Restorative Guides

These four restorative guides demonstrate the ease of using silver diamine fluoride (SDF) as part of your regular treatment protocols and then restoring each tooth to full form, function, and esthetic beauty. The guides are available at whollymolar.com and centrixdental.com.

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There are various factors that determine when and if to restore immediately after SDF placement or delay definitive restorative treatment until the caries lesions are fully arrested and the disease is controlled. Although it isn't necessary to achieve full lesion arrest prior to restoration, this approach can be especially beneficial for high caries risk patients and allows time for disease management with preventive interventions such as motivational interviewing, oral hygiene coaching, and topical fluoride application. Furthermore, decreasing the patient's caries risk will reduce the incidence of recurrent decay and extend the longevity of the restoration.

Although the techniques in this guide may seem simple (based on images provided), please be familiar with the nuances in handling conventional glass ionomer, resin modified glass ionomer, and composite – and take CE courses in SDF before attempting these procedures in the esthetic zone. Light, in all its forms, especially from a curing light, can facilitate silver precipitation, which is easy to avoid if the chemistry is respected and you are aware of which steps in the protocol are most likely to result in precipitation. Those particularly technique sensitive steps are highlighted within this guide to help jumpstart your success and achieve predictable esthetic results.

There are a few brands of silver diamine fluoride to choose from, however in this guide, I'm specifically referencing SilverSense SDF by Centrix, Inc.

GENERAL RECOMMENDATIONS TO CONSIDER WHEN USING SILVER DIAMINE FLUORIDE:

- At baseline it is ideal to do a prophylaxis first and then apply SDF.
- After application of SDF, clinically assess for signs of arrest – hardening of dentin treated by SDF and the characteristic silver deposition. If desired, SDF can be re-applied, depending on restorative timeline.
- Curing lights activate the silver ions and cause graying that may show through translucent restorations. You can protect against the graying effect by:
  - Cleaning the perimeter (margins and DEJ) of the lesion to remove silver particles using your preferred technique (rotary instrument, air abrasion, or hand instruments such as hand drills or spoon excavators).
  - Opaquing the dentinal walls where SDF has been applied with a liner or base.
- According to the ADA, patients with caries are considered 'high risk'. Fluoride varnish (e.g., FluoroDose®, by Centrix) should be applied to all of the patient's teeth after SDF application for maximum preventive effect. It should be applied as the last step of the appointment, before dismissal.
- If you are not restoring at the same appointment but are concerned with the discoloration of the lesion, a temporary filling material, such as Tempit® by Centrix, is a fast and easy way to mask any discoloration until you are ready to restore. Tempit can easily be removed with a hand instrument or ultrasonic scaler at the restorative appointment.

Glass Ionomer – Immediate Restoration

Same Appointment Restoration with Self-Cure Glass Ionomer, after SDF application

Self-cure Glass Ionomer materials are less moisture sensitive and have continued fluoride release.

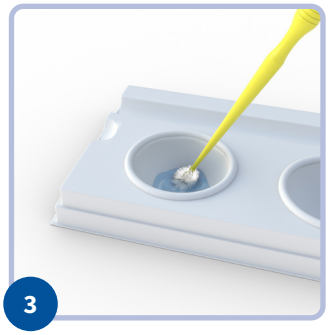
This approach is best suited for scenarios where:

- Patient recall is likely
- Caries lesion is non-cleansable
- Patient oral hygiene and caries risk status may be slow to improve

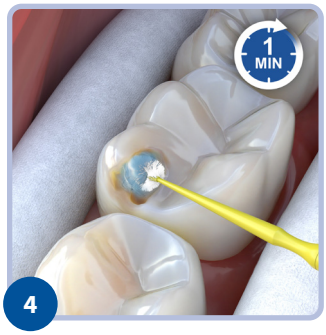
PHASE 1: APPLICATION OF SDF

Remove plaque and biofilm from lesion site. Isolate with cotton rolls where SDF will be applied.

Dispense 1–2 drops of SDF into dappen dish.



Dip Benda Micro applicator into SDF, blotting out excess on side of well.



Scrub directly onto lesion for one minute, until wet. No tooth preparation or removal of infected material is necessary.

Allow to air dry for 1 minute.

