

SDF/SMART and Other Minimally Invasive Techniques

Choose Your Own Adventure 2026

Brooke MO Fukuoka DMD, DABSCD



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“I Do My Own Stunts”

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Thank You For Attending

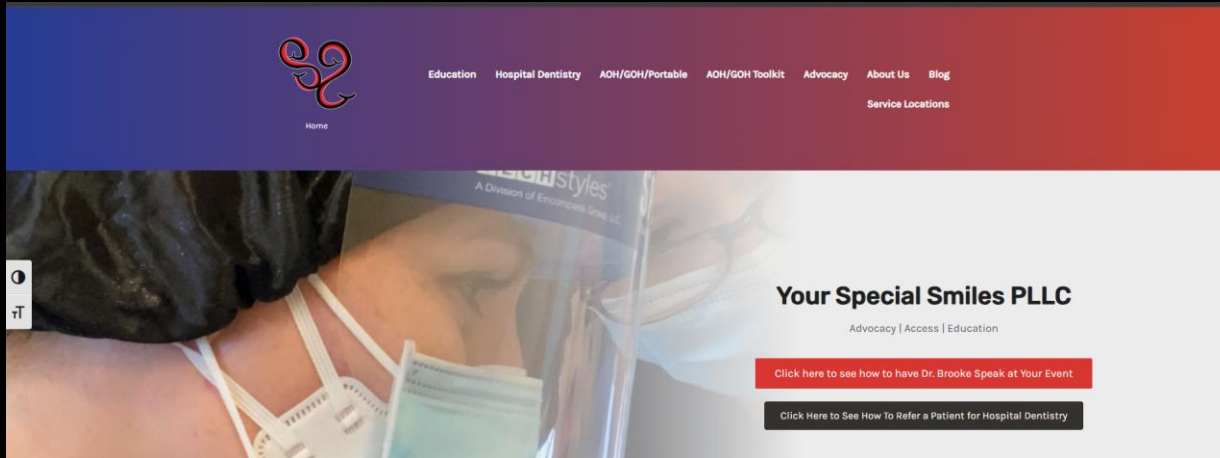
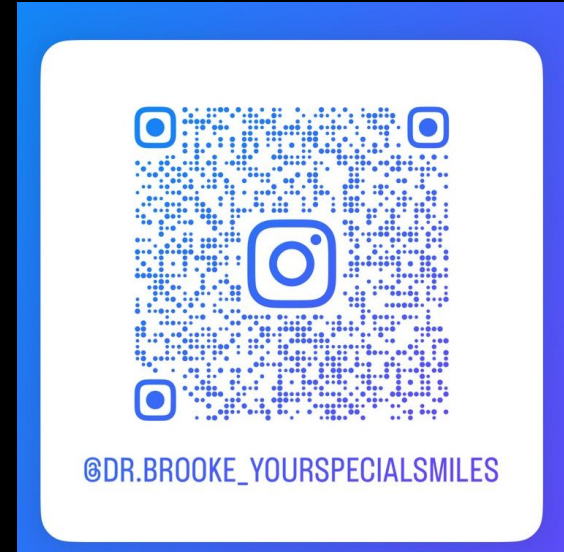
By attending this course YOU have helped improve the quality of life for residents of long-term care



Contact/Website/Social

Website: <https://www.yourspecialsmiles.com/>

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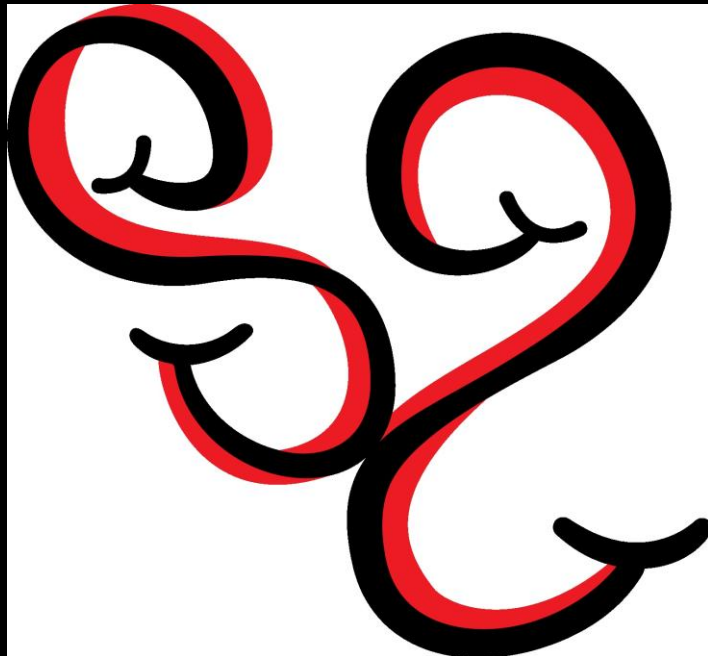


<https://www.facebook.com/brooke.fukuokaosgood/>



Dr. Brooke's Dental Life

Private Practice:
Owner



Federally Qualified Health Center :
Employee



Your Special Smiles PLLC

Portable: Hygiene



Assisted Oral Hygiene



Education



Family Health Services Advanced Delivery Dental Clinic



Innovative in Office Care

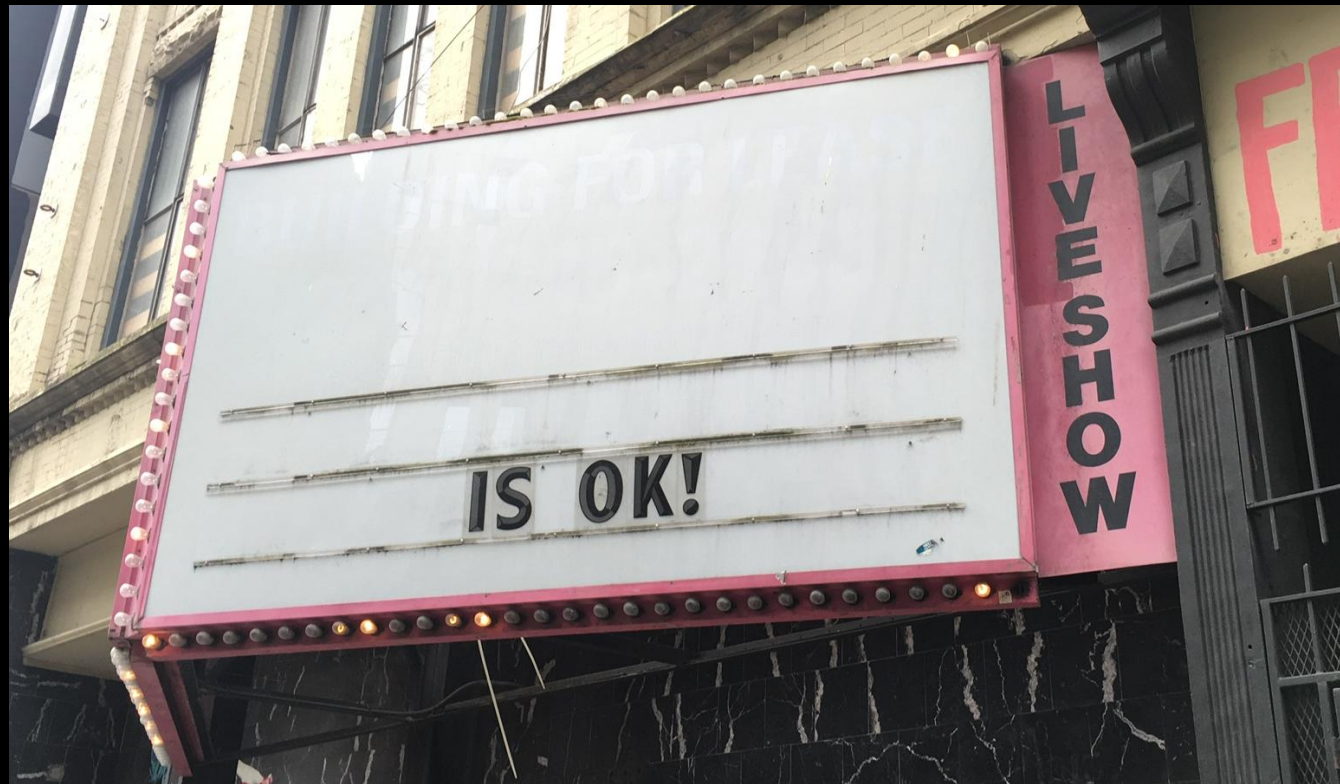


Hospital Care

<https://fhsid.org/locations/jerome/jerome-advanced-delivery-dental-clinic/>



What To Expect...



I am a practicing dentist who likes to learn and has found this useful



Choose YOUR Destiny...

SDF

Basic Science SDF and Fluoride

Comparing Protocols

Indications / Contraindications

Who is Applying SDF

Clean UP

Other MID Chemicals

Povidone Iodine

P1 1-4 Peptides & Resin Infiltrate

Hydroxyapatites & Recaldent

Caries Removal

Partial Caries Removal

Chemo-mechanical
caries removal

Glass Ionomer

GI Basic Science

GI Protocols

SMART Protocols

Failed SDF and SMART
Restorations

Other

Patient Stories

CDT Codes

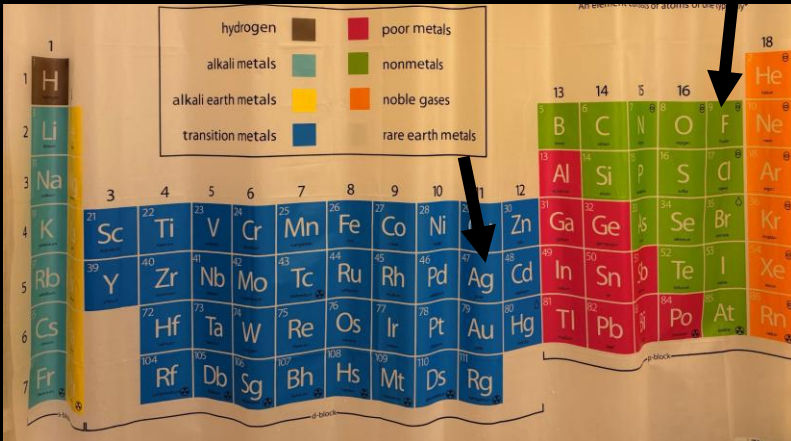
Caries Risk Sheet

Caninization

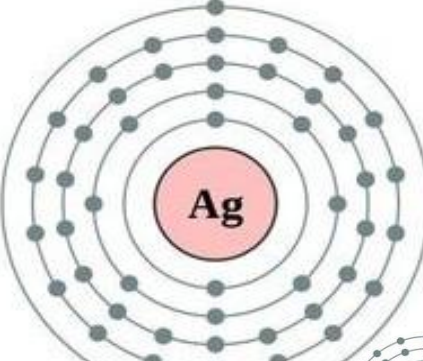
Chelation /
Desiccation



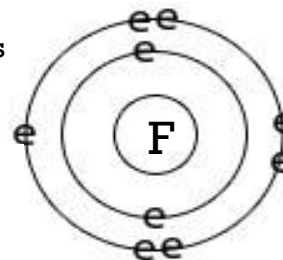
WHAT IS IN SDF?



38% $\text{Ag}(\text{NH}_3)_2\text{F}$
 5% - Fluoride
 8% - Ammonia
 25% - Silver
 62% - Water
 If Gel has
 carboxymethylcellulose < 2%
 If blue has FD&C Blue #1 < 1%
 *pH about 9
 If Riva Star Aqua- doesn't have ammonia

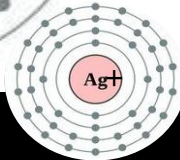


Silver
 Atomic # 47
 47 protons
 47 electrons
 61 neutrons

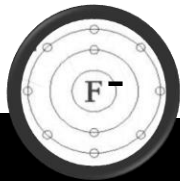


Fluorine
 Atomic # 9
 9 protons
 9 electrons
 10 neutrons

Shell	# e ⁻
1	2
2	8
3	8
4	18
5	18



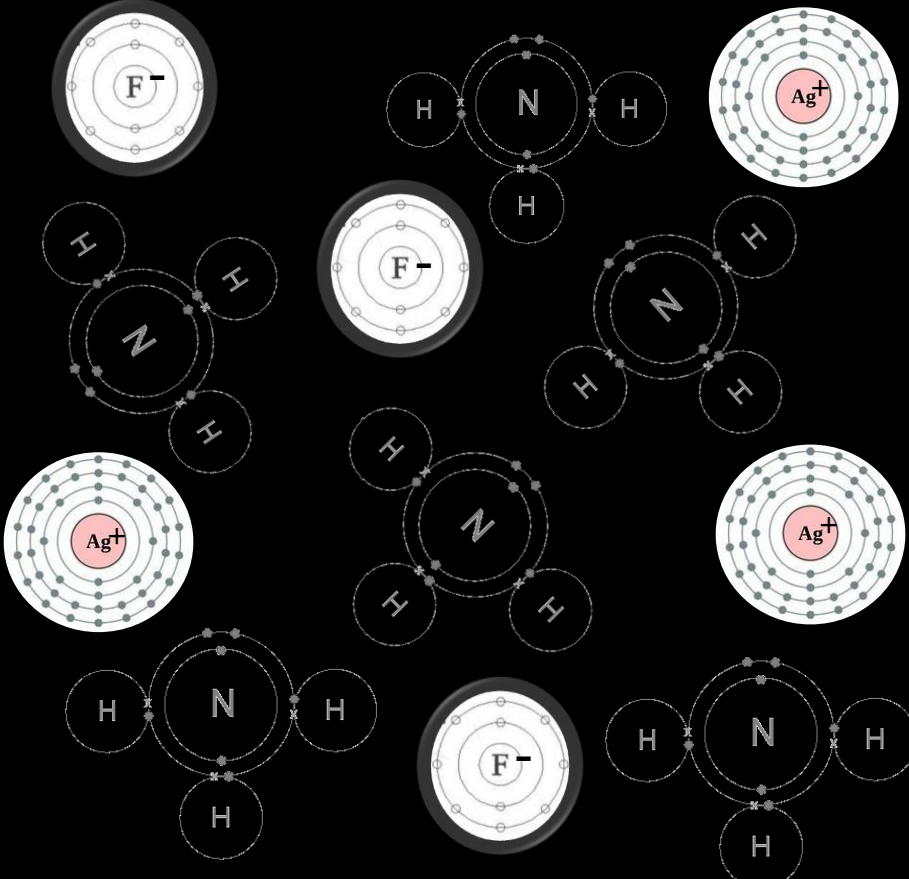
47 P, 46 E



9 P, 10 E

Silver and Fluoride Ions Dissolved in Ammonia

$\text{Ag}(\text{NH}_3)_2\text{F}$



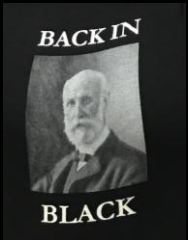
- Rosenblatt A, Stamford T.C.M., Niederman R. "Silver Diamine Fluoride: A Caries "Silver-Fluoride Bullet". *J Dent Res* 88(2):116-125. 2009 https://www.researchgate.net/publication/24194015_Silver_Diamine_Fluoride_A_Caries_Silver-Fluoride_Bullet/link/00b49525abb72534fb000000/download
- MSDS: <https://www.elevateoralecare.com/site/images/AdvantageArrestGELSDFS.pdf>
- Yan IG, Zheng FM, Gao SS, Duangthip D, Lo ECM, Chu CH. Ion Concentration of Silver Diamine Fluoride Solutions. *Int Dent J*. 2022 Dec;72(6):779-784. doi: 10.1016/j.identj.2022.04.005. Epub 2022 May 13. PMID: 35570012; PMCID: PMC9676425. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9676425/>



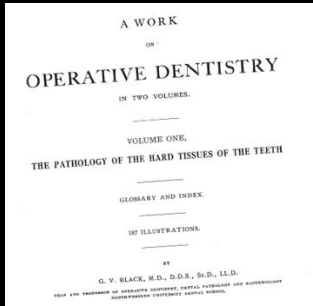
SILVER NITRATE + FLUORIDE VS SILVER DIAMINE FLUORIDE

Silver Nitrate + Fluoride
 $AgNO_3 + F^-$

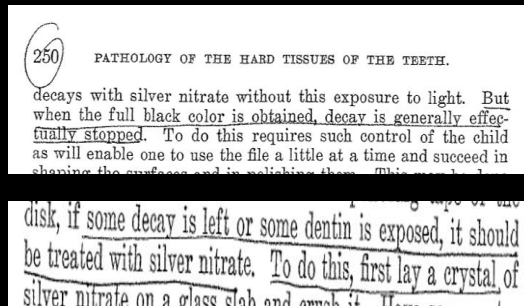
Silver Diamine Fluoride
 $Ag(NH_3)_2F$



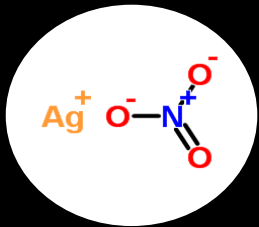
1920's



GV Black



9% - Nitrate
 16%- Silver
 75%- Water



+

2.5% -5%
 Fluoride varnish



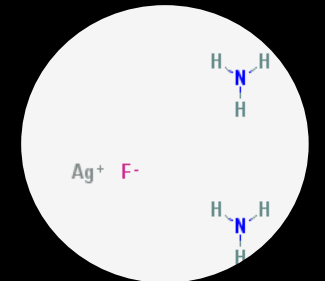
1960's (1963)



Mizuho Nishino

5% - Fluoride
 8% - Ammonia
 25%- Silver
 62% - Water

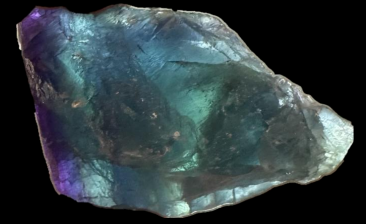
Gel: carboxymethylcellulose < 2%
 Blue: FD&C Blue #1 <1%



- Gao SS, Zhao IS, Duffin S, Duangthip D, Lo ECM, Chu CH. Revitalising Silver Nitrate for Caries Management. *Int J Environ Res Public Health*. 2018;15(1):80. Published 2018 Jan 6. doi:10.3390/ijerph15010080 <https://pubmed.ncbi.nlm.nih.gov/29316616/>
- MSDS: <https://www.elevateoralcare.com/site/images/AdvantageArrestGELSDDS.pdf>
- Watch her on YouTube: [LINK](#) (in Japanese but has English subtitles)



Fluoride Strengthens Tooth



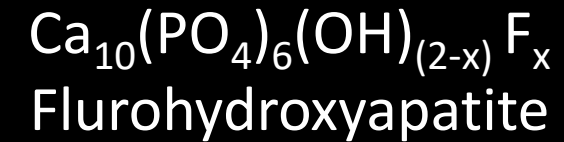
- Rosenblatt A, Stamford T.C.M., Niederman R. "Silver Diamine Fluoride: A Caries "Silver-Fluoride Bullet". *J Dent Res* 88(2):116-125. 2009 https://www.researchgate.net/publication/24194015_Silver_Diamine_Fluoride_A_Caries_Silver-Fluoride_Bullet/link/00b49525abb72534fb000000/download
- Lamia Mokeem, Abdulrahman A. Balhaddad, Isadora M. Garcia, Fabricio M. Collares, Mary Anne S. Melo, Emerging Nanomaterials and Nano-Based Drug Delivery Approaches to Combat Antimicrobial Resistance, Elsevier, 2022, Pages 661-700, ISBN 9780323907927, <https://doi.org/10.1016/B978-0-323-90792-7.00013-0>
- Walmsley, D. Restorative Dentistry. Second Edition 2007 , Chapter 7 , <https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/fluorapatite>
- Simmer JP, Hardy NC, Chinoy AF, Bartlett JD, Hu JC. How Fluoride Protects Dental Enamel from Demineralization. *J Int Soc Prev Community Dent.* 2020 Apr 2;10(2):134-141. doi: 10.4103/jispcd.jispcd_406_19. PMID: 32670900; PMCID: PMC7339990. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7339990/>



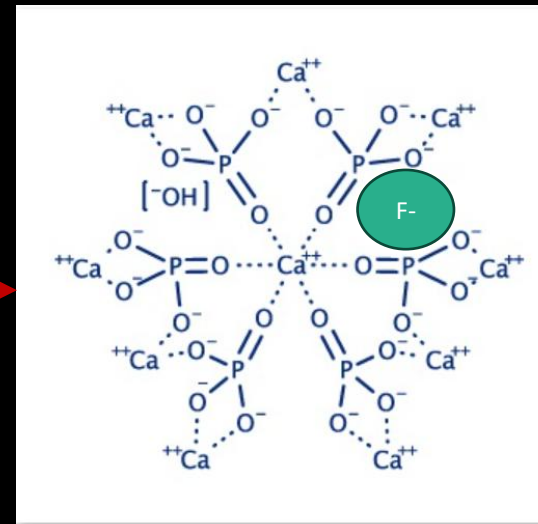
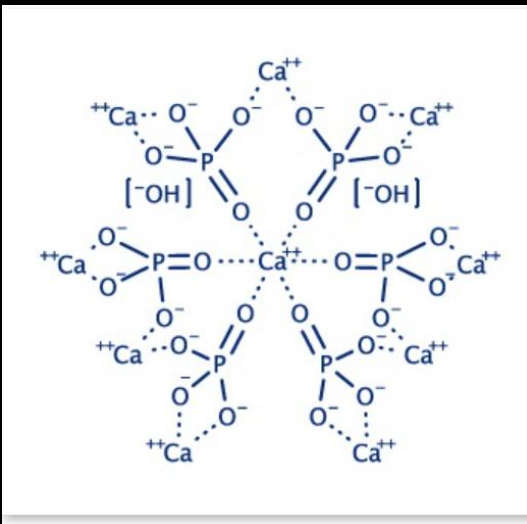
Fluoride: Strengthens Tooth



Critical pH = about 5.5



Critical pH = about 4.5



- Rosenblatt A, Stamford T.C.M., Niederman R. "Silver Diamine Fluoride: A Caries "Silver-Fluoride Bullet". *J Dent Res* 88(2):116-125. 2009 https://www.researchgate.net/publication/24194015_Silver_Diamine_Fluoride_A_Caries_Silver-Fluoride_Bullet/link/00b49525abb72534fb000000/download
- Lamia Mokeem, Abdulrahman A. Balhaddad, Isadora M. Garcia, Fabrício M. Collares, Mary Anne S. Melo, Emerging Nanomaterials and Nano-Based Drug Delivery Approaches to Combat Antimicrobial Resistance, Elsevier, 2022, Pages 661-700, ISBN 9780323907927, <https://doi.org/10.1016/B978-0-323-90792-7.00013-0>
- Walmsley, D. Restorative Dentistry. Second Edition 2007, Chapter 7, <https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/fluorapatite>
- Simmer JP, Hardy NC, Chinoy AF, Bartlett JD, Hu JC. How Fluoride Protects Dental Enamel from Demineralization. *J Int Soc Prev Community Dent.* 2020 Apr 2;10(2):134-141. doi: 10.4103/jispcd.JISPCD_406_19. PMID: 32670900; PMCID: PMC7339990. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7339990/>
- Mei ML, Nudelman F, Marzec B, Walker JM, Lo ECM, Walls AW, Chu CH. Formation of Fluorohydroxyapatite with Silver Diamine Fluoride. *J Dent Res.* 2017 Sep;96(10):1122-1128. doi: 10.1177/0022034517709738. Epub 2017 May 18. PMID: 28521107; PMCID: PMC5582683. <https://pubmed.ncbi.nlm.nih.gov/28521107/>
- Hydroxyapatite crystalline structure: <https://www.chromospheres.com/nano-hydroxyapatite-powder/>



Critical pH and pH Scale

Dentin (less inorganic) =6.5

Hydroxyapatite =5.5

Fluorohydroxyapatite =4.5

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 Stomach Acid
- 2 Lemon Juice
- 3 Coke/Pepsi
- 4 Orange juice / sour beer
- 5 Dr. Pepper
- 6 Tomato juice / ales
- 7 7 up / wheat beer/ lager
- 8 Black Coffee,/blonde ale
- IPAs / Pale ales/ brown ales
- Milk
- Pure water / blood
- Baking soda, sea water

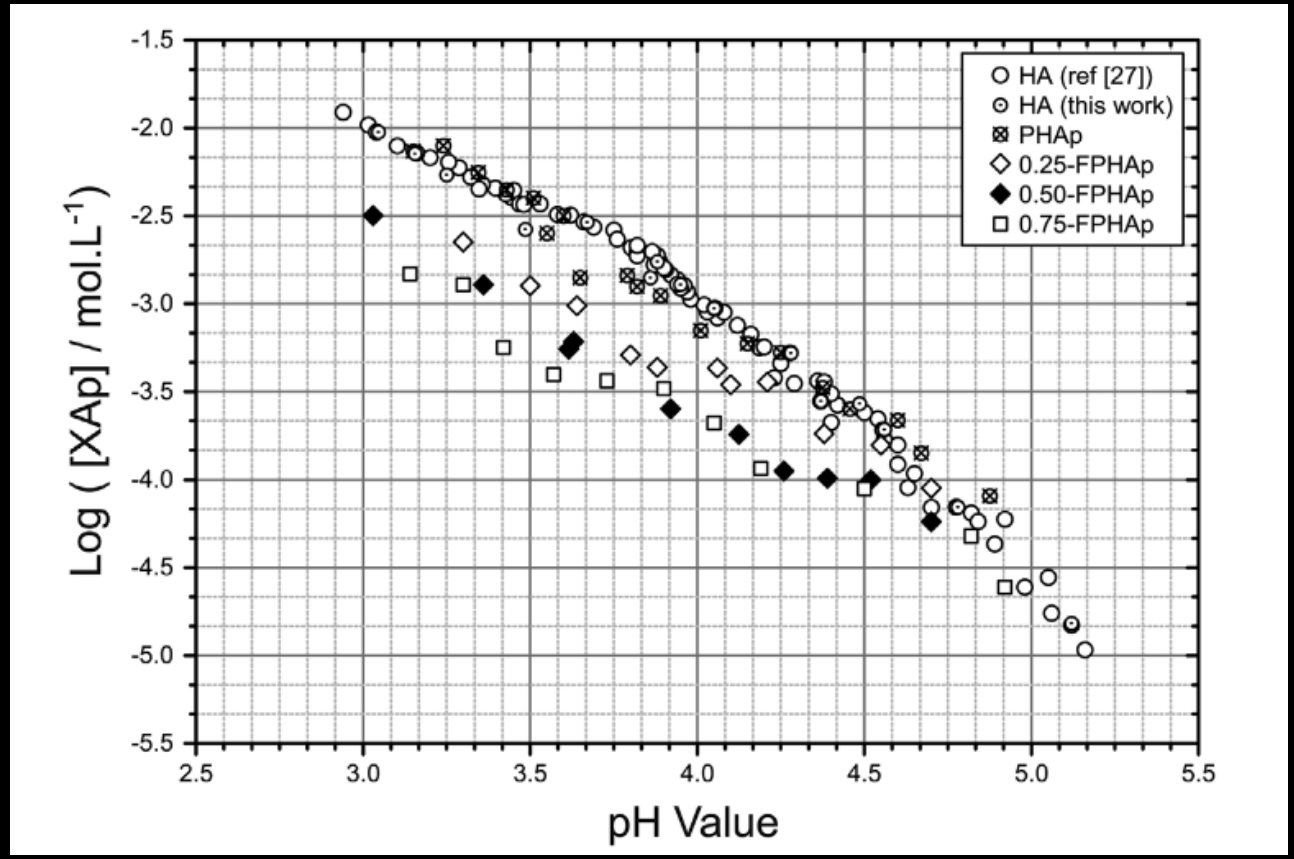
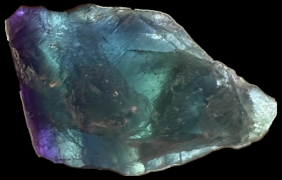


Figure 5. Solubility isotherms of PHAp, 0.25-FPHAp, 0.50-FPHAp, and 0.75-FPHAp 100 mM KCl solution at 37.0 ± 0.1°C by solid titration. Solubility data of stoichiometric HAp were shown for comparison.

• Qiao W, Liu Q, Li Z, Zhang H, Chen Z. Changes in physicochemical and biological properties of porcine bone derived hydroxyapatite induced by the incorporation of fluoride. Sci Technol Adv Mater. 2017 Feb 1;18(1):110-121. doi: 10.1080/14686996.2016.1263140. PMID: 28243337; PMCID: PMC5315024. <https://pmc.ncbi.nlm.nih.gov/articles/PMC5315024/>

• pH of common liquids: <https://www.epa.gov/goldkingmine/what-ph>

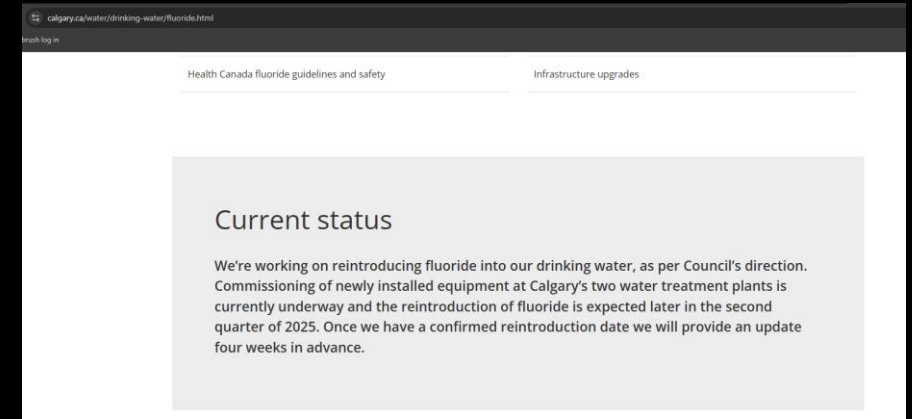
• pH of beers: <https://atlas-scientific.com/blog/ph-of-beer/?srsltid=AfmBOoplogFTWE40uMfE5NShKye51ndCrTptUwvIFSaOIS4pH8Z6NJL> * note porters range 3.5-5.5 so were not included, also note that the beers have ranges and were included only as examples.



Oh Canada...

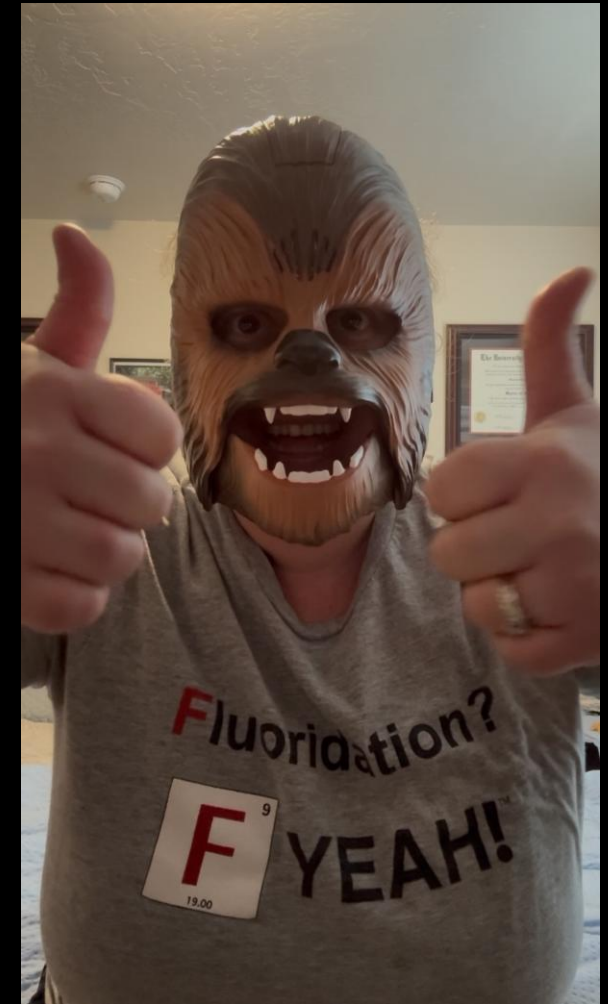
- In 2011 in Canada:
 - Calgary stopped fluoridating
 - Edmonton kept fluoridation
 - Now Calgary is working on putting it back...
 - Dr. Amanda is from Calgary...

