The Non-Invasive Caries Therapy Guide

The Non-Invasive Caries Therapy Guide is an illustrated manual on diagnostics, preventives, and therapeutics to fight dental caries.

Goals of the Guide

1. **Increase access to care** by decreasing reliance on invasive dentistry.
2. **Transform the oral health workforce** by empowering non-dentists to manage dental caries.
3. **Improve clinical outcomes** by optimizing clinical technique.
4. **Lower barriers** to adopting evidence-based techniques.

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Differentiate Active vs. Arrested Caries Lesions
(Tooth Decay/Cavity) by Visual-Tactile Assessment of Surface Texture and Topography

**ACTIVE non-cavitated lesions (initial)**
- No surface breakdown, yet. Lesions as deep as the outer 1/3 of dentin are not infected and can be remineralized.
- Usually plaque-covered.
- The lesion can be opaque white, yellow, orange, or brown.
- Chalky, no shine upon drying.
- Active lesions typically reach the gumline (facial or buccal) and extend out of pits and fissures.
- Feels bumpy and soft when gently dragging the end of a blunt instrument across the lesion.
- Radiographs may show demineralization in the outer third of dentin. Without cavitation, dentin is not infected.

**ACTIVE cavitated lesion (moderate, advanced)**
- Visible cavitation. The hole breaches the dentin. Usually the demineralization reaches the middle or inner 1/3 of dentin.
- Usually plaque-covered.
- White, yellow, orange, or light brown and usually dull = bacterial growth.
- Feels soft or leathery when gently dragging the end of a blunt instrument across the lesion.

**ARRESTED non-cavitated lesions (initial)**
- No surface breakdown.
- Usually plaque-free.
- Lesion can be white, amber, brown, or black.
- Shiny upon drying, not chalky.
- Arrested lesions typically do not reach the gumline (facial or buccal) and do not extend out of pits and fissures. May have dark staining.
- Feels smooth and hard when gently dragging the end of a blunt instrument across the lesion.
- Dentin may be affected, but is not infected.

**ARRESTED cavitated lesion (moderate, advanced)**
- Easily visible cavitation. The hole breaches the dentin.
- Usually plaque-free.
- Amber to dark brown or black and usually shiny = no bacteria.
- Feels smooth and hard when gently dragging the end of a blunt instrument across the lesion.
- Cleansable lesions are much more likely to arrest than lesions with plaque traps.

**Note:** Assess before cleaning, and assure adequate lighting.
TIPS ON HOW TO

Assess Lesion Activity with a Protein-Linked Dye Caries Visualization Aid

1. **Active lesion**
   - Trace active lesion.
   - Clean carefully, rinse, and dry with air.
   - For no aerosols, thoroughly dry with cotton.

2. **Apply**
   - Apply to all teeth.

3. **Absorb**
   - Keep open for 1 minute while it absorbs.

4. **Rinse**
   - Rinse well with water, then spit.

5. **Active lesion**
   - Trace active lesion.
   - Color indicates active caries lesions.

6. **Document & review**
   - Take a picture of the colored areas. Assess for cavitation and cleansability.
   - Show the patient or caregiver: Help them choose self-management goals and non-invasive interventions.

7. **Remove**
   - Remove color by cleaning with detergent-containing toothpaste.
   - A brush, gauze, or prophy cup may be used.

8. **Manage**
   - Active caries lesions should be managed per the clinical team’s judgement. The American Dental Association recommends to “prioritize the use of non-restorative interventions,” including relevant non-invasive therapies in this Guide.
   - Use at future recare visits to monitor dental caries.

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Developed from Jablonski-Momeni Caries Res, 2023
Apply Fluoride Varnish
for Caries Prevention or Treatment of Initial Caries Lesions

Rosin-Type Varnish

1 Mix
Mix for 5 seconds.

Note: Mix, regardless of package instructions.

2 Dry (moist)
Help the patient remove excess saliva. For example, ask the patient to swallow, use cotton, or use a saliva ejector.

3 Apply
Apply a thin layer across all teeth. A gloved finger may be used instead of a brush.

4 Cover
Be sure to apply to all high risk surfaces, such as: pits, fissures, exposed roots, and contact points.

5 Spit in trash
Do not spit into the sink (it may clog the plumbing). Any spit should end up in the trash.

6 Protect
Help the patient avoid brushing, flossing, alcohol, hot drinks, and foods that are crunchy or sticky, for 30 minutes.

