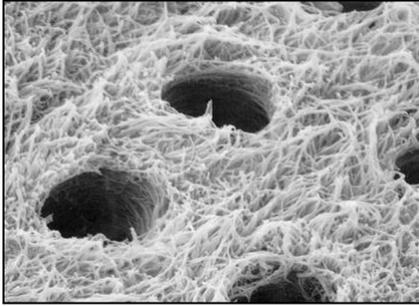


# Hemaseal & Cide® Mechanism of Action

by Joseph Pelerin, DDS

Hemaseal & Cide has achieved tremendous clinical success over the last 20+ years. What follows is scientific and clinical documentation behind the commercial reputation.

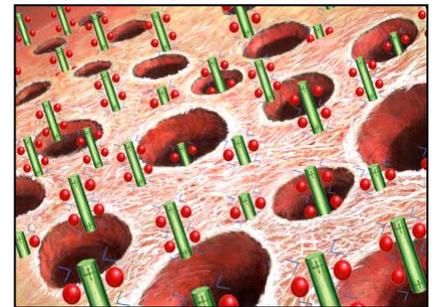
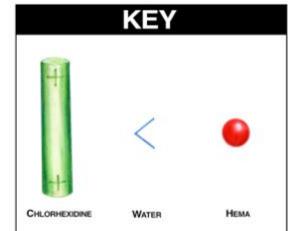
## 1. Ability to totally wet or infuse the bond zone



4% chlorhexidine is the major difference maker in this product. Chlorhexidine can lower the surface tension of water. It is a linear molecule with a dual-pole positive charge and is attracted to the negatively charged tooth.

As one positive pole is drawn into a negatively charged tooth, the other positive pole is available to attach to the negative cell wall of the bacteria. As it infuses the bond surface it also brings HEMA and water with it.

While this wetting or infusion of the bond zone provides the best anti-microbial activity, it also "puffs up" the collagen for better bonding or cementation. It is this collagen network, not the tubules, that provide bond strength.



## 2. Elimination of Bonding Sensitivity

The honeycomb network of dentinal tubules, that can only be seen by an electron microscope, is totally infused along with the collagen network. If any voids exist after bonding, a pressure sensitivity will exist and it will not go away. Also, this surface must be totally disinfected. No product does this better than Hemaseal & Cide, by its ability to attract to the tooth and lower the surface tension of water. A 2020 Clinical Evaluation by 15 clinicians of Catapult Education placed Hemaseal & Cide in 150 (direct and indirect) restorations, with NONE reporting sensitivity.

## 3. Short and Long Term Bond Strength

Numerous studies including the Dental Advisor <sup>1</sup>, CRA, and independent testing <sup>2-5</sup>, confirmed that Hemaseal & Cide improves dentin bond strength. In a nine-product test, CRA confirmed this was the only product to improve bond strength of self-etch products.

Moreover, studies by Pashley, Tay, and others show the Matrix Metalloproteinases (MMP) activity can break down dentin bonds over time. They also found chlorhexidine, the best agent tested in their studies, could prevent this enzyme activity and prolong the bonds <sup>6,7</sup>. HEMA is also helpful in this regard. Therefore, for short and long term bond integrity, there is no better product.



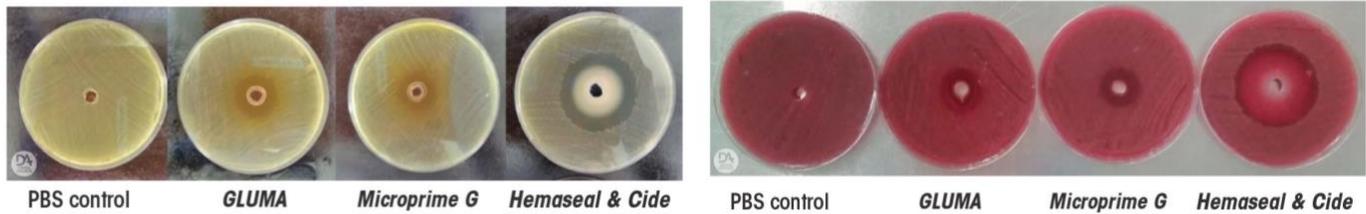
## 4. Micro-leakage

The study European Journal of Dentistry by Celik, Cal, and Turbin et al <sup>8</sup>, showed after 1,000 thermal cycles with ceramic luting bonds, Hemaseal & Cide showed significantly less micro leakage at both the dentin and ceramic interface.