Rinse with water; this will also help to improve bond strength.[a]

PHASE 2: SELECTIVE CAVITY PREPARATION (RECOMMENDED)

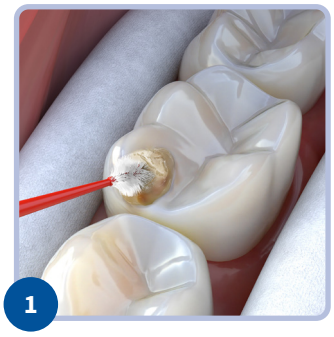
Glass ionomer may react with the SDF and cause a darkening of the restoration.[c] For best esthetic results:

Do a quick 1-second burst from a curing light to accelerate SDF precipitation to identify areas of silver ions. This step helps accelerate the darkening so it's easier to see what needs to be removed.

Clean the perimeter of the lesion (enamel margins & DEJ) to remove silver particles using your preferred technique (rotary instrument, air abrasion, or hand instruments such as hand drills or spoon excavators).

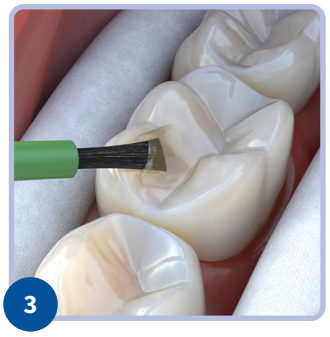
Due to their opacity, GI materials will opaque silver precipitates on internal dentin walls; no mechanical preparation is necessary.

PHASE 3: RESTORATION WITH SELF-CURE GLASS IONOMER



Use polyacrylic acid to remove the smear layer prior to restoration (follow manufacturer's instructions). **Do not** use phosphoric acid.[b]

Place GI restorative material according to manufacturer instructions. Allow to cure.



Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

References

a. Fröhlich TT, Botton G, Rocha RO. Bonding of glass-ionomer cement and adhesives to silver diamine fluoride-treated dentin: An updated systematic review and meta-analysis. J Adhes Dent 2022 Mar 1;24(1):29-38.
b. Young DA, Quock RL, Horst J, Kaur R, MacLean JK, Frachella JC, Duffin S, Semprum-Clavier A, Ferreira Zandona AG. Clinical instructions for using silver diamine fluoride (SDF) in dental caries management. Compend Contin Educ Dent 2021 Jun;42(6):e5-e9.
c. Sekar A, Ramar K (December 14, 2024) Impact of Different Time Intervals on the Color Stability of Glass Ionomer Cement and Composite Materials Bonded to Silver Diamine Fluoride: An In Vitro Study. Cureus 16(12): e75711. doi:10.7759/cureus.75711

Glass Ionomer – Delayed Restoration

Two-Appointment Restoration with Self-Cure Glass Ionomer, after SDF application

Self-cure Glass Ionomer materials are less moisture sensitive and have continued fluoride release.

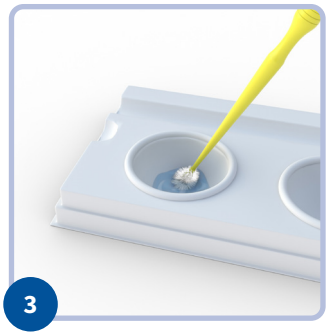
This approach is best suited for scenarios where:

- Patient recall is likely
- Cavitated carious lesions are cleansably formed and located
- Patient oral hygiene and caries risk status may be slow to improve.

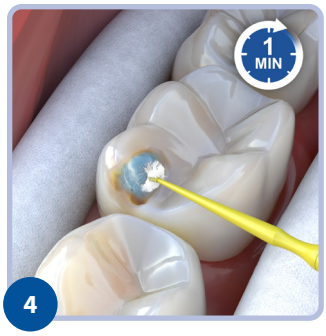
INITIAL APPOINTMENT — APPLICATION OF SDF

Remove plaque and biofilm from lesion site. Isolate with cotton rolls where SDF will be applied.

Dispense 1–2 drops of SDF into dappen dish.

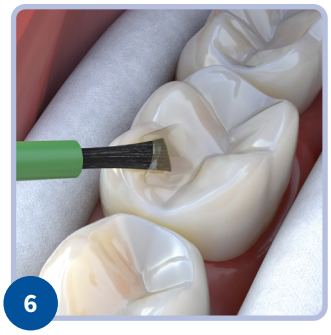


Dip Benda Micro applicator into SDF, blotting out excess on side of well.



