Q&A

What is New about
an innovative dentin desensitizer,
NANOSEAL

nanoseal®

Nippon Shika Yakuhin Co., Ltd.

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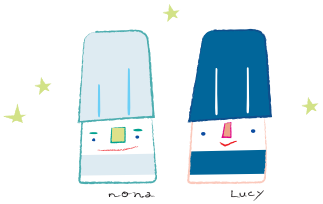

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Q&A about Product Characteristics

Q1. What type of dentin desensitizer is NANOSEAL?

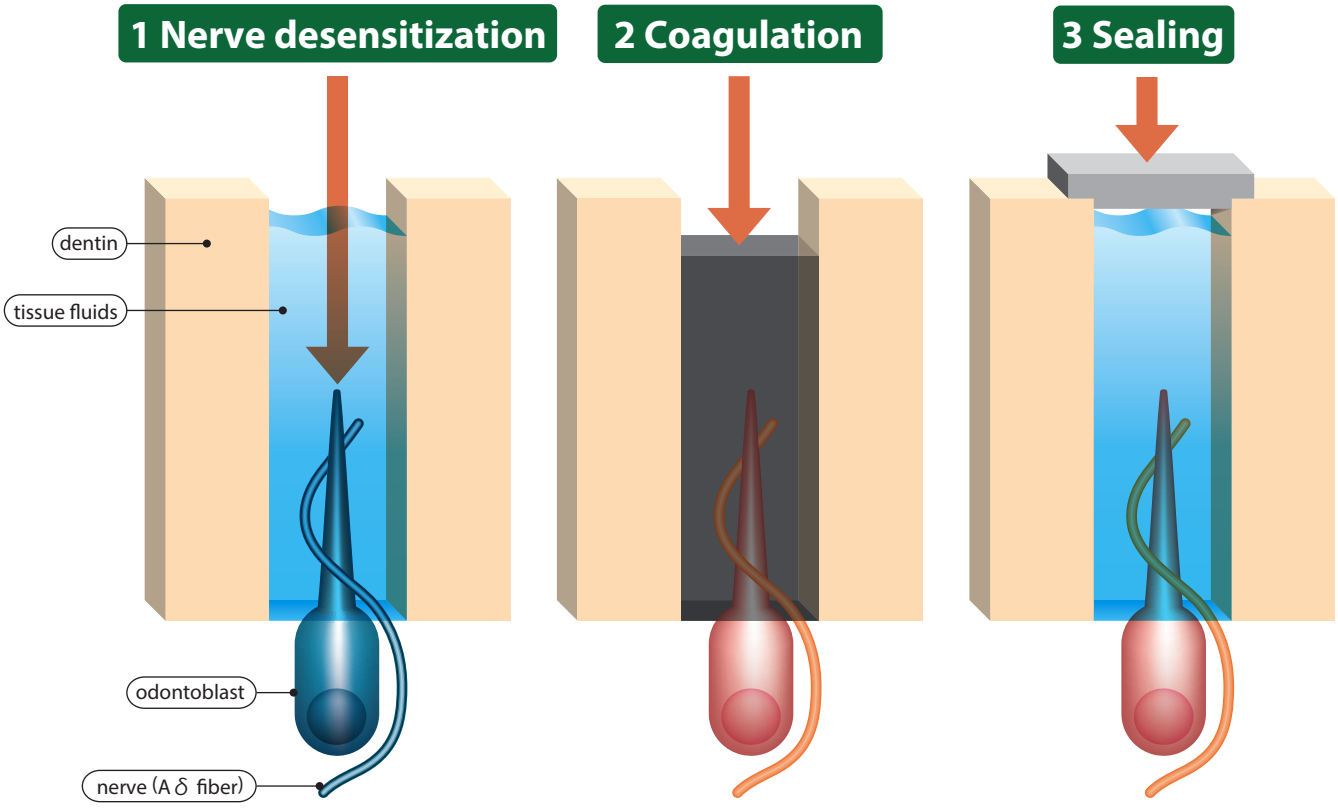
A The products with the following three characteristics are primarily available as a dentin desensitizer[1]:

1 Nerve desensitization … "Make the nerve less sensitive"

2 Coagulation … "Coagulate protein to prevent movement of tissue fluids in the dentinal tubules."

3 Sealing … "Seal the dentinal tubule."

Among them, **NANOSEAL is a product that seals the dentinal tubule.**



[Figure by the courtesy of Prof. Morioki Fujitani and Prof. Akira Senda (Operative Dentistry Course, School of Dentistry, Aichi Gakuin University)]

Q2. What are the new characteristics of NANOSEAL?

