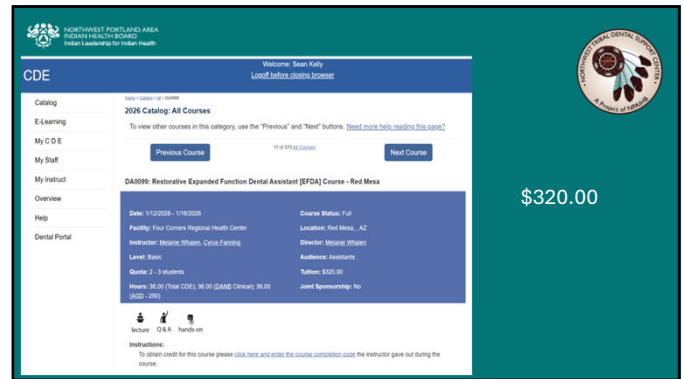




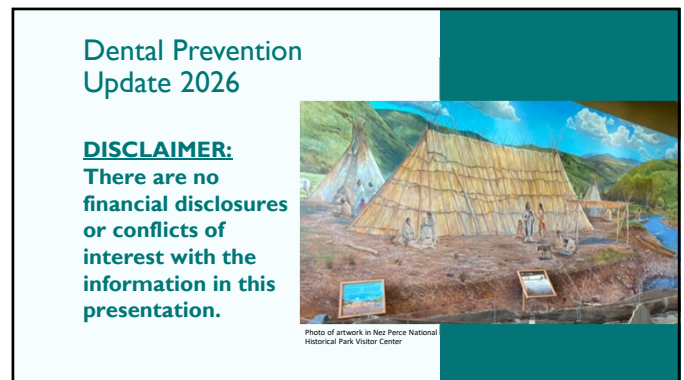
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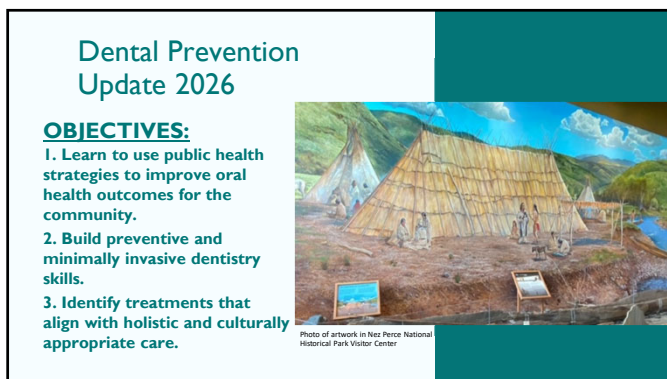
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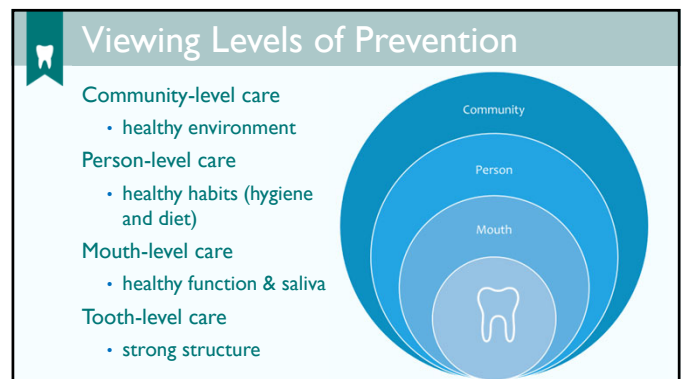
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4



5



6

Public Health Dentistry

Doing the **most good** for the **greatest number** of people.

Who is your patient?

- Clinic users
- Non-clinic users
- Entire community

7

Focus on Prevention

- 41-68% of children treated under GA for severe ECC have new decay within 2 years.^{1,2,3}
- Restorative treatment alone does **NOT** reduce the bacterial levels nor stop the process of dental caries.

- <https://onlinelibrary.wiley.com/doi/10.1111/jpd.12969>
- <https://pubmed.ncbi.nlm.nih.gov/21108916/>
- <https://pubmed.ncbi.nlm.nih.gov/24030856/>

Images courtesy of Dr. Joannette MacLean, DDS

8

Prevention and MID/NID

Minimally Invasive or Non-Invasive Dentistry

- May also hear Medical Management of Caries (MMC)

"Minimally Invasive Dentistry is the application of 'a systematic respect for the original tissue.' And 'The evidence-base for survival of restorations clearly indicates that restoring teeth is a temporary palliative measure that is doomed to fail if the disease that caused the condition is not addressed properly.'"

<https://pubmed.ncbi.nlm.nih.gov/15646587/>

9

Prevention and MID/NID

Minimally Invasive or Non-Invasive Dentistry

- May also hear Medical Management of Caries (MMC)

Minimally Invasive Dentistry is the application of "a systematic respect for the original tissue." This implies that the dental profession recognizes that an **artifact is of less biological value than the original healthy tissue.**

The common delineator is **tissue preservation**, preferably by **preventing disease** from occurring and intercepting its progress, **but also removing and replacing with as little tissue loss as possible.** It does not suggest that we make small fillings to restore incipient lesions...

<https://pubmed.ncbi.nlm.nih.gov/15646587/>

10

Prevention and MID/NID

Minimally Invasive or Non-Invasive Dentistry

'does not suggest that we make small fillings to restore incipient lesions...'

It does require however to know the ADA's Caries Classification System and that bacteria cannot penetrate enamel until it is broken or cavitated.

[https://jada.ada.org/article/S0002-8177\(14\)00029-4/fulltext](https://jada.ada.org/article/S0002-8177(14)00029-4/fulltext)

11

Prevention and MID/NID

Minimally Invasive or Non-Invasive Dentistry

American Dental Association Caries Classification System.

Initial Lesion: the dentin is unlikely infected

[https://jada.ada.org/issue/S0002-8177\(14\)00029-4](https://jada.ada.org/issue/S0002-8177(14)00029-4)

12

Prevention and MID/NID

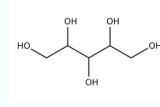
Today's Update will review the following:

- Xylitol, because that can be a good start for the newborn
- Povidone Iodine, because it too can be effective for the expecting mom, babies, and toddlers
- Papacarie Duo, assist in removing infected dentin
- Silver Diamine Fluoride (Nano-Silver Fluoride?)
- Glass Ionomer for so many reasons
- We always talk about caries, what about Perio!?