- <https://www.cdc.gov/fluoridation/about/index.html>
- <https://www.cdc.gov/mmwr/preview/mmwrhtml/00016840.htm#:~:text=Annual%20costs%20of%20water%20fluoridation,serving%20fewer%20than%2010%2C000%20persons;>
- <https://ntp.niehs.nih.gov/whatwestudy/assessments/noncancer/completed/fluoride>
- <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2828425>
- https://nccd.cdc.gov/doh_mwf/default/default.aspx
- <https://www.thetimes.com/us/news-today/article/this-city-took-fluoride-out-of-the-water-now-its-putting-it-back-in-6gsgk63hf>
- <https://pmc.ncbi.nlm.nih.gov/articles/PMC9542152/>
- <https://www.calgary.ca/water/drinking-water/fluoride.html>



Basic Fluoride Info For Public Health

- CDC : 10 greatest public health measures of 20th century
- Ideal H₂O Fluoride: 0.7ppm
- Costs about 12-75 cents per person for communities over 10,000
- This website you can see your water's fluoride content https://nccd.cdc.gov/doh_mwf/default/default.aspx

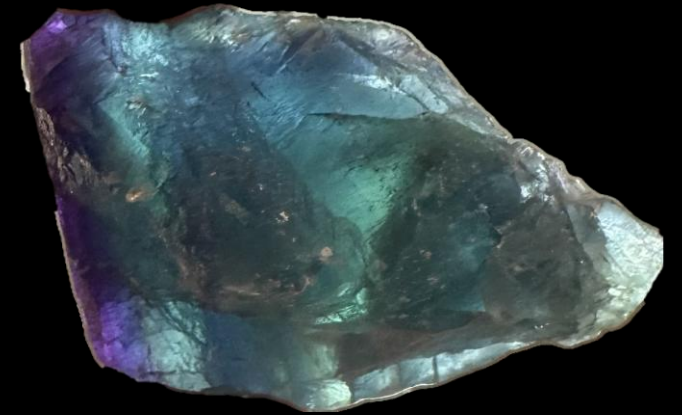


- <https://www.cdc.gov/fluoridation/about/index.html>
- <https://www.cdc.gov/mmwr/preview/mmwrhtml/00016840.htm#:~:text=Annual%20costs%20of%20water%20fluoridation,serving%20fewer%20than%2010%2C000%20persons;>
- <https://ntp.niehs.nih.gov/whatwestudy/assessments/noncancer/completed/fluoride>
- <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2828425>
- https://nccd.cdc.gov/doh_mwf/default/default.aspx
- <https://www.thetimes.com/us/news-today/article/this-city-took-fluoride-out-of-the-water-now-its-putting-it-back-in-6gsgk63hf>
- <https://pmc.ncbi.nlm.nih.gov/articles/PMC9542152/>
- <https://www.calgary.ca/water/drinking-water/fluoride.html>



Fluoride in Your Water: Fears

- “Fluoride in water is a manufacturing byproduct” - Kinda
 - Most common fluorides used in fluoridation
 - sodium fluoride
 - sodium fluorosilicate
 - fluorosilicic acid - this is a byproduct of phosphate fertilizer manufacturing
 - All chemicals added to water are purified and must meet standards from National Sanitation Foundation and American Water Works Association.
- “There was as study in JAMA...”
 - The study that looked at IQ looked at much higher (at least double the recommended) doses



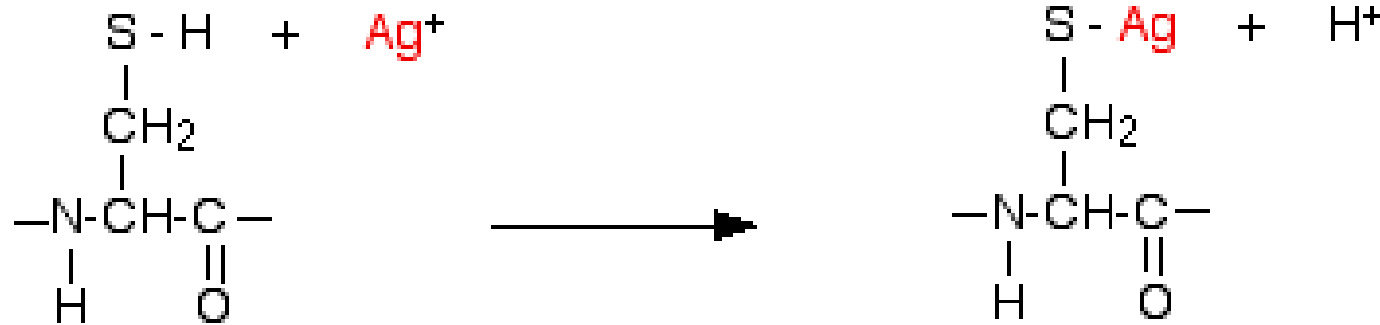
- <https://www.thetimes.com/us/news-today/article/this-city-took-flouride-out-of-the-water-now-its-putting-it-back-in-6gsgk63hf>
- <https://pubmed.ncbi.nlm.nih.gov/articles/PMC9542152/>
- <https://www.calgary.ca/water/drinking-water/fluoride.html>
- <https://www.in.gov/health/eph/water-fluoridation-program/fluoride-and-water-fluoridation-information/#>
- <https://www.awwa.org/policy-statement/fluoridation-of-public-water-supplies/>



Silver Fights Bacteria

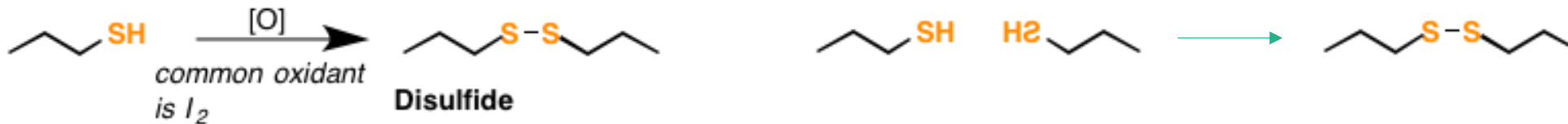
Silver Interacting with Thiol Groups (S-H groups) of DNA, RNA, Proteins and preventing disulfide bonds

- Disrupts Thiol Nucleic and Amino Acids
- Inhibits enzyme breakdown of organic matrix such as metalloproteinases and cathepsins
- Disrupts cell membranes and biofilm formation



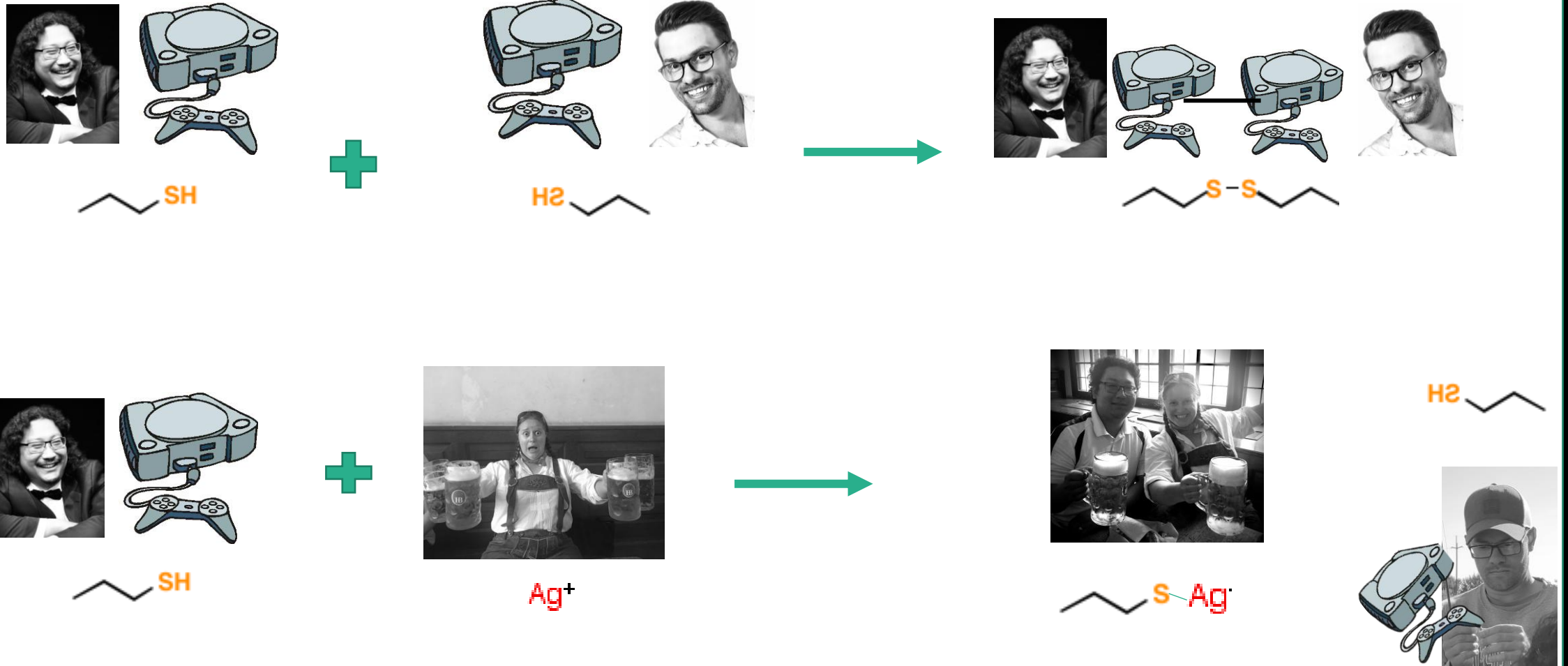
cysteine residue in protein chain

Oxidation to disulfides



Silver and Disulfide Bonds... explained

The function these men need to carry out is to win video games, when I come along and bring beer, I significantly decrease their ability to do that.



Zombie Effect

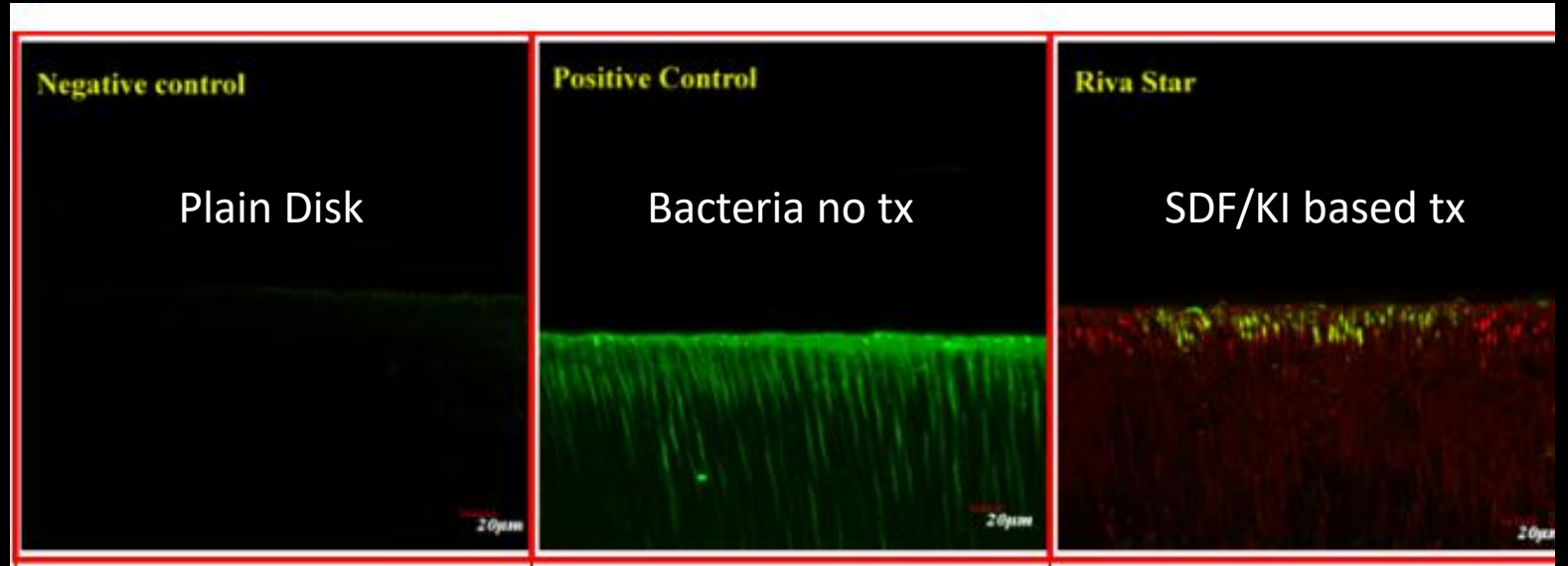
- When cell is infected with silver ions, it can disintegrate and release silver into the environment to kill other cells....



Can it Kill Bacteria? - YES

Live/Dead Stain
 Green is live bacteria
 Red is dead bacteria

	% Live bacteria	% Dead bacteria
Positive control	100.0	0.0
RS	43.9	56.1
CHX	81.0	19.0
CHX + RS	57.2	42.8
Carisolv	99.6	0.4
Carisolv + RS	72.3	27.7
Papacarie	80.5	19.5
Papacarie + RS	63.1	36.9



- Hamama H, Yiu CK, Burrow MF. Effect of silver diamine fluoride and potassium iodide on residual bacteria in dentinal tubules. Australian Dental Journal. 2015; 60(1):80–87.10.1111/adj * Abridged for simplicity <https://onlinelibrary.wiley.com/doi/10.1111/adj.12276>
- Carisolv is a combo of amino acids and NaOCl: Pai VS, Nadig RR, Jagadeesh T, Usha G, Karthik J, Sridhara K. Chemical analysis of dentin surfaces after Carisolv treatment. J Conserv Dent. 2009 Jul;12(3):118-22. doi: 10.4103/0972-0707.57636. PMID: 20543919; PMCID: PMC2879719. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2879719/#:~:text=Carisolv%20is%20a%20chemomechanical,Solution%20%20contains%200.5%25%20NaOCl>.
- Papacaries uses enzymes to be antimicrobial: Reddy MV, Shankar AJ, Pentakota VG, Kolli H, Ganta H, Katari PK. Efficacy of antimicrobial property of two commercially available chemomechanical caries removal agents (Carisolv and Papacarie): An ex vivo study. J Int Soc Prev Community Dent. 2015 May-Jun;5(3):183-9. doi: 10.4103/2231-0762.159955. PMID: 26236677; PMCID: PMC4515800 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4515800/#:~:text=%5B45%5D%20In%20case%20of%20Papacarie,presence%20of%20proteolytic%20cysteine%20enzymes>.
- Mubarak H, Ingle NA, Baseer MA, AlMugeiren OM, Mubarak S, Ciccù M, Minervini G. Effect of Silver Diamine Fluoride on Bacterial Biofilms-A Review including In Vitro and In Vivo Studies. Biomedicines. 2023 Jun 5;11(6):1641. doi: 10.3390/biomedicines11061641. PMID: 37371736; PMCID: PMC10296145. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10296145/>
- Hamama H, Yiu CK, Burrow MF. Effect of silver diamine fluoride and potassium iodide on residual bacteria in dentinal tubules. Australian Dental Journal. 2015; 60(1):80–87.10.1111/adj <https://onlinelibrary.wiley.com/doi/10.1111/adj.12276>



Other Cool Ways Silver is Used as Antimicrobial

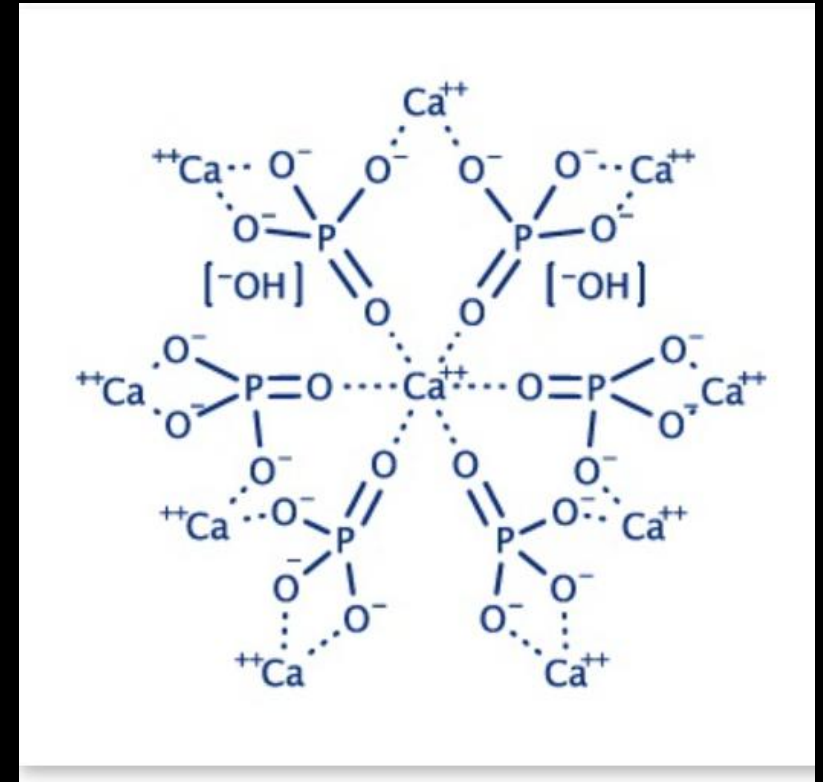


Back to Board



Hydroxyapatite = $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$

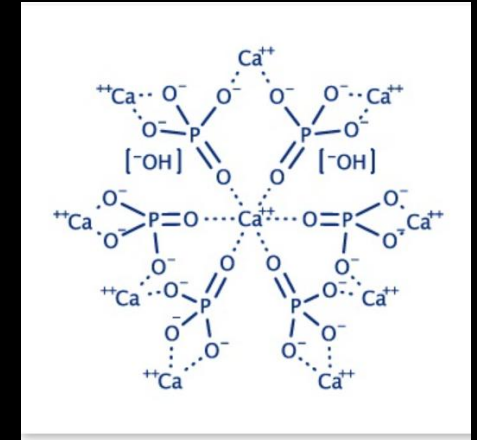
- The major part of inorganic component of teeth
 - Enamel 96%-97% inorganic
 - Dentin 65% -70% inorganic
- Shape:
 - Enamel: Shape and Size: Rods 20-50nm
 - Products: Shape and size vary (sphere, rod, irregular)
 - Micro: 5,000-10,000nm
 - Nano: 20-100 nm



- Pushpalatha C, Gayathri VS, Sowmya SV, Augustine D, Alamoudi A, Zidane B, Hassan Mohammad Albar N, Bhandi S. Nanohydroxyapatite in dentistry: A comprehensive review. Saudi Dent J. 2023 Sep;35(6):741-752. doi: 10.1016/j.sdentj.2023.05.018. Epub 2023 Jun 7. PMID: 37817794; PMCID: PMC10562112. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10562112/>
- Beniash, E., Stiffler, C.A., Sun, CY. *et al.* The hidden structure of human enamel. *Nat Commun* 10, 4383 (2019). <https://doi.org/10.1038/s41467-019-12185-7> <https://www.nature.com/articles/s41467-019-12185-7#:~:text=The%20elongated%20crystals%20are%20indeed,angle%20spread%20of%2090%C2%B0.>
- Chen L, Al-Bayatee S, Khurshid Z, Shavandi A, Brunton P, Ratnayake J. Hydroxyapatite in Oral Care Products-A Review. *Materials (Basel)*. 2021 Aug 27;14(17):4865. doi: 10.3390/ma14174865. PMID: 34500955; PMCID: PMC8432723. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8432723/#:~:text=Currently%2C%20there%20are%20two%20types,membrane%20%5B19%2C32%5D.>
- Vitiello F, Tosco V, Monterubbianesi R, Orilisi G, Gatto ML, Sparabombe S, Memé L, Mengucci P, Putignano A, Orsini G. Remineralization Efficacy of Four Remineralizing Agents on Artificial Enamel Lesions: SEM-EDS Investigation. *Materials (Basel)*. 2022 Jun 22;15(13):4398. doi: 10.3390/ma15134398. PMID: 35806523; PMCID: PMC9267358. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9267358/>



Micro-Hydroxyapatite vs Nano-Hydroxyapatite Size



Micro	Nano
Micrometer = micron = 1000nm	
Micrometer 1/1,000,000m (millionth)	Nanometer 1/1,000,000,000m (billionth)
Microparticles: 1-1000 micrometers (1000-1,000,000nm)	Nanoparticles: at least one direction smaller than 100nm
Micro-hydroxyapatite typically 5,000-10,000nm	Nano-hydroxyapatite particle size range : 20-100 nm

- National Nanotechnology Initiative: <https://www.nano.gov/about-nanotechnology/just-how-small-is-nano>
- National Nanotechnology Coordinated Infrastructure: <https://nncci.net/what-nano>
- Microparticles and Nanoparticles. Shalu Suri et al. Biomaterials Science (Third Edition) 2013 <https://www.sciencedirect.com/topics/engineering/microparticles>
- Bioresorbably polycrystalline in the medical and pharmaceutical fields S.A. Chew <https://www.sciencedirect.com/topics/materials-science/microparticle#:~:text=Concluding%20Remarks,small%20enough%20to%20be%20injectable>.
- Sebastian R, Paul ST, Azher U, Reddy D. Comparison of Remineralization Potential of Casein Phosphopeptide, Amorphous Calcium Phosphate, Nano-hydroxyapatite and Calcium Sucrose Phosphate on Artificial Enamel Lesions: An *In Vitro* Study. Int J Clin Pediatr Dent. 2022 Jan-Feb;15(1):69-73. doi: 10.5005/jp-journals-10005-2339. PMID: 35528489; PMCID: PMC9016902. <https://pubmed.ncbi.nlm.nih.gov/articles/PMC9016902/>
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Hydroxyapatite = $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$

- What it can do ?
 - Calcium and Phosphate Reservoir
 - If small enough :
 - Bind to Crystals as a Unit
 - Penetrate Collagenous Matrix
 - Interrupt pellicle formation, can bind to bacteria

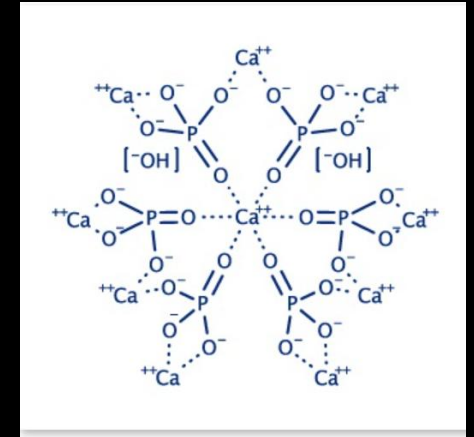


- Pushpalatha C, Gayathri VS, Sowmya SV, Augustine D, Alamoudi A, Zidane B, Hassan Mohammad Albar N, Bhandi S. Nanohydroxyapatite in dentistry: A comprehensive review. *Saudi Dent J.* 2023 Sep;35(6):741-752. doi: 10.1016/j.sdentj.2023.05.018. Epub 2023 Jun 7. PMID: 37817794; PMCID: PMC10562112. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10562112/>
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Nano-Hydroxyapatite vs Micro-Hydroxyapatite

- Hydroxyapatite crystals in tooth enamel are around **20-50nm wide**
 - primarily rod-shaped
 - 20-50nm wide but can be over 10 micrometers long
- Nano-hydroxyapatite particle size range : **20-100 nm**
 - Ideal size a between 20-50nm for remineralization
 - Ideal concentration 10% nano-hydroxyapatite
 - May show promise in penetrating bacteria
- Micro-hydroxyapatite typically **5-10 microns (5,000-10,000nm)**
 - Significantly LARGER THAN enamel hydroxyapatite crystals
 - May show promise in blocking pellicle receptors and having bacteria bind to them instead of forming pellicle



Beniash, E., Stiffler, C.A., Sun, C.Y. *et al.* The hidden structure of human enamel. *Nat Commun* 10, 4383 (2019). <https://doi.org/10.1038/s41467-019-12185-7> or find at <https://www.nature.com/articles/s41467-019-12185-7#:~:text=c%20Zoomed%2Din%20region%20in,large%20area%20of%20inner%20enamel>.

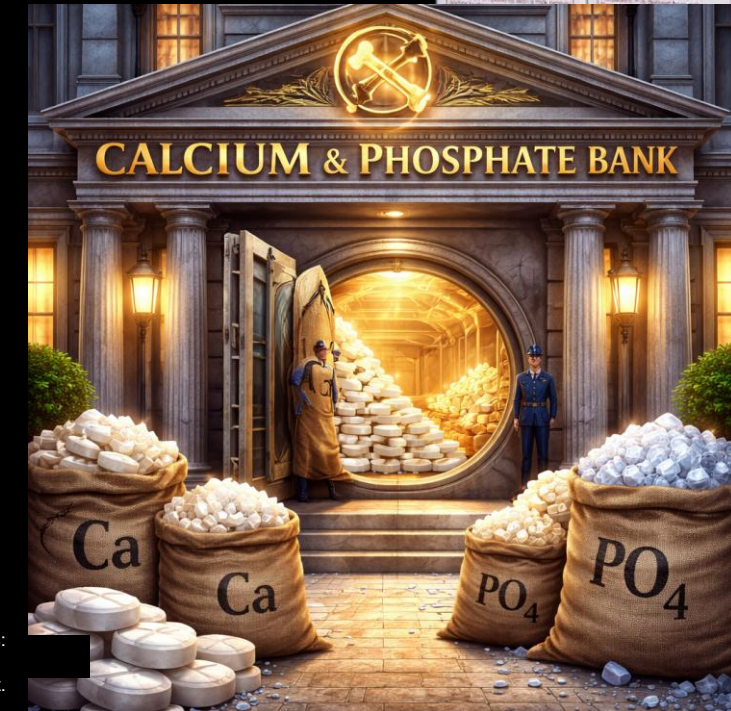
Chen L, Al-Bayatee S, Khurshid Z, Shavandi A, Brunton P, Ratnayake J. Hydroxyapatite in Oral Care Products-A Review. *Materials* (Basel). 2021 Aug 27;14(17):4865. doi: 10.3390/ma14174865. PMID: 34500955; PMCID: PMC8432723. <https://pubmed.ncbi.nlm.nih.gov/articles/PMC8432723/#:~:text=Currently%2C%20there%20are%20two%20types,membrane%20%5B19%2C32%5D>.

Huang, S.B. & Gao, S.S. & Yu, H.Y.. (2009). Effect of nano-hydroxyapatite concentration on remineralization of initial enamel lesion in vitro. *Biomedical materials* (Bristol, England). 4. 034104. 10.1088/1748-6041/4/3/034104. https://www.researchgate.net/publication/26268434_Effect_of_nano-hydroxyapatite_concentration_on_remineralization_of_initial_enamel_lesion_in_vitro



Recaldent: CPP-ACP (the stuff in MI Paste)

- CPP = Casein Phosphopeptide
 - Casein- cheese protein- inhibit bacteria adhesion to teeth
 - Stabilizes high concentrations of fluoride, calcium, and phosphate
 - Binds to pellicle, in low pH releases Ca^{2+} and PO_4^{3-}
- ACP = Amorphous Calcium Phosphate
 - supplies calcium and phosphate
- The idea is to maintain supersaturation of calcium and phosphate ions at the tooth surface for remineralization.



Pushpalatha C, Gayathri VS, Sowmya SV, Augustine D, Alamoudi A, Zidane B, Hassan Mohammad Albar N, Bhandi S. Nanohydroxyapatite in dentistry: A comprehensive review. Saudi Dent J. 2023 Sep;35(6):741-752. doi: 10.1016/j.sdentj.2023.05.018. Epub 2023 Jun 7. PMID: 37817794; PMCID: PMC10562112. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10562112/>

MI paste uses CPP-ACP <https://www.gc.dental/america/products/operator/operative/preventive/mi-paste>

Vitiello F, Tosco V, Monterubbianesi R, Orilisi G, Gatto ML, Sparabombe S, Memé L, Mengucci P, Putignano A, Orsini G. Remineralization Efficacy of Four Remineralizing Agents on Artificial Enamel Lesions: SEM-EDS Investigation. Materials (Basel). 2022 Jun 22;15(13):4398. doi: 10.3390/ma15134398. PMID: 35806523; PMCID: PMC9267358. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9267358/>

Wahba N, Schwendicke F, Kamel MA, Allam G, Kabil N, Elhennawy K. Preventing and Arresting Primary Tooth Enamel Lesions Using Self-Assembling Peptide P₁₁₋₄ *In Vitro*. J Int Soc Prev Community Dent. 2022 Jan 29;12(1):58-70. doi: 10.4103/jispcd.JISPCD_257_21. PMID: 35281691; PMCID: PMC8896585. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8896585/>

Imani MM, Safaei M, Afnaniesfandabad A, Moradpoor H, Sadeghi M, Golshah A, Sharifi R, Mozaffari HR. Efficacy of CPP-ACP and CPP-ACPF for Prevention and Remineralization of White Spot Lesions in Orthodontic Patients: a Systematic Review of Randomized Controlled Clinical Trials. Acta Inform Med. 2019 Sep;27(3):199-204. doi: 10.5455/aim.2019.27.199-204. PMID: 31762578; PMCID: PMC6853720. <https://pmc.ncbi.nlm.nih.gov/articles/PMC6853720/#:~:text=Results:WLS%20during/after%20orthodontic%20treatment.>



Highlighting part of a study looking at : nHA, vs CPP-ACP vs F Varnish



• Vitiello F, Tosco V, Monterubbianesi R, Orilisi G, Gatto ML, Sparabombe S, Memé L, Mengucci P, Putignano A, Orsini G. Remineralization Efficacy of Four Remineralizing Agents on Artificial Enamel Lesions: SEM-EDS Investigation. Materials (Basel). 2022 Jun 22;15(13):4398. doi: 10.3390/ma15134398. PMID: 35806523; PMCID: PMC9267358. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9267358/>



Dr. Brooke's Protocol:

Embrace the Black



Fantasy world – apply for 1-3 minutes

Re-Application / Monitoring: Success and Risk Based

4 minute very basic Caregiver Training YouTube Video : <https://youtu.be/hjq6goWEjhc>

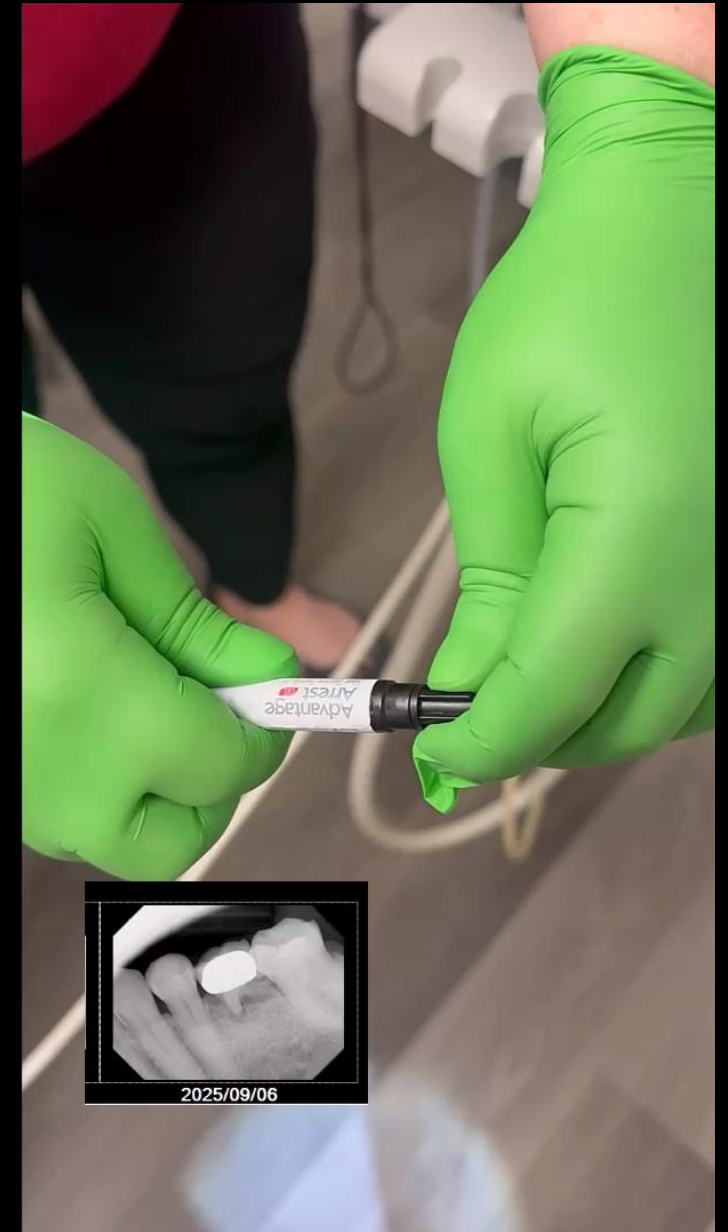


Random Application Tips:

- The drier the better
- Longer scrubs are more distracting (seems like less waiting)
- Interproximal:
 - Superfloss: Avoid Cat Whiskers
 - Wedges can make space
 - Micro brush with liquid in contacts
- Liquid vs Gel
 - More control with gel
 - More spread with liquid



New Cool Toy:



Comparison of 3 United States Product Insert Protocol

	Advantage Arrest	Riva Star	Centrix
Isolation:	Isolate affected area of tooth with cotton rolls or protect gingival tissue with petroleum jelly. Alternatively, rubber dam can be used	Use rubber dam or light curable gingival barrier, protect exposed gingiva with petroleum jelly/coco butter. When not using rubber dam isolate area with cotton rolls	Apply petroleum jelly or coco butter, or use cotton rolls to protect the gingival tissues, Alternatively a rubber dam can be used
Preparation:	Clean and dry affected tooth surface	Use non-fluoride prophylaxis paste in rubber cup and clean tooth /teeth to be treated and abutting teeth. Dry area to be treated and isolate	Clean and dry affected tooth surface *when possible we suggest removing soft infected dentin with an excavator or similar instrument to reduce potential for staining
Application	Transfer material directly to tooth surface with applicator	Carefully apply solution to treatment sites with medium sized micro brush	Transfer material directly to the tooth surface with supplied Centrix Benda Micro applicator
After:	Allow to air dry, do not rinse. If needed one or two re-applications may be administered at intervals of one week.	Immediately after step one dispense step 2 and apply generous amount, initially appears creamy white, keep applying step 2 until turns clear	Allow to air dry for 60 seconds, do not rinse. If needed one or two re-applications may be administered at intervals of one week.