A

① **Immediately reduce hypersensitivity just after the application.**

② **Protect from demineralization**

③ **Promote remineralization**

④ **Easier than ever! There is no need for drying, rubbing or light-curing before/after the application.**

Q3. What is the composition and pH of NANOSEAL? Does it smell?

A NANOSEAL consists of two liquids, Liquid A and Liquid B.
Each composition is as follows:

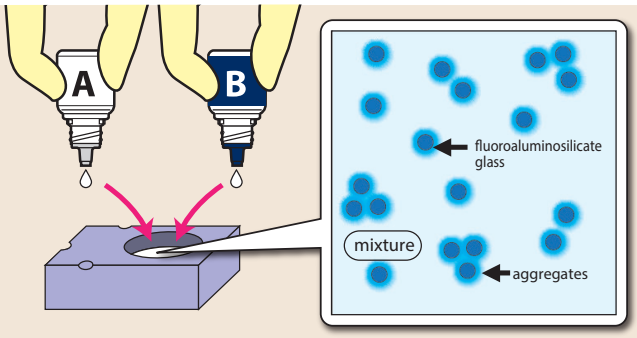
	Composition	pH	odor
Liquid A	fluoroaluminosilicate glass dispersion liquid (paraben is used as a preservative), purified water	approx. 8.0-9.0	odorless
Liquid B	aqueous phosphate solution(approximately 10%), purified water	approx. 1.0	odorless
Mixture		approx. 2.0-3.5	odorless

Q&A about Product Characteristics

Q4. How is the acid-resistant nanoparticle layer formed?

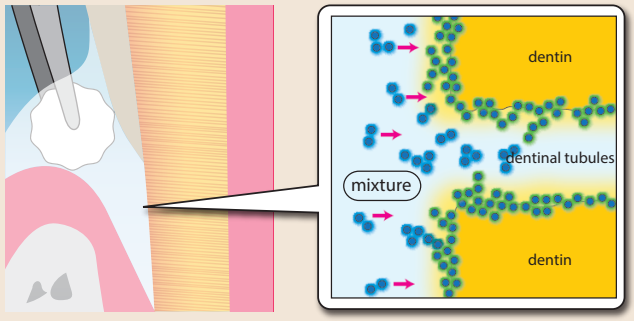
A **A solid nanoparticle layer incorporated with the tooth substance (thickness: approximately 1 μm[2])) is formed** after an immediate reaction with the tooth substance by the application of the mixture of Liquid A and Liquid B on the tooth surface.

Mix



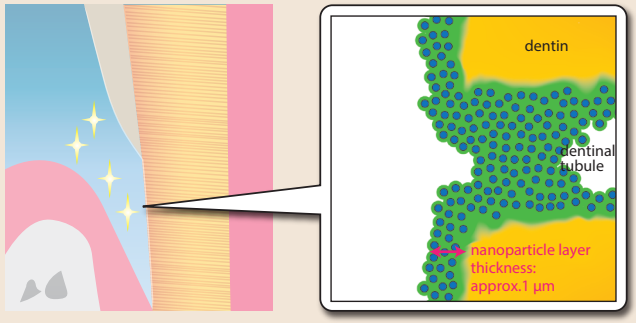
Fluoroaluminosilicate glass reacts with (aggregates) phosphoric acid.

Apply



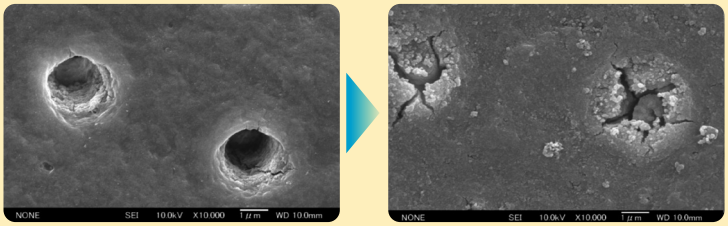
With the deposition of aggregates of fluoroaluminosilicate glass, an acidic mixture decalcifies the tooth substance to incorporate ingredients derived from the tooth substance (such as calcium ions and phosphate ions).

Rinse



The solid nanoparticle layer incorporated with the tooth substance (thickness: approximately 1 μm[2]) is formed.