13

Xylitol

- Benefits
- How to Use
- Mouth "Resting"



Would you consider this holistic and/or culturally appropriate?



Xylitol is a naturally occurring sugar alcohol found in small amounts in various fruits, vegetables, and the human body. Commercially, it is extracted from plant fibrous materials and hardwoods, most commonly birch tree bark and corn cobs, through a chemical process called hydrogenation.

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Xylitol

- Benefits

Xylitol for moms with high levels of mutans streptococci (MS), this reduces new caries in infant/toddlers by 74%.

Summary of preventives

1. Xylitol in Moms of 3-15mo's	74%
2. F varnish + Iodine	62%
3. Silver Diamine Fluoride	61%
4. Vitamin D / UV	50%
5. Xylitol in infants/toddlers	40%
6. Daily Pro-Flossing	40%
7. F varnish	37%
8. High F toothpaste	37%
9. Arginine + F toothpaste	36%
10. F toothpaste	22%
11. Prophies, MI paste, CHX, Daily Self-Flossing	00%

Courtesy of Dr. Jeremy Horst-Keeper

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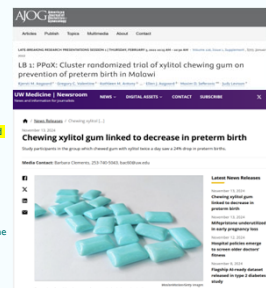
Xylitol

- Benefits

- Study participants (Malawi) in the group which **chewed gum with xylitol twice a day** saw a **84% drop in preterm births** and a **30% drop in low birthweight babies**.
- Previous research has shown that, during pregnancy, periodontal disease is associated with a two- to threefold increase in risk for preterm birth and low-birthweight delivery.
- While little evidence exists to identify the mechanism behind this link, it might be explained by the inflammatory response associated with periodontal disease, or through the spread of bacteria from the mouth through the bloodstream to organs throughout the body, the researchers surmised. "Basically, we know that periodontal disease is associated with preterm birth," Valeriano said. "This is particularly significant in Malawi, since about 70% of the pregnant individuals suffer from gum disease."
- Malawi has one of the highest incidences of preterm birth worldwide, with preterm birth occurring in up to 20% of births, the researchers noted. Preterm birth is the leading cause of death worldwide for children under 5, the report noted.
- The researchers plan to test the xylitol-gum intervention in pregnancies in lower-resourced communities in the Seattle area.

<https://pubmed.ncbi.nlm.nih.gov/28541971/>

<https://newsroom.uw.edu/news-releases/chewing-xylitol-gum-linked-to-decrease-in-preterm-birth/>



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Xylitol

- How to Use

The literature review has also concluded that the most effective xylitol product in caries prevention was (100%) xylitol, **chewed or consumed three to five times per day, after meals with a total dose of 5–10 g of xylitol per day**. Products included xylitol-containing lozenges, candies, and chewing gum, foods based on xylitol, and xylitol-containing toothpaste and mouth rinse. **Results showed that xylitol-containing products significantly prevented caries compared with the other (control) non-xylitol products.**



<https://pmc.ncbi.nlm.nih.gov/articles/PMC9022379/>

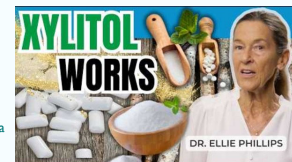
17

Xylitol

- Mouth "Resting"

- **Key Guidelines for Mouth Resting:**
- **Duration:** Chew xylitol gum or use a mint (5-10 minutes), then wait 60–90 minutes.
- **Restrictions:** Do not eat, drink, or brush your teeth during this time.
- **Purpose:** This allows mineral-rich, stimulated saliva to harden enamel and reduce harmful bacteria.
- **Routine:** Use xylitol gums or mints after meals to combat acid, then rest your mouth.
- **Benefits:** This technique helps reverse gum damage, prevents cavities, and can alleviate issues like dry mouth or tonsil stones.

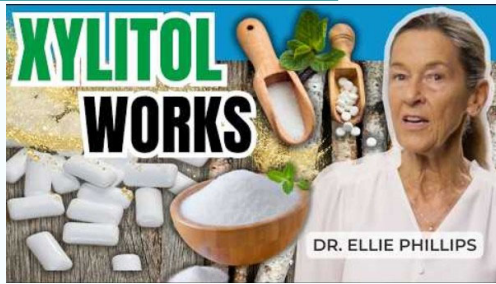
Courtesy of Dr. Ellie Phillips



<https://www.youtube.com/watch?v=gAoIFywXww&t=202s>

18

Xylitol



<https://www.youtube.com/watch?v=gAolFywXww&t=202s>

19

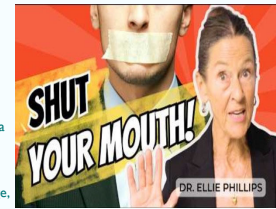
Xylitol

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Courtesy of Dr. Ellie Phillips



<https://www.youtube.com/watch?v=04UGxVU0PVs&t=175s>

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Xylitol

• A quote

"It is the time of sugars on teeth that causes caries. Sugar-time-on-teeth causes dysbiosis. Sugar-time-on-teeth causes plaque formation. Sugar-time-on-teeth causes demineralization. The dysbiosis can be transferred horizontally to young children before their plaque matures, and this can be prevented with xylitol. No?"

Peace and Thanks,
Jeremy

<https://groups.google.com/d/msgid/silver-caries-arrest/>

Dysbiosis is an imbalance in the types and numbers of microorganisms (bacteria, fungi, and viruses) living in a specific part of your body.

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Povidone Iodine (PVP-I)

- Benefits
- How It Works
- How To Use It



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Povidone Iodine (PVP-I)

• Benefits

- Broad Spectrum
- Activity Against Biofilms
- Lack of Resistance
- Positive influence on tissue repair
- Hemostyptic Actions
- Anti-inflammatory
- Anti-edematous
- Reduce *S. mutans* levels
- Chronic Periodontitis improved:
 - gingival conditions
 - reduced probing & pocket depth
 - increase attachment level



https://journals.iuhw.com/iuhw/fulltext/2020/13050/povidone-iodine-in-dental-and-oral-health_a-1-asx

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Povidone Iodine (PVP-I)