- Advantage Arrest IFUs: <https://www.elevateoralcare.com/Application-Downloads>
- Riva Star IFUs: https://www.sdi.com.au/pdfs/instructions/es-sa/riva%20star_bottle_sdi_instructions_es-sa.pdf
- Centrix IFUs: [silversense-sdf-ifu.pdf](https://www.silversense.com.au/pdfs/instructions/es-sa/centrix%20sdf-ifu.pdf)



Advantage Arrest: Product Insert- Sensitivity

Advantage Arrest™

Silver Diamine Fluoride 38%
Professional Tooth Desensitizer

Rx Only

Desensitizing Ingredient: Aqueous Silver Diamine Fluoride, 38.3% to 43.2% w/v

Inactive Ingredients: Purified water, FD&C Blue 1

Clinical Pharmacology: Product forms insoluble precipitates with calcium or phosphate in the dentinal tubules to block nerve impulses.

Indication and Usage: Treatment of dentinal hypersensitivity. For use in adults over the age of 21.

Contraindications: This product is contraindicated in patients with ulcerative gingivitis or stomatitis, or known sensitivity to silver or other heavy-metal ions. Patients with more than six affected sites, patients having had full mouth gingivectomies and patients showing abnormal skin sensitization in daily circumstances are recommended for exclusion.

Warnings: This product is intended for local application only. Not for ingestion. Protect the patient's eyes. Use caution to avoid contact with skin or clothing. In the event of exposure to eyes or skin, flush the area copiously with water and immediately seek medical consultation. This product yielded positive cytotoxicity in standard testing.

Dosage and Administration:

1. Isolate the affected area of the tooth with cotton rolls or protect the gingival tissue of the affected tooth with petroleum jelly. Alternatively, a rubber dam can be used to isolate the area.
2. Clean and dry the affected tooth surface.
3. For up to 5 treated sites per patient, dispense 1-2 drops of solution into a disposable dappen dish. Transfer material directly to the tooth surface with an applicator.
4. Allow to air dry, do not rinse.

If needed, one or two reapplications may be administered at intervals of one week.



Riva Star: Product Insert - Sensitivity

SDI | **RIVA STAR**

**INSTRUCTIONS FOR USE
(BOTTLE)**

Riva Star is a dental cariostatic and desensitizing agent that detects and arrests carious lesions.

INDICATIONS FOR USE:

- A. Desensitising cervical tooth hypersensitivity.
- B. Arresting Caries
- C. Detection of carious lesions

CONTRA-INDICATIONS

Do not use on patients undergoing thyroid gland therapy, who have a history of chemical allergies such as silver, fluoride, potassium, iodine and ammonia. Note: If in doubt, consult a doctor or an allergy specialist before use.

Note: If the product is used in carious lesions or demineralized areas, the treatment site may present a darkening effect. The patients should be informed before treatment.

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PROCEDURE:

A. DESENSITISING CERVICAL TOOTH HYPERSENSITIVITY:

1. Assess the condition of the teeth. Only treat teeth with sound dentin and enamel unless a restorative material is will be used to cover the treated area.
2. Using a non-fluoride prophylaxis paste in a rubber cup, clean the tooth/teeth to be treated and adjacent teeth.
3. Dry the area to be treated and isolate it using rubber dam or a light curable gingival barrier (SDI Limited).
4. Protect any exposed gingival tissues and lips with petroleum jelly/ cocoa butter taking care not to contaminate treatment site. When not using rubber dam, isolate adjacent area with cotton rolls.

NOTE 1: Make sure that the area where the Riva Star will be applied is well isolated to prevent product flowing to the adjacent teeth.

NOTE 2: If the product seeps into a tooth that has decayed tissue, it may stain.

5. **Riva Star Step 1:** Dispense one (1) drop of the solution on a non-absorbent mixing pad or dappen dish. (**grey** label)
6. Carefully apply solution to treatment site only, a medium sized micro brush, such as Points (SDI Limited) is recommended.
7. **Riva Star Step 2:** Immediately after, dispense two (2) drops of solution on a new non-absorbent mixing pad or glass Dappen. (**green** label)
8. Apply a generous amount of the solution to the treatment site. It is recommended to use a medium micro brush such as Points (SDI). Apply the same solution to other surfaces dental products that may have come into contact with the **Riva Star Step 1** solution (**grey** label).
Note: The surface being treated will initially be creamy white, continue applying the Riva Star Step 2 solution (**green** label) until it is clear.
9. Blot dry.
10. Remove all protective/isolation materials used in the mouth.
11. Clean dappen dishes and discard used mixing pads and micro-brushes in accordance with local regulations.

IMPORTANT : Ensure that both Step 1 and Step 2 bottle surfaces (Eg : tip, neck, thread and inside the cap) are wiped thoroughly with an absorbent paper towel to remove any excess solution and prevent build up of dried material.

On website also has instructions for arresting carries

B a). ARRESTING CARIES WITHOUT RESTORING TOOTH:

Note: If used on carious lesions or demineralised dentition, treatment site will stain or slightly discolour. Patients must be informed of this prior to treatment. Ideally keep treatment away from aesthetic zone.

1. **Using a non-fluoridated prophylaxis paste in a rubber, clean the teeth to be treated and the adjacent teeth.**
2. Dry area to be treated and isolate it using rubber dam or a light curable gingival barrier (SDI Limited).
3. Protect any exposed gingival tissues and lips with petroleum jelly/ cocoa butter taking care not to contaminate treatment site. When not using rubber dam, isolate area with cotton rolls.
4. Remove any food debris using an excavator.

NOTE 1: Make sure that the region where the Riva Star will be applied is well insulated to prevent product flow to the adjacent teeth.

NOTE 2: If the product seeps into a tooth that has decayed tissue, it may stain.

5. **Riva Star Step 1:** Dispense one (1) drop of the solution on a non-absorbent mixing pad or dappen dish. (**grey** label)
 6. **Carefully apply the solution only to the treatment site, keeping in contact with the carious lesion for 60 seconds, It is recommended to use a medium micro brush such as Points (SDI).**
 7. **Riva Star Step 2:** Immediately after, dispense two (2) drops of solution (**green** label) onto fresh non-absorbent mixing pad or dappen dish.
 8. Apply a generous amount of the solution to treatment site, a medium sized micro brush is recommended, such as Points (SDI Limited). Apply same solution to any other tooth surfaces that may have come into contact with the **Riva Star Step 1** solution (**grey** label). Note: Treatment surface initially appears creamy white, keep applying **Riva Star Step 2** solution (**green** label) until it turns clear. (It is possible that a residual yellowish matt or brownish surface may remain).
 9. Remove all protective/isolation materials used in the mouth.
 10. Blot dry.
- IMPORTANT: Ensure that both Step 1 and Step 2 bottle surfaces (Eg: tip, neck, thread and inside the cap) are wiped thoroughly with an absorbent paper towel to remove any excess solution and prevent build up of dried material.**
11. Reschedule patient to return for permanent restoration procedure. For deciduous teeth, wait for teeth to exfoliate
 12. Clean dappen dishes and discard used mix pads and micro-brushes in accordance with local regulations.

Some studies show a decrease in staining with KI

• https://www.sdi.com.au/pdfs/instructions/es-sa/riva%20star_bottle_sdi_instructions_es-sa.pdf

• Karaduran, B., Çelik, S., Gök, M.K. *et al.* Evaluation of staining potential of Silver Diamine Fluoride, Potassium Iodide, Nanosilver Fluoride: an in vitro study. *BMC Oral Health* **24**, 699 (2024).

<https://doi.org/10.1186/s12903-024-04370-y> and found at <https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-024-04370-y#citeas>

• Patel J, Anthonappa RP, King NM. Evaluation of the staining potential of silver diamine fluoride: in vitro. *Int J Paediatr Dent*. 2018 Jul 4. doi: 10.1111/ipd.12401. Epub ahead of print. PMID: 29974546.

<https://pubmed.ncbi.nlm.nih.gov/29974546/>



Centrix: Silver Sense SDF- Sensitivity

SilverSense SDF™ 38% Silver Diamine Fluoride

INSTRUCTIONS FOR USE

REF 310172 SilverSense SDF Standard Kit 1 x 5 mL bottle
REF 310173 SilverSense SDF Clinic Kit 3 x 5 mL bottle



PROFESSIONAL TOOTH DESENSITIZER

DESENSITIZING INGREDIENT: Aqueous Silver Diamine Fluoride, 38.3% to 43.2% w/v.

OTHER INGREDIENTS: Purified water, food-grade green colorant.

DESCRIPTION: Amber dropper bottle of 5 mL of SilverSense SDF solution for a dosage of 0.03 mL per drop. Product forms insoluble precipitates with calcium or phosphate in the dentinal tubules to block nerve impulses.

INDICATIONS FOR USE: Treatment of dentinal hypersensitivity for use in adults over the age of 21.

CONTRAINDICATIONS:

1. Patients with ulcerative gingivitis or stomatitis or known sensitivity to silver or other heavy-metal ions.
2. Patients with six or more affected sites, or patients having had full-mouth gingivectomies.
3. Patients showing abnormal skin sensitization in daily circumstances.

DIRECTIONS:

1. Isolate the affected area of the tooth following the recommended precautions.
2. Clean and dry the affected tooth surface.
3. For up to 5 treated sites per patient, dispense 1-2 drops of solution into a disposable dappen dish. Use care to avoid getting the solution onto soft tissue or spilling on counters or clothing, and transfer material directly to the tooth surface with the supplied Centrix Benda® Micro applicator.
4. Allow to air dry for 60 seconds, do not rinse. If needed, one or two re-applications may be administered at intervals of one week.

NOTE: When possible, we suggest removing soft infected dentin with an excavator, or similar instrument, to reduce the potential for staining.

WARNINGS: SilverSense SDF is intended for local application only. Not for ingestion. Protect the patient's eyes. Use caution to avoid contact with skin or clothing. In the event of exposure to eyes or skin, flush the area copiously with water and immediately seek medical consultation. This product yielded positive cytotoxicity in standard laboratory testing.

PRECAUTIONS FOR USE:

1. SilverSense SDF does not normally stain enamel or burnished dentin. Advise patients that soft dentin or margins of composite restorations may be stained. Staining may be reversed by gentle polishing with a tincture of iodine (weak iodine solution).
2. Advise patients that air-drying and product application can cause momentary transient pain to hypersensitive areas.
3. Minimize product contact with gingiva and mucous membrane by using recommended amounts and careful application, as transient but rare irritation of the gingiva has been reported. Apply petroleum jelly or cocoa butter, or use cotton rolls, to protect the gingival tissues. Alternatively, a rubber dam can be used to isolate the area.
4. SilverSense SDF has a blue tint to increase visibility during application.
5. When dosing, ensure SilverSense SDF is kept separate and not confused with other colored liquids, such as etchants and tooth conditioners.

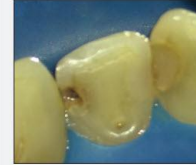
PRECAUTIONS FOR HANDLING:

1. Store in original packaging in a cool, dark place. Do not freeze or expose to extreme heat.
2. Replace cap immediately after use. Use as soon as dispensed.
3. SilverSense SDF will stain skin, clothes, countertops, floors and instruments brown or black. Refer to the following for stain removal:
 - Skin; wash immediately with water, soap, ammonia or iodine tincture and then rinse thoroughly with water. Do not use excessive methods in an attempt to remove difficult stains from skin as the stains will eventually fade.
 - Clothing/Countertops/Floors/Instruments; use the same procedure as with stained skin. Difficult stains may be treated with sodium hypochlorite.
 - Use caution to avoid transferring the material from gloved hands to other surfaces.
4. After SilverSense SDF is dispensed into a separate container, be sure to wash or thoroughly wipe the container clean immediately after use.

CENTRIXDENTAL.COM/IFU-SDS FOR SAFETY DATA SHEET (SDS)

SilverSense SDF™ 38% Silver Diamine Fluoride

FAST & EASY TO USE!



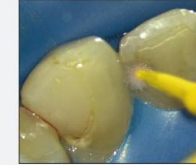
STEP 1:

- Ensure the tooth is clean and dry.
- Isolate the tooth (rubber dam or cotton roll).
 - Remove excess plaque.
 - Dry the affected area with a cotton pellet.



STEP 2:

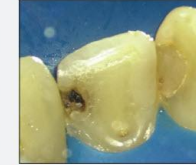
- Place 1-2 drops of SilverSense SDF into a disposable dappen dish. Tinted blue for increased visibility.



STEP 3:

- Apply SilverSense SDF directly to the affected tooth surface with a Benda® Micro applicator. Reapply until the lesion stays wet.

For approximal surfaces, apply to embrasures. SilverSense SDF will wick into the lesion.



STEP 4:

- Allow to air dry for 60 seconds. **Do not rinse.** Remove excess SilverSense SDF with a cotton pellet.



Comparison of International Product Insert Protocols

	Caristop 30% Brazil	E-SDF 38% India	Saforide 38% Japan	FAGamin 38% Argentina	Topamine 38% Australia
<u>Isolation:</u>	Protect gingiva and mucosa with petroleum jelly or rubber dam	Protect gingiva and mucosa with petroleum jelly, isolate tooth	Use cotton roll and saliva ejector if high saliva flow, if by gingiva use rubber dam or apply vasoline or similar material	In cases where carious tissue is near gingival tissue cover with vasoline or coco butter	Protect gingiva with petroleum jelly or cocoa butter and use cotton rolls, alternatively can use rubber dam
<u>Preparation:</u>	Clean with water or prophylaxis with pumice, dry lesion	Dry lesion	Clean with oxygenated water. Clean by rubber cup and dentifrice if necessary, wipe away moisture and dry with air syringe,	Wash and dry tooth.	Clean and dry gasoline affected tooth
<u>Application:</u>	Apply SDF directly to lesion 2-3 minutes	Apply SDF to lesion, use superfloss for proximal lesions	Apply to lesion for 3-4 minutes (180-240 sec)	Apply with swab or brush and leave to act for a few minutes rubbing the applied area	Transfer directly to tooth surface with micro applicator
<u>After:</u>	Leave 120-180 seconds then wash	Leave 60-180 seconds	After applying for 3-4 minutes rinse with water	Rinse well	Air dry

* Riva Star is also in Australia, see US product comparisons for their info

- Caristop IFUs: https://www.biodinamica.com.br/IU/000004_IU-CARISTOP.pdf
- E SDF IFUs:
- Saforide: IFUs sent by Japanese company. PDF available upon request.
- FAGamine IFUs: https://tedequim.com/wp-content/uploads/InstruccionUso_FAGamin_ESP_ENG.pdf
- Topamine IFUs: <https://www.matrixdental.com.au/doc/products/044-PPS-Topamine-SDF-v20240109.pdf>
- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". International Dental Journal 72 (2022) 579-588 <https://pmc.ncbi.nlm.nih.gov/articles/PMC9485517/>
- Yan IG, Zheng FM, Gao SS, Duangthip D, Lo ECM, Chu CH. Ion Concentration of Silver Diamine Fluoride Solutions. Int Dent J. 2022 Dec;72(6):779-784. doi: 10.1016/j.identj.2022.04.005. Epub 2022 May 13. PMID: 35570012; PMCID: PMC9676425. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9676425/>



Caristop 38% (Brazil) : IFUs

CARISTOP

Cariostatic

biodinâmica®

CONTENTS:

1x10 mL flask **CARISTOP 12%**.

or

1X5 mL flask **CARISTOP 30%**.

or

1X5 mL flask **CARISTOP 38%**.

Reg. ANVISA: 10298550048.

COMPOSITION:

Fluoridric Acid, Silver Nitrate, Amonia Hydroxide and Deionized Water.

INDICATION:

Inhibiting agent from dental decay;

Prevention and inhibiting of dental decay in children;

For night feeding cases (when kids eat at night and do not brush their teeth appropriately);

Preventing secondary decays after amalgam restorations or melt down blocks;

Prevention of decays in pits and fissures;

As dentin desensitizer.

TECHNICAL INFORMATION:

Silver Fluoride solution 12%, 30% and 38% in amoniacal environment performance the strength of the enamel structure by forming CaF_2 (calcium fluoride) and Ag_3PO_4 (silver phosphate), through its reaction with dental structure. Besides, there is the formation of proteical complexes of silver on the tooth surface. Preventing action is related to Fluoride ion and controlling action with Silver ion. Cariostatic action is obtained by the stimulation of dentin sclerosis, not allowing the progress of dental decay. Antimicrobial action is given mainly because its action over *S. Mutans*.

Researches and studies reported a reduction of 65% of decays in molars when cariostatics are applied every three months.

USE INSTRUCTIONS:

I - Intensive treatment:

4 applications: 1 per week during from 1 to 4 minutes according to the age.

II - Maintenance treatment:

1 application every 6 or 12 months.

Techniques or procedures

1. Clean or prophylaxis with water and pumice powder;
2. Protection of soft tissues with vaseline or rubber dam;
3. Dry and apply the product during 2 - 3 minutes;
4. Wash.

SPECIAL CARES:

- Product is highly concentrated and caustic (pH 8,5). Protect soft tissues with vaseline or rubber dam.

- Presents secondary reaction regarding dental coloration (black stains) in the places where there are decays or structural failure, then it is not recommended to be used in permanent dentition.

- Protect yourself to avoid stains in the fingers and clothes when manipulating the product or its package.

NOTE: Repeat procedure at least once again and keep control over the patient.

SPECIAL RECOMMENDATIONS:

In case of accidental stains in skin apply on it a solution of Iodine tincture.

Dispose the product in accordance with local regulations, ensuring its complete distortion, preventing its reuse and environment damages.

CONTRAINDICATION:

CARISTOP should not be used in patients is known to have sensibility to any of the ingredients listed.

WARNINGS:

Do not use material after expiry date.

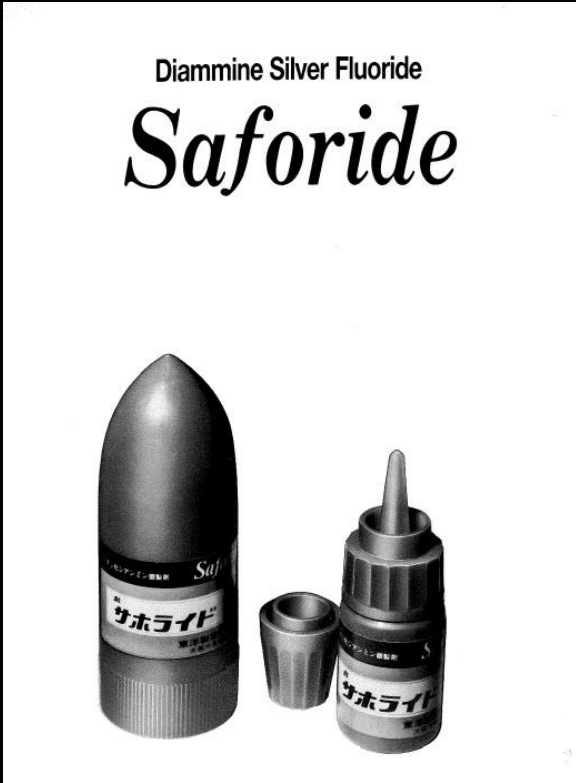
The manufacturer is not liable for damages caused by improper use or use not provided at these instructions.

"KEEP MATERIAL OUT OF THE REACH OF CHILDREN".

FOR USE IN DENTISTRY ONLY



Saforide 38% (Japan): IFUs



General Application Method of SAFORIDE

- Cleaning of the lesion**
Clean enough the lesion with oxygenated water in accordance with the conventional method. Clean by a rubber cup and a dentifrice, if necessary. (Fig. 1 and 2)
- Exclusion of moisture and drying**
Exclude moisture simply with a cotton roll, and use a saliva ejector, if necessary. Wipe away moisture from the surface with a cotton pellet, and dry with an air syringe. (Fig. 3)
- Application of SAFORIDE**
Apply SAFORIDE with a cotton pellet to the lesion allowing to rub for about 3 – 4 minutes. (Fig. 4)
- Procedure after application of SAFORIDE**
Remove the cotton roll. If necessary, the patient may be allowed to wash the mouth with water or saline solution. Reduction is not necessary after application of the agent.



1



2



3



4



A. Prevention and arrestment of caries of the deciduous teeth
Remove the softened dentin of carious lesion with a spoon excavator, and clean and dry the lesion according to conventional method. Apply SAFORIDE to the lesion according to the general application method and allow to react for 3 – 4 minutes. Repeat the application up to 3 times at 2 – 7 day intervals.

Perform filling for deep cavities. Cavities requiring no filling should be examined (e.g. for hardness) periodically once every six months, and SAFORIDE should be applied depending on the condition of the lesion. A greater effect is encouraged by the application following slice-cut at the proximal surface which improves self-cleansing action.

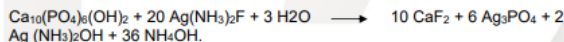


FAgamin 38% (Argentina) & Topamine (Australia) IFUs

FAgamin®
Antibacterial, remineralization, desensitizing
agent to inhibit and arrest dental caries.
Professional use only.

Description:

FAgamin® contains Silver diamine fluoride (Ag (NH₃)₂F). Other similar products used in caries prevention and dental hypersensitivity have several disadvantages in opposition to **FAgamin®**. When applying silver nitrate (AgNO₃) or sodium fluoride (NaF), the dental enamel hydroxyapatite dissociates resulting in soluble calcium and phosphate ions. The action on teeth of silver diamine fluoride is based on the chemical reaction with hydroxyapatite.



Calcium fluoride (CaF₂) and silver phosphate (Ag₃PO₄) form deposit over the tooth surface, reinforcing and protecting it. This explains the remineralizable effect of **FAgamin®**.

The silver ion (Ag⁺) inhibits the development of bacteria and has an anti-enzymatic action. The ammonia stabilizes the silver ions by forming a complex and keeping them in aqueous solution, giving a basic pH. On the other hand, the fluoride ion decreases the solubility of hydroxyapatite and inhibits the development of already formed caries. In case of applying **FAgamin®** on a cavity, a black deposit is formed due to the reaction of silver ions with organic matter. That's why it also acts as a caries detector.

FAgamin® has a wide range of clinical applications due to its chemical composition. Some of these are: old teeth enamel and caries nearby dentin remineralization, caries detection and arrest, incipient and old caries inhibition, dental hypersensitivity desensitization. It also has bactericidal and antiseptic action.

Furthermore, **FAgamin®** offers a practical, easy and quick topical method for dental caries treatment on temporary teeth.

Applications:

It is applied in temporary teeth, in incipient or rampant caries, in pits and fissures (after widening) if the dentist deems it convenient, in cavity preparations for prosthesis, crowns, dies, fixed bridges. It can be applied in root canals diluting it (1:10 with distilled water).

In patients with severe cognitive and physical disabilities and patients with dental phobias.

Instruction for use:

Wash and dry the tooth before starting treatment.

FAgamin® is applied using a swab or brush impregnated with 2 or 3 drops of the product. It is placed on the area of the tooth to be treated, left to act for a few minutes by rubbing the applied area. Finally, rinse well to remove traces of the solution.

To avoid the contact of **FAgamin®** with the mucous membrane, isolate it with a cotton pellet or rubber dump.

In cases where the carious tissue is near gingival tissue, cover it with vaseline or cacao butter.

In incipient caries, **FAgamin®** is applied only once, but in other cases more than one application may be necessary.

Handling care:

- Attach the bottle cap immediately after using.
- Wear gloves.
- Store in a place protected from light.
- In case of staining the skin, wash it with household bleach rubbing with cotton, or hydrogen peroxide.

Warnings:

- Due to the fact that the reaction of the silver on the dentin can produce darkening, it is not advisable to use **FAgamin®** in permanent front teeth where the aesthetic factor is important.
- To avoid the aesthetic factor, the treated area can be covered with glass ionomer or potassium iodide. The immediate application of a potassium iodide solution reduces the darkening produced by the reaction of silver ions.
- In case of deep cavities, since filtrations to the pulp may occur, it is advisable to avoid its use or dilute the dose with distilled water, in a 1:10 ratio.
- Leakage to the pulp may also occur depending on the quality of the tooth.
- When contact occurs accidentally or when the patient manifests pain, rinse immediately with mouthfuls of salt water or water with 10 V hydrogen peroxide. If pain persists, apply camphorated phenol for dental use.

Contraindications:

Generally does not possess in application doses. Do not apply too close to pulp or when there are known deep seepages.

Content:

FAgamin® contains 5 ml of 38% silver diamine fluoride solution at controlled pH

Storage:

Keep at temperatures between 4 and 30 °C, well closed and protected from light.

Exclusive Professional use.

Technical director: Miryam della Vedova – Pharmacist – Licence 2107
Authorized by ANMAT PM 1277-14
Made in Argentina
Manufactured by TEDEQUIM SRL
Bv. De los Polacos 6136- Los Boulevares
X5147GQP Córdoba – Argentina
Tel/FAX: 54-3543-448260
www.tedequim.com.ar
Rev. D



Topamine Silver Diamine Fluoride complex

Composition	Silver Diamine Fluoride complex in aqueous, tinted blue solution. Active Silver ion content 25% w/v, Ammonia 8% w/v, Fluoride 5% w/v in a water base.
Uses	For relief of exposed dental hypersensitivity. For professional dental use only. Use undiluted.
Contraindications	This product is contraindicated in patients with ulcerative gingivitis or stomatitis or known sensitivity to silver or other heavy-metal ions. Patients having had full mouth gingivectomies and patients showing abnormal skin sensitisation in daily circumstances are recommended for exclusion.
Adverse Reactions	Transient irritation of the gingiva has rarely been reported.
Precautions for Use	1) Minimise product contact with gingiva and mucous membranes by using recommended amounts and careful application. Topamine may cause reversible short-term irritation. When applying Topamine to areas near the gingiva, apply petroleum jelly or cacao butter and use cotton rolls to protect the gingival tissues. Alternatively, a rubber dam can be used to isolate the area. 2) If accidental contact occurs to non-targeted areas, thoroughly wash the area with water or saline solution. Topamine has been coloured blue to help identify the presence of solution when dispensing. Always use caution to avoid transferring the solution from gloved hands to other surfaces. 3) Topamine does not normally stain enamel or burnished dentin. Advise patient that soft dentin or margins of composite restorations may be stained. Staining may be reversed by gentle polishing with tincture of iodine (weak iodine solutions). 4) Advise patients that air-drying and product application can cause momentary transient pain to hypersensitive areas. Topamine has not been shown to cause pulpal necrosis even when applied to soft dentin.
Precautions for Handling	1) Storage Precautions a. Store in original packaging in a cool, dark place. b. Replace cap immediately after use. c. Use liquid as soon as dispensed. 2) Topamine will stain skin, clothes, surfaces, floors, instruments and equipment surfaces brown or black. Refer to the following for stain removal techniques a. Skin: wash immediately with water, soap, ammonia solution or iodine tincture and then rinse thoroughly with water. Do not use excessive methods in an attempt to remove difficult stains from skin. Staining on skin will eventually fade in 1 to 3 weeks. b. Clothing/Benchtops/Floors/Instruments/Equipment Surfaces Use the same procedures as with stained skin. Difficult stains may be treated with sodium hypochlorite if surface will allow. 3) If Topamine is dispensed into a separate container, be sure to wash or thoroughly wipe the container clean immediately after use with a disposable tissue or wipe.
Warnings	This product is intended for local application only. Not for ingestion. Protect the patient's eyes. Use caution to avoid contact with skin or clothing. In the event of exposure to eyes or skin, flush the area copiously with water and immediately seek medical attention. Avoid contact with equipment and surfaces as permanent staining may occur.
Dosage and Administration	1) Isolate the affected area of the tooth with cotton rolls and rubber dam or alternatively, protect the gingival tissue of the affected tooth with petroleum jelly. 2) Clean and thoroughly dry the affected tooth surface. 3) For up to 5 treated sites per patient, dispense 1 drop (20 uL) of solution into a disposable dappen dish. Transfer material directly to the tooth surface to be treated with a micro applicator (brush). 4) Air dry. If needed, one or two reapplications may be administered at intervals of one week.
First Aid	For advice, contact a Poisons Information Centre (Australia) 13 11 26
SDS	Available on request
Presentation	Topamine Silver Diamine Fluoride complex supplied in 5ml White, Multidose, Drip Proof, Dropper Bottles Product Code : DL6200
Storage	Store below 25 °C. Replace cap immediately after use and store away from direct sunlight. Keep in a dark place. Do not freeze or expose to extreme heat.
Shelf Life	2 years as indicated on the label.



Developed and Manufactured in Australia by: Dentalife Australia Pty Ltd
9/525 Marondah Hwy Ringwood, Vic. 3134
www.dentalife.com.au



Comparison of Non-Product Insert Protocols

	British Society of Pediatric Dentistry	AAPD	UCSF	What I Do
Isolation:	Isolate with cotton roll, and petroleum jelly	Protective coating on lips and skin, isolate with cotton roll	Isolate with cotton rolls or gauze, if near gingiva consider petroleum jelly	Isolate the best I can with the cooperation I have. DO NOT USE PETROLEUM JELLY
Preparation:	Talks about taking pre-op photos Clean lesion with cotton roll, dry lesion with cotton roll or syringe	Remove gross debris from cavitation, Dry lesion with gentle flow of compressed air	Dry tooth with triple syringe or if not feasible dry with cotton	Clean out tooth as well as I can, sometimes use spoon excavator and remove soft caries
Application:	Apply SDF with micro brush, Leave for 60-180 seconds, ideally 180 seconds - Also includes KI instructions	Apply SDF to tooth surface, remove excess with cotton pellet try to apply for at least one minute, try to keep isolated as long as three minutes. -Also includes KI instructions	Bend micro sponge immerse into SDF and apply directly to tooth. Let absorb 1 minute then remove excess with gauze or cotton roll	Apply SDF repeatedly – if good cooperation try to do it for one to three minutes.
After:	Remove excess with gauze, cover with toothpaste or varnish	Apply gentle flow of compressed air to dry	Rinse with water (from original no longer do)	Cover with varnish or toothpaste



- British Society of Pediatric Dentistry Guidelines: <https://www.bsdp.co.uk/Professionals/Resources> - removed the covering with toothpaste or varnish in most recent update, but I left it.
- Horst, J. et al "UCSF Protocol for Caries Arrest Using Silver Diamine Fluoride: Rationale, Indications and Consent". CDA Journal. Volume 44. No1. January 2016 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778976/>
- Crystal YO, Marghalani AA, Ureles SD, et al. Use of silver diamine fluoride for dental caries management in children and adolescents, including those with special health care needs. *Pediatr Dent* 2017;39(5):E135-E145. <https://pubmed.ncbi.nlm.nih.gov/29070149/>
- AAPD Chairside Guide: https://www.aapd.org/media/Policies_Guidelines/R_ChairsideGuide.pdf
- Yan IG, Zheng FM, Gao SS, Duangthip D, Lo ECM, Chu CH. A Review of the Protocol of SDF Therapy for Arresting Caries. *Int Dent J*. 2022 Oct;72(5):579-588. doi: 10.1016/j.identj.2022.06.006. Epub 2022 Jul 14. PMID: 35843730; PMCID: PMC9485517. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". *International Dental Journal* 72 (2022) 579-588 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>



Conclusions From Reviewing Protocols & Experience

Do You Remove Caries Prior to Applying?