《The nanoparticle layer seals the dentinal tubules[3]》

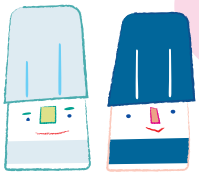


Opened dentinal tubules

Sealed dentinal tubules after the application of NANOSEAL

Q5. What is the composition of the acid-resistant nanoparticle layer?

A It contains calcium fluoride, calcium phosphate, calcium silicate, and fluoroaluminosilicate glass, etc.



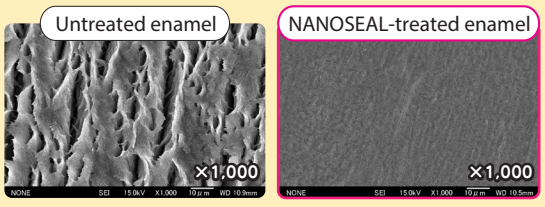
Q6. How can resistance to acids of the nanoparticle layer be provided?

A **The acid resistance** can be gained **with the acid buffer capacity of fluoroaluminosilicate glass and calcium silicate.**

Q7. How strong is the acid resistance of the nanoparticle layer?

A It has been reported that no change was observed in the acid resistance after 110-hour immersion in carbonated beverages, that is, cola drinks (pH 2.7).[4)]

《The tooth enamel after 110-hour immersion in cola drinks (pH 2.7)》



It has been reported that NANOSEAL -treated tooth enamel and dentin exhibited superior acid resistance.

Q8. Does NANOSEAL contain fluorine?

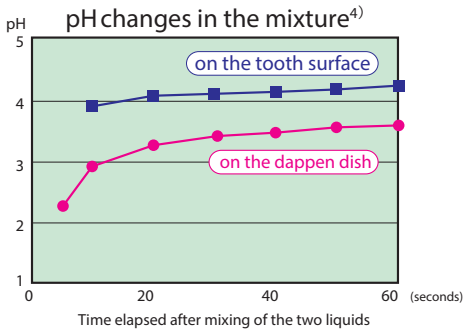
A The fluoroaluminosilicate glass (nanoparticles) in Liquid A contains **fluorine almost equivalent to that present in typical acidulated phosphate fluoride (APF)** preparations, which implies that the nanoparticle layer also contains fluorine.

Q&A about Usage

Before application

Q1. How long can the mixture of Liquid A and Liquid B be used?

A Use it **within 1 minute** after mixing of the two liquids. As shown in the figure, the pH of the mixture increases over time, which reduces the reactivity. Therefore, the rate of sealing of the dentinal tubules may start to gradually decline 1 minute after the mixing, undermining the preventive effects against hypersensitivity.



Q2. Is there any problem if the collection ratio of Liquid A and Liquid B is not equal?

A If the difference is within the range of variation observed during one-drop collection, the volumes of the two liquids do not need to be exactly the same. However, a significant difference in the collection ratio (two drops or more vs. one drop) may attenuate the preventive effects against hypersensitivity.

Q3. Is any pre-application treatment required for the tooth surface other than cleaning?

A No treatment such as air-drying is required for the tooth surface. If cleaning the tooth surface is difficult and the surface is stained only with saliva or if there is a small amount of blood due to bleeding during scaling and root planning (SRP), NANOSEAL is still effective and the dentinal tubules can be sealed with the application without cleaning the surface.[5)] However, we recommend removing massively accumulated plaque and tartar as much as possible.

During application

Q4. How should NANOSEAL be applied?

A Apply NANOSEAL sufficiently to the affected area. If hypersensitivity remains even after applying and rinsing the product with water, the area might have been left partially uncoated. In this case, apply the product again using a new mixture.


Just after NANOSEAL application[4)]

Q5. Should the surface be recoated?

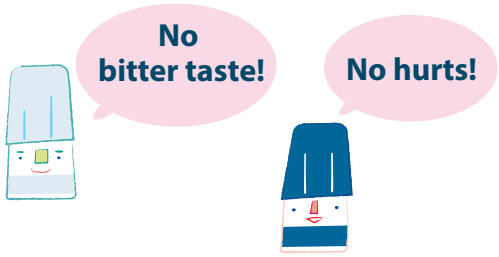
A There is **no need** for recoating.
We rather recommend applying NANOSEAL sufficiently to the affected area to prevent uneven coating or partial coating.

Q6. Is there any problem if NANOSEAL contacts to the gingiva during application?