• Benefits

- Broad Spectrum: A study involving six bacterial species (*Porphyromonas gingivalis*, *Actinobacillus actinomycetemcomitans*, *Fusobacterium nucleatum*, *Tannerella forsythensis*, *Prevotella intermedia*, and *Streptococcus anginosus*) comparing PVP-I gargle and chlorhexidine mouthwash found that PVP-I reduced the viable cell count of all strains to below the limit of detection within 15s. This was superior to the results for chlorhexidine wash and demonstrated the rapid bactericidal activity of PVP-I against strains relevant to dental disease.
- Activity Against Biofilms: A combination of 10% PVP-I and 5% fluoride varnish was observed to reduce biofilm accumulation with repeated administration suggested to augment plaque control during dental rehabilitation in children.
- Lack of Resistance: No reported resistance to iodine and this is thought to be due to the sheer number and diversity of cellular targets that are susceptible to such oxidation.
- Positive influence on tissue repair: Is efficacious in the local control of infection in a dose-dependent manner, eliciting a positive influence on tissue repair and the healing of wounds.
- Hemostyptic Actions: Is useful in preventing localized site bleeding following oral surgery. Alveolar sockets irrigated using PVP-I following routine dental extraction, while those of the control group were irrigated with normal saline (0.9% w/v). The average time until bleeding cessation in the PVP-I group was 1:15:15, which was superior to the saline group at 1:15:15 ($P < 0.001$).



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Povidone Iodine (PVP-I)

• Benefits

- **Anti-inflammatory:** Studies have shown that PVP-I suppresses human neutrophil-mediated TNF- α release.
- **Anti-edematous:** The group that received 0.5% PVP-I solution (equivalent to 0.5mg/mL) experienced significantly reduced postoperative swelling ($P < 0.01$). Facial swelling in postoperative patients demonstrated reduced swelling over time, leading to reduced patient discomfort.
- **Reduce S. mutans levels:** Irrigation with PVP-I caused a significant reduction in the rise of S. mutans levels from the baseline score following 12 months of treatment. The reduction in counts resulted in a lower incidence of caries relapse in these children compared with the deionized water-irrigated controls.
- **Chronic Periodontitis improved:** Treatment with 0.1% PVP-I significantly improved all clinical endpoints tested. Importantly, these improvements were apparent at 3, 6, and 12 months after the initiation of treatment.
 - Improved gingival conditions
 - reduced probing & pocket depth
 - increase attachment level



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Povidone Iodine (PVP-I)

• Early Childhood Caries

- Povidone iodine is used as a topical antimicrobial agent in prevention of dental caries. Based on the study conducted by Simratvir et al. regular applications of 10% povidone iodine application can be a good alternative to control dental caries in children affected with ECC along with oral rehabilitation [32]. Lopez et al. concluded that periodic topical application of an iodine solution to the dentition of children at high risk for ECC should suppress dental S. mutans levels and in turn reduce risk for the development of ECC [33]. Bimonthly topical application of a 10% povidone iodine solution to the dentition of babies at high risk for ECC increased disease-free survival [34].
- Topical application of a 10% povidone iodine solution to the dentition of infants every 2 months in a double-blind, placebo-controlled clinical trial for 1 year increased the number of caries-free infants [35]. Povidone iodine solution being a water soluble compound liberates iodine which has antimicrobial action. The slow release of iodine from povidone iodine allows for long term antibacterial effect [36].

<https://pmc.ncbi.nlm.nih.gov/articles/PMC3950430/>



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Povidone Iodine (PVP-I)

• How it Works on Teeth

- Povidone-iodine (PVP-I) is a powerful, fast-acting antimicrobial agent that actively targets cavity-causing bacteria at the tooth level. By neutralizing cariogenic bacteria and disrupting plaque biofilms, it treats the underlying disease rather than just restoring the physical damage, making it a highly effective preventative tool.
- Bacterial Suppression: PVP-I drastically reduces the oral load of *Streptococcus mutans* and *Lactobacillus*, which are primarily responsible for enamel-destroying acid production.
- Biofilm Disruption: It inhibits the enzymes these bacteria use to stick to the enamel, preventing sticky buildup on smooth surfaces and interproximal spaces.
- Synergistic Action: While highly effective on its own, PVP-I works synergistically with fluoride. Applying a 10% PVP-I solution to teeth prior to a fluoride treatment can significantly enhance the cavity-reduction rate compared to using fluoride alone.

Current State of Topical Antimicrobial Therapy in Management of Early Childhood Caries

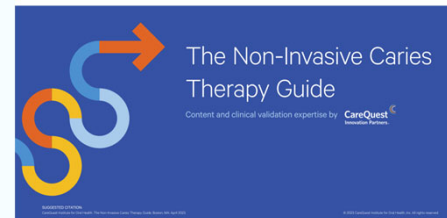
<https://pmc.ncbi.nlm.nih.gov/articles/PMC3950430/>



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Povidone Iodine (PVP-I)

• How to Use



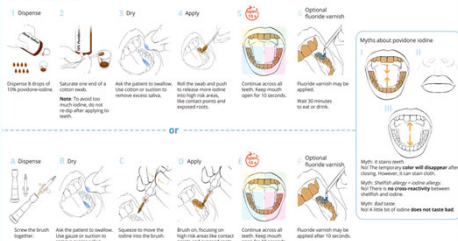
https://carequest.org/wp-content/uploads/2025/12/CareQuest_Institute_Non-Invasive-Caries-Therapy-Guide_071023.pdf

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Povidone Iodine (PVP-I)

• How to Use

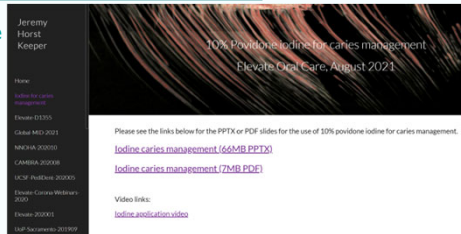
HOW TO Apply Povidone Iodine for caries prevention.



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Povidone Iodine (PVP-I)

• How to Use



Courtesy of Dr. Jeremy Horst-Keener

<https://sites.google.com/site/jeremyhorst/iodine-for-caries-management>

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Povidone Iodine (PVP-I)

- How to Use for ECC

Courtesy of Dr. Jeremy Horst-Keeper

Suggested Iodine frequency protocol

- For mild caries risk: none
This has got to be done at home.
- For mod-high caries risk: 4 times per year
- For severe caries risk: 4-6 times per year

Iodine treatment frequency protocol

- For 1-4 caries lesions: 1/wk for a month, 1/mo
- For 5+ caries lesions: 1/wk for a month, 2/mo
This has got to be done at home.