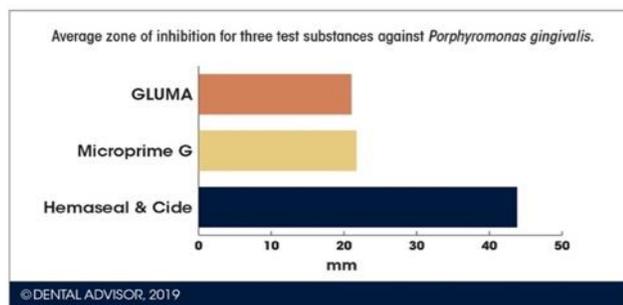
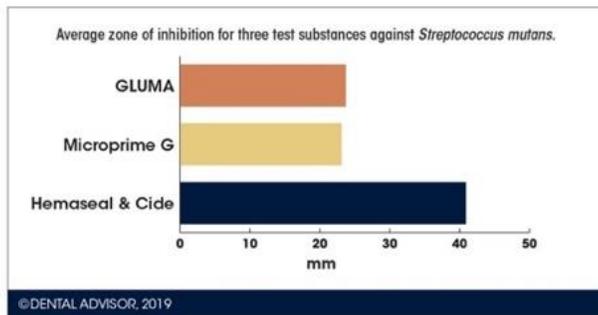
## 5. Superior antimicrobial activity

In a group study by CRA <sup>2</sup> it was the best anti-microbial of nine products tested - even better than Gluma and Microprime G<sup>®</sup> (both are based on Glutaraldehyde, now a suspected carcinogen)\*. *“Oral disinfection potential was “BEST” for D/Sense and Hemaseal & Cide, and “GOOD” for all others except for SuperSeal. Testing included 4 Total-Etch and 2 Self-etch adhesive systems”.*

In 2019, The Dental Advisor commissioned and supervised independent in-vitro “Inhibition Zone” testing of the anti-microbial efficacy of Gluma, Microprime® G and Hemaseal & Cide. The petri dishes show the inhibition “Kill” zones, against *Streptococcus Mutans* (left), and *p. Gingivalis* (right). A larger Inhibition/Kill Zone, generally represents the better antimicrobial action.



The antimicrobial activity is translated into histograms below, indicating that with both of these common microbes, the Chlorhexidine-based Hemaseal & Cide was roughly twice as effective as the Glutaraldehyde products.



## 6. Deep Caries Treatment Ability

Unlike Gluma® and some other products, Hemaseal & Cide does not irritate the soft tissue. That's why so many dentists have had success treating deep lesions that might otherwise have required Endo. This occurs because of its ability to totally disinfect, wet, and seal the bond zone. This is demonstrated in a 2007 clinical article <sup>10</sup>.

### Summary:

Because of its multifaceted abilities and tremendous clinical track record, Hemaseal & Cide is the best product to use under all your bonding, or cementing operative procedures. It is also the only product that improves self-etch **and** total-etch adhesives. Furthermore, it has tested well under all current crown cementing materials.

The August, 2002 CRA Newsletter may have summarized it best: “*The desensitizer with best combination of characteristics tested was the Chlorhexidine-based Hemaseal & Cide*”.

### References:

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6. Ultrastructural correlates of in vivo/in vitro bond degradation in self-etch adhesives

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8. Influence of two desensitizer agents on the micro-leakage of adhesively luted ceramic inlays. Celik, E.U., Kumbaraci, N., Cal, E., Turkun, M., *Eur J Dent* 2011;5:77-83.

9. The Dental Advisor, Laboratory Research Report #127, May, 2019

10. Deep Caries Treatment, Pelerin, J. Dental Products Report June, 2007

\* The United States Department of Labor says this about glutaraldehyde:

“Contact with glutaraldehyde liquid and vapor can severely irritate the eyes, and at higher concentration burns the skin. Breathing glutaraldehyde can irritate the nose, throat and respiratory tract, causing coughing and wheezing, nausea, headaches, browsing's, nosebleeds, and dizziness.”

“Prolonged exposure can cause a skin allergy and chronic eczema and, afterwards, exposure to small amounts produces severe itching and skin rashes. It has been implicated as a possible cause of occupational asthma.”