YES	NO
AAPD Suggests to Remove Gross Debris	Most instructions do not say anything about needing to
Centrix Silver Sense IFU to if possible	There are studies that show you don't need to

- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". International Dental Journal 72 (2022) 579-588
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- University protocols found in the article above: University of Pittsburgh & North Carolina, New York University, University of Washington, University of California San Francisco, University of Greifswald Germany, University of Dundee UK, Tufts University
- See previous slides for sources, when I say "reviewed" I am referring to previous slides



Conclusions From Reviewing Protocols & Experience

How Long Do You Apply SDF?

- Protocols:
 - 60-180 seconds (1-3 minutes) almost universally mentioned longer is better
- Reality in My Practice:
 - I agree – but may be luxurious, even quick “Dry, Apply, Protect” seems to work, but may need to re-apply

- Iliana Gehui Yan et al “A Review of the Protocol of SDF Therapy for Arresting Caries”. International Dental Journal 72 (2022) 579-588
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- University protocols found in the article above: University of Pittsburgh & North Carolina, New York University, University of Washington, University of California San Francisco, University of Greifswald Germany, University of Dundee UK, Tufts University
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Conclusions From Reviewing Protocols & Experience

Dry the Excess SDF After the Wait Period?

YES	NO
All 7 University Protocols	Not a huge deal if you can't
All 3 product inserts	
Minimize taste and spread of stain	

- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". International Dental Journal 72 (2022) 579-588
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- University protocols found in the article above: University of Pittsburgh & North Carolina, New York University, University of Washington, University of California San Francisco, University of Greifswald Germany, University of Dundee UK, Tufts University
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Conclusions From Reviewing Protocols & Experience

Do You Use Petroleum Jelly or Coco Butter to Protect?

YES	NO
6 of 7 University Protocols Mention This	If you get it in the lesion it won't treat the lesion
5 of 5 International Protocols Mention This	
3 of 3 Non-product insert Protocols Mention this	

- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". International Dental Journal 72 (2022) 579-588
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- University protocols found in the article above: University of Pittsburgh & North Carolina, New York University, University of Washington, University of California San Francisco, University of Greifswald Germany, University of Dundee UK, Tufts University
- See previous slides for sources, when I say "reviewed" I am referring to previous slides



Conclusions From Reviewing Protocols & Experience

Can You Apply it To Deep Lesions?

- Some stay yes and to dilute it (Japan)
 - Egyptian study showed dilution can make it less effective.
- I don't dilute it.

YES	NO
Japanese Product says yes with dilution	One study that was a single clinical trial found pulpal necrosis for a patient
Argentinian Product says yes with dilution	I have had one fail with this where it didn't hurt before and did hurt after
Systematic review said can even be used as a pulp cap in primary teeth	
I have done this many times	



Conclusions From Reviewing Protocols & Experience

Can You Apply it To Deep Lesions?- Japanese Protocol

4. In applying SAFORIDE to deep cavity very close to the pulp (less than 0.6 mm), it is advisable to use 2 – 3 times diluted solution of SAFORIDE.

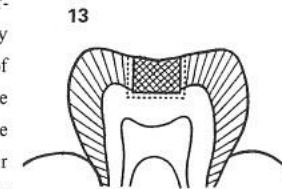
Recommended dilution of SAFORIDE

Estimated width of dentin	SAFORIDE
0.6mm ↑	Original solution (38%)
0.5 – 0.6 mm	3-fold dilution
0.5 mm ↓	10-fold dilution

5. In the presence of bared pulp, the application of SAFORIDE should be carefully done with a cotton pellet lest the pulp should be contacted.

B. Treatment of occlusal surface

In the treatment of caries of the occlusal surface of the deciduous molars, good efficacy can be obtained by the application of SAFORIDE following removing the free enamel and soft dentin as much as possible with a spoon excavator or something. Later on, perform filling (Fig. 13) and restorative treatment such as a full cast crown.



However, in caries of deep cavity where pulpitis is likely to occur with the application of SAFORIDE, apply 3 – 10 times diluted solution of SAFORIDE and perform temporary sealing.

Subsequently, the application of non-diluted solution should be repeated 2 or 3 times at 2 – 3 day intervals. After the last application, do not allow the patient to wash the mouth but wipe away superfluous solution with a cotton pellet. Then, dry the lesion with an air syringe and perform filling.



Conclusions From Reviewing Protocols & Experience

Can You Apply to Deep Lesions? - Sources

- Zeinab O. Tolba^{1,4*}, Heba S. Hamza¹, Dalia M. Moheb², Hassan E. Hassanein³ and Hend M. El Sayed¹. “Effectiveness of two concentrations 12% versus 38% of silver diamine fluoride in arresting cavitated dentin caries among children: a systematic review” Egyptian Pediatric Association Gazette (2019) 67:1 <https://doi.org/10.1186/s43054-019-0001-y>
- Japanese product and has NOT gone through FDA. Included for reference only as it is a very similar product. Dr. Brooke obtained English translated product instructions from through email while in Japan
- Yan IG, Zheng FM, Gao SS, Duangthip D, Lo ECM, Chu CH. A Review of the Protocol of SDF Therapy for Arresting Caries. Int Dent J. 2022 Oct;72(5):579-588. doi: 10.1016/j.identj.2022.06.006. Epub 2022 Jul 14. PMID: 35843730; PMCID: PMC9485517. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- Shafi N, Kaur H, Choudhary R, Yeluri R. Dilute Silver Diamine Fluoride (1:10) Versus Light Cure Calcium Hydroxide as Indirect Pulp Capping Agents in Primary Molars - A Randomized Clinical Trial. J Clin Pediatr Dent. 2022 Jul 1;46(4):273-279. doi: 10.22514/1053-4625-46.4.3. PMID: 36099230. <https://pubmed.ncbi.nlm.nih.gov/36099230/#:~:text=Conclusion:%20Dilute%20silver%20diamine%20fluoride,molars%20with%20deep%20cariou%20lesions.>
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- Manuschai J, Talungchit S, Naorungroj S. Penetration of Silver Diamine Fluoride in Deep Carious Lesions of Human Permanent Teeth: An In Vitro Study. Int J Dent. 2021 Dec 22;2021:3059129. doi: 10.1155/2021/3059129. PMID: 34976061; PMCID: PMC8716243. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8716243/#:~:text=5.,amount%20of%20cariou%20tissue%20remained.>
- Product insert Fagamin 38%



Conclusions From Reviewing Protocols & Experience

Do You Rinse After Application?

YES	NO
3 of 5 international protocols have rinsing in IFUs	6 of 7 University protocols don't
Saforide IFUs say if feel pain rinse immediately	
Study showed ECC no difference when rinsing immediately vs waiting 30 minutes to rinse	Study showed rinsing can reduce radio-opacity of treated lesions and possibly SDF or SDF-PI content
Helps the bad taste go away faster	I had better success after I stopped rinsing



Conclusions From Reviewing Protocols & Experience

Do You Rinse After Application? – Sources

- Iliana Gehui Yan et al “A Review of the Protocol of SDF Therapy for Arresting Caries”. International Dental Journal 72 (2022) 579-588
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- University protocols found in the article above: University of Pittsburgh & North Carolina, New York University, University of Washington, University of California San Francisco, University of Greifswald Germany, University of Dundee UK, Tufts University
- See previous slides for sources, when I say “reviewed” I am referring to previous slides
- Jabbour Z, Esmaili M, Hayashi M, Kim R. Radiographic Changes to Silver Diamine Fluoride Treated Carious Lesions after a Rinsing Step. Dent J (Basel). 2022 Aug 9;10(8):149. doi: 10.3390/dj10080149. PMID: 36005247; PMCID: PMC9406764.
<https://pmc.ncbi.nlm.nih.gov/articles/PMC9406764/#:~:text=The%20radiopacity%20of%20carious%20lesions%20increases%20after,the%20content%20of%20SDF%20in%20carious%20lesions.>
- Ivy Guofang Sun, Duangporn Duangthip, Faith Miaomiao Zheng, Bella Weijia Luo, Edward Chin Man Lo, Chun Hung Chu,
- IG Sun et al. A randomised clinical trial to arrest caries using silver diamine fluoride therapy with two postoperative instructions, Journal of Dentistry, Volume 149, 2024, <https://www.sciencedirect.com/science/article/abs/pii/S0300571224004779>

(3) Because of its permeability into the tooth components, SAFORIDE sometimes affects the pulp transiently. When pain occurs, immediately wash the mouth with running water, saline solution or hydrogen peroxide water. If pain persists, apply camphor-phenol for dental use.



Conclusions From Reviewing Protocols & Experience

Do You Apply Varnish After?

YES	NO
Mentioned in 5 of 7 University Protocols	5 of the 5 international IFUs do not say to
AAPD and British Society of PD have in protocol	3 of 3 domestic IFUs do not say to
Not even close to too much fluoride, so not worried	Unneeded increase in fluoride dose
Masks the bad taste	Possible reduction of bioactive silver
Protects from immediate licking	In-vitro study: stronger inhibition of biofilm without
Study showed adding varnish increased arrest rate in moderate lesions	Study showed lesion depth same w and w/o varnish

- See Next slide for references



Conclusions From Reviewing Protocols & Experience

Do You Apply Varnish After? -Sources

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- Douglas A. Young, DDS, EdD, MBA, MS; Ryan L. Quock, DDS; Jeremy Horst, DDS, PhD; Roopwant Kaur, BDS, MS; Jeanette K. MacLean, DDS; John C. Frachella, DMD; Steve Duffin, DDS; Adriana Semprum-Clavier, DDS, MS; and Andrea G. Ferreira Zandona, DDS, MSD, PhD Clinical Instructions for Using SDF. Compendium June 2021. <https://www.aegisdentalnetwork.com/cced/2021/06/clinical-instructions-for-using-silver-diamine-fluoride-sdf-in-dental-caries-management>
- Yan IG, Zheng FM, Gao SS, Duangthip D, Lo ECM, Chu CH. A Review of the Protocol of SDF Therapy for Arresting Caries. *Int Dent J.* 2022 Oct;72(5):579-588. doi: 10.1016/j.identj.2022.06.006. Epub 2022 Jul 14. PMID: 35843730; PMCID: PMC9485517. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9485517/>
- Iliana Gehui Yan et al "A Review of the Protocol of SDF Therapy for Arresting Caries". *International Dental Journal* 72 (2022) 579-588
- See previous slides for more source details on IFUs
- Abdellatif EB, El Kashlan MK, El Tantawi M. Silver diamine fluoride with sodium fluoride varnish versus silver diamine fluoride in arresting early childhood caries: a 6-months follow up of a randomized field trial. *BMC Oral Health.* 2023 Nov 17;23(1):875. doi: 10.1186/s12903-023-03597-5. PMID: 37978488; PMCID: PMC10656986. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10656986/#:~:text=NaF%20varnish%20can%20remineralise%20enamel,at%20different%20stages%20of%20progression.>



Conclusions From Reviewing Protocols & Experience

To Cure or Not To Cure?

Was not able to find robust support either way, some studies conflicted.

YES	NO
Study showed more silver in infected lesion with cure	Same study did not show difference in antimicrobial properties with cure
Study showed higher dentin microhardness with cure	
Study showed more penetration in shorter time: SDF applied for 10 seconds and cured showed equal penetration to SDF applied for 1 minute without curing Theorized that curing may increase kinetic energy to facilitate initial penetration	Extra step with limited to no benefit
One Study Showed more bond strength with GI. They Dried, applied SDF for 3 minutes, cured 40 seconds, stored 14 days (in-vitro)	Looks terrible immediately



Conclusions From Reviewing Protocols & Experience To Cure or Not To Cure?

- Toopchi S, Bakhurji E, Loo CY, Hassan M. Effect of Light Curing on Silver Diamine Fluoride in Primary Incisors: A Microscopic *Ex Vivo* Study. *Pediatr Dent*. 2021 Jan 15;43(1):44-49. PMID: 33662250. <https://pubmed.ncbi.nlm.nih.gov/33662250/>
- Zaineb, Haradwala F.; Winnier, J. Jasmin; Arwa, Soni M.. Effect of light-curing silver diamine fluoride on microtensile bond strength of primary carious dentin restored with glass ionomer cement: In vitro study. *Journal of Orofacial Sciences* 15(1):p 16-20, January-June 2023. | DOI: 10.4103/jofs.jofs_242_22
https://journals.lww.com/joro/fulltext/2023/15010/effect_of_light_curing_silver_diamine_fluoride_on.4.aspx
- Wilson J, Swanbeck S, Banning G, Alhwayek T, Sullivan V, Howard KM, Kingsley K. Assessment of Sodium Diamine Fluoride (SDF) with Light Curing Technique: A Pilot Study of Antimicrobial Effects. *Methods Protoc*. 2022 Apr 7;5(2):31. doi: 10.3390/mps5020031. PMID: 35448696; PMCID: PMC9033077. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9033077/> - a lot of conflicting materials and says "sodium diamine fluoride a lot"
- Alhanouf Binhezaim, Tahani Almutairi, Afnan Alsaleem, Aida Albegamy, Sultana Alsaadon, Muhammad Saad Shaikh,, Effect of light curing on the efficacy of silver diamine fluoride: A systematic review, *Journal of Taibah University Medical Sciences*, Volume 19, Issue 1, 2024, <https://www.sciencedirect.com/science/article/pii/S1658361223001361>
- Crystal, Yasmi. Et al. Effects of LED curing light on silver diamine fluoride penetration into dentin. *Journal of Clinical Pediatric Dentsitry* May 2023. <https://oss.jocpd.com/files/article/20231103-149/pdf/JOCPD2023033101.pdf>
- Lau L, Quock RL, Wu DI, Harrington DA, Patel SA, Barros JA. Effect of surface preparation and light curing on penetration of silver particles from 38% silver diamine fluoride in dentin of primary teeth: An in vitro evaluation. *Am J Dent*. 2021 Feb;34(1):44-48. PMID: 33544988. <https://pubmed.ncbi.nlm.nih.gov/33544988/>
- Min SN, Duangthip D, Detsomboonrat P. Effects of light curing on silver diamine fluoride-treated carious lesions: A systematic review. *PLoS One*. 2024 Aug 12;19(8):e0306367. doi: 10.1371/journal.pone.0306367. PMID: 39133713; PMCID: PMC11318914. <https://pubmed.ncbi.nlm.nih.gov/39133713/>

[Back to Board](#)



On-Label Use: Desensitizer

- Won't stain healthy teeth but ...
 - Can stain organic material in rough spots or margins
- Same protocol for application
- Reapplication:
 - Self- reapply when sensitivity starts
 - Patients- ask each cleaning if they would like to

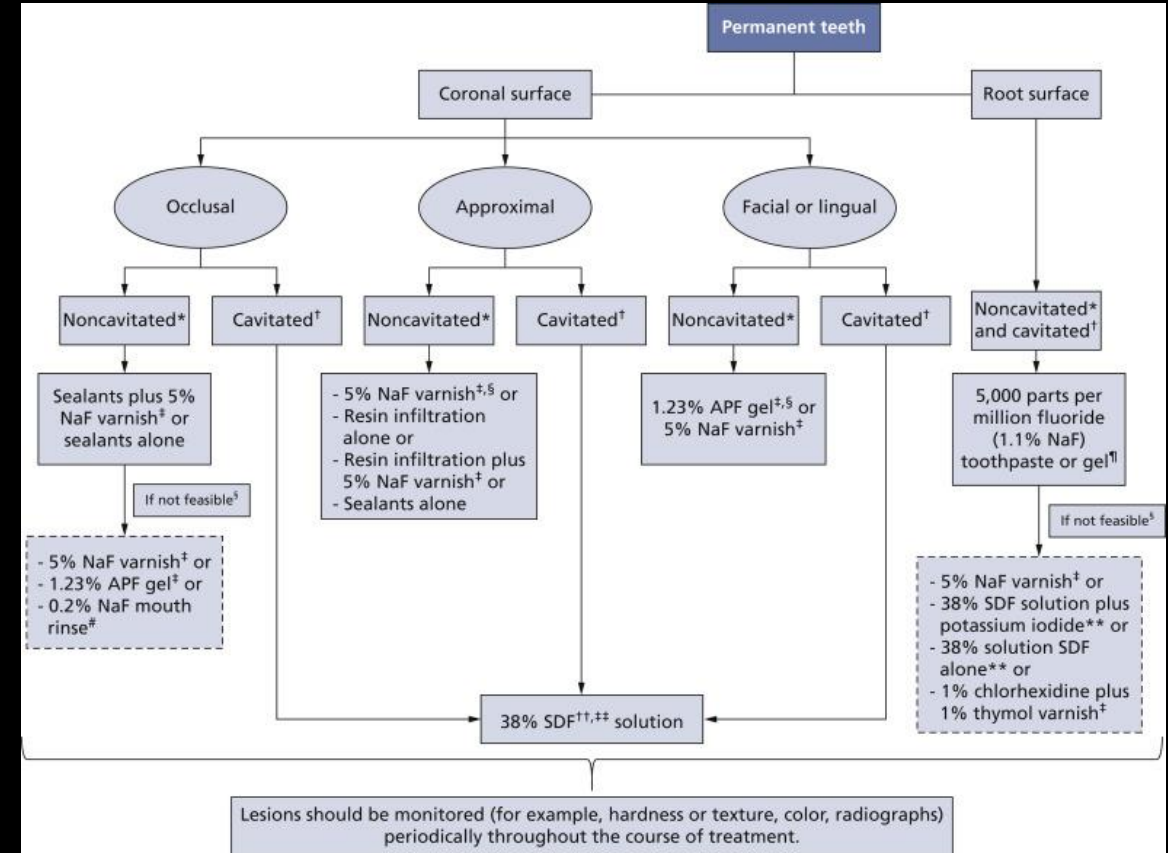
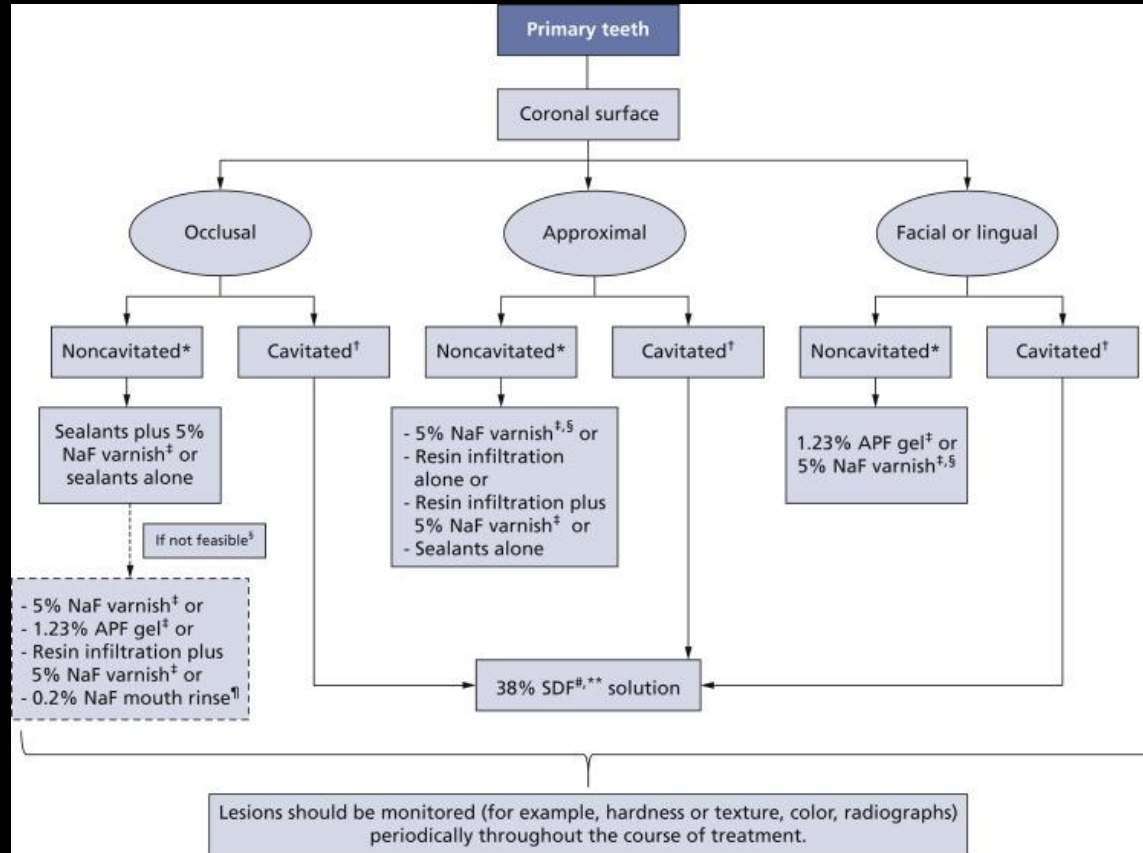


Rare but possible complication



Off Label Use: Non-Restorative Tx of Caries

2018 ADA EBD Guidelines for Non-Restorative Treatments



*Japanese guidelines (2nd edition of Caries Treatment Guidelines from Japanese Society of Conservative Dentistry - recommend SDF as primary prevention and treatment of root caries) - this is stated in Mizuho Nishino's lecture- guidelines are in Japanese so I took her word for it- [LINK TO VIDEO COURSE](#)



Off Label Use: Non-Restorative Tx of Caries

- Arrest caries while waiting for...
 - Hospital case
 - Specialist wait list
 - Insurance to “reset”
 - Patient is saving for complex care plan
 - Rapid or extensive decay we can't keep up with
 - Medical Complexity Prohibits Traditional Care
 - End of Life Care



Off Label Use: SMART Restorations

If SDF treatment worked and the disease is not progressing, why would you need to fill?



What do you think this is?

Why close the doors if you sprayed for bugs ?



Off Label Use: SMART Restorations

- Avoiding the needle
- Helping patients who are tough to get numb
- If avoid excessive tooth structure removal



Off Label Use: Unique Case of Re-cementing Crown

- Recurrent caries and root caries



Off Label Use: Periodontal Disease

- SDF can kill periodontal and cariogenic pathogens
 - *Streptococcus mutans*, *Lactobacillus acidophilus*, *Streptococcus sobrinus*, *Lactobacillus rhamnosus*, *Actinomyces naeslundii*, and *Enterococcus faecalis*
 - *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Prevotella intermedia/nigrescens*
 - But also there were studies that have shown no change in microbial biodiversity after application



Off Label Use: Periodontal Disease

- Some studies show same plaque scores and less inflammation with SDF
 - Participants not allowed to brush/floss posterior teeth
 - One group treated with SDF + Varnish, other Saline and Varnish
- I see this clinically in our residents
 - Another study -application each week for three weeks then eval showed this



1. SMART Oral Health. The Medical Management of Caries. Edited by Dr. Steve Duffin, DDS et al. 2019 Published by Oral Health Outreach LLC. (Section by Monika Alcon RDH, MPH)
2. Rams, Thomas. "Antimicrobial activity of silver diamine fluoride on human periodontitis microbiota". General Dentistry September/October 2020
3. Ho Y, Gyurko R, Uzel NG, Steffensen B, Xenoudi P, Loo C, Zoukhri D. An In Vitro Pilot Study on the Effects of Silver Diamine Fluoride on Periodontal Pathogens and Three-Dimensional Scaffolds of Human Fibroblasts and Epithelial Cells. Int J Dent. 2022 May 17;2022:9439096. doi: 10.1155/2022/9439096. PMID: 35620728; PMCID: PMC9129993. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9129993/>
4. Alshehri Saad Wedad doctoral dissertation paper: Effect of Silver Diamine Fluoride on the treatment of gingivitis in geriatric patients. August 2020. Subject Oral Biology. <https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/189553/ALSHEHRI-DISSERTATION-2020.pdf?sequence=1&isAllowed=y>
5. Guillermo J ramirez-Martinez DMD May 2019 Masters Thesis Paper. "Antimicrobial effects in Vitro of Silver Diamine Fluoride Against Selected Human Red and Orange Complex Periodontal Pathogens: <https://scholarshare.temple.edu/bitstream/handle/20.500.12613/3443/TETDEXRamirezMartinez-temple-0225M-13692.pdf?sequence=1>
- Amal Noureldin, Wedad Alshehri, Helena Tapias, Lisa Mallonee, Lloyd M. Mancl, Peter Milgrom, Kathy Svbody, Efficacy of 38% silver diamine fluoride in reducing gingival inflammation and plaque accumulation in older adults living in retirement-homes: A randomized controlled pilot trial, Journal of Dentistry, Volume 143, 2024, <https://www.sciencedirect.com/science/article/pii/S0300571224000605>
- Jingyang zhang A concise review of Silver diamine fluoride on oral biofilm. <https://www.mdpi.com/2076-3417/11/7/3232#:~:text=SDF%20also%20inhibited%20the%20growth,bacteria%2C%20and%20possessed%20antifungal%20properties.>



SDF Contraindications

- Very rough enamel you can't polish easily
- Mirror Test
- Silver Allergy
- Open Tissue Lesions (Tattoo)
- May consider diluting in deep asymptomatic lesions
- Pregnancy : I STILL haven't found any good info on this
 - Medical device, not a drug, so doesn't have pregnancy category
 - Silver Nitrate and Fluoride Varnish- Category C (like topical)
 - But has been used on cervical warts in pregnant patients.
 - In Riva Star, the KI is contraindicated in pregnant patients or lactating patients per IFUs



- Douglas A. Young, DDS, EdD, MBA, MS; Ryan L. Quock, DDS; Jeremy Horst, DDS, PhD; Roopwant Kaur, BDS, MS; Jeanette K. MacLean, DDS; John C. Frachella, DMD; Steve Duffin, DDS; Adriana Semprum-Clavier, DDS, MS; and Andrea G. Ferreira Zandona, DDS, MSD, PhD. Clinical Instructions for using Silver Diamine Fluoride (SDF) in Dental Caries Management. <https://www.aegisdentalnetwork.com/cced/2021/06/clinical-instructions-for-using-silver-diamine-fluoride-sdf-in-dental-caries-management>
- Lipke MM. An armamentarium of wart treatments. *Clin Med Res.* 2006;4(4):273-293. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1764803/>
- Silver Nitrate Pregnancy Category: <https://www.drugs.com/compare/silver-nitrate-topical>

Back to Board



Who is Applying SDF? – The Dental Team

Rules vary by state: ask your board of dentistry

Idaho = Anyone who can do varnish can apply SDF.



In my clinic: all clinical team



Getting Caregivers to Apply SDF during COVID-19

Caregiver Training For SDF Application

What is SDF???

Light Blue Liquid

- Slows or Stops the Progression of Cavities
 - Fluoride Strengthens the Tooth
 - Silver is Antimicrobial
- Turns tooth Black
- Can Cause Severe Burns to the Eyes
- Stains EVERYTHING
- Easy to apply

Your Special Smiles PLLC

Advocacy - Assess - Educate

Checklist and Completion

Obtain Parental Consent	
Obtain Informed Consent	
Obtain Health Insurance Information	
Obtain Dental Insurance Information	
Obtain Social Security Number	
Obtain Address	
Obtain Phone Number	
Obtain Email Address	
Obtain Date of Birth	
Obtain Sex	
Obtain Race	
Obtain Ethnicity	
Obtain Religion	
Obtain Marital Status	
Obtain Number of Children	
Obtain Number of Siblings	
Obtain Number of Grandchildren	
Obtain Number of Grandparents	
Obtain Number of Great-Grandchildren	
Obtain Number of Great-Grandparents	
Obtain Number of Great-Great-Grandchildren	
Obtain Number of Great-Great-Grandparents	
Obtain Number of Great-Great-Great-Grandchildren	
Obtain Number of Great-Great-Great-Grandparents	

Ideal Setup

CAN CAUSE SERIOUS DAMAGE IF GETS IN EYES

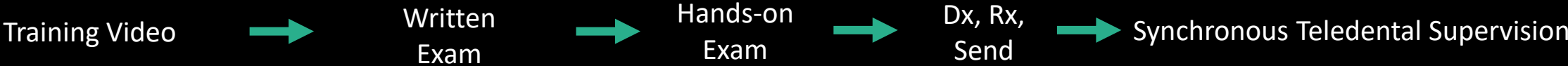
Stains all it touches

Individual Trained: _____

Trainer: _____

Area that needs improvement: _____

Abile to apply with televisual supervision by dentist/agent and orders from dentist: - Y or N



Only the Rx was needed (legally) , the others steps I required



Medical Provider Application of SDF

Medical Code (CPT) : 0792T

Application of silver diamine fluoride 38% by a physician or other qualified health care professional”

SDF Training for Medical Providers:

- SDF for Medical Providers DDOD Health Equity Think Tank Video: <https://youtu.be/gAV1hJt5Er8?si=xHzjyztDAmLj8VI9>
 - This is a course I recorded for an interdisciplinary medical provider group in Ohio
- Mental Health and Dental Health: <https://youtu.be/B1GXLuLpqq>
 - The first half of this course is a psychiatric NP talking about mental health and dental conditions, then the last 30 minutes is SDF for medical providers.



[Back to Board](#)

- AAPD note on CPT: https://www.aapd.org/globalassets/sdf-guidance-for-physicians_aapd_2023.pdf
- YouTube Caregiver Training Video: <https://youtu.be/hjg5goWEjhc>
- American Academy of Pediatrics : <https://www.aap.org/en/patient-care/silver-diamine-fluoride-application-in-the-pediatric-medical-setting/silver-diamine-fluoride-frequently-asked-questions-for-health-professionals/#:~:text=In%202022%2C%20silver%20diamine%20fluoride,risks%20and%20benefits%20of%20SDF?>



Stains EVERYTHING

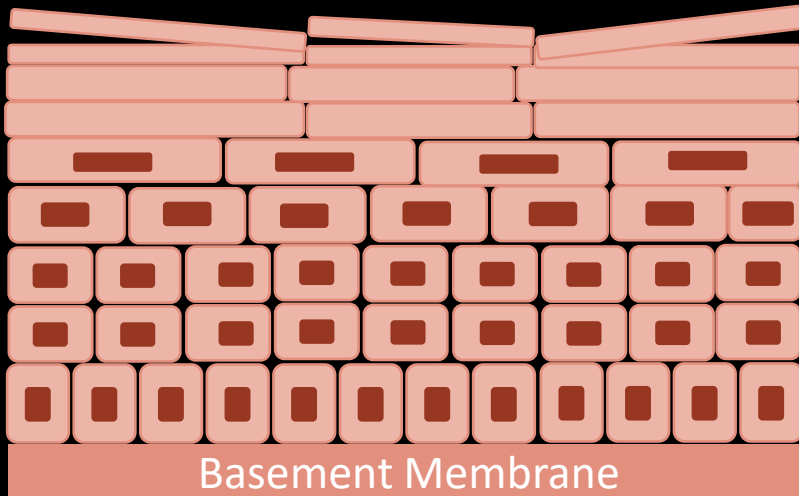
- Epithelial turnover
- Counters don't have epithelium... we hope...
- Some studies show KI decreasing staining , but not eliminate



Carious Lesions= FOREVER



Skin: 2-14 Days



Turtle Shell: ??