Scrub directly onto lesion for one minute, until wet. No tooth preparation or removal of infected material is necessary.

Allow to air dry for 1 minute.



Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

OPTIONAL STEP TO COVER THE LESION:

If the lesion is located in a visible area, you may choose to place a tooth-colored temporary filling material, such as Tempit from Centrix, to cover any discoloration. Tempit is easily removable at the restorative appointment.

To consider while waiting for the restorative appointment:

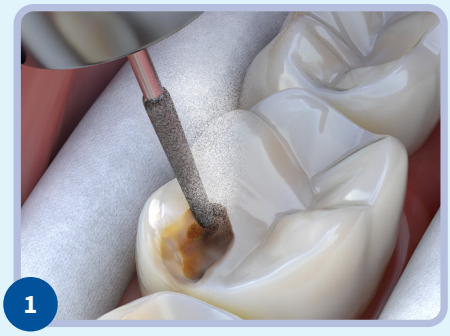
In some cases, it may be desirable to re-apply SDF additional times to ensure complete arrest of the lesions, depending on patient age, number and severity of disease or lesion(s). Recall patient and clinically assess for signs of lesion arrest (noticeable hardening of dentin and characteristic silver deposition). SDF can be re-applied as frequently as 1–2 weeks for the first month or so, and then every six months thereafter until the restoration is placed. When it is determined that a satisfactory level of arrest is achieved, the tooth is ready for restoration.

RESTORATIVE APPOINTMENT – APPROXIMATELY 2–4 WEEKS AFTER THE MOST RECENT SDF APPLICATION

As is reasonable, remove plaque and biofilm from arrested lesion site, and if a temporary filling material was used to cover the lesion, remove it with an explorer or ultrasonic scaler. Now follow these steps, starting with selective cavity preparation:

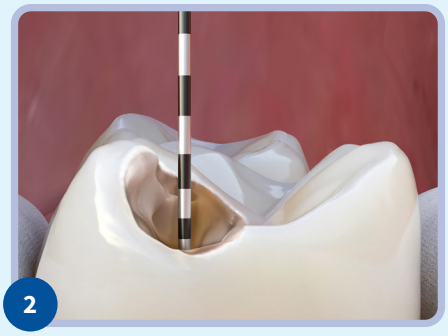
SELECTIVE CAVITY PREPARATION

Selective cavity preparation is recommended for best aesthetic result since the restoration may darken as the SDF reacts with the glass-ionomer and oral environment.[c]



1

Clean the perimeter of the lesion (enamel margins & DEJ) to remove silver particles using your preferred technique (rotary instrument, air abrasion, or hand instruments such as hand drills or spoon excavators).[a]

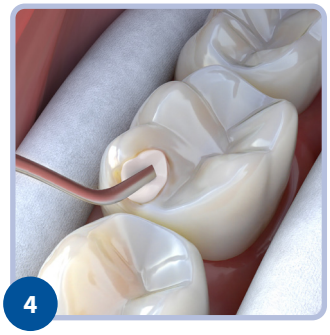


2

Due to their opacity, GI materials will opaque silver precipitates on internal dentin walls; no mechanical preparation is necessary.

3

Use polyacrylic acid to remove the smear layer prior to restoration (follow manufacturer's instructions). **Do not** use phosphoric acid.[b]



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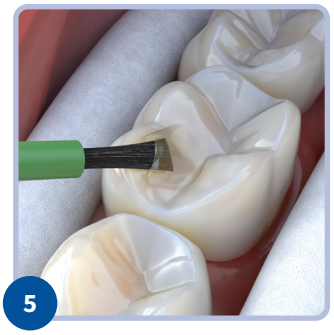
Place GI restorative material according to manufacturer instructions. Allow to cure.



5

Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

References

a., b. Young DA, Quock RL, Horst J, Kaur R, MacLean JK, Frachella JC, Duffin S, Semprum-Clavier A, Ferreira Zandona AG. Clinical instructions for using silver diamine fluoride (SDF) in dental caries management. Compend Contin Educ Dent 2021 Jun;42(6):e5-e9.