Shellac-Type Varnish

A Mix
Invert the bottle 2–3 times, and then dispense for application.

B Dry (moist)
Help the patient remove excess saliva. For example, ask the patient to swallow, use cotton, or use a saliva ejector.

C Apply
Starting from the back of each quadrant, apply a thin swipe across buccal/facial surfaces in one sweeping motion.

A gloved finger may be used instead of a brush.

D Let spread
Shellac varnishes spread unaided.

E Inhale through teeth
Ask the patient to inhale forcefully through their teeth 3 times to set the varnish.

F Protect
Help the patient avoid alcohol and brushing for 4 hours.
Apply 10% Povidone-Iodine for Caries Prevention

1 Dispense
Dispense 8 drops of 10% povidone-iodine.

2 Saturate
Saturate one end of a cotton swab.

3 Dry
Help the patient remove excess saliva. Keep moist. For example ask the patient to swallow, use cotton, or use a saliva ejector.

4 Apply
Roll the swab and push to release more iodine into high risk areas, like contact points and exposed roots. Note: To avoid too much iodine, do not re-dip after applying to teeth.

5 Cover
Continue across all teeth. Keep mouth open for 10 seconds. Help the patient remove any pooled saliva by swallowing or spitting, or using cotton or a saliva ejector.

6 Optional fluoride varnish
Fluoride varnish may be applied immediately. Help the patient avoid eating or drinking for 30 minutes.

Myths about Povidone-Iodine

Myth: It stains teeth.
No! The temporary color will disappear after closing. However, it can stain cloth.

Myth: Shellfish allergy = iodine allergy.
No! There is no cross-reactivity between shellfish and iodine.

Myth: Bad taste.
No! A little bit of iodine does not taste bad.

Developed from: Milgrom J Dent Child 78:143
Apply Self-Assembling Peptide P_{11-4} to Initial Caries Lesions (Non-Cavitated)

1 Clean
Clean the teeth with pumice. Rinse or wipe clean. Isolate with cotton.

2 Ensure lesion porosity
If the lesion is not already porous, etch the white spot lesion(s) for 3–5 seconds. Rinse thoroughly. Removal of decay is not indicated.

3 Activate
Plunge together and pull apart

4

5

6 Dry
Thoroughly dry the affected areas (desiccate if feasible).

7 Apply
Apply P_{11-4} to dried white spots. Allow to soak in. Re-apply every 5–10 seconds until the area stays wet.

8

9

10 Protect
Keep saturated teeth isolated with cotton for 3–5 minutes. Remove excess with cotton. Do not rinse.

11 Fluoride
For optimal results, apply fluoride varnish.
Help the patient promote a healthy oral environment for the next 3–6 months to optimize enamel regeneration.

Note: The manufacturer’s instructions state to bleach and etch for 20 seconds each.

IMPORTANT: The P_{11-4} peptide is on the sponge applicator. It is activated by contact with the liquid at the bottom.

IMPORTANT: The sponge applicator must be used.

IMPORTANT: The Flori technique cut the sponge into 2–3 pieces and push one into each affected proximal space.

Developed from: Splieth A Dent Res 29:42
Apply Silver Diamine Fluoride (SDF) to Initial, Moderate, or Advanced Caries Lesions

**1. Isolate**
Dispense 1–4 drops in a dappen dish.
Isolate the teeth with cotton.
Protect the patient’s eyes.

**2. Dry**
Thoroughly dry with cotton. Compressed air helps desiccate.
Help the patient keep their mouth open.
Removal of decay is not indicated.

**3. Apply**
Apply to dry caries lesions. Re-apply every 5–10 seconds until the entire lesion stays wet.
Be careful of dripping, SDF stains.
If treating approximal surfaces, simply apply to the embrasures. The liquid/gel will wrap around the contact point and flow by capillary action into the lesion.

**4. Reapply**
Until saturated

**5. Protect**
Option 1: cover the treated areas with fluoride varnish or petroleum jelly (e.g. Vaseline), then remove cotton.
Option 2: continue to isolate from saliva for 1 minute.

**6. Wait**
Allow at least 10 seconds for SDF to absorb. During this time, the SDF will seep deeper into the caries lesion through capillary action.
Do not rinse. Do not blow compressed air.