Surfaces: Clean It



Cleaning Off Surfaces

Stain had been present for months

- What I like:
 - Mr. Clean Magic Eraser
- Per product insert:
 - water, soap, ammonia, iodine
 - sodium hypochlorite may also be used if very hard
- As with any cleaner test first in small area



Cleaning Off Skin

- Product insert (Elevate) :
 - Gingiva: 3% hydrogen peroxide, water or saline
 - Skin: water, soap, ammonia, povidone iodine*



All methods irritated my skin but my SDF Sista has had success



- Someone in a course: Salt and Lemon Scrub



[Back to Board](#)

Applied to Arm



Salt and Lemon Scrub



Back Next Day



2nd Salt and Lemon Scrub



10 % Povidone Iodine Basics

- Povidone Iodine
 - 90% water
 - 8.5% polyvinylpyrrolidone (PVP) – forms complex with iodine
 - 1% iodine - the antimicrobial part
- Mechanism of Action: broad spectrum germicidal agent
 - Damages proteins in bacterial cytoplasm
 - Damages bacterial cell membrane
 - Interferes with biofilm formation on the tooth



The Science of 10 % Povidone Iodine Sources

- Lopez, et al. "Topical Antimicrobial therapy in the prevention of early childhood caries: A follow up report. *Pediatr Dent*. 2002;24(3):204-6. <https://www.ncbi.nlm.nih.gov/pubmed/12064491>
- Amin MS et al. "Effect of Povidone-iodine on *Streptococcus mutans* in children with extensive dental caries." *Pediatr Dent*. 2004 JanFeb;26(1):5-10. <https://www.ncbi.nlm.nih.gov/pubmed/15080351>
- Simratvir Mauli et al. "Efficacy of 10% Povidone Iodine in Children Affected with Early Childhood Caries: An In VIVO study. *Journal of Clinical Pediatric Dentistry* April 2010 Vol 34 No <https://www.jocpd.org/doi/pdf/10.17796/jcpd.34.3.l552816527xtv122>
- Zhan Ling. Et al "Antibacterial Treatment Needed for Severe English Childhood Caries." *Journal of Public Health Dentistry*. May 2007. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1752-7325.2006.tb02576.x>
- Herdiyati Yetti et al. "Stop Caries with Povidone Iodine" *International Journal of Science and Research*. Volume 4 Issue 5 May 2015. http://media.unpad.ac.id/files/publikasi/2016/rpm_20160813135015_1285.pdf
- Twetman S: Antimicrobials in Future Caries Control? *Caries Res* 2004;38:223-229. doi: 10.1159/000077758 <https://www.karger.com/Article/Abstract/77758#>
- *University of Hong Kong* <https://ichgcp.net/clinical-trials-registry/NCT03654820/> this was presented at IADR 2019- J. Zhang et al. presentation #0763
- Zahra Hashemi et al. "The Effect of Topical Iodine and Fluoride Varnish combination in preventing early childhood caries: A pilot Study" . *Journal of Dental Materials and Techniques*. Autumn 2015. http://jdmt.mums.ac.ir/article_5175.html
- Avshalom Tam, Moshe Shemesh, Uri Wormser, Amnon Sintov, Doron Steinberg, Effect of different iodine formulations on the expression and activity of *Streptococcus mutans* glucosyltransferase and fructosyltransferase in biofilm and planktonic environments, *Journal of Antimicrobial Chemotherapy*, Volume 57, Issue 5, May 2006, Pages 865–871, <https://doi.org/10.1093/jac/dkl085> <https://academic.oup.com/jac/article/57/5/865/764605>
- Herdiyati Yetti et al. "Stop Caries with Povidone Iodine" *International Journal of Science and Research*. Volume 4 Issue 5 May 2015. http://media.unpad.ac.id/files/publikasi/2016/rpm_20160813135015_1285.pdf
- Great course on this go this website and look up Dr. Jeremy Horst, Iodine use in caries prevention and management: <https://www.elevateoralcare.com/elevatingcare> or youtube link <https://youtu.be/uLrtPgWnWy0?si=e-6Oz8gE2iY6QHAn>
- Paul Lorenz Bigliardi, Syed Abdul Latiff Alsagoff, Hossam Yehia El-Kafrawi, Jai-Kyong Pyon, Chad Tse Cheuk Wa, Martin Anthony Villa, Povidone iodine in wound healing: A review of current concepts and practices, *International Journal of Surgery*, Volume 44,2017, <https://www.sciencedirect.com/science/article/pii/S1743919117305368>



Povidone Iodine Application

- My Protocol: Dry - Apply – Protect
- Then Ideally Send Some Home
 - Moderate risk: Apply every other month
 - High risk: Apply monthly



Wait 10
seconds



10% Povidone Iodine Application



INSTRUCTIONS FOR USE:



1. Remove one ampule (caramel-colored container) and one brush (clear adapter) from the box. Screw the brush into the threaded end of the ampule until you hear a "pop" which opens the ampule.



2a. Dry the patient's teeth with gauze or a tissue.

2b. Squeeze ampule over gauze or tissue to wet bristles prior to application.



3a. Apply a light application of Povi-One™ to the teeth and gums.

3b. Do not over apply. With the bristles wet, there is no need to squeeze extra material out of the ampule during application.



4a. Continue to rewet bristles over gauze or tissue in between each section.

4b. Continue across all teeth. Keep mouth open for ten seconds after application is complete.

Follow your dental or medical professional instructions for frequency of application. Do not use more than one ampule each month unless instructed by a dental or medical professional.

Drug Facts		Drug Facts (continued)
Active ingredient (in each ampule) Povidone-iodine USP, 10% w/v.....	Purpose Antiseptic	Other information ■ Store at room temperature, 23°C±2°C. ■ when mixed with patient saliva concentration is diluted to 0.5%
Uses health-care antiseptic for preparation of the skin and oral tissues, first aid antiseptic to help prevent the risk of infection, clears bacteria that can cause infection ■ cuts ■ scrapes ■ burns		Inactive ingredients Citric Acid, Disodium Phosphate, Glycerin, Purified Water, Sodium Citrate, Tween 80
Warnings For external use only Do not use ■ in the eyes ■ over large areas of the body ■ if you are allergic to povidone-iodine or any other ingredients in this preparation ■ more than one unit per patient per month unless directed otherwise by a doctor ■ in children under 12 years of age unless directed by a dentist or doctor ■ if you have thyroid conditions		Contents 6 unit-dose applicators, each containing 0.45 mL
Stop use and ask a doctor if ■ irritation, swelling, rash or fever develops, or redness occurs		Questions? 877-866-9113 (8:30 am - 5 pm, EST, Mon-Fri) or visit www.elevateoralcare.com .
Keep out of reach of children. If pregnant or breast feeding ask a health care professional before use. Do not swallow, expectorate (spit) extra material out. If more than one dose is swallowed, seek medical advice or contact a Poison Control Center right away.		Packaged by Elevate Oral Care, LLC 346 Pike Road, Suite 5 West Palm Beach, FL 33411 Povi-One is a trademark of Elevate Oral Care, LLC © Elevate Oral Care 2024. All rights reserved. ELE828.110424
Directions ■ Remove one ampule (caramel-colored container) and one brush (clear adapter) from the box. ■ Screw the brush into the threaded end of the ampule until you hear a "pop" which opens the ampule. ■ Dry the patient's teeth with gauze or a tissue. ■ Apply a light application of Povi-One to the teeth and gums surrounding the teeth. ■ Do not over-apply. Often, wetting the bristles before applying to teeth is sufficient to deliver the product. ■ You will likely have extra material in the ampule when finished. There is no need to use the extra material. ■ Discard the ampule. Do not re-use the product. ■ Follow your dental or medical professional instructions for frequency of application. Do not use more than one ampule each month unless instructed by a dental or medical professional.		



10% Povidone Iodine Indications/Contraindications

• Indications

- Prevention:
 - Moderate & High Risk Patients
- Treating caries??- super off label
 - In lesions when you can't treat with SDF *
 - Doesn't stain

* Not really evidence based yet, I haven't seen many studies on this method, but I have been doing it when I don't have other options and I find it helpful

• Contraindications:

- Thyroid problems
- Pregnancy/Breastfeeding
- Allergy/Hypersensitivity



Want more info on Povidone Iodine?

Antimicrobial Iodine to Complement Fluoride in Routine Oral Health Care



How does povidone-iodine work?

- Saliva activates iodine release via dilution.
- Iodine deactivates DNA, RNA, & proteins via ortho substitution of side chains.
- Iodine differentially kills cariogenic bacteria, inhibits glucosyltransferase, and suppresses *S. mutans* for ~6 months.

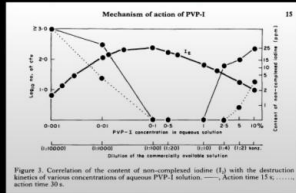
Differential *S. mutans* kill

Microorganism	Case of Iodine Iodine (ppm)	Minimum killing time (min)
<i>S. mutans</i> ATCC 10558	0.04	5
<i>S. mutans</i> ATCC 10558	0.20	5
<i>A. viscosus</i> ATCC 11104	0.04	20
<i>A. viscosus</i> ATCC 11104	0.04	30

Microorganism	Case of Iodine Iodine (ppm)	Minimum killing time (min)
<i>S. mutans</i> ATCC 10558	0.04	5
<i>S. mutans</i> ATCC 10558	0.20	5
<i>A. viscosus</i> ATCC 11104	0.04	20
<i>A. viscosus</i> ATCC 11104	0.04	30

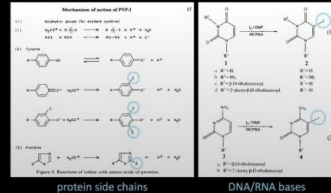
Tanzer et al, *Antimicrob Ag Chemo* 1977

Activation via dilution



Berkelman et al., *J Clin Microbiol* 1982
Rackur et al., *J Hosp Inf* 1985

DNA, RNA, protein deactivation



Ascoli & Kahan, *J Biol Chem* 1966
Hwang et al., *Arch Pharm Res* 1992

GTF inhibition

Monofluoride	Residual activity (control)	Residual activity (control)
Stannous ²⁺	8.7 ± 0.2	0.2 ± 0.2
Elmer [®]	75.8 ± 5.4	54.0 ± 2.5
Eladit [®]	71.1 ± 1.5	68.1 ± 1.3
Linefil [®]	96.0 ± 2.0	74.6 ± 2.5
Colistin	78.5 ± 0.9	84.0 ± 1.2
Meridol [®]	97.3 ± 2.3	100.0 ± 0.3

Furiga et al., *Oral Micro Immun* 2008
Evans et al., *Aust Dent J* 2015

6 mo *S. mutans* suppression

Fluoride	Saliva	Occlusal	Approximal
Fluoride	1.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.1
Fluoride + Iodine	0.5 ± 0.1	0.5 ± 0.1	0.5 ± 0.1

Caufield & Gibbons, *J Dent Res* 1979
Gibbons et al., *Infect Immun* 1974

- For more Information, Dr. Jeremy Horst Keeper DDS, PhD has WONDERFUL full length courses on povidone iodine.
 - This screenshot came from this course: <https://youtu.be/uLrtPgWnWy0?si=e-6Oz8gE2iY6QHAN>
 - The slides he is reviewing come from a previous course he did <https://youtu.be/vPrkD1w6388>

19:09 / 1:07:03

Scroll for details

Back to Board

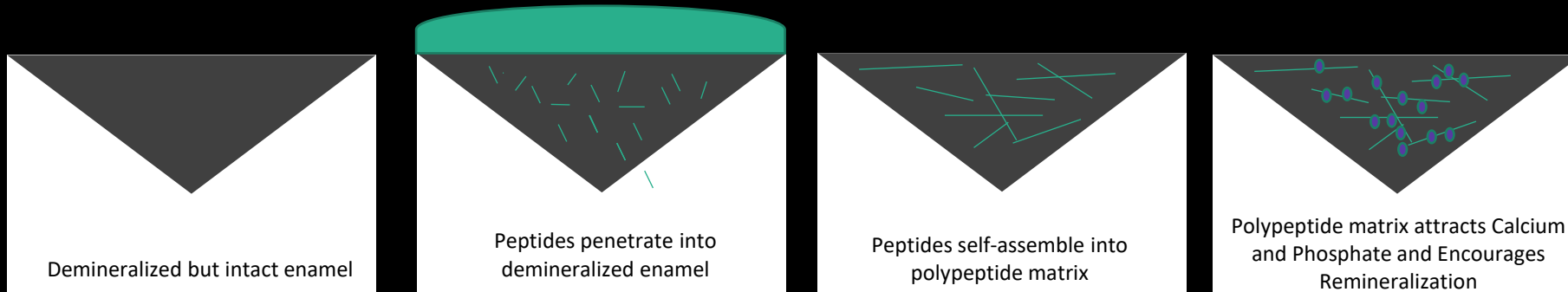


Self Assembling Peptides P11-4

- Composition:
 - Self –assembling peptides (P11-4) and fluoride
- Mechanism of Action: Mimics enamel matrix proteins
 - Amino Acids → peptide → polypeptide → folds into protein
 - Forms a peptide biomatrix that attracts calcium and phosphate
 - Also can bind to collagen fibers



I want to go in there!




- Dawasaz AA, Togoo RA, Mahmood Z, Azlina A, Thirumulu Ponnuraj K. Effectiveness of Self-Assembling Peptide (P11-4) in Dental Hard Tissue Conditions: A Comprehensive Review. *Polymers (Basel)*. 2022 Feb 18;14(4):792. doi: 10.3390/polym14040792. PMID: 35215706; PMCID: PMC8879648. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8879648/>
- Jablonski-Momeni A, Heinzel-Gutenbrunner M. Efficacy of the self-assembling peptide P11-4 in constructing a remineralization scaffold on artificially-induced enamel lesions on smooth surfaces. *J Orofac Orthop*. 2014 May;75(3):175-90. doi: 10.1007/s00056-014-0211-2. Epub 2014 May 15. PMID: 24825830. <https://pubmed.ncbi.nlm.nih.gov/24825830/>
- B K A, R Y, Puranik MP. Remineralization of early enamel caries lesions using self-assembling peptides P₁₁₋₄: Systematic review and meta-analysis. *J Oral Biol Craniofac Res*. 2022 May-Jun;12(3):324-331. doi: 10.1016/j.jobcr.2022.03.012. Epub 2022 Mar 29. PMID: 35433245; PMCID: PMC9011020. <https://pubmed.ncbi.nlm.nih.gov/35433245/>





Self Assembling Peptides P11-4 – Does it work?

- “CR is a promising treatment for initial carious lesions”
- Note : This review was carried out on the foreign product, not the Curdont Fluoride plus, but some studies that used the other product and fluoride varnish still had favorable results. The foreign product does not have the fluoride.

Systematic Review

 Check for updates


ADA American Dental Association


Supplemental material is available online.

Systematic review and meta-analysis on the effect of self-assembling peptide P₁₁₋₄ on arrest, cavitation, and progression of initial caries lesions

Jeremy Horst Keeper, DDS, PhD; Laura J. Kibbe, BS, RDH; Madhuli Thakkar-Samtani, BDS, MPH; Lisa J. Heaton, PhD; Courtney Desrosiers, BS, MPH; Kathryn Vela, MLIS; Bennett T. Amaechi, BDS, MSc, PhD; Anahita Jablonski-Momeni, PhD; Douglas A. Young, DDS, EdD, MBA, MS; Jeanette MacLean, DDS; Robert J. Weyant, DMD, MS, DrPH; Andrea Ferreira Zandonata, DDS, MS, PhD; Woosung Sohn, DDS, PhD, DrPH; Nigel Pitts, FRSE, BDS, PhD; Julie Frantsve-Hawley, PhD

- Jeremy Horst Keeper et al. Systematic review and meta-analysis on the effect of self assembling peptide P11-4 on arrest, cavitation and progression of initial lesions. JADA 2023 <https://jada.ada.org/action/showPdf?pii=S0002-8177%2823%2900189-7>
- Remineralizing potential of the biomimetic P₁₁₋₄ self-assembling peptide on noncavitated caries lesions , Godenzi, Denisa et al. The Journal of the American Dental Association, Volume 154, Issue 10, 885 - 896.e9 <https://jada.ada.org/action/showCitFormats?doi=10.1016%2Fj.adaj.2023.07.009&pii=S0002-8177%2823%2900416-6>
- Dawasaz AA, Togoo RA, Mahmood Z, Azlina A, Thirumulu Ponnuraj K. Effectiveness of Self-Assembling Peptide (P11-4) in Dental Hard Tissue Conditions: A Comprehensive Review. Polymers (Basel). 2022 Feb 18;14(4):792. doi: 10.3390/polym14040792. PMID: 35215706; <https://pmc.ncbi.nlm.nih.gov/articles/PMC8879648/#:~:text=7.3.&text=A%20perusal%20of%20literature%20showed,to%20330%20nm%20%5B21%5D.MC8879648>.



Self Assembling Peptides P11-4

- Indications:
 - For use in non-cavitated active white spot lesions
- Limitations:
 - Needs demineralized but intact enamel to form matrix
 - Not as effective on dentin, root caries, or marginal decay
 - White spots may stay white
 - Doesn't fill macroscopic holes
- Contraindications:
 - Didn't find any
 - If you can't apply it



de Sousa JP, Carvalho RG, Barbosa-Martins LF, et al. The Self-Assembling Peptide P11-4 Prevents Collagen Proteolysis in Dentin. Journal of Dental Research. 2019;98(3):347-354. doi:10.1177/0022034518817351

<https://journals.sagepub.com/doi/abs/10.1177/0022034518817351?journalCode=jdrb#:~:text=The%20immediate%20treatment%20of%20artificial%20caries%20affected%20dentin,effe%20decreased%20after%206%20mo%20of%20water>

Vardis website with instructional videos: <https://professional.vardis.us/resources/>



Self Assembling Peptides P11-4 : Basic Steps (Old)

- Clean area
 - Optional NaOCl step here
- Dry
- Etch: 35% phosphoric acid – 20 seconds
- Rinse
- Sponge in liquid for at least 10 seconds
- Apply **WITH SPONGE – one lesion per tail**
- Wait 5 minutes and do not rinse
- Do not eat, drink or rinse for 30 minutes

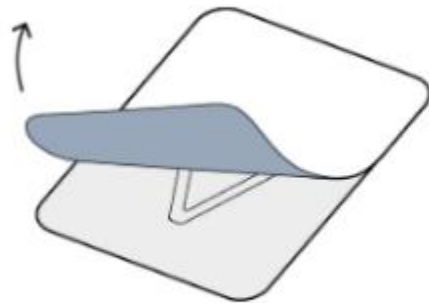
Video snip from Vardis- OLD



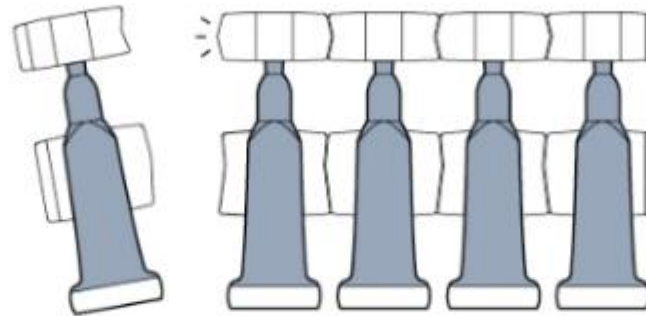
Self Assembling Peptides P11-4 : Basic Steps (New)

Note the differences in protocol between old and new product:

Product Preparation



Carefully peel the cover off **UNIT A** to expose the sponge.



Retrieve one **UNIT B** dropper. Put the remaining unopened dropper(s) back in the pouch.

Immerse the sponge fully with **UNIT B** liquid* and let it soak for at least 2 minutes. Do not replace **UNIT B** with any other liquid.



*Minimal liquid left over in the dropper inadvertently is acceptable.

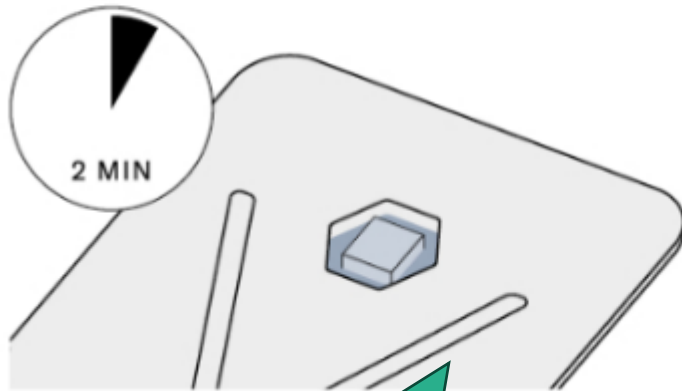
- Gözetici B, Öztürk-Bozkurt F, Toz-Akalin T. Comparative Evaluation of Resin Infiltration and Remineralisation of Noncavitated Smooth Surface Caries Lesions: 6-month Results. *Oral Health Prev Dent.* 2019;17(2):99-106. doi: 10.3290/j.ohpd.a42203. PMID: 30874252. <https://pubmed.ncbi.nlm.nih.gov/30874252/>
- Xie, Z., Yu, L., Li, S. *et al.* Comparison of therapies of white spot lesions: a systematic review and network meta-analysis. *BMC Oral Health* 23, 346 (2023). <https://doi.org/10.1186/s12903-023-03076-x> and found at <https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-023-03076-x#:~:text=Conclusions,combination%20also%20would%20increase%20efficacy.>



Self Assembling Peptides P11-4 : Basic Steps (New)

Patient Preparation

While the sponge is soaking
proceed with preparing the treatment site:



- Clean the treatment site using one of your preferred methods, i.e.:
 - Pumice
 - Prophy paste (with or without fluoride)
 - Air Polisher

- Rinse and dry.
- Etch using 35 % phosphoric acid for not more than 20 seconds. Rinse and dry.
- Once the sponge is fully saturated and soft, place cotton rolls around the treatment site.

Notice no NaOCl?

Notice the wait here

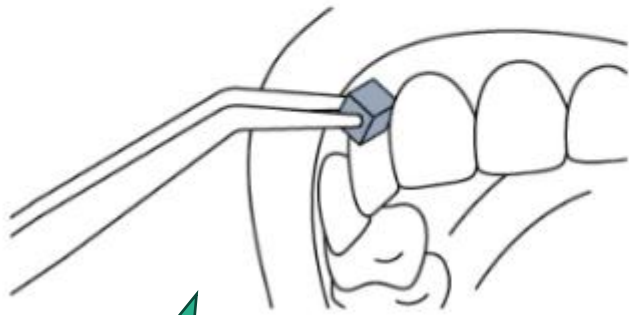
- Gözetici B, Öztürk-Bozkurt F, Toz-Akalin T. Comparative Evaluation of Resin Infiltration and Remineralisation of Noncavitated Smooth Surface Caries Lesions: 6-month Results. *Oral Health Prev Dent.* 2019;17(2):99-106. doi: 10.3290/j.ohpd.a42203. PMID: 30874252. <https://pubmed.ncbi.nlm.nih.gov/30874252/>
- Xie, Z., Yu, L., Li, S. *et al.* Comparison of therapies of white spot lesions: a systematic review and network meta-analysis. *BMC Oral Health* 23, 346 (2023). <https://doi.org/10.1186/s12903-023-03076-x> and found at <https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-023-03076-x#:~:text=Conclusions,combination%20also%20would%20increase%20efficacy.>



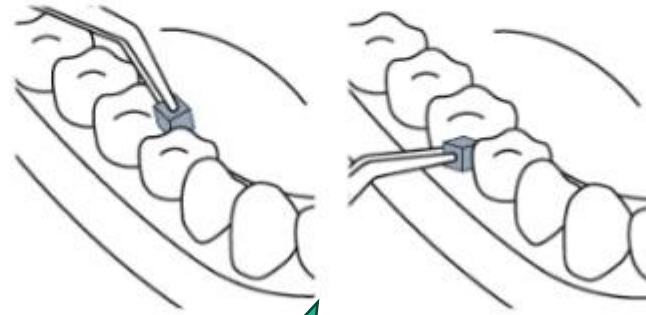
Self Assembling Peptides P11-4 : Basic Steps (New)

Application

- Use cotton pliers/hemostat to pick up the soft saturated sponge.
- Press it on/near the lesion for 5 seconds.
- Use one sponge per lesion.



For interproximal application, apply from the lingual embrasure followed by the buccal embrasure.



- Instruct the patient not to eat, drink, spit or rinse for 30 minutes after application.
- Provide routine oral hygiene instructions.
- Discharge.
- Dispose the used sponge and dropper.



NO floppy
beaver tail...



Notice only
need to apply
for 5 seconds

- Gözetici B, Öztürk-Bozkurt F, Toz-Akalin T. Comparative Evaluation of Resin Infiltration and Remineralisation of Non-Vitiated Smooth Surface Caries Lesions: 6-month Results. *Oral Health Prev Dent*. 2019;17(2):99-106. doi: 10.3290/j.ohpd.a42203. PMID: 30874252. <https://pubmed.ncbi.nlm.nih.gov/30874252/>
- Xie, Z., Yu, L., Li, S. *et al*. Comparison of therapies of white spot lesions: a systematic review and network meta-analysis. *BMC Oral Health* 23, 346 (2023). <https://doi.org/10.1186/s12903-023-03076-x> and found at <https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-023-03076-x#:~:text=Conclusions,combination%20also%20would%20increase%20efficacy.>
- Instructions on Vardis website: <https://professional.vardis.us/wp-content/uploads/2025/08/CRFP-Gen3-IFU.pdf>



Curodont: Product Insert Directions

HOW TO APPLY CURODONT™ REPAIR FLUORIDE PLUS

- 1 Perform oral prophylaxis and finish with a coarse prophylaxis paste (with or without fluoride), pumice, or air polisher to eliminate all organic matter and the salivary pellicle. **Unwaxed** dental floss must be used to distribute prophylaxis paste/pumice through the proximal surface.
- 2 Rinse thoroughly and dry.
- 3 Apply 35% phosphoric acid to the surface of the early carious lesion for 20 seconds and then rinse thoroughly. **Unwaxed** dental floss must be used to distribute it over the proximal surface.
- 4 Isolate the treatment area (cotton rolls, dry angle, etc). The use of a rubber dam is not necessary.
- 5 Activate the CURODONT™ REPAIR FLUORIDE PLUS applicator, remove the black clip, and plunge the sponge into the liquid reservoir. Let the sponge soak in the liquid for at least 10 seconds, then withdraw the saturated sponge.
- 6 Squeeze the sponge on the treatment area to draw as much liquid as possible on/near the surface of the early carious lesion; a 'painting' motion is not recommended. *Important:* Only the sponge applicator must be used. The solution cannot be transferred to other applicators.
- 7 Wait for 5 min, using the saliva ejector as needed. Do not rinse during this time. The patient can semi-close his/her mouth if needed. Use this time to provide routine instructions and emphasize the need to maintain good oral hygiene.
- 8 Discharge the patient, instructing them not to eat, drink, or rinse for 30 minutes.

ADDITIONAL INFORMATION

- As an additional option you can use 2% Sodium Hypochlorite to remove salivary pellicle.
- 35-37% phosphoric acid is acceptable.
- Use one applicator for 1-3 lesions, depending on the size and depth of the lesion.
- If on adjacent proximal surfaces, the same applicator may be used for both lesions at once.
- Fluoride varnish can be applied after the 5-minute isolation period.
- It can be applied directly after bleaching/whitening treatment.
- Allow 2 weeks post treatment to bleach/whiten teeth. Whitening toothpastes are acceptable.

V VARDIS
SWITZERLAND
BIOMIMETIC DENTAL SCIENCE

- Product Insert: https://professional.vvardis.us/wp-content/uploads/2023/10/Curodont-Repair-Fluoride-Plus-Workflow-Leaflet_EN.pdf
- All these videos are on their website: <https://professional.vvardis.us/product/curodont-repair-fluoride-plus/>
- Video from Manufacturer part 1: https://www.youtube.com/watch?v=GY3g_ElvOsc&ab_channel=CURODONT%E2%84%A2
- Video from manufacturer part 2: https://www.youtube.com/watch?v=7SolpJ-YkB4&t=15s&ab_channel=CURODONT%E2%84%A2
- Video from manufacturer part 3: https://www.youtube.com/watch?v=OolkcfTfD8Y&t=26s&ab_channel=CURODONT%E2%84%A2
- New Delivery System: Dr. MacLean <https://www.instagram.com/reel/DN4MExcEmi1/>
- KOL PPT from Vardivis



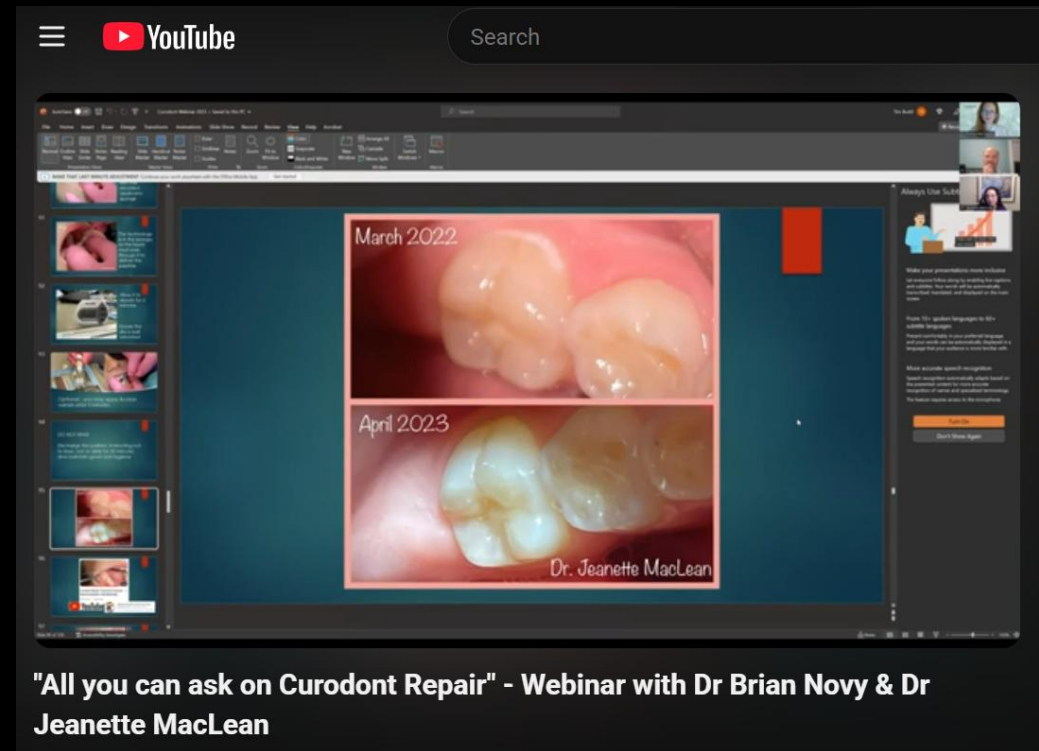
Self Assembling Peptides P11-4 : Comparing Old and New

Old	New
	Put liquid on cube at least 2 min
Clean area (pumice, air polish, fluoride free prophylactic paste)	Clean area (pumice, air polish, fluoride free prophylactic paste)
NaOCl- optional	(no mention of NaOCl)
Rinse/ Dry	Rinse/Dry
Etch with 35% phosphoric for 20 sec	Etch with 35% phosphoric for 20 sec
Rinse / Dry	Rinse/Dry
Sponge in liquid for 10 seconds	
Apply with sponge ONE LESION PER BEAVER TAIL	Apply with sponge ONE LESION PER CUBE
Wait 5 minutes and do not rinse	Apply for 5 seconds
Do not eat, drink or rinse for 30 minutes	Do not eat, drink or rinse for 30 minutes

- Gözeticci B, Öztürk-Bozkurt F, Toz-Akalin T. Comparative Evaluation of Resin Infiltration and Remineralisation of Noncavitated Smooth Surface Caries Lesions: 6-month Results. *Oral Health Prev Dent.* 2019;17(2):99-106. doi: 10.3290/j.ohpd.a42203. PMID: 30874252. <https://pubmed.ncbi.nlm.nih.gov/30874252/>
- Xie, Z., Yu, L., Li, S. *et al.* Comparison of therapies of white spot lesions: a systematic review and network meta-analysis. *BMC Oral Health* 23, 346 (2023). <https://doi.org/10.1186/s12903-023-03076-x> and found at <https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-023-03076-x#:~:text=Conclusions,combination%20also%20would%20increase%20efficacy>.