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Composite – Immediate Restoration

Same Appointment Restoration with Light-Cure Resin Composite, after SDF application

Composite materials typically have higher wear resistance and esthetics but also include technique-sensitive adhesive procedures.

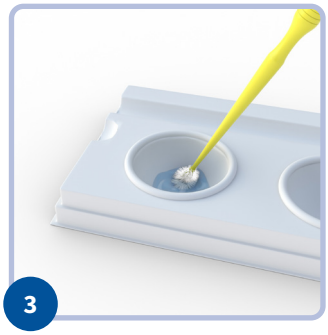
This approach is best suited for scenarios where:

- Patient recall is likely
- Minimally active cavitated lesions on 1–2 isolated teeth
- Patient is engaged in a caries management plan based on risk assessment

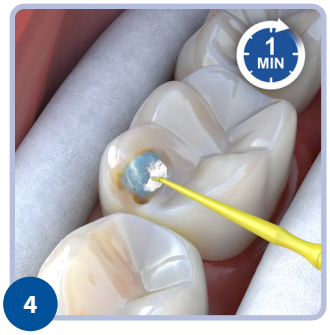
PHASE 1: APPLICATION OF SDF

Remove plaque and biofilm from lesion site. Isolate with cotton rolls where SDF will be applied.

Dispense 1–2 drops of SDF into dappen dish.



Dip Benda Micro applicator into SDF, blotting out excess on side of well.



Scrub directly onto lesion for one minute, until wet. No tooth preparation or removal of infected material is necessary.

Allow to air dry for 1 minute.

Rinse with water, this will also help to improve bond strength.[a]

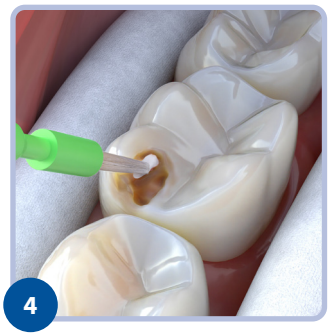
PHASE 2: SELECTIVE CAVITY PREPARATION (RECOMMENDED)

Exposure to ambient and curing lights will cause silver to precipitate where SDF makes contact. For best esthetic results:

Do a quick **1-second burst** from a curing light to accelerate SDF precipitation to identify areas of silver ions.

Clean the perimeter of the lesion (enamel margins & DEJ) to remove silver particles using your preferred technique (rotary instrument, air abrasion, or hand instruments such as hand drills or spoon excavators).

Silver precipitation on internal dentin walls (axial and/or pulpal) can be left with little to no mechanical preparation.



Opaque using a glass ionomer base in deeper preparations or use a resin-modified glass ionomer liner in shallower preparations.[b]

PHASE 3: RESTORE WITH RESIN COMPOSITE

RESTORE WITH RESIN COMPOSITE:

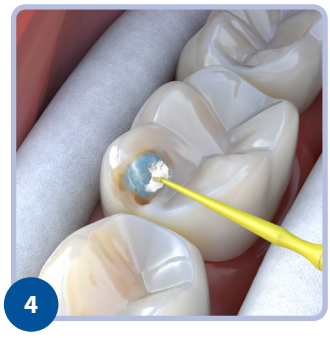
For best bond strength, use a separate phosphoric acid etch step first.[c]

Follow manufacturer's instructions.

Etch enamel with phosphoric acid for 15-30 seconds.

Rinse with air-water spray for 10 seconds.

Gently dry tooth leaving enamel frosty and dentin glossy and moist.



Apply adhesive of choice.

Polymerize per manufacturer's instructions.

Restore with composite material of choice and polymerize per manufacturer's instructions.

Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

References

a., c. Fröhlich TT, Botton G, Rocha RO. Bonding of glass-ionomer cement and adhesives to silver diamine fluoride-treated dentin: An updated systematic review and meta-analysis. J Adhes Dent 2022 Mar 1;24(1):29-38.

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Composite – Delayed Restoration

Two-Appointment Restoration with Light-Cure Resin Composite, after SDF application

Composite materials typically have higher wear resistance and esthetics but also include technique-sensitive adhesive procedures.