<https://sites.google.com/site/jeremyhorst-iodine-for-caries-management>

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Chemo-mechanical caries removal (CMCR)

- Brix3000
- Papacarie Duo

Brix3000 and Papacarie Duo are both chemomechanical caries removal (CMCR) gels used in dentistry to dissolve decayed tooth tissue without the need for a dental drill. While both rely on the enzyme papain, Brix3000 uses a higher-concentration, drill-free formula.

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Chemo-mechanical caries removal (CMCR)

- Brix3000
- Papacarie Duo

Brix 3000 and Papacarie Duo were more effective than hand excavation in reducing cariogenic bacteria, minimizing pain, and enhancing restoration longevity in immature permanent molars. Both CMCR methods supported favorable clinical, radiographic, and quality-of-life outcomes over one year.

One-year clinical and radiographic evaluation of young permanent molars treated with brix 3000 vs. papacarie duo: a randomized controlled clinical trial

Pascent H Hassanein¹, Abdel Wahab M Samaha², Azza S Zakaria³, Dalia M Talaat⁴

Affiliations: ¹ egypard, PMID: 4098041, PMID: PMIC149045, DOI: 10.1186/s12903-025-06715-7

<https://pubmed.ncbi.nlm.nih.gov/40988041/>

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Chemo-mechanical caries removal (CMCR)

- Papacarie Duo

Atraumatic Restorative Treatment with Papacarie Duo

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Atraumatic Restorative Treatment with Papacarie Duo

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Chemo-mechanical caries removal (CMCR)

- Papacarie Duo

'Jeanette MacLean' via Silver caries arrest <silver-caries-arrest@googlegroups.com> Sep 8, 2025, 1:25 PM

Here is a longer version of my ART with Papacarie Duo and EQUIA Forte video, in case it is helpful for any of you for teaching Atraumatic Restorative Treatment, Chemomechanical Caries Removal (CMCR), and glass hybrid restoratives. **Yes, you can do this multiple ways, no prep, spoon only, hand drill, slow speed,** etc. IMO the Papacarie is very helpful for easy and painless selective caries removal, which many of our colleagues struggle with desperately. This is sometimes necessary for better esthetics (in the case of shallow lesions in the esthetic zone) and durability (in the case of unsupported enamel that can chip over time). Yes, Hall technique would be another option.

'Jeanette MacLean' via Silver caries arrest Thu, Jan 22, 12:42 PM (5 days ago)

to Jeremy

It's a shame they didn't use Papacarie Duo, it works faster than Brix 3000. (I've used both)

Jeanette MacLean, DDS

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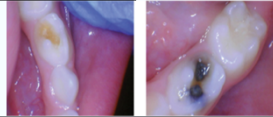
Silver Diamine Fluoride (SDF)

- SDF
- [SDF was approved by the FDA for sensitivity but can be used off label for caries arrest]
- Informed consent recommended
- Arrests about 90% of carious lesions
- Arrested lesions turn dark brown or black
- Recall 3-4 months to assess/reapply
- After lesion is arrested, consider glass ionomer filling if needed

SDF is likely to arrest cleansable lesions



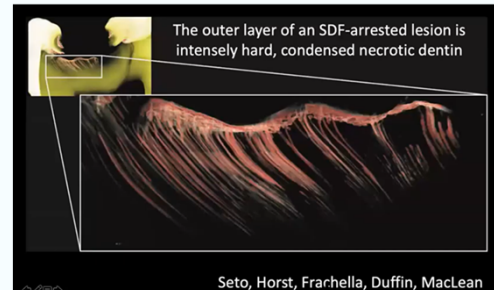
Cathy Bessie, Dr. Jeanette MacLean



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Silver Diamine Fluoride (SDF)

- SDF



Seto, Horst, Frarhella, Duffin, MacLean

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Silver Diamine Fluoride (SDF)

- SDF

When applied to a carious lesion, SDF has also been shown to decrease caries risk of adjacent tooth surfaces. (ADA)

Ulodra JC, Rodriguez A, Ferrer B, et al. Efficacy of silver diamine fluoride for caries reduction in primary teeth and first permanent molars of schoolchildren: 36-month clinical trial. J Dent Res 2005;84(8):721-4.

<https://www.ada.org/resources/research/science-and-research/institute/clinical-trials/topical-silver-diamine-fluoride-for-caries-prevention-in-primary-teeth-and-first-permanent-molars-of-schoolchildren>



Seto, Horst, Frarhella, Duffin, MacLean

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Silver Diamine Fluoride (SDF)

Non-invasive dentistry clinical decision tree



https://carequest.org/wp-content/uploads/2025/12/CareQuest_Institute_Non-Invasive-Caries-Therapy-Guide_071023.pdf

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Silver Diamine Fluoride (SDF)

- BlueCheck
- BlueCheck is a detection tool that identifies early-stage tooth decay, supporting preventive measures to preserve the natural tooth structure.



Five simple steps to detect caries



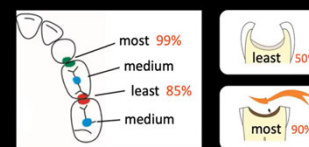
<https://www.bluecheckdental.com/resources>

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Silver Diamine Fluoride (SDF)

- Cleansability

Likelihood of SDF caries arrest = cleansability



Courtesy of Dr. Jeremy Horst-Keeper

Craig & Powell, Dental Outlook. 2013

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Silver Diamine Fluoride (SDF)

HOW TO
apply Silver Diamine Fluoride (SDF)
to initial, moderate, or advanced caries lesions.

1. Isolate: Isolate the tooth with cotton. Protect the eye.

2. Dry: Disinfect with 35% HCl for 30 seconds, thoroughly dry with cotton. Absorb excess water. No debris is removed.

3. Apply: Apply to dry caries lesions, repeat until lesion is SDF saturated. No cavity of filling.

4. Wait: Allow at least 10 seconds for SDF to absorb. During this time, it will turn black into the caries lesion and form a protective barrier.

5. Protect: Apply a protective resin coating. Remove excess with cotton. Repeat 3-5 times. Then restore cavity.

https://carequest.org/wp-content/uploads/2025/12/CareQuest_Institute_Non-Invasive-Caries-Therapy-Guide_071023.pdf

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Silver Diamine Fluoride (SDF)

SDF Follow Up

- Estimations of SDF effectiveness in arresting dental caries lesions range from 47 to 90 percent with one-time application depending on size of the cavity and tooth location.⁴⁻⁷
- Anterior teeth have higher rates of arrest than posterior teeth.⁵ Therefore, follow-up for evaluation of caries arrest is advisable.²⁻³
- Follow-up at two to four weeks after initial treatment to check the arrest of the lesions treated.
- Reapplication of SDF may be indicated if the treated lesions do not appear arrested (dark and hard). Additional SDF can be applied at recall appointments as needed, based on the color and hardness of the lesion or evidence of lesion progression.
- Caries lesions can be restored after treatment with SDF.
- When lesions are not restored after SDF therapy, biannual reapplication shows increased caries arrest rate versus a single application.

Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions*

https://www.aapd.org/media/PolicyGuidelines/R_ChairsideGuide.pdf

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Silver Diamine Fluoride (SDF)

HOW TO
differentiate Active vs. Arrested caries lesions (tooth decay / cavity)
by visual-tactile assessment of surface texture and topography.

ACTIVE non-cavitated lesions (initial)

- Surface texture: Rough, irregular, and sticky.
- Color: Yellow, brown, or black.
- Topography: Soft and sticky when touched.

ARRESTED non-cavitated lesions (initial)

- Surface texture: Smooth, shiny, and hard.
- Color: Yellow, brown, or black.
- Topography: Hard and smooth when touched.

ACTIVE cavitated lesion (moderate, advanced)

- Surface texture: Rough, irregular, and sticky.
- Color: Yellow, brown, or black.
- Topography: Soft and sticky when touched.

ARRESTED cavitated lesion (moderate, advanced)

- Surface texture: Smooth, shiny, and hard.
- Color: Yellow, brown, or black.
- Topography: Hard and smooth when touched.

https://carequest.org/wp-content/uploads/2025/12/CareQuest_Institute_Non-Invasive-Caries-Therapy-Guide_071023.pdf

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Silver Diamine Fluoride (SDF)

SDF Stain
[silver-carries-arrest] It works!
Jeremy Horst Keeper
Apr 10, 2026, 8:31 PM

I was sloppy. SDF stain set in by 30min. Powl swab, 15s, wet paper towel. These photos were taken literally less than a minute apart!

This is MUCH more effective than make-up remover or anything I've ever tried!!!

Peace and thanks,
Jeremy

Why does it work?
Ag⁺ and I⁻
The same reason we don't apply SDF and PVP-I on the same tooth or carious lesion.

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Silver Diamine Fluoride (SDF)

SDF vs Nanosilver Fluoride (NSF)
Jeremy Horst Keeper
Tue, Jan 13, 8:09 AM (12 days ago)

I'm still thinking that nanoAgF works, just not nearly as well as SDF. But for example way better than F varnish. We've seen most everyone back who we treated. Basically no lesions have grown! All initial lesions, but many d1's. Certainly as I said before it did not desensitize nor harden cavitated lesions.

But many of our patients we started on nano have chosen to continue with nano, instead of pivoting to SDF. We have not started anyone on nano since ~September. But I think it's not a topic we should completely drop.

In the prevention trial below, nanoAgF did worse than SDF, but massively better than control.

Peace and thanks,
Jeremy

Efficacy of Silver Diamine Fluoride and Nanosilver Fluoride in Preventing Caries: A Comparative Study
Priyanka Karande¹, Sameep Singh², Neel Mittal³, Binay Singh⁴, Ashish Arora⁵, Jyoti Patel⁶, Jyoti Ranjan Saini⁷
Affiliations: 1- Major II, PMOD-4152981; PMOD-4152981; PMOD-4152981; PMOD-4152981; PMOD-4152981; PMOD-4152981; PMOD-4152981
DOI: 10.4103/gjphs.1030.25
Epub 2025 Dec 17
<https://pubmed.ncbi.nlm.nih.gov/4152981/>

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Sealants

Sealants:

- Children and adolescents with sound occlusal surfaces, the use of pit-and-fissure sealants compared with nonuse of sealants, reduces the incidence of occlusal carious lesions in permanent molars by 76% after 2 to 3 years of follow-up

[https://jada.ada.org/article/S0002-8177\(16\)30473-1/fulltext](https://jada.ada.org/article/S0002-8177(16)30473-1/fulltext)

https://www.aapd.org/media/PolicyGuidelines/G_Sealants.pdf

<https://www.ada.org/resources/ada-library/oral-health-topics/dental-sealants>

SEALANTS WORK
Sealants on permanent molars reduce the risk of cavities by 80%.

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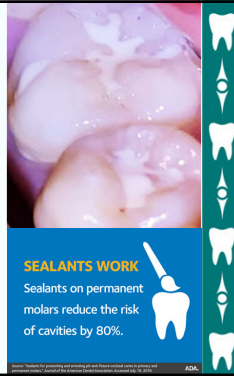
Sealants

• Sealants:

- Children and adolescents with sound occlusal surfaces, the use of pit-and-fissure sealants compared with nonuse of sealants, reduces the incidence of occlusal carious lesions in permanent molars by 76% after 2 to 3 years of follow-up
- On review of these studies, as well as review of other published sealant data and recent IADR abstracts, one could conclude that the **expected sealant loss from permanent molars is between 5 and 10% per year**. In addition, because caries risk returns after sealant loss, it's suggested that the caries rates for sealed teeth reflect the 5-10% loss multiplied by the usual population caries rates for pit and fissure surfaces.

<https://www.aapd.org/globalassets/media/publications/archives/feigal-20-02.pdf>

<https://www.ada.org/resources/ada-library/oral-health-topics/dental-sealants>



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Sealants

J Int Dent Fed. 2022 Aug;50(4):475-480. doi: 10.1111/jid.12586. Epub 2022 Jan 11.

Evaluation of the success rate of pit and fissure sealants on first molars: 12 months follow-up study

Ahmed Behnassen¹, Zahra Aghasadeh², Zahra Khalil Sadeghi³, Maryam Aghasadeh⁴, Val Alizadeh⁵, Zeynab Esmaili⁶, Marziyeh Piroozchi Agha⁷

Affiliations: ¹ - mspad

PMID: 34852322 DOI: 10.1111/jid.12586

• Sealants: Retention

- Materials and methods:** Sixty-five children were randomly selected. The **subjects had already received fissure sealants in the department of public health dentistry**. Demographic data, including age and gender, sealant failure and the type of failure were recorded in the relevant checklists. Feigl criteria were used to evaluate the success or failure of fissure sealant treatments.
- Results:** Overall success rate was 74.3% for 1 year. Evaluation of the failure rate showed that at the 3-month interval, 20.6% of the sealants exhibited failure (57.1% due to **margin discoloration** and 42.9% due to **lack of margin adaptation**). 28.6% of the sealants failed at the 6-month (75% due to marginal discoloration and 25% due to **anatomical form**) and 41.2% failed at the 12-month interval (57.1% due to marginal discoloration and 42.9% due to the lack of margin adaptation).
- Conclusion:** **The total failure rate of fissure sealant failures after 1 year was 27.7%. The most frequent reason for the failure of fissure sealants was marginal discoloration.**

How should we measure sealant failure?