P11-4 Self – Assembling Peptide: Learn More



Resin Infiltration

- “Micro Resin Sealant”
- Low viscosity resin flowed into demineralized enamel
 - The higher the penetration coefficient the better
 - “triethylene glycol dimethacrylate is generally better than bisphenol A glycidyl methacrylate”
- The way the resin reflects the light closely mimics healthy wet enamel – so is esthetic



Resin Infiltration Basic Instructions

- BASIC INSTRUCTIONS

- Clean and isolate
- Pumice lesion
- Etch with their “etch” 2 minutes (**15% Hydrochloric Acid**)
 - At least 2mm beyond lesion
 - opens more efficiently than 37% phosphoric acid
- Rinse 30 seconds
- Dry with air only syringe
- Dry with their “drying solution” 30 seconds (Ethyl-alcohol)
 - If white spot doesn't go away with drying agent etch again (up to 3 times)
- Turn off lights, apply resin infiltrate for 3 minutes (at least)
- Cure 40 seconds
- Then re-apply for one minute and cure (polymerization shrinkage) and cure.
- Polish with polishing disks

If whitening wait 2 weeks after so peroxide is not in tubules



Resin Infiltration Icon Product Insert

Recommended use (for image, see »Handling«)

1. Preparation

- Before the start of treatment, clean the affected tooth and adjacent teeth. Remove all cleaning residue with water spray.
- Ensure that the working area is sufficiently dry. For this purpose, appropriate measures such as a rubber dam or liquid dam should be taken. Make sure that the lesion to be treated remains fully accessible.

2. Exposing the lesion body

- Pretreatment measures: To ensure successful infiltration, the complete hypermineralized surface layer must be removed prior to applying Icon Infiltrant in order to gain access. Similarly, access to deeper white spots must also be gained first.
- The use of suitable assistive devices (e.g., medium grit abrasive disk, microabrasion or sandblasting) is optional prior to etching.

Application of Icon Smooth Surface Etch:

- Screw the Vestibular Tip onto the Icon Smooth Surface Etch syringe.
- Apply an ample amount of Icon Smooth Surface Etch onto the lesion site by turning the syringe shaft carefully, let it take effect for 02:00 minutes and activate the effect by moving the Tip occasionally. Remove excess material with cotton roll (Fig. 1).
- Aspirate off Icon Smooth Surface Etch and rinse with water for at least 30 seconds. Then dry using oil-free and water-free air.

3. Result preview and drying

For effective treatment results it is necessary to dry the lesion to its full depth. In this step a preview of the final result is shown.

Application of Icon Dry:

- Screw the Application Tip onto the Icon Dry syringe, apply an ample amount of material onto the lesion and allow it to take effect for 30 seconds. Dry carefully with oil-free and water-free air (Fig. 2).
- When wetted with Icon Dry, the whitish-opaque coloration on the etched enamel should fade. If this is not the case, repeat step 2.
- After a visual check, dry the lesion with oil-free and water-free air to remove the Icon Dry.

4. Infiltration

Do not apply Icon Infiltrant under direct operating light as this may cause the material to set prematurely.

Application of Icon Infiltrant

- Screw a new Vestibular Tip onto the Icon Infiltrant syringe.
- Apply an ample amount of Icon Infiltrant by turning the shaft.
- Allow Icon Infiltrant to infiltrate for 03:00 minutes, occasionally activate the infiltration by moving the syringe and top up if necessary (Fig. 3).
In case of deeper and larger defects the esthetic result can be improved by extending the exposure time.
- Remove excess material with a cotton roll and, if necessary, dental floss.
- Light-cure Icon Infiltrant for a minimum of 40 seconds from all sides.
- Repeat the application with Icon Infiltrant as previously described but with a contact time of 01:00 minute
- Remove the rubber dam.
- Use polishing cups, or similar, for the surface finish.



Resin Infiltration: Learn More



- Course on Icon: https://youtu.be/JbRXBb_DTUA?si=9ZB8wvQyOepNczUn

- Course on Icon Dr. Jenette MacLean : https://youtu.be/JbRXBb_DTUA?si=9ZB8wvQyOepNczUn
- Shivanna V, Shivakumar B. Novel treatment of white spot lesions: A report of two cases. Journal of Conservative Dentistry : JCD. 2011 Oct;14(4):423-426. DOI: 10.4103/0972-0707.87217. PMID: 22144817; PMCID: PMC3227295. <https://europepmc.org/article/pmc/pmc3227295>



Self Assembling Peptides P11-4 vs Resin Infiltration?

	P 11-4	Resin Infiltration
How Does it Work?	Encourages natural remineralization	Acts as a Resin Micro Sealant to fill defects
Technique Sensitivity	Sometimes requires multiple appointments	Requires the use of hydrochloric acid acid
Outcomes	More natural- using remineralization	More esthetic, resin reflects very similar to wet enamel

- Gözetici B, Öztürk-Bozkurt F, Toz-Akalın T. Comparative Evaluation of Resin Infiltration and Remineralisation of Noncavitated Smooth Surface Caries Lesions: 6-month Results. *Oral Health Prev Dent.* 2019;17(2):99-106. doi: 10.3290/j.ohpd.a42203. PMID: 30874252. <https://pubmed.ncbi.nlm.nih.gov/30874252/>
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- Gholami S, Boruziniat A, Talebi A, Yazdandoust Y. Effect of Extent of White Spot Lesions on the Esthetic Outcome after Treatment by the Resin Infiltration Technique: A Clinical Trial. *Front Dent.* 2023 Oct 22;20:40. doi: 10.18502/fid.v20i40.13926. PMID: 38025306; PMCID: PMC10679783. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10679783/>
- Icon IFU: [https://dentalkart-media.s3.ap-south-1.amazonaws.com/PDF/IFU_icon_091808_us_version_for_printing+\(3\).pdf](https://dentalkart-media.s3.ap-south-1.amazonaws.com/PDF/IFU_icon_091808_us_version_for_printing+(3).pdf)

Back to Board



Chemo-mechanical caries removal

- Chemical softening of infected dentin so you can remove it more easily
 - Can be removed with non-cutting instrument
- Two major types of chemo-mechanical caries removal agents:
 - Sodium hypochlorite based (GK-101, GK-101E, and Carisolv)
 - Enzyme based (Papacarie Duo, Carie Care, Biosolv TM, Brix3000)



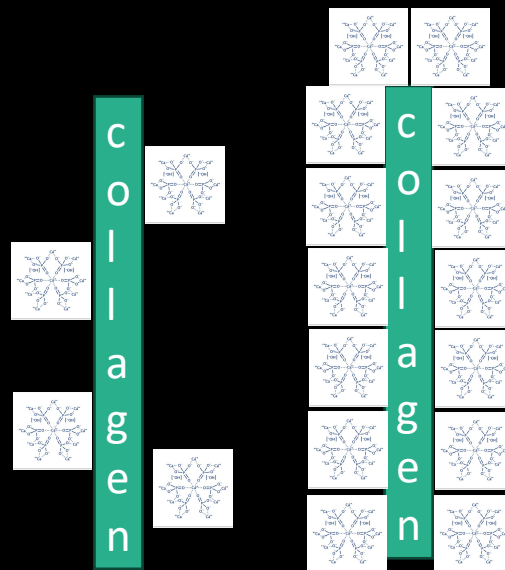
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- Reddy MV, Shankar AJ, Pentakota VG, Kolli H, Ganta H, Katari PK. Efficacy of antimicrobial property of two commercially available chemomechanical caries removal agents (Carisolv and Papacarie): An ex vivo study. J Int Soc Prev Community Dent. 2015 May-Jun;5(3):183-9. doi: 10.4103/2231-0762.159955. PMID: 26236677; PMCID: PMC4515800. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4515800/>
- Carisolv: https://www.straumann.com/content/dam/media-center/straumann/en/documents/brochure/product-information/18-1460_PB_Straumann_Carisolv_HCP_Brochure_FINAL_180827-en_low.pdf
- Gupta S, Pentapati KC, Acharya S. A Randomised Controlled Trial Comparing Chemomechanical (Carie-Care™) Versus Conventional Caries Removal for Atraumatic Restorative Treatment. ScientificWorldJournal. 2025 Jan 30;2025:6689053. doi: 10.1155/tswj/6689053. PMID: 39949659; PMCID: PMC11824596. <https://pubmed.ncbi.nlm.nih.gov/39949659/>



Chemo-mechanical Caries Removal

- Removes soft dentin by breaking up collagenous matrix

My crystals protect me



AFFECTED dentin



This is INFECTED dentin



Carisolv

- Uses buffered hypochlorite (0.25% - 0.475%)
 - water, carboxymethylcellulose, sodium chloride, amino acids, sodium hypochlorite
 - Disrupt hydrogen bonds of partially degraded collagen
- Suggested Protocol
 - Apply carisolv in lesion for 30 seconds
 - Remove caries with instrument
 - Know you are done when no longer cloudy



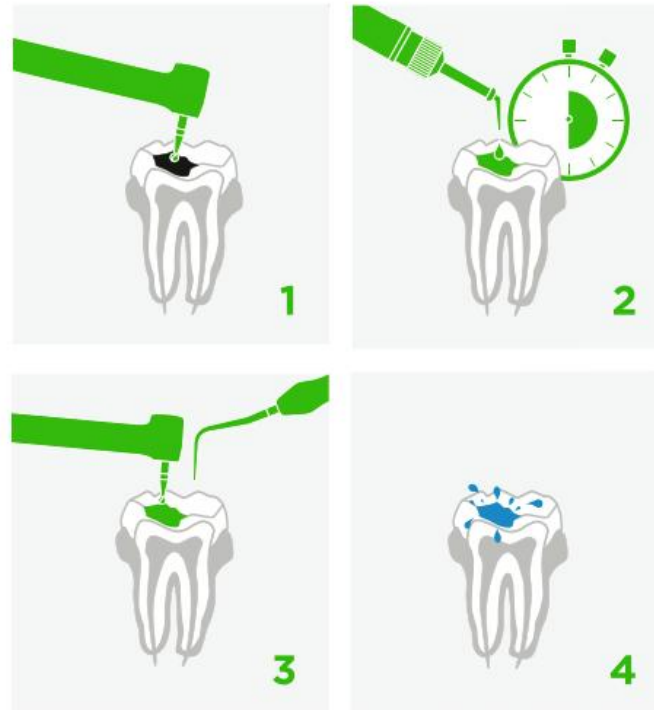
• Carisolv by Straumann brochure: https://www.straumann.com/content/dam/media-center/straumann/en/documents/brochure/product-information/18-1460_PB_Straumann_Carisolv_HCP_Brochure_FINAL_180827-en_low.pdf
• Current update of chemomechanical caries removal methods. H Hamama, C You, M Burrow. Published August 2014 in Australian Dental Journal.)
<https://onlinelibrary.wiley.com/doi/10.1111/adj.12214#:~:text=25%20The%20original%20Carisolv%20was,2a>).



Carisolv – Product Insert

HOW TO TREAT CARIES WITH CARISOLV

1. If necessary open the cavity using a conventional bur.
2. Apply Carisolv directly into the cavity. After 30 seconds the carious dentine has softened.
3. Remove the softened, carious tissue using a hand excavator or a minimally invasive bur.
4. Rinse and blow the cavity dry for inspection.



The cavity is free of caries and traditional filling treatment can commence.

- Carisolv by Straumann brochure: https://www.straumann.com/content/dam/media-center/straumann/en/documents/brochure/product-information/18-1460_PB_Straumann_Carisolv_HCP_Brochure_FINAL_180827-en_low.pdf
- Current update of chemomechanical caries removal methods. H Hamama, C You, M Burrow. Published August 2014 in Australian Dental Journal.) <https://onlinelibrary.wiley.com/doi/10.1111/adj.12214#:~:text=25%20The%20original%20Carisolv%20was,2a>).
- Product insert: https://www.straumann.com/content/dam/media-center/straumann/en/documents/brochure/product-information/18-1460_PB_Straumann_Carisolv_HCP_Brochure_FINAL_180827-en_low.pdf



Papacarie

- Uses Papain – a proteolytic enzyme
- Suggested Protocol
 - Apply to decayed area
 - let soak 30-60 seconds
 - Remove soft dentin
 - May need to repeat



Cleared as prep conditioner/cleaner



[Back to Board](#)

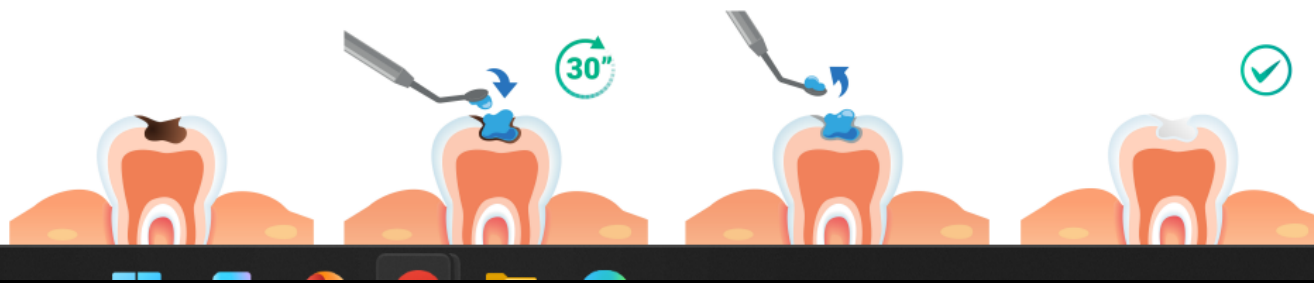


Papacarie – Product Insert

Papacarie Duo use protocol



1. Perform a periapical or interproximal diagnostic radiograph.
2. Clean the area to be treated with water.
3. Relative isolation with cotton swabs and suction.
4. Put the gel in a dappen glass or on the glove and carry it to the cavity with the curette.
5. Apply the gel and wait for the cavity to soften (30 to 60 seconds).
6. Scrape the carious dentin using pendular sweeping movements with a blunt curette.
7. Reapply the gel whenever necessary until the complete removal of the carious tissue.
8. Inspection of the remaining dentin texture.
9. Clean the cavity with water.
10. Restoration according to the usual procedure.
11. Perform a check radiograph.



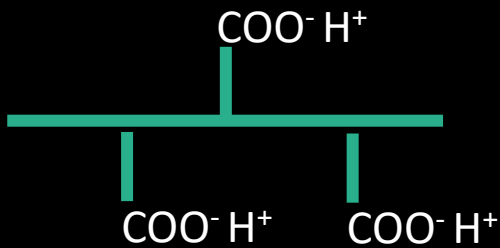
[Back to Board](#)



Basic Parts of a Glass Ionomer

- Polyacrylic Acid: 25-50%
 - Copolymerized w/ other acids for viscosity and stability
 - Polybasic carboxylic acid 5-10%

- Water



+



+

- Ion-leachable Glass Powder



Fluoroaluminumsilicate Glass

Other Components: Silica (SiO₂), Alumina (Al₂O₃)
Lime (CaO), polyacrylic acid powder

Also Can Contain: Strontium oxide (SrO), Zinc oxide (ZnO), Fluorite (CaF₂), Phosphate (P₂O₅), Soda (Na₂O)



- Sikka N, Brizuela M. Glass Ionomer Cement. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK582145/>
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>
- Equia Forte powder SDS : <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/sds/equia-forte-ht-powder-sds-en.pdf>
- Equia Forte liquid SDS: <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/sds/equia-forte-ht-liquid-sds-en.pdf>



2 Reactions of GI:

Setting Reaction = Viscous Liquid  Solid

Bonding Reaction = Glass Ionomer Attaching to Tooth.

- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>



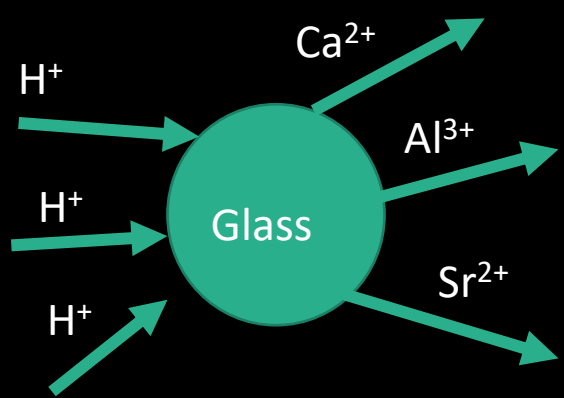
Setting Reaction Phase 1: Liquid to Solid

1. Acid reacts with glass and ions are released

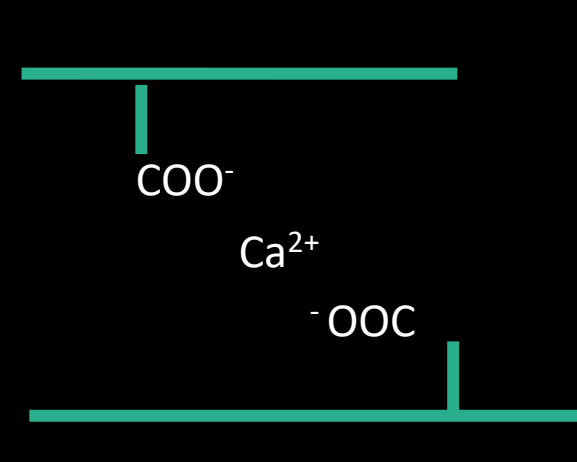
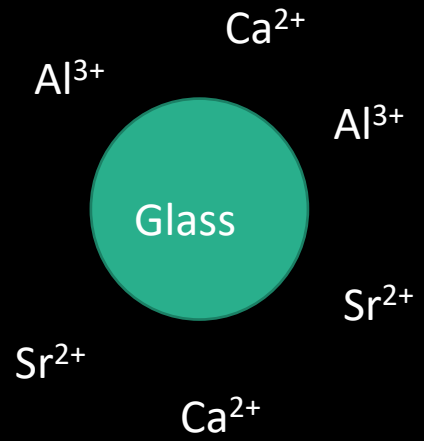
2. Ions now floating freely

3. Ca^{2+} Ions
 • Cross link acid,
 • Bind glass to acid

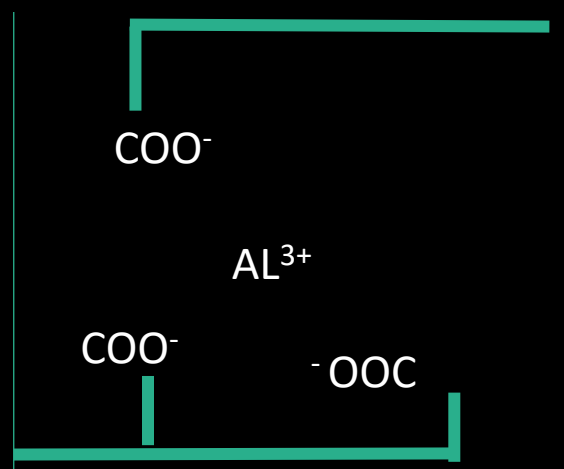
4. Al^{3+} Swaps out the Ca^{2+} ions
 • ↑ crosslinks structure
 • ↑ strength (24-72 hrs)



45 seconds



3-6 minutes



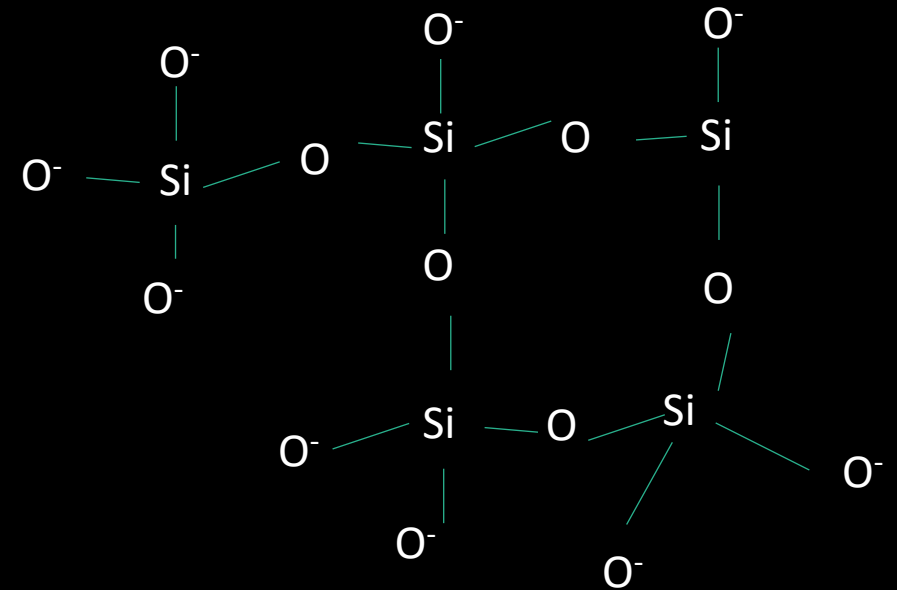
24-72 hours

• Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
 • Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>



Setting Reaction Phase 2: Formation of Covalent Silicate Network

- Silicate ions + H₂O → covalent silicate network (or phosphate)
- Time: 30 days
- Maximum strength and final set in 30 days



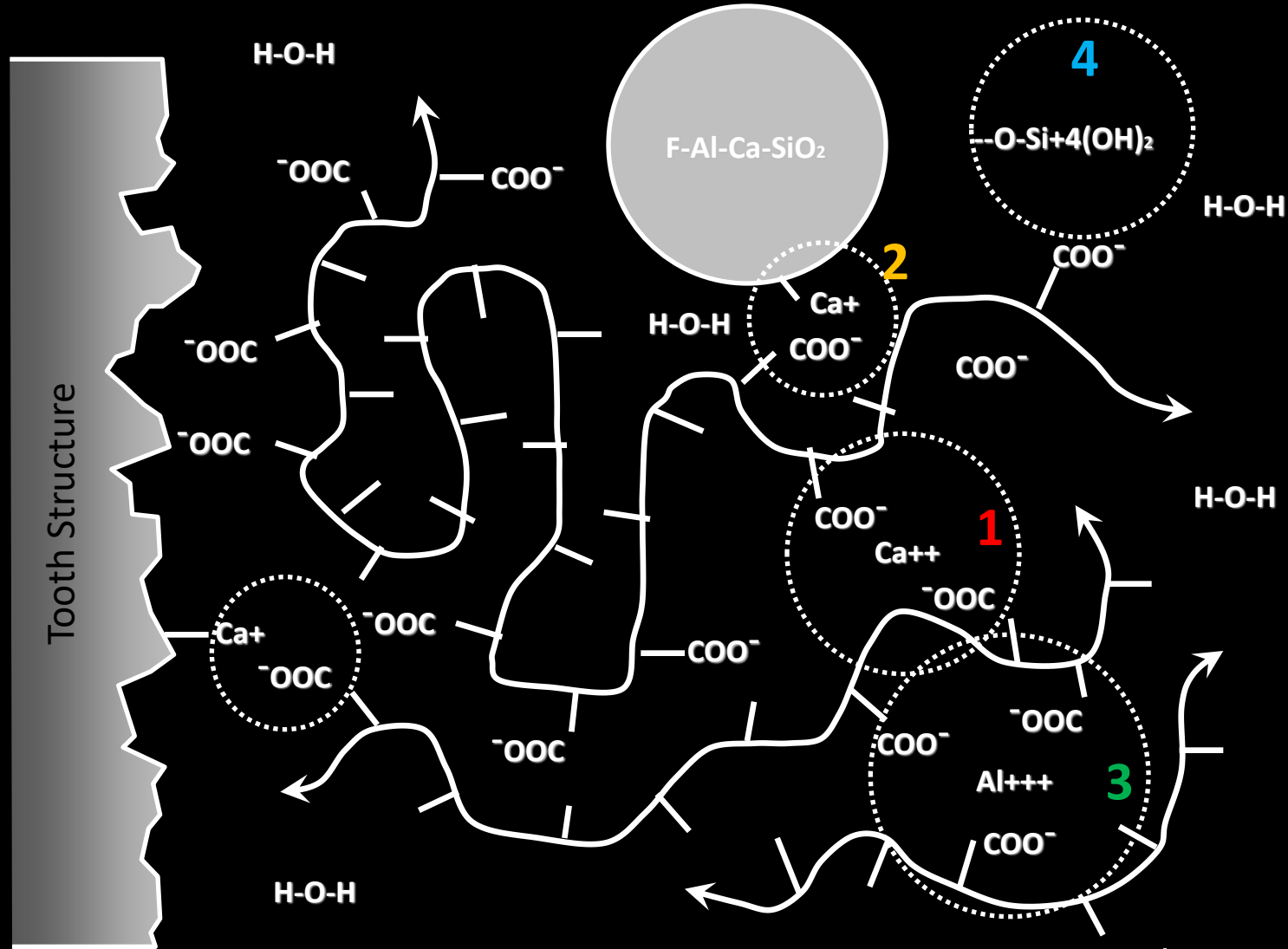
Setting Reaction

1. Calcium cross linking in the material
45 seconds

2. Acid chain bonding with glass particles-
3-6 min

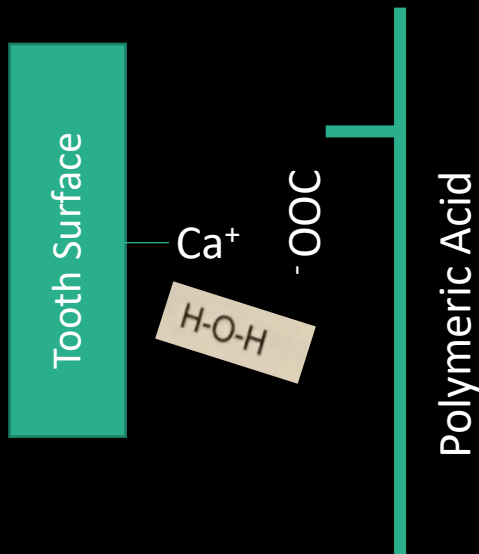
3. Stronger cross linking with Aluminum
24-72 hrs

4. Formation of silicate network
30 days

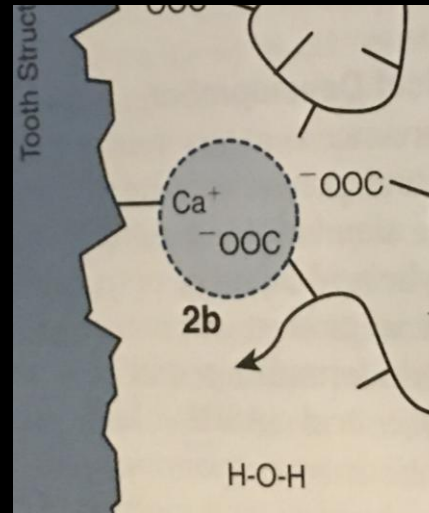


Bonding Reaction: Glass Ionomer Bonding to Tooth

1. Hydrogen Bonds: carboxyl group of PAA and water on tooth



2. Ionic Bonds: PAA with Ca^{+} ion on tooth structure.
 - 3-15 minutes



3. Formation of ion-exchange layer
 - several days



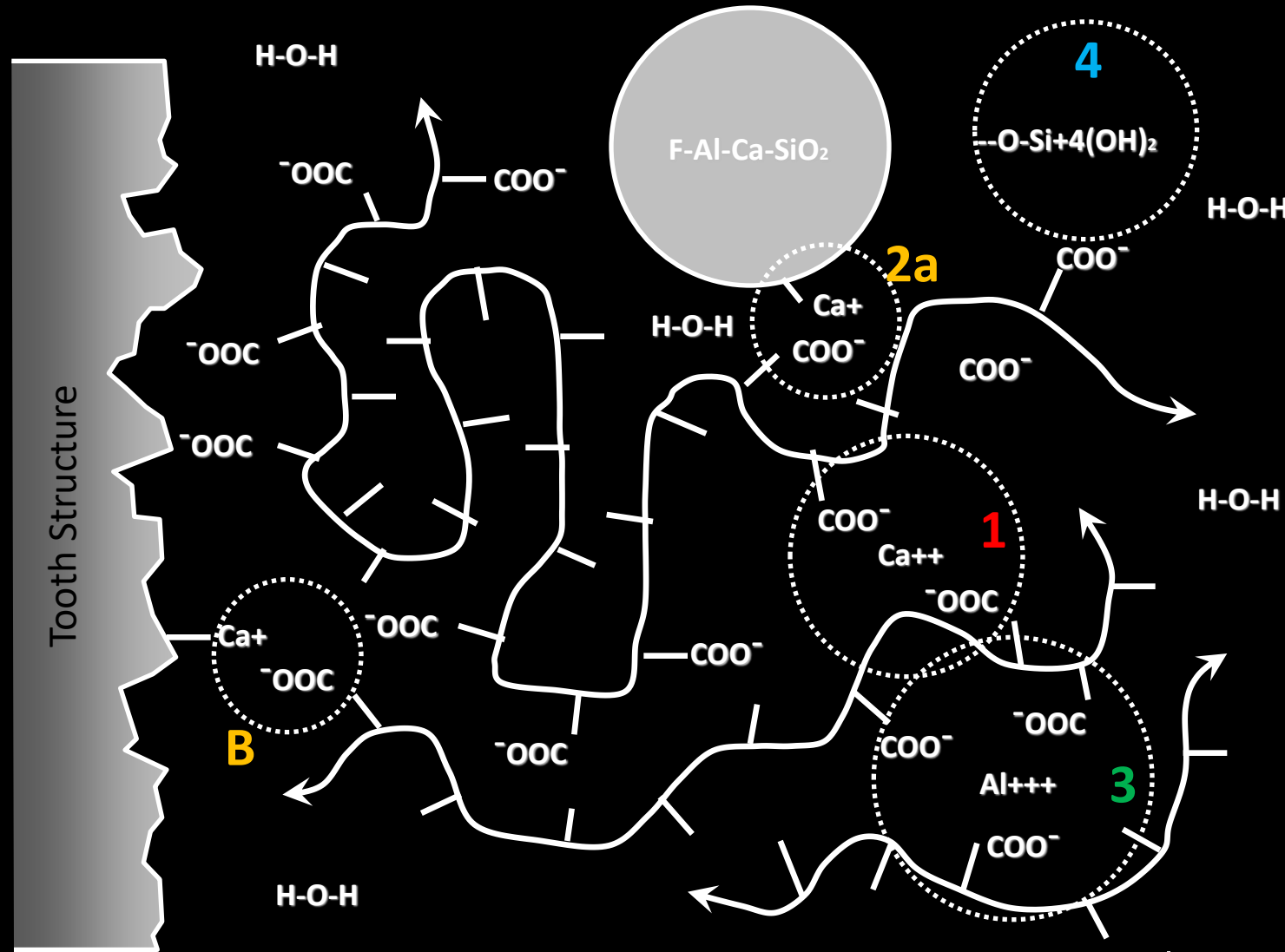
Bonding and Setting Reaction Together

1. Calcium cross linking in the material
45 seconds

2. Acid chain bonding with glass particles- 3-6 min

3. Stronger cross linking with Aluminum
24-72 hrs

4. Formation of silicate network
30 days



“B”
Represents acid chain bonding with tooth formation of silicate network 3-6min



What is Conditioner?

