth were contaminated with Enterococcus faecalis for 4 weeks. After biomechanical instrumentation using 1.3% or 5.25% NaOCl as root canal irrigant, the root canal and the external surface of each tooth were exposed to a 5-min application of MTAD, 1.3% NaOCl, 5.25% NaOCl or a 1-min application of EDTA followed by irrigation with 5 ml of 1.3% NaOCl or 5.25% NaOCl. Teeth or dentin shavings were cultured to determine presence or absence of the test bacteria. Fisher's exact test showed that the combination of 1.3% NaOCl as a root canal irrigant and MTAD as a final rinse was significantly more effective against E. faecalis than the other regimens. The chi2 test showed no difference between the other regimens.

E faecalis is a predominating pathogen in endodontic failures.

## EVALUATION OF CYTOTOXICITY OF MTAD USING THE MTT-TETRAZOLIUM METHOD

**Journal of Endodontics**

Zhang W, Torabinejad M, Li Y.

*Oct 2003 29(10):654-7*

Previous studies have shown that MTAD (a mixture of a tetracycline isomer, an acid, and a detergent) is an effective antibacterial irrigant as a final rinse to remove the smear layer from the instrumented surface of root canals. In this investigation we examined the cytotoxicity of MTAD compared with that of commonly used irrigants and medications. L929 fibroblasts were grown on cell culture plates and were placed in contact with various concentrations of test irrigants and medications. The cytotoxicity of these materials was evaluated 24 h after incubation using MTT assay. Means and standard deviations of absorbance were calculated for each group and statistically analyzed to determine presence or absence of significant difference between the means. The 50% inhibitory dose values were calculated, ranked, and statistically analyzed using the sign interval for median. Based on our results it seems that MTAD is less cytotoxic than eugenol, 3% H2O2, Ca(OH)2 paste, 5.25% NaOCl, Peridex, and EDTA and more cytotoxic than 2.63%, 1.31%, and 0.66% NaOCl.

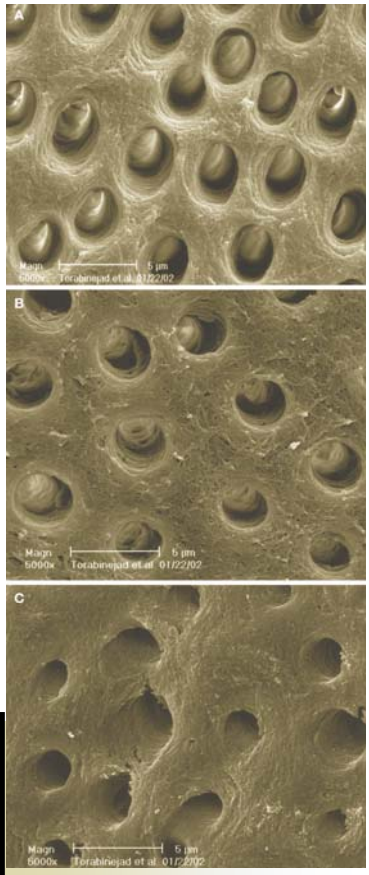
## EFFECT OF MTAD ON CORONAL LEAKAGE OF OBTURATED ROOT CANALS

**Journal of Endodontics**

Park DS, Torabinejad M.

*Dec 2004 30(12): 890-2*

The purpose of this study was to evaluate the effect of smear-layer removal using MTAD on coronal leakage of obturated root canals using a dye-leakage test. Fifty, extracted, single-rooted, human teeth were cleaned and shaped and divided into 5 equal groups of 10 each. The smear layer in groups 1 to 3 was left intact. The smear layer in groups 4 and 5 was removed using 17% EDTA or MTAD, respectively. After obturation of root canals, the access opening to each canal was filled with India ink for 48 h. The depth of coronal-dye penetration was measured using the Sigmascan software. ANOVA analysis showed statistically significant differences among the groups ($p < 0.05$). Samples treated with MTAD yielded significantly less leakage than samples treated with sodium hypochlorite. The amount of dye penetration was not statistically different between teeth treated with MTAD or EDTA ($p = 0.062$).




Instrumentation of a root canal with 5.25% NaOCl as root canal irrigant and treatment with 5 min of MTAD as a final rinse resulted in the removal of the smear layer in the coronal (A), middle (B), and apical portions of the root canal (original magnification X5000).

"MTAD has 10+ peer reviewed literature citations. It was brought to market at the end of 2004 and is now available"