**7. Remove excess**
Remove excess with cotton.
Leave surfaces moist.

**8. Protect**
Option 1: cover the treated areas with fluoride varnish or petroleum jelly (e.g. Vaseline), then remove cotton.
Option 2: continue to isolate from saliva for 1 minute.
### TIPS ON HOW TO

#### Apply Glass Ionomer Cement Sealants or Fillings

to Carious or Healthy Fissures with a Sound Enamel Perimeter

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Clean &amp; keep moist</strong></td>
<td>Clean out debris. Do not dry.</td>
</tr>
<tr>
<td>2. <strong>Condition</strong></td>
<td>Apply poly-acrylic acid conditioner (10 to 20%) to the fissures, extend onto sound enamel. Wait 10 seconds. Alternatively, traditional etchant can be used if thoroughly rinsed.</td>
</tr>
<tr>
<td>3. <strong>Rinse</strong></td>
<td>Rinse gently. Keep moist. For example, dab with damp gauze.</td>
</tr>
<tr>
<td>4. <strong>Isolate</strong></td>
<td>Isolate with cotton, not a rubber dam. Keep the teeth moist. Removal of decay is not indicated.</td>
</tr>
<tr>
<td>5. <strong>Activate</strong></td>
<td>Firmly tap the capsule on a hard surface. Experienced hand-mixers may reduce material costs with powder &amp; liquid kits.</td>
</tr>
<tr>
<td>6. <strong>Plunge</strong></td>
<td>Compress the plunger completely and hold it down for 2 seconds.</td>
</tr>
<tr>
<td>7. <strong>Mix</strong></td>
<td>Mix for a full 10 seconds at 4,000 rpm.</td>
</tr>
<tr>
<td>8. <strong>Insert</strong></td>
<td>Insert the capsule into the applicator.</td>
</tr>
<tr>
<td>9. <strong>Apply – at least 1 quadrant at a time</strong></td>
<td>Immediately squeeze into the deepest part. To avoid air bubbles, kiss the tip to the most surface and backfill while slowly withdrawing. Release pressure on the applicator and progress to the next tooth.</td>
</tr>
<tr>
<td>10. <strong>Use finger</strong></td>
<td>Use a gloved finger to rapidly push and shape the glass ionomer into the desired areas.</td>
</tr>
<tr>
<td>11. <strong>Lubricate</strong></td>
<td>The gloved finger should be moist with the patient’s saliva or a thin layer of petroleum jelly (e.g. Vaseline).</td>
</tr>
<tr>
<td>12. <strong>Push</strong></td>
<td>Push down firmly for about 1 second to make excess flow out.</td>
</tr>
<tr>
<td>13. <strong>Contour</strong></td>
<td>With continued downward pressure, slide the fingertip across the occlusal surface.</td>
</tr>
<tr>
<td>14. <strong>Work fast</strong></td>
<td>Slide the finger up and off without lifting up. Immediately continue to the next tooth, using a wave-like motion. Do not over manipulate.</td>
</tr>
<tr>
<td>15. <strong>Bite down</strong></td>
<td>Remove the cotton. Help the patient bite down hard and grind. Hold the chin and click the jaws together until you feel and hear enamel-to-enamel contact. Then help the patient open.</td>
</tr>
<tr>
<td>16. <strong>Remove excess</strong></td>
<td>Use a cotton swab, explorer, or dental floss to remove excess from surfaces where the glass ionomer is not meant to stay (e.g. approximal). Do not agitate glass ionomer that is meant to stay until after set time. Fluoride varnish can be applied after 3 minutes.</td>
</tr>
</tbody>
</table>

**Note:** This option may reference quicker times than manufacturer’s instructions.
Perform Two-Visit Silver-Modified Atraumatic Restorative Treatment (2-Visit SMART)
for Cavitated Caries Lesions

1st Visit (for more details, see HOW TO: SDF page)

1. **Dry**
   - Isolate and dry thoroughly with cotton.
   - Protect the patient’s eyes.
   - Help the patient keep their mouth open.

2. **Apply**
   - Apply SDF and re-apply until the area stays wet. Either:
     - wait 10 seconds, remove excess, and apply a varnish,
     - or wait 1 minute and remove excess. Usually: return in 3 days to 6 weeks.
   - Some clinicians proceed immediately (if so, skip the varnish).

3. **Clean**
   - Clean out debris. Do not dry.
   - Removal of arrested decay is **not** indicated for treatment success.
   - Usually, no tooth structure is removed.
   - Removal of SDF-stained enamel improves final aesthetics.

