

CRA
FIRST LOOK

DESENSITIZER USE WITH RESTORATIVE PROCEDURES

Post-operative tooth sensitivity is not a new problem. It can be caused by restorative procedures, perio procedures, or by patients' over zealous home care. It causes patient discomfort & costs time, money, & loss of patient confidence. This report focuses on some current products marketed to control post-operative sensitivity associated to restorative procedures. It addresses the following questions: (1) Do desensitizers differ? (2) Do desensitizers reduce post-op sensitivity related to restorative procedures?

1. DO DESENSITIZERS DIFFER?

YES - Chart below shows differences. Products are listed & grouped by major active ingredient.

A.	B.	C.	D.	E.	F.	G.	H.
Current Active Ingredients (Listed Alphabetically)	Example Product Brands (Manufacturer)	Cost per ml - BULK	Cost per ml - UNIDOSE	Manufacturer Stated Application Time (seconds)	Soft Tissue Response *	Patient Comments on Soft Tissue Pain *	Oral Disinfection Potential *
1 Benzalkonium Chloride HEMA Sodium Fluoride	DESENSITIZER (Healthdent [®] 1)	\$4.00	\$3.70	30	White with Blisters & Ulcer	Mild to Moderate Pain	Good
2 Benzalkonium Chloride HEMA Sodium Fluoride	HURRISEAL (Beutlich)	\$3.33	No unidose	30	White with Blisters & Ulcer	Mild to Moderate Pain	Good
3 Benzalkonium Chloride HEMA	D/SENSE (Centrix)	No bulk pkg.	\$5.20	20	White with Blisters & Ulcer	Mild Pain	Excellent
4 Benzethonium Chloride HEMA Sodium Fluoride	MICROPRIME (Danville Engineering)	\$4.00	No unidose	20	White with Blisters & Ulcer	Mild to Moderate Pain	Good
5 Chlorhexidine HEMA	HEMASEAL & CIDE (Advantage Dental Products)	\$7.50	No unidose	15	White with Blisters & Ulcer	Little or No Pain	Excellent
6 Glutaraldehyde HEMA	GLUMA (Heraeus Kulzer)	\$18.26	\$20.62	30	Orange & Ulcer	Moderate to Severe Pain	Good
7 Glutaraldehyde Proprietary Wetting Agent Sodium Fluoride	DENTIN DESENSITIZING SYSTEM (Southwest Dental)	\$4.00	No unidose	10	Orange & Ulcer	Mild Pain	Good
8 Glutaraldehyde Glycol Dimethacrylate Maleic Acid	SYSTEMP (Ivoclar Vivadent)	\$16.00	\$17.00	10	Orange & Ulcer	Mild Pain	Good
9 Potassium Oxalate	SUPER SEAL (Phoenix Dental)	\$10.00	No unidose	30	Mild Reddening	Little or No Pain	None

* See CRA website for research methods

SUMMARY OF CHART:

- **COST** ranged from \$3.33 to \$20.62 per ml. Hurriseal had least cost per ml & Gluma had most cost per ml.
- **UNIDOSE** dispensing can improve infection control & ease of use, but generally costs more per ml.
- **APPLICATION TIME** varied from 10 to 30 seconds, but any time expended may be justified if it eliminates post-op sensitivity.
- **SOFT TISSUE** was irritated by all desensitizers & severity correlated with exposure time. Photos at right show mucous membrane & attached gingiva after 5 minute contact times which represent cases where anesthetized patients were unaware of run off & the situation was not noted for a period of time.
- **PATIENT PAIN** persisted 24+ hours with 7 of 9 products & was most severe with Gluma. There was little or no pain with Hemaseal & Cide or Super Seal.
- **ORAL DISINFECTION POTENTIAL** was best for D/Sense & Hemaseal & Cide, & good for all other products except Super Seal.



Numbers in pictures correspond with numbers to left of chart above.

"CLINICAL SUCCESS IS THE FINAL TEST."

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2. DO DESENSITIZERS REDUCE SENSITIVITY?

YES - However, no one desensitizer was effective clinically for all patients treated.

Data from 8 separate field evaluations performed by 158 different dental offices showed:

- A. 74% of CRA Evaluators reported all the desensitizers tested reduced sensitivity for most patients.
- B. No desensitizer gave relief to 100% of the patients treated.
- C. CRA Evaluators could not predict which desensitizer formulation would, or would not, result in relief for specific patients.
- D. Type of problem appearing to cause sensitivity (ie. deep prep, pre-op sensitivity, use of specific restorative product or technique, patient pain tolerance, etc.) did not correlate with desensitizer formulation that gave relief.