A **No problem, if NANOSEAL contacts to the gingiva.**
The pH of the mixture is approximately 2.0–3.5, which is equivalent to that of cola drinks, orange juice, and isotonic drinks.[4] (See the graph in Q1 on p. 7)

Q7. Do patients feel a bitter taste during application?

A **No, they don' t feel a bitter taste.**
It may taste slightly sour, though.



Q8. Does the tooth hurt during application?

A **No, it does not.**
No irritation occurs because the acid-resistant nanoparticle layer is formed immediately after the application.

After application

Q9. Can the surface be rinsed with water immediately after the application?

A **The tooth can be rinsed with water soon after the application** because NANOSEAL immediately works on the tooth substance. Although it may taste slightly sour if left for a while after the application, it does not have adverse effects on the tooth substance and gingiva.

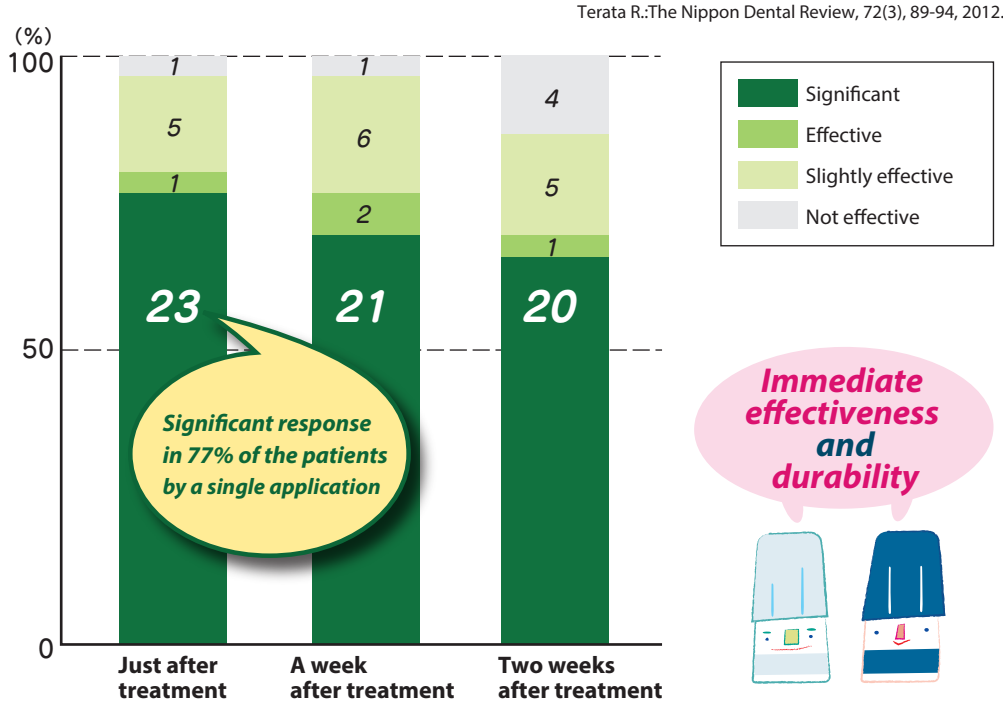
Q&A about Desensitizing Effect

Q1. What desensitizing effects of NANOSEAL have been reported against hypersensitivity?

A It has been reported that **a single application of NANOSEAL resulted in a significant response** (felt no pain at all) **in approximately 77% of the patients** and that these desensitizing effects were maintained even 2 weeks after the application, without showing a significant reduction, as depicted in the figure below.[4] Furthermore, since the nanoparticle layer is incorporated with the tooth substance, the applied NANOSEAL **will not easily come off.** Moreover, **the effects will not be attenuated.**

《Efficacy and durability of the desensitizing effects (in 30 patients)》

Terata R.:The Nippon Dental Review, 72(3), 89-94, 2012.



[Evaluation Procedure] Evaluation was performed based on pain that occurred due to 3-minute cold air stimulation generated by an air syringe placed approximately 1 cm away from the affected area or tactile stimulation using the tip of the dental probe. The efficacy was assessed using pain scores.

Q2. Will additional application be beneficial if no benefit has been observed with a single application?

