

## Chlor-XTRA™

J Endod. 2009 Jan;35(1):95-7. Epub 2008 Nov 7.

Antimicrobial susceptibility of monoculture biofilms of a clinical isolate of *Enterococcus faecalis*.

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The purpose of this study was to create a monoculture biofilm of a clinical isolate of *Enterococcus faecalis* and to determine susceptibility against four antimicrobial irrigants. Biofilms were subjected to 1-, 3-, and 5-minute exposures to one of the following irrigants: 6% sodium hypochlorite (NaOCl), 2% chlorhexidine gluconate (CHX) or one of two new products, <6% NaOCl with surface modifiers (Chlor-XTRA) or 2% CHX with surface modifiers (CHX-Plus) (Vista Dental Products, Racine, WI). It was hypothesized that NaOCl and CHX would be equally effective and that addition of surface modifiers would improve bactericidal activity of the respective irrigants compared to the original formulations. Results indicate that 6% NaOCl and Chlor-EXTRA were significantly superior against *E. faecalis* biofilms compared to 2% CHX and CHX-Plus at all time points except five minutes.

PMID: 19084133 [PubMed - indexed for MEDLINE]

### Antimicrobial and Tissue Dissolving Capabilities of Different NaOCl Concentrations

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**Objective:** The objective of this in vitro study was to establish the antimicrobial efficacy and the potential to dissolve vital pulp using different concentrations of sodium hypochlorite (NaOCl) solutions.

**Materials and Methods:** The following solutions were tested: (1) 2% NaOCl (Thick Jik); (2) 3.5% NaOCl (Jik); (3) 6% NaOCl (Vista); (4) 6% NaOCl (Dent-Ionics); (4) 6% NaOCl (Chlor-Xtra) and (5) Water (Control).

**Antimicrobial Effects:** A MacFarland 1 suspension was prepared from an overnight culture of *E. faecalis* and spread onto 15 CASO-Agar plates. The prepared plates were randomly divided into 5 groups (n=3). Ten microlitres of each solution were dispensed onto four five millimetre diameter filter paper disks on each plate and incubated anaerobically at 37°C for 24 hours respectively. The antibacterial activity of materials was apparent from circular clear inhibition zones forming around the filtration paper. Measurements were done after incubation at three different positions for each paper disk. An average was calculated for the nine measurements per paper disc on each plate.

**Tissue Dissolving Ability:** Vital pulp tissue was removed from 4 freshly, extracted, human, third molar teeth and divided into 25 equal portions according to weight. Each specimen was immersed into 40ml of the selected irrigation solution (n=5). The time taken to dissolve the pulp tissue was recorded by means of a digital video camera. Averages between the five recording times for each solution were calculated. All the data was collected and statistically analyzed (Student's-t test).

**Results:** No significant inhibition of *E. faecalis* was observed with sterile water (control) and 3.5% NaOCl. However, the 2% NaOCl and all the other 6% NaOCl solutions showed significant inhibition against *E. faecalis*. Chlor-Xtra dissolved the pulp tissue in significantly less time compared to all the other groups (p<0.05). Conclusion: Chlor-Xtra demonstrated the best antimicrobial properties as well as tissue dissolving capabilities.

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Multiple Patents Pending

(Continued)

# Chlor-XTRA™ (Continued)

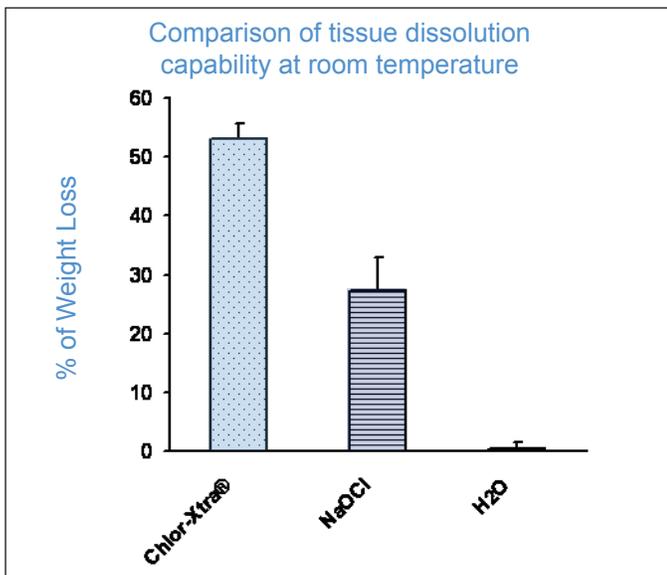
## Derived from Communication — Unpublished Data

### Comparison of tissue dissolution capability at room temperature

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Sodium hypochlorite (NaOCl) has been used in root canal procedures for decades due to its ability to dissolve organic material (i.e. dental pulp) and simultaneously disinfect the canal. Recently, the dissolution capacity of NaOCl has been reported to increase with the addition of detergents/wetting agents. Herein, the dissolution rate of bovine muscular tissue was observed at room temperature between 6% NaOCl (VWR International, LLC) and 6% NaOCl with surface modifiers (Chlor-Xtra®, Vista Dental Products) Distilled water was used as a negative control. Using the protocol described, it was determined that the dissolution rate of NaOCl can be increased by the addition of surface modifiers to NaOCl. Specifically, it was determined that dissolution rates were significantly (p-value < 0.001 One-Way ANOVA) faster for a <6% solution of NaOCl containing surfactants than standard 6% NaOCl.



### Result:

Solution	Chlor-XTRA™	6% NaOCl	H <sub>2</sub> O	
<b>Tissue Weight (mg)</b>	Before Treatment	79.78±10.59	73.76±6.10	62.18±6.17
	After 5 Minutes	37.52±6.54	53.72±7.01	61.88±5.62
<b>Percentage of Weight Loss (%±SD)</b>	53.16±2.60	27.25±5.62	0.41±1.10	

Notes: All ANOVA showed P<0.001

### Catalog Information:

Description	Item#	Price
<b>Prefilled Syringes:</b>		
10 / Box - Prices include syringe, solution and needle tip		
3cc (6%)	503825	<b>\$13.25</b>
12cc (6%)	503850	<b>\$13.25</b>
Each includes (10) prefilled syringes and (10) 27ga side-vent irrigating tips. Tips and syringe individually packaged.		
<b>16 oz. Bottles:</b>		
480mL Bottle (6%)	503800	<b>\$60.95</b>