Historically, lack of dependable desensitization 100% of the time has been a frustration. The above data indicate current products do not overcome this long standing problem.

3. DO DESENSITIZERS AFFECT BOND STRENGTHS?

YES - Bond strengths remained the same, increased, or decreased depending on desensitizer-adhesive combination.

A. METHODS

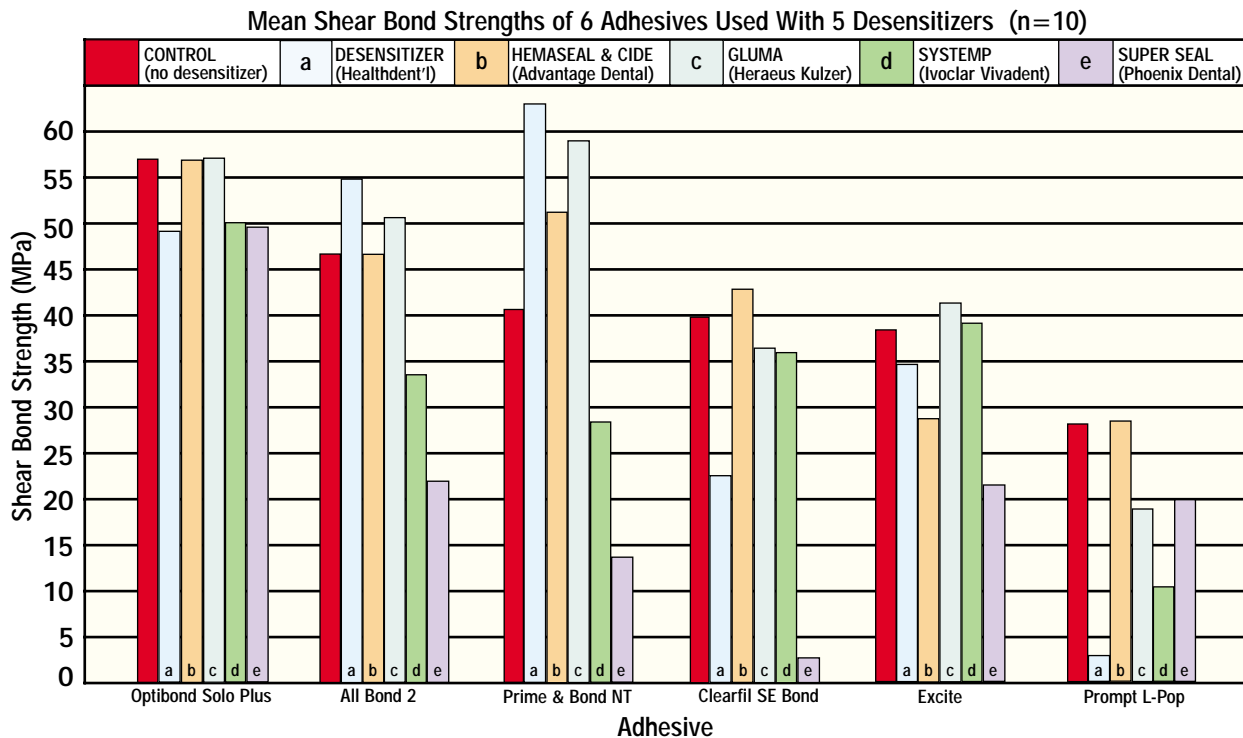
The Notched Blade Shear Bond Test Method (See Jun '02 CRA Newsletter) was used with 5 desensitizers & 6 adhesives. Thermal stressing of bonded joints included 5000 cycles at 5 °C & 55 °C. Products tested are listed below:

(1) DESENSITIZER NAME	(2) ADHESIVE NAME	Type*	Total or Self Etching	Solvent
a DESENSITIZER (Benzalkonium Chloride, HEMA, Sodium Fluoride)	All Bond 2 (Bisco)	1	Total Etch	Acetone
b HEMASEAL & CIDE (Chlorhexidine, HEMA)	Excite (Ivoclar Vivadent)	2	Total Etch	Ethyl Alcohol
c GLUMA (Glutaraldehyde, HEMA)	Optibond Solo Plus (Kerr)	2	Total Etch	Ethyl Alcohol
d SYSTEMP (Glutaraldehyde, Glycol Dimethacrylate, Maleic Acid)	Prime & Bond NT (Dentsply Caulk)	2	Total Etch	Acetone
e SUPER SEAL (Potassium Oxalate)	Clearfil SE Bond (Kuraray)	3	Self Etching Primer	Water
	Prompt L-Pop (3M ESPE)	4	Self Etching Primer	Water

- *Type 1 - Etchant applied & washed off to remove smear layer; primer & adhesive applied separately.
- Type 2 - Etchant applied & washed off to remove smear layer; primer & adhesive applied in single solution.
- Type 3 - Self-etching primer applied to dissolve smear layer & not washed off; adhesive applied separately.
- Type 4 - Self-etching primer & adhesive applied as single solution to dissolve & treat smear layer simultaneously.