- 20% Polyacrylic Acid
- Not the same liquid as in capsule
 - Cavity Conditioner: 20% polyacrylic acid and 3% aluminum chloride hexahydrate
 - Liquid in Capsule: 5-10% polybasic carboxylic acid, 25-50% polyacrylic acid, Water 12%
 - Optimized to do different things



But it did get sticky as it dried on my fingers

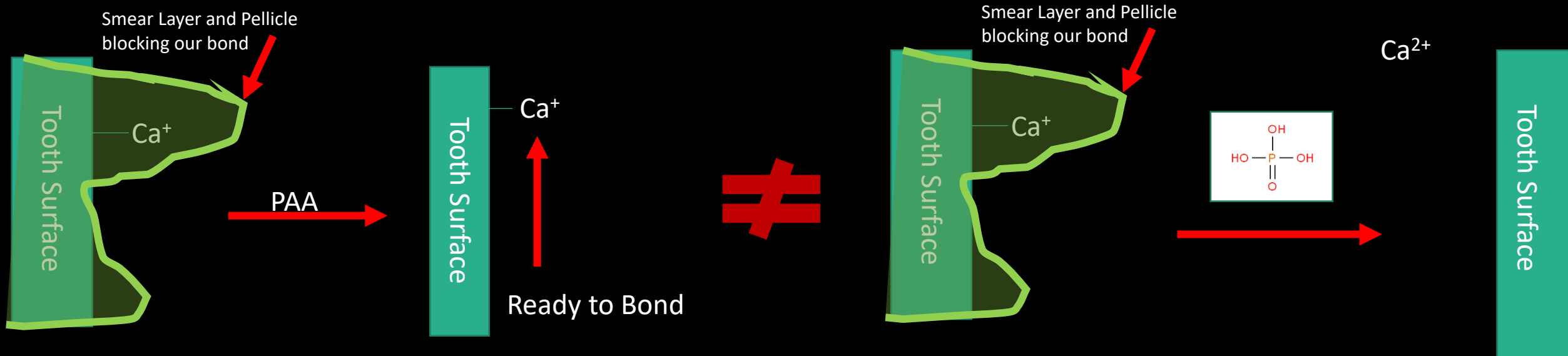
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>



Polyacrylic Acid \neq Phosphoric Acid

Polyacrylic Acid 20% (Cavity Conditioner) or 37% Phosphoric Acid (Etch)

1. Both Remove Smear Layer
2. 37% Phosphoric Acid also removes more valuable Ca^+ we need for bonding.



Water: Solvent- is the medium where the reaction takes place

- ↓ Water :
 - Chalky rough
 - Cracking and crazing at surface
- ↑ Water :
 - More translucency
 - Too much early on can wash away the metal cations (Al^{3+})
 - Can ditch out



- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>



What is Top Coat?

- Resin
- Protects from dehydration and water uptake
 - Can use coco butter or petroleum jelly to protect from water
- Increases surface hardness and wear resistance
- Wears off
 - Fluoride release improves when wears off



- Sikka N, Brizuela M. Glass Ionomer Cement. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK582145/>
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>
- Equia forte Guide: <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/technical%20manual/equia-forte-ht-comprehensive-guide.pdf>



Types of Glass Ionomer: Based on Function

- Types of GI: Cement, Sealant, Restorative Material
 - Same basic stuff
 - Different liquid powder ratio
 - Different “add ins” to optimize for different things



- Sikka N, Brizuela M. Glass Ionomer Cement. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK582145/>
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, “A Review of Glass-Ionomer Cements for Clinical Dentistry” Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. “Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>
- Equia forte Guide: <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/technical%20manual/equia-forte-ht-comprehensive-guide.pdf>



Types of Glass Ionomer Restoratives

- Resin Modified GI:
 - “Umbrella effect”
 - Helps protect from moisture contamination
 - Dual Cure:
 - Adding bisphenol A-glycidyl dimethacrylate or urethan dimethacrylate and photo initiators
 - Greater:
 - initial strength, flexural strength, wear resistance
 - Prettier with polish
 - Less:
 - Direct bond to tooth- still bonds, but less because resin in the way
 - Fluoride release
 - Some polymerization shrinkage
 - Great for Sandwich Technique
 - Examples: Fuji II LC, Ketac Fil, Photac Fil, ChemFil Rock

- Sikka N, Brizuela M. Glass Ionomer Cement. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK582145/>
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, “A Review of Glass-Ionomer Cements for Clinical Dentistry” Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. “Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>
- Equia forte Guide: <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/technical%20manual/equia-forte-ht-comprehensive-guide.pdf>



Types of “Glass Ionomer”

- Metal Modified GI:
 - Adding silver
 - Improve wear resistance, slightly less bonding to tooth
 - Examples: Miracle Mix (GC) , Ketac Silver (3M), Riva Silver (SDI)
- Compomer:
 - Ion leachable glass particles of GI added as fillers to composite matrix, but doesn't have the PAA
 - Light cured
 - Bond is micromechanical- no chemical bonding
 - Does have fluoride release
 - Examples: Dyract (Dentsply), Compoglass (Vivadent), Hytac (ESPE) Twinky Star (voco)

- Sikka N, Brizuela M. Glass Ionomer Cement. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK582145/>
- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, “ A Review of Glass-Ionomer Cements for Clinical Dentistry” Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. “Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>
- Equia forte Guide: <https://www.gc.dental/america/sites/america.gc.dental/files/products/downloads/equiaforteht/technical%20manual/equia-forte-ht-comprehensive-guide.pdf>

[Back to Board](#)



What is Partial Caries Removal?

- Restoring over compromised tooth in hopes to conserve tooth structure

AFFECTED dentin





This is INFECTED dentin



1. Innes N.P.T et al. "Managing Carious Lesions: Consensus Recommendations on Terminology" *Advances in Dental Research* 2016, Vol. 28(2) 49–57 <https://pubmed.ncbi.nlm.nih.gov/27099357/>
2. Lawson, N. Robles, A. "Clinical Treatment of Deep Caries: Adopting a minimally invasive approach in managing deep caries lesions will help avoid complications with pulpal involvement." *Decisions in Dentistry*. February 2019 <https://decisionsindentistry.com/article/clinical-treatment-of-deep-caries/>



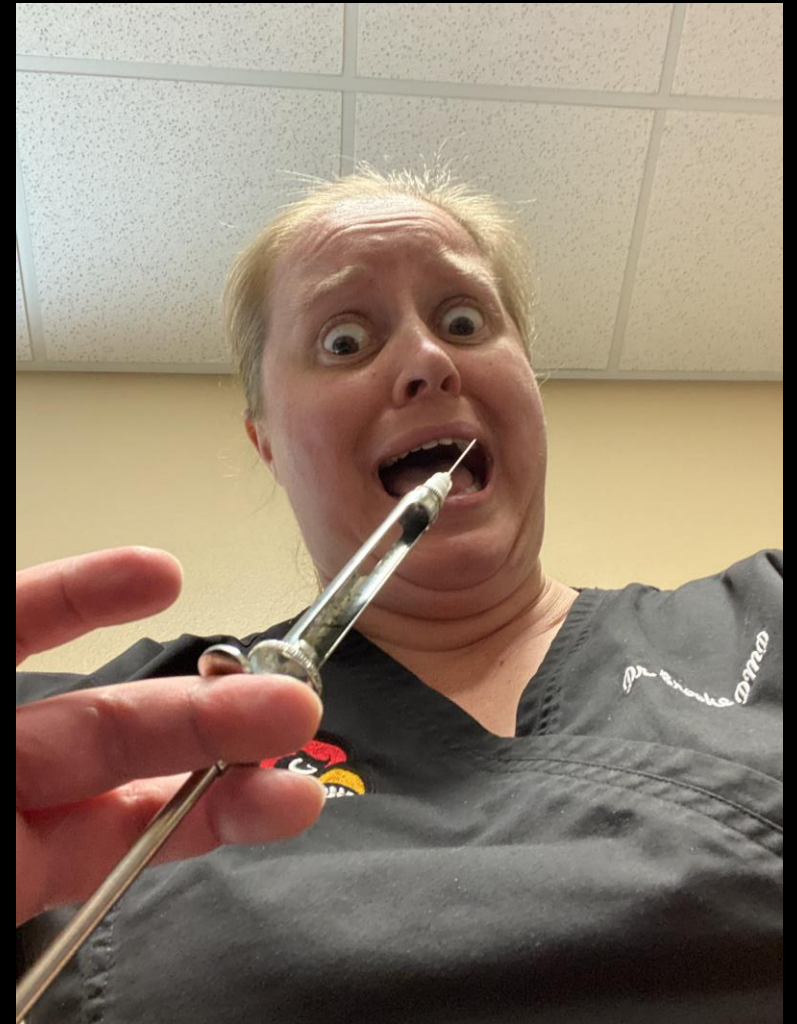
	Affected Dentin	Infected Dentin
Mineralization	Demineralized	Demineralized
Collagenous Matrix	Intact	Broken Down
Feel of tissue:	Leathery	Peanut butter
Bacterial Presence	Little to None	More Significant Bacteria
Ability to Bond	Better than	Worse than Affected
	 <p>Lawson, N. Robles, A</p>	 <p>Lawson, N. Robles, A</p>

1. Lawson, N. Robles, A. "Clinical Treatment of Deep Caries: Adopting a minimally invasive approach in managing deep caries lesions will help avoid complications with pulpal involvement." *Decisions in Dentistry*. February 2019 <https://decisionsindentistry.com/article/clinical-treatment-of-deep-caries/>
2. Palma-Dibb RG et al. "Bond Strength of glass-ionomer cements to caries-affected dentin." *Journal of Adhesive Dentistry*. 2003 Spring: <https://pubmed.ncbi.nlm.nih.gov/12729084/>
3. Alves, FB et al. "The bonding of glass ionomer cements to caries-affected primary tooth dentin." *Pediatric Dent*. 2013 July-Aug: 35(4) 320-4 https://www.researchgate.net/publication/255732115_The_Bonding_of_Glass_Ionomer_Cements_to_Caries-affected_Primary_Tooth_Dentin/link/00b495239a828e84b4000000/download
4. Choi, K "Micortensile Bond Strength of Glass iomer Cements to artificially Created Carious Dentin". *Operative Dentistry*. 2006 31-5, 590-597 <https://pubmed.ncbi.nlm.nih.gov/17024948/>
5. Frohlich Bonding of GI cement and adhesives to silver diamine fluoride treated dentin http://www.quintpub.com/journals/jad/fulltext.php?article_id=22183



Why Partial Caries Removal?

- Avoiding pulp exposure
- Conserve tooth structure
- **AVOIDING THE NEEDLE**



1. Innes N.P.T et al. "Managing Carious Lesions: Consensus Recommendations on Terminology" *Advances in Dental Research* 2016, Vol. 28(2) 49–57 <https://pubmed.ncbi.nlm.nih.gov/27099357/>
2. Lawson, N. Robles, A. "Clinical Treatment of Deep Caries: Adopting a minimally invasive approach in managing deep caries lesions will help avoid complications with pulpal involvement." *Decisions in Dentistry*, February 2019 <https://decisionsindentistry.com/article/clinical-treatment-of-deep-caries/>



Partial Caries Removal Has Many Names

ITR - INTERIM Therapeutic Restoration

ART - Atraumatic/Alternative Restorative Technique

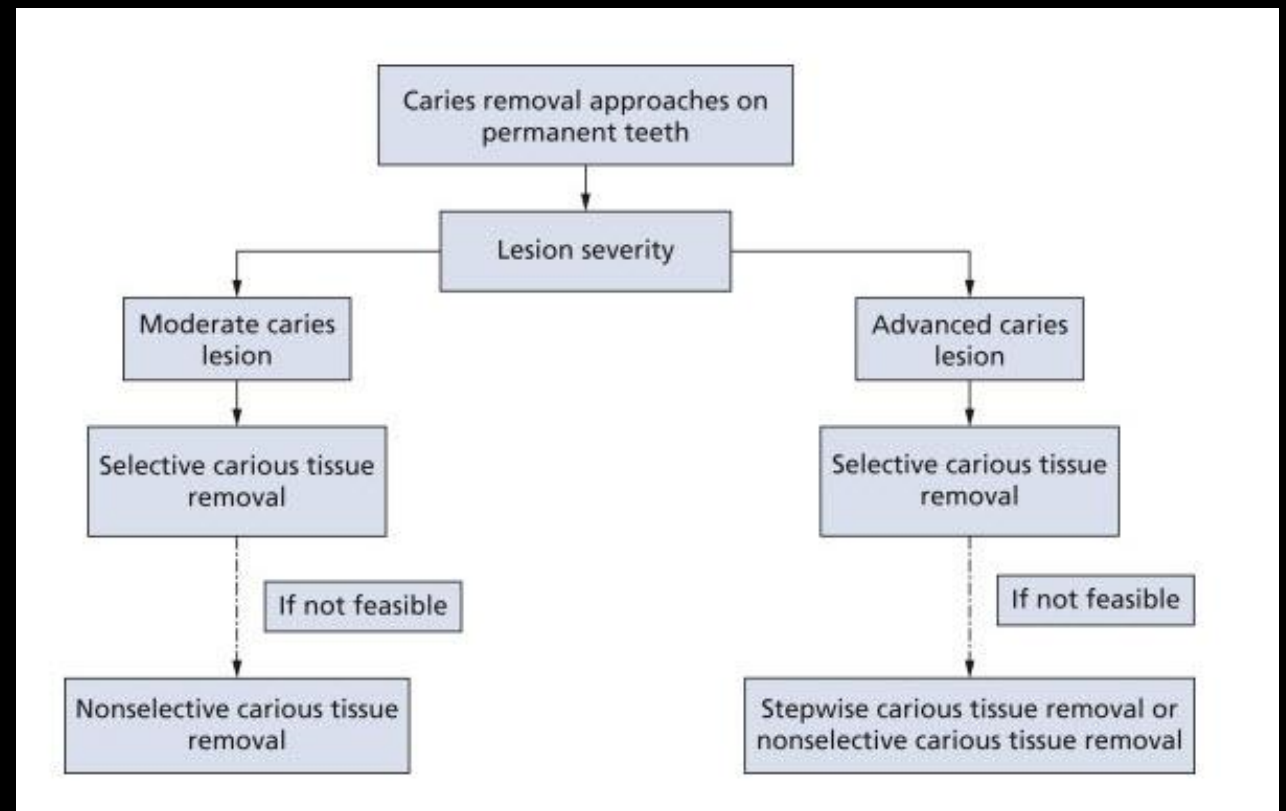
SMART - Silver Modified “ART”

1. Saber AM, El-Housseiny AA, Alamoudi NM. Atraumatic Restorative Treatment and Interim Therapeutic Restoration: A Review of the Literature. *Dent J (Basel)*. 2019;7(1):28. Published 2019 Mar 7. doi:10.3390/dj7010028 <https://pubmed.ncbi.nlm.nih.gov/30866534/>
2. AAPD Restorative Guidelines 2019 https://www.aapd.org/assets/1/7/G_Restorative1.pdf

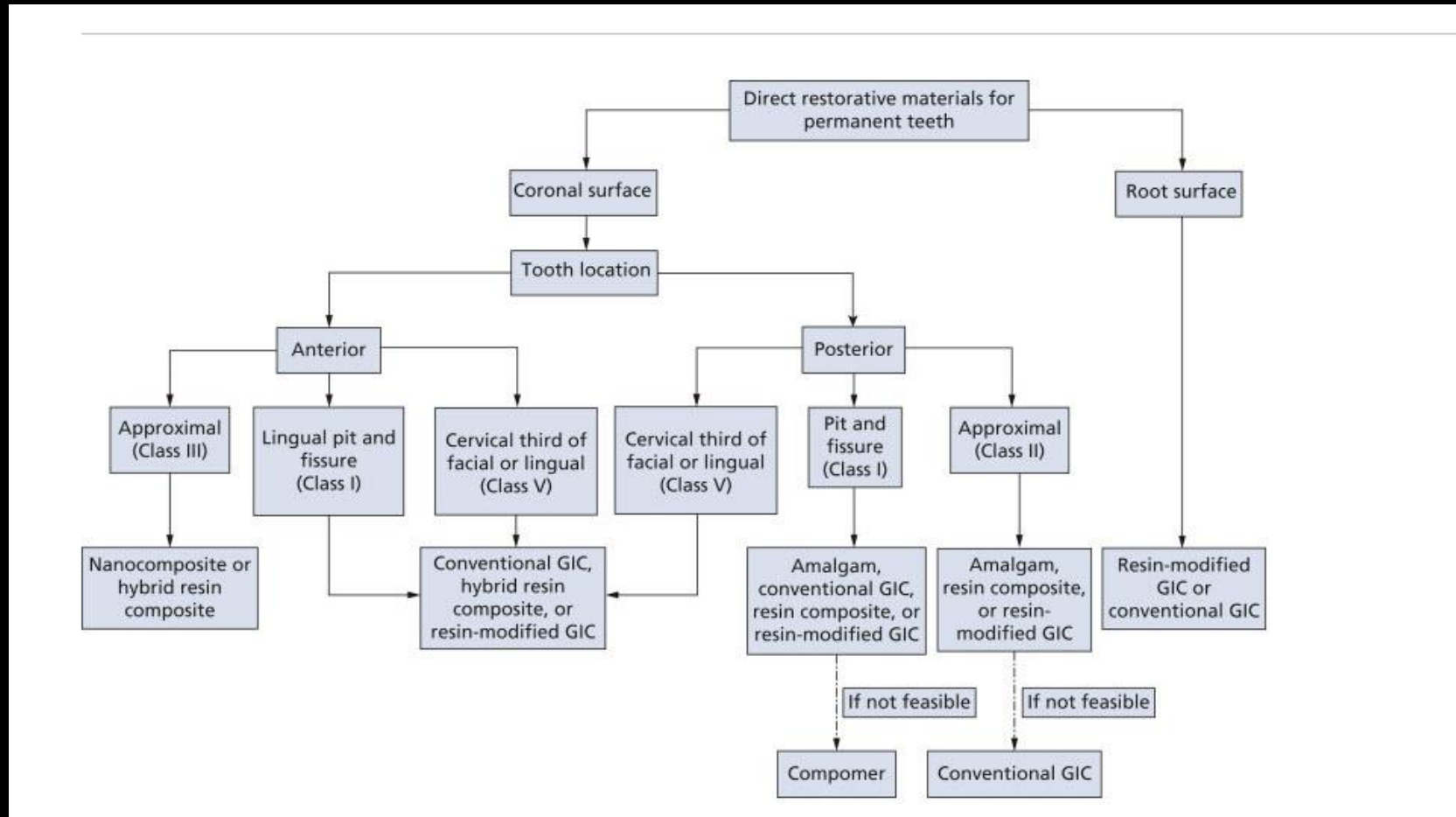


ADA Evidence-Based Clinical Practice Guidelines

“To treat moderate caries lesions on vital permanent teeth requiring a restoration, the guideline panel suggests prioritizing the use of selective carious tissue removal over nonselective carious tissue removal”



ADA Evidence-Based Clinical Practice Guidelines

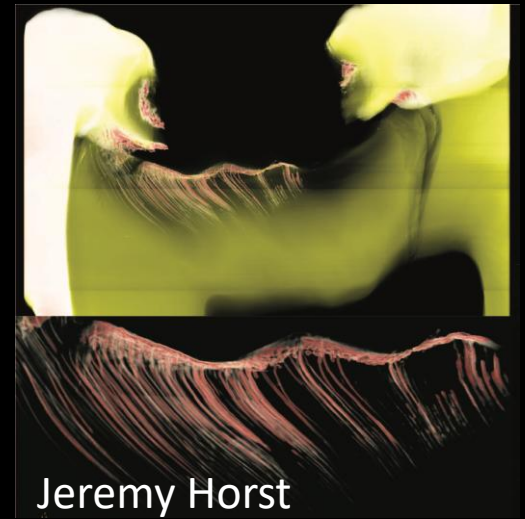


For Class II: I asked one of the members on the group why Equia Forte (a conventional GI) was not included, it is new enough not enough studies to include)



Materials: Composite Use in PCR

- Etch and Rinse Adhesive performed more effectively to caries-affected dentin than self-etching adhesives¹
- Success depends on having periphery of sound structure²
- Relying on “resin tags” and micromechanical retention³
- Using SDF and rinsing had positive effect on bond strength in some studies. ⁴



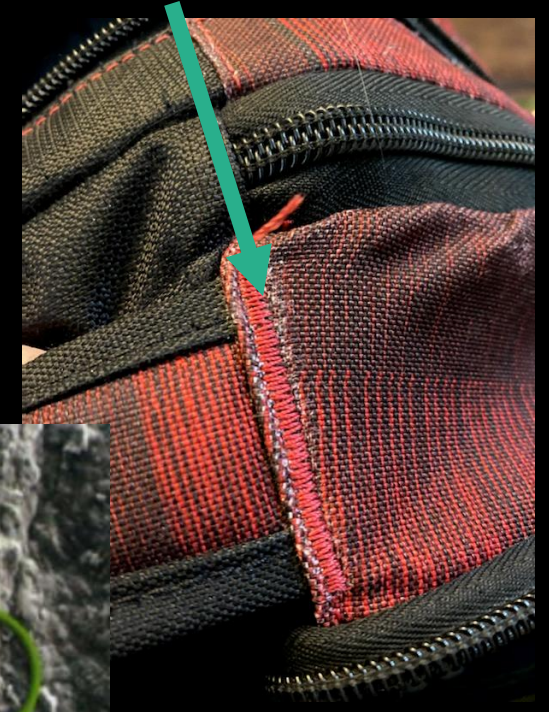
1. Xuan W, Hou BX, LuYL. Bond Strength of different adhesives to normal and caries affected dentins. *Chin Med J (Eng)*. 2010 Feb 5; 123(35(1):57-62):332-6 <https://pubmed.ncbi.nlm.nih.gov/20193255/>
2. Lawson, N. Robles, A. "Clinical Treatment of Deep Caries: Adopting a minimally invasive approach in managing deep caries lesions will help avoid complications with pulpal involvement." *Decisions in Dentistry*. February 2019 <https://decisionsindentistry.com/article/clinical-treatment-of-deep-caries/>
3. Powers, J. Sakaguchi R. *Craigs Restorative Dental Materials*. Elsevier. 2006 <https://shop.elsevier.com/books/craigs-restorative-dental-materials/sakaguchi/978-0-323-47821-2>
4. Tambara, Tatiana et al, " Bonding of Glass Ionomer cement and Adhesivess to Silver Diamien fluoride treated dentin. An updated Systematic review with Meta Analysis". *Journal of Adhesive Dentistry* 2022



Materials: If use GIC in PCR

- GI forms a chemically fused ion layer
- Some invitro studies show Resin modified GI had higher bond strengths than pure GI to carious dentin^{1, 2}
 - These studies tested one day after placement – Ion Exchange layer takes time to form
 - Advantage of more micromechanical bond ? Umbrella effect?
- For GI properties want at least 80% GI³
- Glass Ionomer bond strength was not affected by treatment with SDF⁴

But you can only put a couple stitches per day



Dr. Stephen Bayne

1. Palma-Dibb RG et al. "Bond Strength of glass-ionomer cements to caries-affected dentin." *Journal of Adhesive Dentistry*. 2003 Spring: (LIMITATION ONLY STORED 24 HOURS PRIOR TO TESTING STRENGTH) <https://pubmed.ncbi.nlm.nih.gov/12729084/>
2. Alves, FB et al. "The bonding of glass ionomer cements to caries-affected primary tooth dentin." *Pediatric Dent*. 2013 July-Aug: 35(4) 320-4 : (LIMITATION ONLY STORED 24 HOURS PRIOR TO TESTING STRENGTH) <https://pubmed.ncbi.nlm.nih.gov/23930629/>
3. SMART Oral Health. The Medical Management of Caries. Edited by Dr. Steve Duffin, DDs et al. 2019 Published by Oral Health Outreach LLC.
4. Tambara, Tatiana et al, " Bonding of Glass Ionomer cement and Adhesives to Silver Diamine fluoride treated dentin. An updated Systematic review with Meta Analysis". *Journal of Adhesive Dentistry* 2022



More Partial Caries Removal Sources

1. [Maltz M¹, Koppe B¹, Jardim JJ², Alves LS³, de Paula LM⁴, Yamaguti PM⁴, Almeida JCF⁴, Moura MS¹, Mestrinho HD⁴](#). “**Partial caries removal in deep caries lesions: a 5-year multicenter randomized controlled trial**”. *Clin Oral Investig*. 2018 Apr;22(3):1337-1343. doi: 10.1007/s00784-017-2221-0. Epub 2017 Oct 8 <https://pubmed.ncbi.nlm.nih.gov/28988345/>
2. Hoefler V, Nagaoka H, Miller CS. Long-term survival and vitality outcomes of permanent teeth following deep caries treatment with stepwise and partial-caries removal: a systematic review. *J Dent*. 2016;54 Sumarized and reprinted in JADA clinical scans April 2017 <https://pubmed.ncbi.nlm.nih.gov/27664467/>
3. Thompson, V. et al. “Treatment of deep carious lesions by complete excavation or partial removal:” *J Am Dent Assoc*. 2008 June ; 139(6): 705–712 <https://pubmed.ncbi.nlm.nih.gov/18519994/>
4. Lim, Z., Duncan, H., Moorthy, A. *et al*. Minimally invasive selective caries removal: a clinical guide. *Br Dent J* **234**, 233–240 (2023). <https://doi.org/10.1038/s41415-023-5515-4>
5. Yao Yao, Aoxiang Luo, Yanhong Hao, Selective versus stepwise removal of deep carious lesions: A meta-analysis of randomized controlled trials,, *Journal of Dental Sciences*, Volume 18, Issue 1, 2023, Pages 17-26, ISSN 1991-7902, <https://doi.org/10.1016/j.jds.2022.07.021>.
6. Khokhar M, Tewari S. Outcomes of Partial and Complete Caries Excavation in Permanent Teeth: A 18 Month Clinical Study. *Contemp Clin Dent*. 2018 Jul-Sep;9(3):468-473. doi: 10.4103/ccd.ccd_344_18. PMID: 30166846; PMCID: PMC6104381. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6104381/>

[Back to Board](#)



Glass Ionomer Protocols: Follow manufacturers instructions

Generalized:

- Clean lesion
- Conditioner 10 seconds
- Don't Over Dry
- Activation Method Differs
- Mix 10 Seconds
- Immediately fill
- Set times differ 3 minutes-7 minutes
- If / when hen to apply "coat" differs
- Don't eat hard stuff for a couple days



*Remember Aluminum replacing calcium stronger 24-72 hrs. and
covalent silicate/ phosphate network forms 30 days*

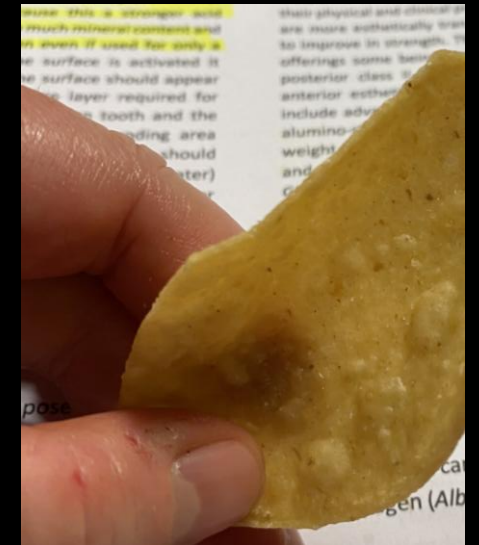
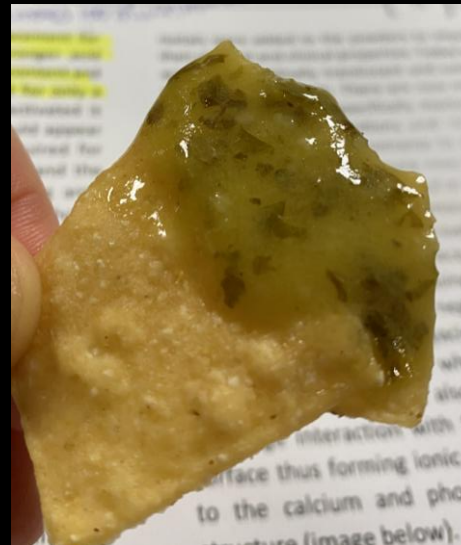


General Glass Ionomer Protocol

“Dry but don’t desiccate” ... “ Don’t over dry”

Generalized:

- Clean lesion
- Conditioner 10 seconds
- Don’t Over Dry
- Activation Method Differs
- Mix 10 Seconds
- Immediately fill
- Set times differ 3 minutes-7 minutes
- If / when hen to apply “coat” differs
- Don’t eat hard stuff for a couple days



AHA!



General Glass Ionomer Protocol

- Priming is NOT Universal

Equia



3
a. Shake or tap.
b. Depress plunger and hold for 2 sec.

4
Mix in capsule mixer for 10 sec. Working time is 1 min. 30 sec. from start of mix.

5
a. Insert into Capsule Applicator.
b. Click twice to prime capsule.

Ketac



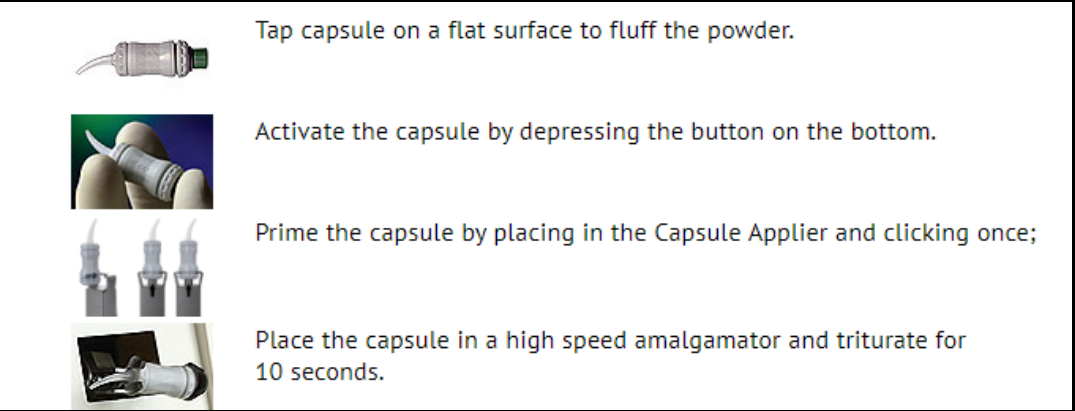
Activate capsule

Ketac™ Universal Aplicap™
Glass Ionomer Restorative

1
STEP 5

https://www.youtube.com/watch?v=tpV2u3Rv1RU&ab_channel=3MOralCare

Fuji



Tap capsule on a flat surface to fluff the powder.

Activate the capsule by depressing the button on the bottom.

Prime the capsule by placing in the Capsule Applicator and clicking once;

Place the capsule in a high speed amalgamator and triturate for 10 seconds.

Riva

4. Activate the capsule and immediately mix in an amalgamator.
Important: Do not click with applicator before you mix.




General Glass Ionomer Protocol

- Not all applicators are the same



General Glass Ionomer Protocol:

- Top Coat Products
 - May put on to avoid initial contamination
 - May put on after initial set and polish
 - May use petroleum jelly or coco butter instead to avoid initial contamination



- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
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General Glass Ionomer Protocol

- Other Helpful Instruments

Esthetic Contouring Instrument



12 blade – careful with 12b



SHARP scalers



Diamond Burs



- Sharanbir K. Sidhu 1 and John W. Nicholson 2,3, "A Review of Glass-Ionomer Cements for Clinical Dentistry" Journal of Functional Biomaterials. Received: 3 May 2016; Accepted: 21 June 2016; Published: 28 June 2016 <https://www.mdpi.com/2079-4983/7/3/16>
- Lohbauer, Ulrich. "Dental Glass Ionomer Cements as Permanent Filling Materials? – Properties, Limitations, and Future Trends. Materials 2010, 76-96; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5510173/>



Glass Ionomer Protocols: Follow Manufacturer's Instructions

3M ESPE
Ketac™ Fil Plus Aplicap™

(M) Glass Ionomer Filling Material – Радиопакет
(L) Цемент стоматологический стеклоиономерный для пломбирования зубов – Рентгеноконтрастный
(B) Глас-иономерен обтвърдобен материал –

Preparation
 ▶ Remove the carious substance only, no undercuts required.
 ▶ Do not prepare thin edges since the material requires a wall thickness of 0.5 mm.

Pulp protection
 ▶ In order to prevent irritations of the dental pulp, areas close to the pulp should be covered punctiformly with a calcium hydroxide preparation.

Conditioning
 ▶ For optimal chemical bonding to the teeth the smear layer produced in the preparatory steps must be carefully removed by applying Ketac Conditioner to the prepared surfaces and allowing the substance to react for 10 sec.
 ▶ Then rinse with copious amounts of water.
 ▶ Blow the cavity dry in only 2-3 short intervals with water and oil-free air or dab dry with cotton pellets. Do not over-dry! The cavity should be just so dry that the surface has a matt shiny appearance. Excessive drying can result in post-operative sensitivity after filling.
 ▶ Avoid further contamination.

Activation
 ▶ Place the Aplicap™ Activator on a sturdy surface and insert the Aplicap capsule in the activator.
 ▶ Using the ball of your hands, depress the activator lever firmly and completely to the stop and hold it down for 2 to 4 seconds.
 – Firmly and completely depressing the lever to the stop and holding it in this position is the only way to ensure that all of the liquid is pressed into the powder. If inadequate pressure is applied or if the lever is not depressed completely, it is possible that too little liquid will be mixed with the powder, increasing the viscosity and changing the product characteristics.