<https://pubmed.ncbi.nlm.nih.gov/3490222/>

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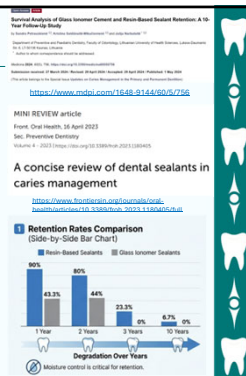
Sealants

• Sealants: Retention

Sealant Retention Rates Over Time

- How long dental sealants last depends largely on the material used and how well they are applied. Resin-based sealants tend to hold up much better than glass ionomer sealants. **Studies show that about 90% of resin-based sealants remain intact after one year, while glass ionomer sealants drop to just 43.3% retention in the same period [8].**
- Over time, both materials experience a decline in retention, but resin-based sealants consistently perform better. For example, after two years, resin sealants retain up to 80%, but this falls to 23.3% by three years. Glass ionomer sealants, on the other hand, retain about 44% at two years, dropping to 0% by three years [8][9]. A long-term study at the Lithuanian University of Health Sciences revealed that only 6.7% of resin-based sealants were still intact after ten years, whereas glass ionomer sealants showed no retention at all by that point [8].

<https://completeemilieu.com.au/research/dental-sealants-cavity-prevention/>



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Glass Ionomer

Glass Ionomer Cement Sealants by Dr. Jeanette MacLean

Home > Denttown Archives > July 2022 > Article

• GI Sealants:

• Key benefits

<https://www.dentaltown.com/magazine/articles/8683/glass-ionomer-cement-sealants>

1. **Hydrophilic.** **Glass ionomer sealants are hydrophilic and can be placed on a moist surface.** GIC works better in a wet field, making it easier for clinicians to handle. GIC can even be placed on partially erupted molars—a big no-no for resin. Instead of taking a few weeks to erupt, the process may take months or even years, trapping food under the operculum in the meantime, and sometimes decaying the permanent molar before it has fully erupted. These isolation issues are no longer a concern now that I've switched to hydrophilic GIC sealants.
2. **Fluoride release.** **GIC sealants release and recharge with fluoride, resulting in a caries prevention effect that is not retention-dependent.** Even when we think the bulk of a low-viscosity glass ionomer cement has disappeared, small particles remain in the bottoms of fissures, acting as fluoride reservoirs that enhance nearby enamel remineralization. After 28 days, enamel adjacent to GIC contains 1,181.03 parts per million more fluoride than enamel adjacent to fluoride-containing resin. Don't want LVGIC washout? Use a more wear-resistant high-viscosity glass ionomer cement (such as GC America's Fuji IX) or a glass hybrid restorative (such as GC America's Equia Forte).

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Glass Ionomer

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• GI Sealants:

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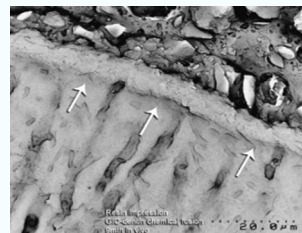
3. **Chemical bond.** **GIC sealants chemically bond to enamel via ionic crosslinking between the material and the tooth surface.** Using a 20% polyacrylic acid cavity conditioner before applying a GIC sealant increases chelation between the enamel and the GI matrix, establishing a more stable bonding surface. With scanning electron microscopy, you can see a **chemical fusion zone established between the enamel and GIC. Chemical bonds are superior to resin tags because they are not prone to detachment or marginal breakdown.** Over time, resin sealant can leak at the margins and develop caries underneath.
4. **Biocompatible and antimicrobial.** **Glass ionomer is the most tooth-like dental material we have.** GIC is antimicrobial, inhibits biofilm attachment and prevents damage from acid and bacteria on the tooth surface by creating an inhibition zone. Caries resistance from GIC at the cavosurface and adjacent smooth surface has been shown in both in vitro and in vivo studies.

Biomimetic materials, most tooth-like. Most culturally, most holistic appropriate care?

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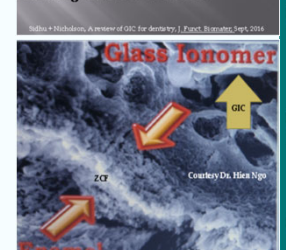
Glass Ionomer

• GI Zone of Fusion and Halo Effect:



SEM technique for examining the glass-ionomer cement chemical fusion zone. Mitchell G. Journal of Microscopy, Vol. 217, Pt 1 January 2005, pp. 44-48

"The **Zone of Chemical Fusion** is a permanent shield of increased Ca and P04 concentration between tooth structures +GIC which is much more resistant to cutting with a dental drill than original tooth structure"

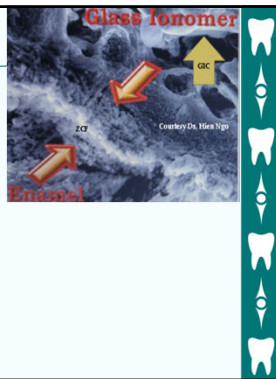


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Glass Ionomer

• GI Zone of Fusion (Q & A)

1. Is this zone of fusion the same for both dentin and enamel?
2. Particularly when using GI for sealants, is this chemical bond happening on all surfaces, depth of pit and fissures? I would imagine this is dependent on the polyacrylic acid (PAA) conditioner reaching the depths of the pits and fissures (surface tension)?
3. What is the life expectancy of the zone of fusion?



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Glass Ionomer

• GI Zone of Fusion (Q & A)

1. Yes, ZCF is the same for both enamel and dentin
2. Caveat: if the enamel surface is intact (no exposed dentin) condition with 38% phosphoric acid etchant for only 10 sec because PAA is too weak to condition aprismatic enamel often found in occlusal fissures and pits but NEVER use acid etchant on exposed dentin because after rinsing the etchant (with is 10,000X more acidic than PAA) leaches out all the minerals in dentinal tubules that you WANT to remain in those tubules to be able to transfer ionically with the exact same minerals that are in the GIC which is what creates the ZCF.
3. The ZCF is PERMANENT, no life expectancy, it IS the dentin/enamel. It is one-with not separate-from and in fact it absolutely cannot be separated.