B. RESULTS

Data in graph below are grouped by adhesive & ordered left to right from highest to lowest mean adhesive shear bond strength when no desensitizer was used. Each bar is an average of 10 tests.



DENTAL UNIT WATERLINES, CENTRAL SYSTEM FOR MULTIPLE UNITS

Maintaining bacterial levels within ADA's 1995 goal of no more than 200 cfu/ml generally requires separate treatment of each waterline of each dental unit. Dentists have sought products & methods to treat multiple dental units simultaneously with minimal maintenance. CRA has tested multiple central unit waterline treatment systems.

1. VISTACLEAR WATERLINE TREATMENT SYSTEM

COST: \$2,540 for initial purchase of central equipment for 4 operatories.
\$ 411 for replacement filters (3) required about once per year.

SOURCE: **Patterson Dental** (U.S.A. & Canada)
Telephones: 651-686-1600 • 800-328-5536

Vista Research Group (outside U.S.A. & Canada)
1554 Township Road 805 • Ashland, OH 44805 • U.S.A.
Telephones: 866-559-2837 • 419-281-3927 • Fax: 419-281-7380 • Website: www.vistaclear.com

DESCRIPTION: Dental unit water system comprised of a series of filters to remove sediment, heavy metals, ions, & some microorganisms; a mixing chamber to add disinfectant periodically; & a series of manually operated valves to control flow of water, air, or disinfectant into downstream waterlines. Requires initial & periodic overnight chemical treatment of all waterlines & a 2 foot by 3 foot wall or cabinet space for mounting of system in an easily accessible location. CRA tested system using Sterilex Ultra & VistaClean disinfectants.

Periodic disinfection entails the following regimen about every 3 to 6 weeks:

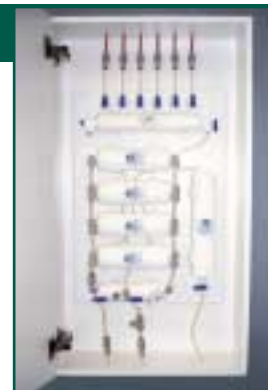
End of day (15-30 minutes):

- Clear water from all lines
- Fill lines with disinfectant
- Leave disinfectant in lines overnight

Following morning (15-30 minutes):

- Empty reservoir of disinfectant
- Air purge lines
- Rinse lines with water thoroughly

Above steps require 30-60 minutes for entire process in a 4 operator office.



+



Source:
Sterilex 410-581-8860

2. ADVANTAGES

- A. Services up to 6 operatories effectively simultaneously.
- B. Keeps bacterial counts at no more than 200 cfu/ml for about 3 to 6 weeks, then requires full system disinfection. CRA data showed Sterilex Ultra & VistaClean gave initial disinfection, but VistaClean did not keep microbe counts down throughout one week. Sterilex Ultra kept microbe counts low for 3 to 6 weeks.
- C. Filters continuously to remove heavy metals; minerals that cause hard water deposits; chlorine residuals; & large protozoa, cysts & some bacteria.
- D. Does not add chemicals to the water continuously that may adversely affect taste, &/or adhesive dentistry.
- E. Reasonable unit cost in relation to other options.
- F. Easy to operate.
- G. Good operating instructions, which are easy to follow.
- H. Reliable construction. Functioned about 2 years continuously with no problems. (Injection port on mixing chamber required cleaning.)

DISADVANTAGES

- A. Size. Unit requires 2 foot by 3 foot wall or cabinet space in an easily accessible location.
- B. Requires 3 manual consecutive overnight disinfection procedures after instillation followed by periodic chemical disinfection. (See steps in description above.)
- C. Sterilex Ultra directions instruct not to leave disinfectant in lines over 18 hrs.
- D. Bacterial counts rise rapidly when chemical disinfection is not performed regularly.
- E. Weekly monitoring of bacterial counts required to know when to disinfect lines.
- F. Has operational cost for disinfectant, replacement filters, & monitoring.

3. CRA CONCLUSIONS

VistaClear is an effective, practical, & dependable central dental unit water system. Although it requires periodic chemical disinfection, the equipment is designed to operate relatively easily & with minimal maintenance.

See CRA Website (www.cranews.com) for test methods & full data from testing.