Mixing
 ▶ Mix the capsules at approx. 4,300 rpm, in a high frequency mixing device such as CapMix™ (for 10 sec) or the RotoMix™ rotating mixer (for 8 sec).

Application
 ▶ Apply with the Aplicap™ Applier. Both the Aplicap Activator and the Aplicap Applier are color-coded in red.
 ▶ Ensure that there is no contamination from water, saliva, etc. entering the working area for the entire duration of application; the working area must be kept dry.

Attention
 • Avoid any lag times between the processes of activation, mixing, and application, as the material is in the process of setting which may impair or prevent application of the material.
 • Ketac Fil Plus Aplicap sticks to metal instruments and should be washed off with cold water prior to setting.

Times
 At an ambient temperature of 23°C/73°F the following times apply:

	min:sec
Activation of capsule	0:02
Mixing with RotoMix	0:08
or	
Mixing with high frequency mixing device such as CapMix	0:10
Processing from start of mixing	1:30
Setting from start of mixing	7:00

At ambient temperatures above 23°C/73°F the setting process is accelerated. Exceeding the indicated processing time may lead to reduced bonding to enamel and dentin.
 Shorter mixing times prolong the processing and setting times, whereas longer mixing times shorten the processing and setting times. The mixing time may be reduced to 8-10 sec where high frequency mixing devices are used, and to 6-8 sec with the RotoMix device.

Filling protection
 In the first phase of their 2-phase setting process, glass ionomers are sensitive to moisture. Subsequently, there is the possibility of dehydration which may be prevented by the use of vaseline and/or cotton rolls directly after modeling.
 ▶ Apply vaseline to all exposed surfaces of the glass ionomer cement.

Finishing
 ▶ Beginning no earlier than 7 minutes after the start of mixing, use Arkansas stone, fine-grain diamonds, polishing discs of decreasing grain size or silicone polishers for finishing.
 ▶ If desired, apply vaseline again for surface sealing.

SDI **RIVA SELF CURE/ RIVA SELF CURE HV** **ENGLISH**

BULK FILL GLASS HYBRID RESTORATIVE SYSTEM
INSTRUCTIONS FOR USE

Riva Self Cure range is the ideal radiopaque, self curing conventional glass hybrid restorative materials. With excellent tooth adhesion, fluoride release and high compressive strength, available in two viscosities, Riva Self Cure range is useful for a wide range of restorative applications.

INDICATIONS

- Non stress bearing Class I and II restorations
- Deciduous teeth restorations.
- Geriatric restorations
- Intermediate restorative and base material for Class I and II cavities using the sandwich technique
- Cervical (Class V) restorations
- Core build ups
- Temporary fillings
- Restorative in the field using the ART technique
- Dentine replacement

CONTRA-INDICATIONS

- Pulp capping
- Product may cause skin irritations to some people. In such cases, discontinue use and seek medical attention.

PROCEDURE

A. CAVITY PREPARATION:

1. Clean and isolate tooth.
 Note: A conservative cavity should be prepared, employing standard techniques and instruments. Undercuts are not necessary.
2. In cases where pulp protection is necessary, use a calcium hydroxide liner.

B. CONDITIONING / ETCHING:

1. Apply Riva Cavity Conditioner to the prepared surfaces and leave in cavity for 10 seconds.
2. Rinse thoroughly with water.
3. Remove excess water. Keep moist. Avoid contamination.
IMPORTANT: Be careful not to completely dry the surface. Surface should be glistening.

C. PROCEDURE FOR MIXING AND PLACING

CAPSULE SYSTEM:

	Riva Self Cure REGULAR	Riva Self Cure FAST	Riva Self Cure HV
Setting	Green	Mustard / White*	Orange
Plunger	Green	Mustard / White*	Orange
Powder / Liquid Ratio (g/g)	0.42 / 0.12	0.42 / 0.12 0.40 / 0.15*	0.50 / 0.12
Mixing time	10 sec	10 sec	10 sec
Working time (Min., Sec.)	1'40"	1'05"	1'30"
Initial setting time @ 23°C (min., sec.)	4'10"	2'30"	3'00"
Finishing time @ 37°C from start of mixing (min., sec.)	6'00"	4'30"	5'00"
Minimum delivery capsule	0.13mL	0.13mL	0.12mL

Test conditions: temperature (23 ± 1°C), relative humidity (50 ± 10%) ISO 9917-1 (Dental water based cement).
 * T-A2, T-A3, T-A3.5 only.

1. Push the plunger on a hard surface until it flush with the body of the capsule. **Important: Do not click with an applicator before you mix.**
2. Immediately place activated capsule into the Ultramat 2 amalgamator or any high speed capsule mixer (4000 – 4800 rpm).
3. Mix for 10 seconds. NOTE: The working time can be extended by decreasing the mixing time by no more than 3 seconds (i.e. minimum mixing time is 7 seconds).
4. Immediately remove the capsule and place into the Riva capsule applicator.
5. Click the trigger of the Riva capsule applicator until glass ionomer paste is seen through the clear nozzle.
6. Extrude Riva Self Cure into the cavity, being careful not to trap air under the restoration. NOTE: Temperatures higher than 23±1°C will shorten the working time specified in the above table.
7. At the end of the working time, apply Riva Coat to all exposed surfaces of restoration.
8. Light cure for 10 seconds.

POWDER / LIQUID SYSTEM (REGULAR SET ONLY)

Powder-liquid dosage:

- 1 flat scoop to 2 drops (T-A2, T-A3, T-A3.5)
- 1 flat scoop to 1 drop (A1, A2, A3, A3.5, A4, B2, B3)

Recommended mixing time: 30 seconds
 Mixing pad type: non-absorbent paper or glass slab.
 NOTE: Cool glass slab for extended working time.

1. Gently tap Riva Self Cure powder bottle on the hand. Using the plastic scoop provided, dispense one level measure of powder onto the mixing pad.
 2. Carefully dispense the recommended number of drops of Riva Self Cure Liquid next to the powder on the mixing pad. Replace cap tightly.
 3. Use a plastic spatula and divide the powder into two equal parts.
 4. Mix the liquid with one part of the powder for 10 seconds and then include the second part and continue mixing for another 15 to 20 seconds.
 5. Place mixed paste into the cavity, being careful not to trap air under or within the restoration. At 23°C / 74°F, the working time will be about two minutes.
 6. At the end of the working time, apply Riva Coat to all exposed surfaces of restoration.
 7. Light cure for 10 seconds.
- D. FINISHING:**
1. Finish the restoration using standard techniques, after the specified finishing time.
 2. Apply another layer of Riva Coat.
 3. Light cure for 10 seconds.
 4. Instruct patient not to eat for at least one hour after procedure.

EQUIA Forte® HT **TECHNIQUE GUIDE** **GC**

Recommended: Apply CAVITY CONDITIONER (GC) for 10 sec.

1 Dispense within 10 sec.

2 Rinse and gently dry, do not desiccate.

3 a. Shake or tap. b. Depress plunger and hold for 2 sec.

4 Mix in capsule mixer for 10 sec. Working time is 1 min. 30 sec. from start of mix.

5 a. Insert into Capsule Applier. b. Click twice to prime capsule.

6 Light cure for 10 sec.

7 Pack and contour. Avoid moisture contamination and desiccation.

8 Final finishing after 2 min. 30 sec. from start of mix.

9 Finish the restoration by applying EQUIA Forte® Coat. DO NOT AIR BLOW.

10 Light cure for 20 sec.

	Fuji IX GP	Fuji IX GP FAST	Fuji IX GP EXTRA	Fuji II LC	Fuji TRIAGE
Working time (min'sec") at 23°C	2'00"	1'15"	1'15"	3'15"	1'40"
Net setting time (min'sec") at 23°C	2'20"	2'00"	2'00"	Light-cure 20"	2'30"
Final finishing commencing time (min'sec") at 37°C	6'00"	3'00"	2'30"	N/A	Light-cure 4'00" Self-cure 6'00"



Doug's Crown Rule: (For GI Fillings)

If you wouldn't do it to a crown you just cemented, don't do it to a Glass ionomer you just placed...



- NEVER REMOVE A MATRIX, SHIM OR FLOSS OCCLUSALLY
- Never use force with finishing, gentle removal of flash needed

[Back to Board](#)



SMART = Silver Modified Atraumatic Restorative Technique

- Chemically treat with SDF antimicrobial - Arrest Caries
- Partial Caries Removal – (sometimes)
- Fill: Glass Ionomer (most common)

Don't worry, I cleaned the excess up...



No Prep



Minor Prep- no numb

- Frohlich et al. Bonding of Glass Ionomer Cement and Adhesives to SDF treated dentin. An Updated Systematic review http://www.quintpub.com/journals/iad/fulltext.php?article_id=22183
- Jiang M, Mei ML, Wong MCM, Chu CH, Lo ECM. Effect of silver diamine fluoride solution application on the bond strength of dentine to adhesives and to glass ionomer cements: a systematic review. BMC Oral Health. 2020 Feb 5;20(1):40. doi: 10.1186/s12903-020-1030-z. PMID: 32024501; PMCID: PMC7003410. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7003410/>
- Salimian N, Ebrahimian M, Jafari N, Shirani F. The effect of silver diamine fluoride on the bond strength of glass ionomer to the enamel of primary teeth. Dent Res J (Isfahan). 2023 May 26;20:65. PMID: 37388302; PMCID: PMC10300269. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10300269/>
- Vuong, C. (2020). Bond Strength of GIC, RMGI, and Resin Composite to Silver Diamine Fluoride Treated Artificial Carious Dentin. UCSF. ProQuest ID: Vuong_ucsf_0034M_12089. Merritt ID: ark:/13030/m5422f64. Retrieved from <https://escholarship.org/uc/item/96i4c8sp>
- Natarajan D. Silver Modified Atraumatic Restorative Technique: A Way towards "SMART" Pediatric Dentistry during the COVID-19 Pandemic. Front Dent. 2022 Mar 12;19:12. doi: 10.18502/fid.v19i12.9215. PMID: 35937154; PMCID: PMC9294662. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9294662/>



2 Day SMART- (My Preference)

Day 1: Treat with SDF



Ideally at
least a week

Day 2: GI Filling



- Alvear Fa B, Jew JA, Wong A, Young D. Silver Modified Atraumatic Restorative Technique (SMART): an alternative caries prevention tool. StomaEduJ. 2016;3(2): <https://www.stomaeduj.com/articles-issues/archive/stoma-edu-j-2016-vol-3-issue-2-p117-258/silver-modified-attraumatic-restorative-technique-smart-an-alternative-caries-prevention-tool/>
- Ng Elizabeth, Sapna, Saini, Karen, Schulze et al, "Shear bond strength of Glass Ionomer Cement to Silver Diamine Fluoride Treated Artificial Dentinal caries". 2020 Pediatric Dentistry 42(3) <https://pubmed.ncbi.nlm.nih.gov/32522327/>



2 Day SMART: Day 2 Ideal Situation

- High Speed- 2mm of clean margins
- Slow Speed/Spoon/chemomechanical: remove soft tooth structure
- Fill with GI per Manufacturer's Instructions



2 Day SMART: Day 2 : No High Speed

- Scoop with spoon and/or slow speed/chemo-mechanical
- Use Wet Composite Tool/Finger to shape well (not over bulk)
- Use 12 blade or SHARP scaler- gently to remove flash
- Slow speed to polish
- No high speed = no resin (my rule)



2 Day SMART: Day 2 : NO Handpieces?

- Scoop with spoon
- Wet tool shaping
- 12 blade/sharp scaler for flash
- Sandpaper finger
- Next visit can use sand paper strip



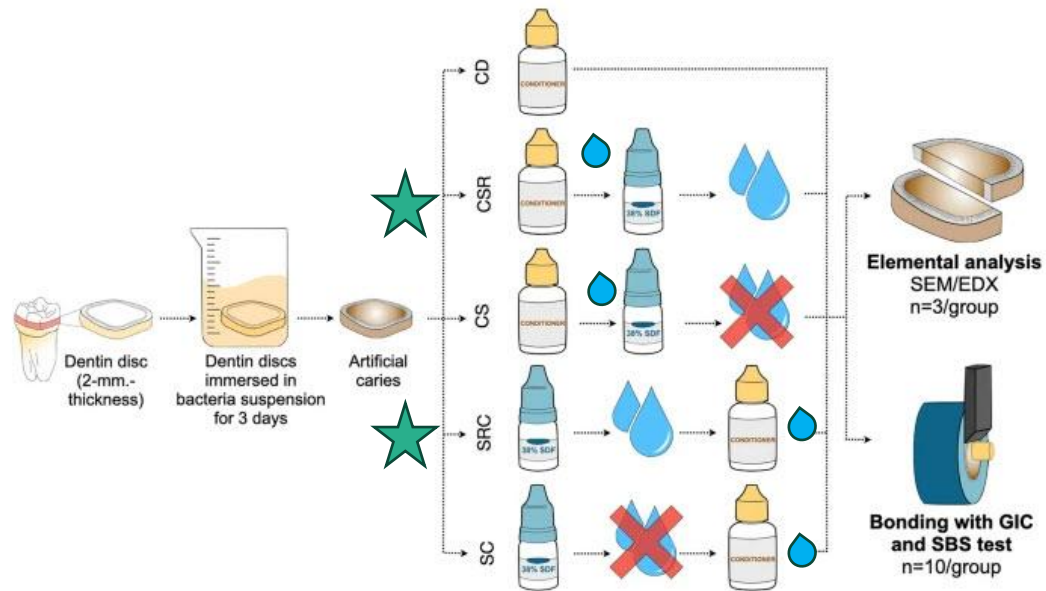
2 Day SMART: Day 2 : Other Challenges

- Clean with spoon excavator
- Micro brushes can “replace” air-water
- Applying with finger or instrument can be easier than “gun”
- Floss while wet, being conscious of direction



Same Day Ordering of Application Study

Figure 1



A schematic illustration representing the procedures used in the current study. SDF 38% silver diamine fluoride; GIC conventional glass ionomer cement; conditioner conditioner, 10% polyalkenoic acid; CD Carious dentin; CSR dentin conditioner + SDF + rinsing with water; CS dentin conditioner + SDF + no rinsing; SRC SDF + rinsing with water + dentin conditioner; SC SDF + dentin conditioner.

● I included this symbol in the chart to indicate that it was rinsed and dried during these stages.

★ I included this symbol in the chart to indicate the methods they found to have the higher bond strength.

This article supports rinsing the SDF.

- possibly helping by removing silver precipitate
- possibly helping because SDF is basic
 - “alkalinity may affect GI acid base reaction”

Table 1 Application procedure of SDF treatment.

From: [Bonding performance of glass ionomer cement to carious dentin treated with different surface treatment protocols using silver diamine fluoride](#)

Group	Application procedure
CD	The carious dentin was used as a baseline. This group was cleaned with dentin conditioner for 20 s, then rinsed and dried
CSR	The carious dentin was treated with dentin conditioner for 20 s, followed by rinsing and drying. Then, 38% SDF was applied to the carious dentin by scrubbing for 1 min, leaving for 3 min, then rinsing thoroughly, and gently drying
CS	The carious dentin was treated with dentin conditioner for 20 s, followed by rinsing and drying. Then, 38% SDF was applied to the carious dentin by scrubbing for 1 min, leaving for 3 min (no rinsing), and gently drying
SRC	The carious dentin was treated with 38% SDF by scrubbing for 1 min, leaving for 3 min, rinsing thoroughly, and gently drying. Then, dentin conditioner was applied to the carious dentin for 20 s, then rinsed and dried
SC	The carious dentin was treated with 38% SDF by scrubbing for 1 min, leaving for 3 min (no rinsing), and gently drying. Then, dentin conditioner was applied to the carious dentin for 20 s, then rinsed and dried



One or Two Day: Equia Forte SMART Instructions

SMART Technique Guide with EQUIA Forte® HT



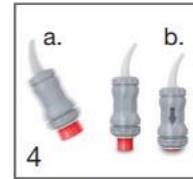
1
Apply Silver Diamine Fluoride following manufacturer's instructions.



2
Recommended: Apply CAVITY CONDITIONER (GC) for 10 sec.



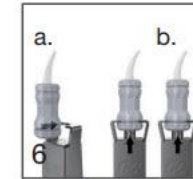
3
Rinse and gently dry, do not desiccate.



4
a. Shake or tap.
b. Depress plunger and hold for 2 sec.



5
Mix in capsule mixer for 10 sec. Working time is 1 min. 30 sec. from start of mix.



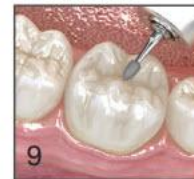
6
a. Insert into Capsule Applicator.
b. Click twice to prime capsule.



7
Dispense within 10 sec.



8
Pack and contour. Avoid moisture contamination and desiccation.



9
Final finishing after 2 min. 30 sec. from start of mix.



10
Finish the restoration by applying EQUIA Forte® Coat. DO NOT AIR BLOW.



11
Light cure for 20 sec.*

*In single-visit treatment, light curing may darken the restoration because of Silver Diamine Fluoride.
Dotted line: For two-visit treatment, the steps on the right side of the dotted line are performed in a second visit.



Consult Instructions for Use



One Day Riva Protocol: Restoration with Self Cure GI Only:

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B – Restoring with Self Cure (Auto Cure) Glass Ionomer Cement

1. Using a non-fluoride prophylaxis paste in a rubber cup, clean the tooth/teeth to be treated and abutting teeth.
2. Assess condition of teeth. Only teeth with sound dentine and enamel should be treated.
3. Isolate area to be treated with cotton rolls or rubber dam or protect the gingival tissue around the affected tooth with petroleum jelly.
4. Apply 37% phosphoric acid, e.g. Super Etch (SDI Limited), to site for 5 seconds - wash then dry, do not desiccate
5. **Riva Star Step 1:** Using the silver brush provided, pierce through the foil of the silver capsule and carefully apply solution to treatment site only.
6. **Riva Star Step 2:** Immediately after, use green brush provided, pierce through the foil of the green capsule and apply a generous amount of the solution to treatment site. Apply same solution to any other tooth surfaces that may have come into contact with the solution from the Riva Star Step 1 capsule (silver capsule).
Note: Treatment surface initially appears creamy white, keep applying solution from Riva Star Step 2 capsule (green capsule) until it turns clear.
7. Discard used capsules and brushes in accordance with local regulations.
8. Blot dry or if clinical situation permits, wash thoroughly with water for at least 10 seconds and air dry, do not desiccate.
9. If required, place suitable matrix system to tooth
10. Place SC GIC e.g. Riva Self Cure (SDI Limited) into cavity preparation according to the manufacturer's instruction for use
11. Contour the restoration prior to occlusal adjustment.
12. Polish to complete restoration
13. Remove all protective/isolation materials used in the mouth

- 37% Phosphoric Acid - 5-15 seconds
- Rinse and Dry
- Then use do two step SDF
 - This set of instructions says leave SDF in place for 1 minute then apply KI 1-3 times until clear, then rinse and air dry
- Fill per GI manufacturer instructions

You can use this product for 2 day as well



One Day Riva Protocol : Restoration with Composite or RMGI

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C – Restoring tooth with a composite or Resin Modified Glass Ionomer Cement (RMGIC)

1. Using a non-fluoride prophylaxis paste in a rubber cup, clean the tooth/teeth to be treated and abutting teeth.
2. Assess condition of teeth. Only teeth with sound dentine and enamel should be treated.
3. Apply 37% phosphoric acid, e.g. Super Etch (SDI Limited), to site for 5 seconds - wash then dry, do not desiccate
4. **Riva Star Step 1:** Using the silver brush provided, pierce through the foil of the silver capsule and carefully apply solution to treatment site only.
5. **Riva Star Step 2:** Immediately after, use green brush provided, pierce through the foil of the green capsule and apply a generous amount of the solution to treatment site. Apply same solution to any other tooth surfaces that may have come into contact with the solution from the Riva Star Step 1 capsule (silver capsule).
Note: Treatment surface initially appears creamy white, keep applying solution from Riva Star Step 2 capsule (green capsule) until it turns clear. (in some cases, a residual yellowish matt surface may remain).
6. Discard used capsules and brushes in accordance with local regulations.
7. Wash thoroughly with water for at least 10 seconds and air dry, do not desiccate.
8. If required, place suitable matrix system to tooth
9. Place SC GIC e.g. Riva Self Cure (SDI Limited) into cavity preparation up to level of DEJ
10. Prior to setting of GIC, prepare resin bonding agent e.g. Riva Bond LC (SDI Limited) and apply to GIC surface using a micro brush, condensing GIC at the same time.
11. Place composite material e.g. Aura Bulk Fill (SDI Limited) or RMGIC e.g. Riva Light Cure (SDI Limited) and condense cavity to slightly overfill the preparation.
12. Light cure the restoration for manufactures recommended time (heat produced from setting will help set the GIC liner).
13. Contour the restoration prior to occlusal adjustment.
14. Polish to complete restoration.
15. Remove all protective/isolation materials used in the mouth.

- Same 1st steps as previous:
 - 37% Phosphoric acid - 5-15 seconds
 - Rinse and Dry
 - Then use do two step SDF
 - This set of instructions says leave SDF in place for 1 minute then apply KI 1-3 times until clear, then rinse and air dry
- Base of Self Cure GI to DEJ
- Before it sets put resin bond
- Then add RMGI or composite before the Self Cure sets.

You can use this product for 2 day as well

[Back to Board](#)



Caninization

- Preserves facial esthetics for smile line
- Decreases risk of lingual cusp fracture in SMART restorations
- Keep contacts to prevent shift of adjacent teeth
- NO occlusion on this tooth- off axis forces.



[Back to Board](#)



Patient Stories

- SMART Restorations have opened many doors and kept patients out of the OR. Here are a few of many examples



SDF/SMART is a game changer for...Anon

- Beautiful Smile
- HIV drug related dry mouth
- Subgingival rampant decay
- Traditional care would have been invasive
- SMART has bought him time
- Vitality test normal
- Poor px, but buys time



SDF/SMART: Game Changer for ... Anon Medically Complex Patient

- Respiratory problems and anxiety
 - Unable to recline, use rubber dam or isolite
- Hypertension (Diastolic >100)
- Cotton roll isolation, spoon excavator, and no anesthetic



SDF/SMART: Game Changer for ... Anon

- Going through divorce
- Non-Restorable tooth
- Endo present
- Food Trap
- Preserving bone for future implant
- Did this as same day- treated, waited, filled



Similar has been done when I was avoiding extraction (bisphosphonates)



SDF/SMART: Game Changer for Trust

- Can not afford replacement
- Refused extractions
- SDF/SMART Built trust



[Back to Board](#)



Failure: Unexpected Severe Stains

- There were carious lesions, but also stained margins and rough enamel that was difficult to clean and polish (proteins)



Failure: Irreversible Pulpitis

- One SMART restoration failed and had Irreversible Pulpitis



Failure: Abscess

- One SMART restoration failed and did end up in abscess



This one was successful, but the failure looked a lot like this

- Tests I now do before GI Domes
 - Percussion
 - Check for PARL
 - Check for Pulpal width
 - Still talk about risks



Failures: GI's Coming Out (vs Recurrent Decay)

- But... Rarely have recurrent decay, and patchable
 - Improved success with good isolation
 - Improved success with not removing matrix band to the occlusal
 - Improved success with topcoat

[Back to Board](#)

2017 Before



2017 After



2018 Before



2018 After



2021ish



CODE WHAT YOU DO- SDF is a product, not a procedure

- D1208 - *“topical application of fluoride excluding varnish” – full mouth*
- D9910 - *“topical application of desensitizing medicament” – full mouth*
- D1354 - *“interim caries arresting medicament application” – per tooth*
- D1355 – *“caries preventative medicament application” - per tooth*
- D1206 – *“topical application of fluoride varnish”- This is NOT a varnish*
- D2991 – *“application of hydroxyapatite regeneration medicament” - per tooth”*
- 0729T (Medical CPT Code) - *“application of silver diamine fluoride 38% by a physician or other qualified health care professional”*

- 2024 CDT Codes
- ADA Guide to Reporting: https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/publications/cdt/d1355_adaguidetoreportingcariespreventivemedicamentapplication_2021aug.pdf?rev=325c43aa41164c5ea0d62b569a837d5a&hash=687ED0299EF3DFFDA9FD087E225914B7
- AAPD: https://www.aapd.org/globalassets/sdf-guidance-for-physicians_aapd_2023.pdf

[Back to Board](#)



Family Health Services EdYOUcation.

Help Control Your Risk For:

Cavities

Gum Disease

Oral Cancer

There is a lot you can do to help yourself have better oral health. Try to maximize your protective factors and minimize your risk factors. Here is your chance to really make a difference for yourself. Nobody is perfect, the goal of this exercise is not to be perfect, it is to be better. Look at your habits and see where there are areas that you can realistically improve.

Protective Factors: (Good)

Brushing: Morning Midday Night

Clean Between Teeth: floss floss picks water flosser

Special Oral Hygiene Products: _____

Baking soda in toothpaste can help neutralize pH

Fluoride in toothpaste helps strengthen teeth.

Mouthwash is NOT a substitute for brushing or flossing but can be beneficial if it is antimicrobial (kill bad bacteria) and if it contains fluoride (strengthen teeth).

Sugar Free Gum can help stimulate saliva

Sugar free products to help with dry mouth

Drink water after sugar exposure

Xylitol can help prevent cavities

Eating a healthy diet, drinking fluoridated water, limiting processed foods with added sugar can help

Wearing lip balm with sunscreen helps decrease risk of sun related oral cancer. Make sure to report to your dentist if you see any new spots of bumps in your mouth.

Visiting your dentist and getting regular professional cleanings, fluoride applications, and Silver Diamine Fluoride at intervals recommended by your dentist can help. Your Dentist may even recommend professional products or prescription products that can help you.

Risk Factors: (Bad)

Sugary Drinks or Acidic Drinks : Sugary or acidic drinks lead to cavities. The more frequently you drink these the worse they are. If you must drink them, it is better to limit yourself to only one per day and do it all in one sitting. The only thing good for your teeth to sip all day is water.

Energy Drinks Fruit Juice Soda Diet Soda
Sport Drinks water mix ins Alcohol Sugary Coffee

Sugary or high carb snacks: Frequent snacking on foods that feed the bad bacteria increases risk of cavities. Frequency is important. Though neither is good for your teeth, it is better for your teeth to eat a pint of ice cream in one sitting than it is to eat a half of a pint of ice cream off and on all day long. Do you consume sugar/fermentable carbohydrates 4 or more times per day? **Acidic foods** can also break down your teeth.

People often forget there is sugar in some medications. Do you use **Sugary Medicine** or use **Sugary Cough Drops**?

Some Medical Conditions can increase your risk for cavities and gum disease. Do you have any medical conditions or take any medications that cause **Dry Mouth**? Do you have **Acid Reflux**? If you have **Diabetes**, how well is it controlled?

Drug and Alcohol use can increase your risks: Do you smoke, vape, or chew tobacco? Do you frequently drink alcohol? Do you use illicit drugs? Do you regularly take narcotic medications?

How Likely Are You To Get:

Cavities, Gum Disease, or Oral Cancer

This sheet will help us assess your risks for oral diseases and will help us cater your treatment specifically to you.

Please circle all that apply to you. We will help you assess your risk for each and what you can do to improve your odds.

Protective Factors: (Good)

Brush morning Brush Midday Brush Night

floss proxy brush floss picks waterpik

Baking Soda toothpaste Fluoride Toothpaste

MI Paste Rx Toothpaste Mouthwash

Rx Mouthwash Sugar Free Gum Xylitol

Oral Probiotics basic bites Carifree

Sunscreen Chapstick Fluoridated water

Additional things you do for your oral health:

Risk Factors: (Bad)

Sugary Drinks or Acidic Drinks : Quickly? Throughout Day?

Energy Drinks Fruit Juice Soda Diet Soda

Sport Drinks water mix ins Alcohol Sugar Coffee

Other: _____

Sugary or high carb snacks: Quickly? Throughout Day?

Write your usual snacks: _____

Do you consume sugar 4 or more times per day- Y or N?

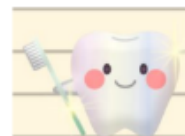
Snacks as Rewards Sugary Cough Drops Sugary Meds

Dry Mouth Acid Reflux Acidic Foods Drug Use

< 10 Cigarette Smoking > 10 Cigarettes/day Former smoker

Vaping Nicotine Vape Chewing Tobacco Pipe /Cigar

Anything else you feel may be putting you at risk:



Back to Board

To learn more about oral health the American Dental Association has created a patient facing website with a lot of great information:
<https://www.mouthhealthy.org/>



Softening Buildup via Chelation

Foam that makes the calculus itself softer

- **Chelation:**
 - Binds to calcium, disrupts crystalline lattice
 - Tetrapotassium Pyrophosphate and Sodium Tripolyphosphate
- **Protocol:** Dry, Put it on for about a minute , rinse and then scale.
- **Lots of other stuff to help it work better:**
 - Foaming agents help it get into nooks and crannies
 - Surfactant: Lower surface tension allowing solution to penetrate (Sodium Dodecyl Sulfate)
 - pH adjustment: uses citric acid and sodium bicarbonate to create an optimal environment for the chelating agents to work.



This is new for
me 😊 knowledge
and experience
limited

Compendium: <https://www.compendiumlive.com/news/?newsID=104323>

Inside Dental Hygiene: <https://insidedentalhygiene.com/news/?newsID=101316>

Inside Dentistry: <https://insidedentistry.net/news/?newsID=101316>



Making Buildup Easier to Remove via Desiccation

Sucks the water out of biofilm making it easier to remove

- In fancy terms: it is a non-antibiotic, sulfonated phenolic formula that disrupts the extracellular polymeric substances (EPS) that protect biofilm, causing them to break down and lift from the tooth surface.
- **Application:** A desiccant gel is applied supra- or subgingivally, left for 10–30 seconds (do not exceed 60 seconds), suctioned off, and then rinsed thoroughly then scale.



This is new
for me 😊
knowledge
limited and
no clinical
experience

Back to Board



Caries Risk Systems

- CAMBRA: <https://dentistry.ucsf.edu/research/cambra>
- Previsor: <https://www.previser.com/>
- Cariogram: <https://pubmed.ncbi.nlm.nih.gov/16008632/>
- ADA CRA : <https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/caries-risk-assessment-and-management>
- AAPD CRA: https://www.aapd.org/media/Policies_Guidelines/BP_CariesRiskAssessment.pdf
- Many Others

[Back to Board](#)



Additional Courses and Sources:

- Many Courses on Minimally Invasive Dentistry and Prevention
 - <https://www.elevateoralcare.com/Landing-Pages/elevatingcare>
- Website where you can get the Big Book:
 - <https://www.smartoralhealth.com/>
- Website with a ton of articles and videos:
 - <https://www.mmclibrary.com/>
- AAPD Policy and Fact Summary 2021 : <https://www.aapd.org/globalassets/media/policy-center/sdf.factsheet.pdf>
- Doug Young Clinical Instructions: <https://www.aegisdentalnetwork.com/cced/2021/06/clinical-instructions-for-using-silver-diamine-fluoride-sdf-in-dental-caries-management>
- American Dental Association:
 - Placement Guide and other materials: <https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride>
 - ADA Policy on SDF: <https://www.ada.org/publications/ada-news/2020/october/ada-supports-silver-diamine-fluoride-for-caries-management#:~:text=The%20ADA%20has%20a%20new,device%20to%20treat%20tooth%20sensitivity>. (can read about it here, but must log in for actual policy)
- American Academy of Pediatric Dentistry: SDF
 - Chairside Guide: https://www.aapd.org/media/Policies_Guidelines/R_ChairsideGuide.pdf
 - AAPD Policy on SDF <https://www.aapd.org/research/oral-health-policies--recommendations/use-of-silver-diamine-fluoride-for-pediatric-dental-patients/>
- Curodont Videos:
 - https://www.curodont.us/professional_anti-cavity_treatment/
 - https://www.curodont.us/professional_anti-cavity_treatment/#Mode-of-Action
 - Part 1: https://www.youtube.com/watch?v=GY3g_ElvOsc
 - Part 2: <https://www.youtube.com/watch?v=7SolpJ-YkB4>
 - Part 3: <https://www.youtube.com/watch?v=OolkcFTfD8Y>
 - Part 4: <https://www.youtube.com/watch?v=FN2VPv8hKMQ>



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