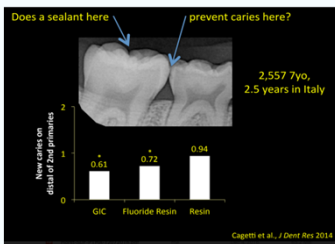


'John Frachella' via Silver caries arrest
<silver-caries-arrest

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Glass Ionomer

• GI Zone of Fusion and Halo Effect:



At baseline, no differences in caries prevalence were recorded in the 3 groups regarding the considered surfaces. At follow-up, the prevalence of an affected unit of analysis was statistically lower ($p = .03$) in the GIC and fluoride-RB groups ($p = .04$). In the GIC group, fewer new caries were observed in the unit of analysis respect to the other 2 groups.

<https://pubmed.ncbi.nlm.nih.gov/24846910/>

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Glass Ionomer

Glass Ionomer Cement Sealants by Dr. Jeanette MacLean

Home > DentalTown Archives > July 2022 > Article

• GI Sealants:

• Key benefits

<https://www.dentaltown.com/magazine/articles/8683/glass-ionomer-cement-sealants>

- A six-year study of a comprehensive, multicomponent, school-based prevention program with 6,927 children in 33 U.S. public elementary schools published in 2021 demonstrated a 50% reduction of untreated caries. This program is an excellent example of the public health benefit of GIC sealants, which were used along with dental examinations, twice-yearly prophylaxis, glass ionomer interim therapeutic restorations, fluoride varnish, toothbrushes, fluoride toothpaste, oral hygiene instruction, and referral to community dentists as needed.⁸

8. Starr, J.R., Ruff, R.R., Palmisano, J., Goodson, J.M., Bukhari, O.M., and Niederman, R. "Longitudinal Caries Prevalence in a Comprehensive, Multicomponent, School-Based Prevention Program." J Am Dent Assoc. 2021 Mar; 152(3): 224-233.

A model school program that utilized GI sealants plus more!!!

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Glass Ionomer

• GI Sealants:

- Conclusions: Resin-based and glass ionomer sealants exhibited similar retention rates at 24 months. However, marginal staining was lower in the glass ionomer group, and the authors found no caries in teeth in this group. Consequently glass ionomer sealants may be a better choice when salivary contamination is expected.

Randomized Controlled Trial > J Am Dent Assoc. 2012 Feb;143(2):115-22. doi: 10.14219/jada.archive.2012.0121.

Twenty-four month clinical evaluation of fissure sealants on partially erupted permanent first molars: glass ionomer versus resin-based sealant

Sibel A Antonsson¹, Donald E Antonsson, Sandra Brenner, Jude Crutchfield, Jose Laurimbe, Christie Michaud, A Riya Yazici, Patrick C Hardigan, Samira Alempour, David Evans, Rome Oranto

<https://pubmed.ncbi.nlm.nih.gov/22298552/>

When moisture control is not attainable!!



<https://www.aegidentalnetwork.com/id/2022/04/preventing-caries-in-partially-erupted-molars>

Dentistry

View Current Issue

Issue 15, Issue 4

Preventing Caries in Partially Erupted Molars

Issue 15, Issue 4

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Glass Ionomer

Blurred Res Int. 2022 Jun 20;2022:7205902. doi: 10.1016/j.blres.2022.7205902

Caries-Preventive Effect and Retention of Glass-Ionomer and Resin-Based Sealants: A Randomized Clinical Comparative Evaluation

Blurred User¹, Cohen-Givon², Benayahu³, Finkelshteyn⁴, Ben-David⁵

• Author Information • Article notes • Copyright and License Information

PMCID: PMC9238009 PMID: 35238025

<https://pmc.ncbi.nlm.nih.gov/articles/PMC9238009/>

• GI Sealants:

- It is important to note that the primary aim of fissure sealing is the protection of healthy fissures; therefore, the effectiveness of fissure sealants is the prevention of the occurrence of a cavitated lesion, and its surrogate endpoint may be the survival of the fissure sealant.

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Glass Ionomer

• GI Sealants:

- The success of a fissure sealant depends not on its retention but on its caries-preventive effect. It is thought that the anticaries effect of glass ionomer-based sealants could be related to the fact that they remain in the deepest parts of the fissures [17]. Also, the fluoride-releasing ability of the glass ionomers could impact the anticaries effect [18]. When the caries-preventive effect of glass ionomer-based fissure sealants was compared to that of resin-based sealants, no significant difference was found at 24-, 36-, and 48-month intervals [19]. However, a significant increase in the anticaries effect was found in favor of glass-ionomer sealants at the 60th month evaluation. Haznedaroglu et al. stated that the anticaries effect of glass ionomer-based fissure sealants was higher than resin-based sealants, although the retention rate of the former was significantly lower than the latter [20].

Caries-Preventive Effect and Retention of Glass-Ionomer and Resin-Based Sealants: A Randomized Clinical Comparative Evaluation

[Braz J Oral Maxillofac Surg](#) 2022; 76(1): 1-10

• Author information • Article notes • Copyright and License information
PMCID: PMC9236800 PMID: 35718402

<https://pmc.ncbi.nlm.nih.gov/articles/PMC9236800/>

How should
we measure
sealant
failure?

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Glass Ionomer

• The Little Things:

- John Frachella' via Silver caries arrest
- Mar 29, 2026, 9:18 AM
- to jahorst, silver-caries-arrest
- Then we taught Daniell not to "roll" GIC caps on a tabletop to "fluff" the glass pow inside, but rather to tap caps forcefully on hard surface.
- Cuz rolling causes heat, GIC sets exothermically, rolling will make it set faster which was an issue that Daniell had been facing .
- Also just saying to Daniell to "handle the caps as little as possible and don't store them in your pockets" made a light bulb turn on in her head.

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Glass Ionomer

• The Challenge:

- Pick a year and pull data of the number of patients that received resin sealants.
- Now pull those same patients two-three years later and see what percentage of them had an exam (D0120, D0145 or D0150 Code).
- This will give you a percentage of patients that had the opportunity to evaluate the retention of their resin sealants.
- Now subtract that number of those patients from the original data of patients who received resin sealants. These are the number of patient who did not have their sealants evaluated at two-three years.
- If 20% of resin sealants (higher?) fail at two years, how many sealants are out there that have failed that you don't know about?
- Test Case: 4 Portland Area Clinics placed sealants for a total of 414 patients (0-17 yo). Of those 153 or 37% did not receive an exam within 2-3 years.
- 20% of 153 is 31. That is number of patients, even more would be the number of failed sealants since multiple sealants are likely to be placed for each patient.

