



TOOTH SEAL

HOW TO USE

Equipment

- Toothbrush
- Floss
- Cotton balls or paper towels
- 1 bottle of Tooth Seal (If you need a bottle see *How To Make* section)

Clean

This is a critical step as you do not want any particles of trapped food to prevent the solution from making contact with the tooth surface.

To prepare the tooth, first brush your teeth, then floss. Because the solution is itself antibacterial, it is not required to rinse with antiseptic mouthwash, or to debride the tooth surface any further.

Dry

- Moisture will prevent the Tooth Seal from bonding properly with the tooth. Dry the tooth using cotton balls or paper towels. Place dry cotton balls or paper towels between the cheek and gum to keep the cheek away from the tooth, and to soak up any saliva being produced.

Keep saliva away from the tooth during the process.

Apply

Two drops placed on a cavity or on a tooth you'd like to protect, creates a concentration of encapsulated silver that adheres to the surface of the tooth and provides protection for about a year. If you use a cotton swab to apply, add one additional drop to account for what gets absorbed by the swab.

The solution should be left in contact with the tooth surface for 2 minutes.

- Do not lick your teeth during that time.
- Don't eat or drink for 2 hours after application.

If necessary, repeat the process in 12 months.

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HOW TO MAKE

Links provided are examples of suppliers we used. Any equivalent product is fine.

Equipment

- A scale capable of accurately measuring in the milligrams range (e.g.: 0.013g = 13mg)
- Wax paper or transfer container for weighing/ pouring fluoride powder
- Spoon or scoop for measuring fluoride
- Bottles in the 3ml range with something like an 8mm dropper top [\[Link\]](#)
- Labels
- Printer
 - To print preexisting Tooth Seal label click here for details -> [\[Link to file\]](#)

Ingredients

Amount needed is based on a ratio of 26mg sodium fluoride to 100ml of silver nanoparticles. Most often made as 13mg to 50 ml or 26mg to 100ml. Here we will use 13mg to 50ml

- Sodium fluoride - food grade power (not capsules) - 4 oz bottle [\[Link\]](#)
- Silver nanoparticles in solution, 50 nanometers (nm) - 50 ml bottle [\[Link\]](#)
 - For this project, particle size can range from 10 to 50 nm, where the larger number is more stable

Preparation

1. Measure 13mg sodium fluoride powder on the scale
2. Transfer it to the 50 ml bottle of silver nanoparticles
3. Cap and shake the bottle; the solution will be a light, translucent yellow color
4. Transfer the solution to 3 ml bottles and label

Expiration

After some time, the Seal solution will break down. When the components break down, it will turn a distinct dark green-grey color, and should not be used.

Discard any dark green-grey solution.

To Extend Shelf Life

- Protect from light
- Store in the refrigerator





WHAT IS IT?

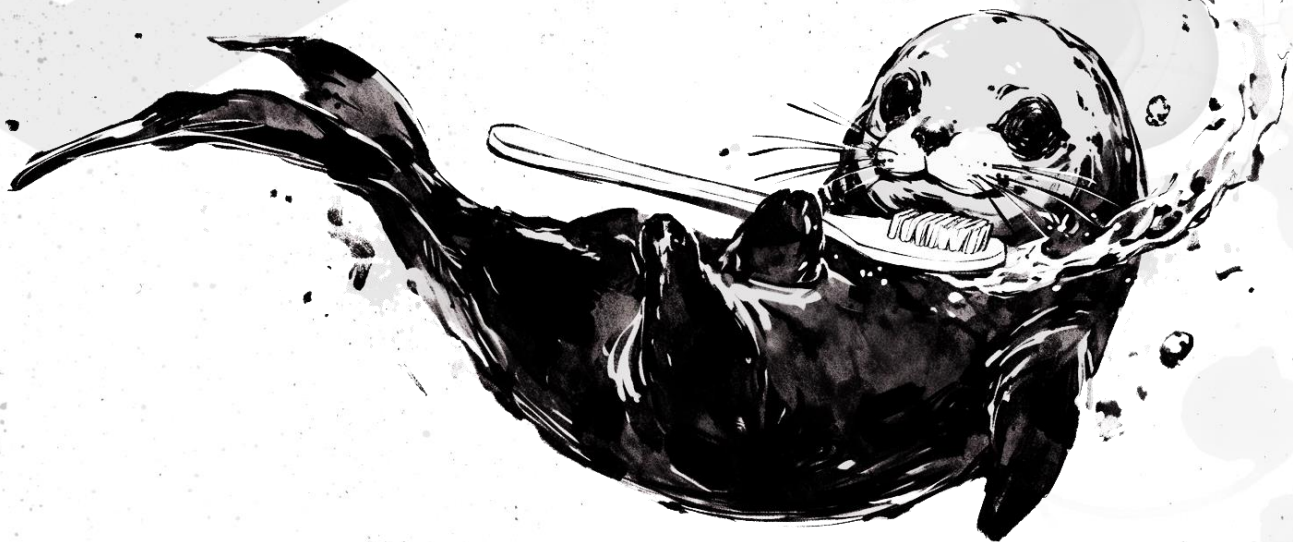
Tooth Seal is a nanoparticle solution that can remineralize enamel and act like a shield against bacteria in order to prevent tooth decay.^{1,4-5,7-8} Two drops per tooth creates a concentration of encapsulated silver that adheres to the surface of the tooth and provides protection from caries for about a year.

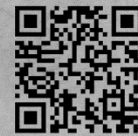
The nanoparticle solution is based on Silver Diamine Fluoride (SDF), which has a well-documented history of clinical success in preventing and halting the progression of cavities.^{6,9} It is also well-known for dyeing teeth black due to the formation of silver oxide.^{6,9} To prevent this, the Tooth Seal solution has the silver atoms encapsulated in nanoparticles. Recent research has demonstrated silver nanoparticles (AgNP) are equally effective in treating dental cavities compared to SDF.^{1,4,6,9} AgNP were also equally effective at inhibiting bacterial growth relative to SDF.^{5,8-9} Current research is focused on further optimizing the nanoparticle material, identifying the ideal size for the nanoparticle, and performing long-term stability studies with these various nanoparticle materials.^{1,4,7-9}

How does it work?

Tooth Seal works three ways to help halt the progression of early cavities and demineralization.

- **Antibacterial** - Silver ions in solution are toxic to a wide range of bacteria like *Streptococcus mutans*, which is the causative agent of tooth cavities.
- **Prevents biofilm formation** - Treatment lasts about a year and prevents new bacteria from colonizing the tooth surface.
- **Remineralization** - Treatment prevents further tooth decay and can rebuild minor damage like small hairline cracks.





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