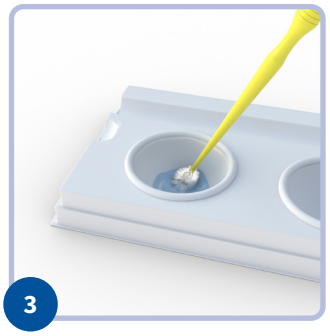
This approach is best suited for scenarios where:

- Patient recall is likely
- Caries lesions are cleansably formed and located
- Patient oral hygiene and caries risk status show clear signs of improvement

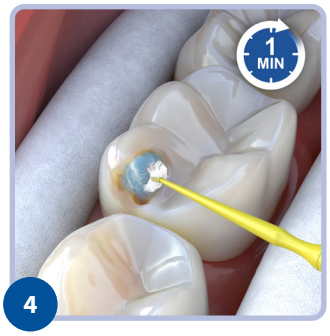
INITIAL APPOINTMENT — APPLICATION OF SDF

Remove plaque and biofilm from lesion site. Isolate with cotton rolls where SDF will be applied.

Dispense 1–2 drops of SDF into dappen dish.

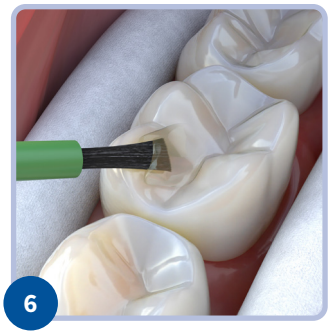


Dip Benda Micro applicator into SDF, blotting out excess on side of well.



Scrub directly onto lesion for one minute, until wet. No tooth preparation or removal of infected material is necessary.

Allow to air dry for 1 minute.



Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

OPTIONAL STEP TO COVER THE LESION:

If the lesion is located in a visible area, you may choose to place a tooth-colored temporary filling material, such as Tempit from Centrix, to cover any discoloration. Tempit is easily removable at the restorative appointment.

To consider while waiting for the restorative appointment:

In some cases, it may be desirable to re-apply SDF additional times to ensure complete arrest of the lesion, depending on patient age, number and severity of disease or lesion(s). Recall patient and clinically assess for signs of lesion arrest (noticeable hardening of dentin and characteristic silver deposition). SDF can be reapplied every 1-2 weeks (if needed) per initial recare period/interval based on caries risk, and then every six months thereafter until the restoration is placed. When it is determined that a satisfactory level of arrest is achieved, the tooth is ready for restoration.

RESTORATIVE APPOINTMENT — APPROXIMATELY 2–4 WEEKS AFTER THE MOST RECENT SDF APPLICATION

As is reasonable, remove plaque and biofilm from arrested lesion site, and if a temporary filling material was used to cover the lesion, remove it with an explorer. Now follow these steps, starting with selective cavity preparation:

1

Clean the perimeter of the lesion (enamel margins & DEJ) to remove silver particles using your preferred technique (rotary instrument, air abrasion, or hand instruments such as hand drills or spoon excavators).[a]

2

Silver precipitation on internal dentin walls (axial and/or pulpal) can be left with little to no mechanical preparation.

3

Opaque using a glass ionomer base in deeper preparations, or use a resin-modified glass ionomer liner in shallower preparations.

RESTORE WITH RESIN COMPOSITE:

For best bond strength, use a separate phosphoric acid etch step first.[b]

Follow manufacturer's instructions.

4

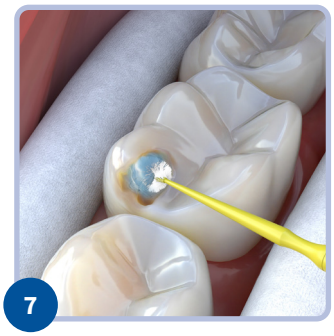
Etch enamel with phosphoric acid 15-30 seconds.

5

Rinse with air-water spray for 10 seconds.

6

Gently dry tooth leaving enamel frosty and dentin glossy and moist.



7

Apply adhesive of choice.

8

Polymerize per manufacturer's instructions.

9

Restore with composite material of choice and polymerize per manufacturer's instructions.

10

Apply fluoride varnish (e.g. FluoroDose by Centrix) to all teeth. Per ADA guidelines, high risk patients should receive 3-4 recare appointments with varnish application each year.

References

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