- Of the 153 patients, who has the failed sealant(s)?
- Would you have rather placed resin sealants or GI sealants?

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Chemical Desiccant Agents

• What are they?

- A specialized topical medication that rapidly draws moisture out of infected tissues and bacteria.
- It is used to destroy stubborn plaque biofilms and debride necrotic tissue without harming healthy underlying structures.
- These agents are highly effective for several reasons:
 - Biofilm Disruption: They break down the hydrated extracellular matrix that protects harmful bacteria, allowing the biofilm to be easily flushed away.
 - Selective Action: They coagulate and destroy dead cells and microbes, while leaving healthy, vital gingival tissue unharmed.
 - Key Ingredients: Most clinical formulas use a highly concentrated, safe mixture of sulfonated and sulfuric acids.

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Chemical Desiccant Agents

- Good to Know: HybenX vs. PerioDT
- HybenX: This is the underlying patented chemical technology and original brand developed by EPIEN Medical.
- PerioDT: This is a specific dental product line distributed by Young Specialties/Oral Science that utilizes HybenX technology and is specifically packaged for periodontics.

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HybenX (HBX)

• How it Works

- HBX exhibits antimicrobial activity against periodontal pathogen bacteria, and reduces inflammatory mediators associated with periodontitis [13].
- HBX represents a distinct adjunctive therapy used not only for its antiseptic effect but also as a biofilm-disrupting agent, applied prior to mechanical debridement.
- This application utilizes HBX's high affinity for water to effectively absorb the aqueous component of the biofilm, promoting its denaturation and subsequent disintegration; a crucial process, given the extensively documented resilience of mature biofilms against both mechanical disruption and chemical eradication [16,17].

antibiotics

Microbiological and Clinical Evaluation of the Efficacy of a Chemical Desiccant Agent in Non-Surgical Periodontal Treatment: A Randomized Controlled Clinical Trial

Alejo Padua¹, Gabriela Brancati², Anaelle Sigurdsson³, Elena Mendes⁴, Giovanni Cornejo⁵, Valeria Bellodi⁶, Gloria Baruchini⁷, Carolina Sigurdsson⁸ and Giorgio Lombardi⁹

<https://pmc.ncbi.nlm.nih.gov/articles/PMC12562174/>



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HybenX (HBX)

• Study and Benefits:

This randomized clinical trial investigated different treatment modalities, including conventional non-surgical periodontal therapy, and the application of a desiccating plaque agent (HybenX gel) in conjunction with full-mouth ultrasonic debridement as well as scaling and root planing, resulting in significant clinical improvements for all groups. Overall, positive results showed **greater reductions in PPD and CAL in the HBX-treated groups compared to the control group.** Notably, a single application of HBX yielded clinical results comparable to three applications; nevertheless, repeated applications achieved a more substantial bacterial reduction. These findings suggest that the inclusion of HBX in periodontal treatment protocols may enhance clinical outcomes and microbial control, potentially offering an effective adjunct to conventional periodontal therapy.

antibiotics

PMID:
Microbiological and Clinical Evaluation of the Efficacy of a Chemical Desiccant Agent in Non-Surgical Periodontal Treatment: A Randomized Controlled Clinical Trial
Alonso-Fernández^{1,2}, Caballero-Bascuñán¹, Asanuma-Sigüenza^{1,3,4,5}, Hara-Muñoz^{1,4,5}, Gómez-Cordero^{1,2}, Valenzuela-Rodriguez¹, Gómez-Rodríguez¹, García-Sagredo¹, and González-Lombardi^{1,2}
<https://pmc.ncbi.nlm.nih.gov/articles/PMC12562174/>



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HybenX (HBX)

• Study and Benefits:

- Materials and methods:** The present study involved 60 subjects diagnosed with chronic periodontitis who were randomly assigned as test groups (laser or HybenX) or control group (SRP alone). The primary outcomes of the clinical trial were pocket probing depth (PPD) and clinical attachment level (CAL), which was evaluated at baseline and at third-month time interval.
- Results:** Both the test groups demonstrated a **decrease in PPD and CAL. However, the HybenX group exhibited statistically significant reduction at the end of the third-month study interval compared to the laser group and SRP alone.**

Anti-infective Efficacy of Mechanical Debridement with Adjunctive Modalities on Clinical and Cytokine Parameters in Treatment of Chronic Periodontitis: Randomized Controlled Clinical Trial
Anjali Rajagopal¹, Jothi Varghese², Vinutha Bhat³, Vidha Acharya⁴, Vinayak Karanth⁵
Affiliations: 1- research
PMID: 37848071 PMCID: PMC11132771 DOI: 10.1055/s-0045-17725672
<https://pubmed.ncbi.nlm.nih.gov/37848071/>



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HybenX (HBX)

• Turbo-CR vs. PerioDT:

- Turbo-CR (Calculus Remover)**
 - Primary Use:** Softens and loosens stubborn, rock-hard calculus so it can be scaled off much more easily with hand instruments or ultrasonics.
- How It Works:** Uses patent-pending activated foaming technology that flows into tight interproximal spaces. It weakens the calculus without scratching enamel or damaging restorations.
- Application:** Can be applied directly to the tooth or placed in a disposable dental tray for 30–60 seconds.
- Patient Experience:** Features a minty flavor; significantly reduces the need for heavy hand scaling, and limits the noise/vibration of ultrasonic scalers, making it great for dental-anxious patients.

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HybenX (HBX)

• Turbo-CR vs. PerioDT:

- PerioDT (Biofilm Debridement)**
 - Primary Use:** A topical gel or liquid engineered to rapidly dehydrate and coagulate periodontal biofilm, making it vastly easier to remove during Scaling and Root Planing (SRP) or periodontal maintenance.
- How It Works:** Uses desiccation technology (sulfonated phenolics) to extract water from infectious microbes and necrotic material on contact. This helps clear out harmful pathogens and drastically reduces bleeding in the pocket.
- Application:** Applied topically to the treatment area. It is available in both a liquid and a slightly thicker gel consistency, depending on whether you need it to stay localized in a deep pocket or treat a broader area.
- Patient Experience:** No local anesthetic is required. By efficiently clearing bacteria, it helps set the stage for faster, more predictable periodontal wound healing.

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Questions!



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Thank you!

Northwest Tribal Dental Meeting CDE Information:

Course number will be **DE0993**

Completion Code will be: **Ally**



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