4. **Condition**
   - Apply poly-acrylic acid conditioner (10 to 20%) to the fissures, extend onto sound enamel.
   - After 10 seconds, rinse gently. Keep moist.
   - For example, dab with damp gauze.

5. **Isolate, keep moist**
   - Isolate with cotton, not a rubber dam.
   - Keep the teeth moist.

6. **Apply**
   - Mix, and immediately squeeze into the deepest part. To avoid air bubbles, kiss the tip to the moist surface and backfill while slowly withdrawing.

7. **Use lubricated finger**
   - Use a gloved finger to rapidly push and shape the glass ionomer into the desired areas.
   - The gloved finger should be moistened with the patient’s saliva or a thin layer of petroleum jelly e.g. Vaseline.

8. **Push and contour**
   - Push down firmly for about 1 second to make excess flow out.
   - With continued downward pressure, slide the fingertip across the occlusal surface.
   - Work fast, do not overmanipulate.

9. **Bite down**
   - Remove the cotton. Help the patient bite down hard and grind. Hold the chin and click the jaws together until you feel and hear enamel-to-enamel contact. Then help the patient open.

10. **Remove excess**
    - Use a cotton swab, explorer, or dental floss to remove excess from surfaces where the glass ionomer is not meant to stay (e.g. approximal).
    - Do not agitate glass ionomer that is meant to stay until after set time. Fluoride varnish can be applied after 3 minutes.

2nd Visit (for more details, see HOW TO: Glass Ionomer page)

- **1st Visit** (for more details, see HOW TO: SDF page)

- **2nd Visit** (for more details, see HOW TO: Glass Ionomer page)

- **Clean**
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  - Do not agitate glass ionomer that is meant to stay until after set time. Fluoride varnish can be applied after 3 minutes.

Developed from: Mohamed Aly J Dent 128:104379

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Perform the Hall Technique for Placing Stainless Steel Crowns
for Cavitated Caries Lesions, usually in Primary Teeth

1st Visit: Create space

1 Assess
If an explorer tip cannot pass through the contact or if floss catches, create space with orthodontic separators for 2–9 days. Some clinicians proceed after just 1–3 hours.

2 Place spacer
To place an orthodontic separator (spacer), stretch it with orthodontic pliers or two pieces of floss. Slide diagonally into the contact.

3 Comfort
This may feel tight, sore, or painful. Analgesics or simply sipping cold water can provide relief.

2nd Visit: Crown placement

4 Remove
Remove the spacer at the next visit using floss or a dental instrument.

5 Clean
Remove debris and plaque.

6 Fit
Protect the airway with unfolded gauze. Try crowns starting with size 5. Do not push the stainless steel crown past the middle third of the tooth crown. A stout spoon excavator is used to remove fully seated crowns.

7 Check fit
The correct size will fit over the occlusal surface. It will give slight springback from the heights of contour around the tooth. Contouring/crimping pliers can be used to adjust the shape to the tooth.

8 Prepare the patient, then mix and load cement
First, help the patient practice clenching as hard as they can, to later seat the crown. Removal of decay is not indicated.

9 Load
Mix a glass ionomer-based luting cement. Hand-mixed luting cement should be the consistency of Greek yogurt or hand lotion. If using a spatula, avoid air bubbles by sliding the spatula against the crown margin. If using an auto-mix tip, backfill while slowly withdrawing.

10 Fill completely
Completely fill the crown.

11 Position
Place the glass ionomer-filled crown on the tooth and steadily push past the heights of contour. Excess cement should extrude from all sides. Do not completely seat.

12 Align
With your fingers, align the crown to the long axis of the tooth again for seating. Consider anything that might get in the way of complete seating, such as the interference of an approximal gingival margin of a cavitation in an adjacent tooth.

13 Seat by clenching
To seat the crown, help the patient clench hard against the opposing teeth, either directly or through a cotton roll or wooden bite stick. If the crown does not seat properly, remove and try again once. If unsuccessful again, immediately clean cement off the tooth. Return to step 6 to re-size, re-fit, etc.

14 Wipe & clench again
Once seated, quickly remove excess cement with moist cotton. Help the patient avoid moving the crown until at least 3 minutes after mix (cement set time). For example, gently bite on a cotton roll with other teeth.

15 Final cleaning
Clean excess cement with knotted floss. Pull floss through laterally. Help the patient avoid eating for 30 minutes, and avoid sticky or hard foods for 24 hours.
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