A Improvements in the symptoms by additional application were reported in patients whose symptoms had been persistent at 1 or 2 weeks after the previous application of NANOSEAL.[6]

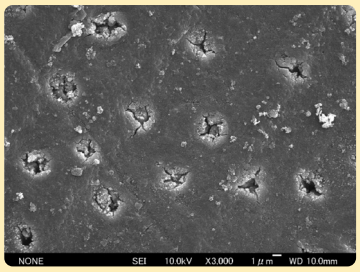
《Change in the significant response rate》

Just after treatment		Two weeks after treatment
68.4% (in 65 of 95 patients)	additionally applied	**96.8**% (in 92 of 95 patients)

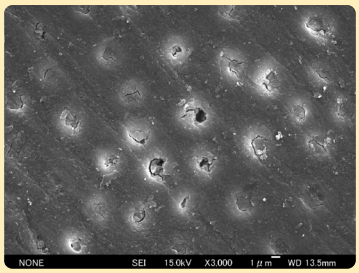
Q3. I am afraid that the nanoparticle layer may be removed by brushing.

A **It cannot be removed** so easily.

The presence of the nanoparticle layer was confirmed on the tooth surface even after 5-minute brushing (toothbrush pressure, 250 g; scrubbing method) using a toothpaste containing an abrasive.[7] However, excessively strong brushing may shave and wear away the tooth. Guidance for brushing should be provided for a patient, if necessary.



Just after the application



After brushing

Q4. Can NANOSEAL be applied to the root surface with the remaining cementum?

A **Yes, it can be applied.**

Desensitizing effect can still be expected for the root surface with the remaining cementum as NANOSEAL works on the cementum and forms the nanoparticle layer.

Q5. Does NANOSEAL have the same effects if used on the surface previously coated with a resin-based dentin desensitizer?

A Effects cannot be expected because NANOSEAL does not act on resin.

We recommend removing the resin to apply the product to the dentinal surface.

Q&A about Application to the Prepared to

Q1. Can NANOSEAL be used for the prepared tooth?

A **Yes, it can.**

Apply NANOSEAL sufficiently to prevent uneven coating or partial coating.

Application to a formed abutment tooth[8)]

Q2. Will the bond strength of resin cement and bonding materials be decreased on the prepared tooth surface coated with NANOSEAL?

A **No, it will not.**

It has been reported that application of NANOSEAL does not interfere with the bond strength of various resin cement and bonding materials used for the dentin.[9)]

Q3. Is phosphoric acid etching on the NANOSEAL-coated surface (enamel) effective?

A **Yes, it is effective.**

It has been demonstrated that phosphoric acid etching on the NANOSEAL-coated surface (enamel) increases the bond strength of the adhesive resin.

【Test Method】
A flat surface of the bovine tooth enamel where a masking tape is attached (thickness, 50 μm; pore size, 3 mm) was used for the test. The inner surface was treated with phosphoric acid etching. The bond strength at a crosshead speed of 1 mm/min was evaluated using treated and untreated materials where Clearfil Mega Bond (Kuraray Noritake Dental Inc. (former Kuraray Medical Inc.)) was applied.
【Test Results】
Without phosphoric acid etching: approximately 10 Mpa/ With phosphoric acid etching: approximately 25 Mpa
(Laboratory data provided by Nippon Shika Yakuhin Co., Ltd.)

Q4. Will the fitting of dental prostheses be affected by NANOSEAL?

A **No, it will not.**

The thickness of the nanoparticle layer is approximately 1 μm, which is much smaller compared to that required for dental prostheses (several tens of μm). The thickness will increase to only about 2 μm if the application and rinsing processes are repeated four times.[10)]

Q5. Can temporary seal and cementation materials be used after the application of NANOSEAL?

A **All types of materials can be used.**

No separating agent is required to use them.

Q6. Can NANOSEAL be applied during whitening treatment?

A Yes, it can.

It has been confirmed that NANOSEAL does not affect the whitening results[11)] and can be used both before and during whitening treatment. Furthermore, no coloring will occur after the application.

Other Q&A

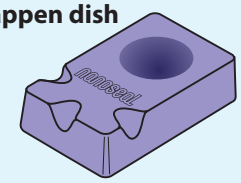
Q1. How many drops can be collected in one bottle? How many teeth can be treated with a single collection?

A **Approximately 100 drops** can be collected from Liquid A and Liquid B, respectively.
At least **two to three teeth** can be treated with one collection (one drop each).

Q2. What should be done for the maintenance of the attached dappen dish after use?

A Follow the procedure below;

◆**Dappen dish**



Cleaning After rinsing with water, wipe the dappen dish with a clean alcohol cotton ball.

Sterilization Chemical sterilization with glutaral can be applied; however, autoclave sterilization should be avoided, as it may result in deformation of the dappen dish due to heat.

Q3. Is there any dedicated tool available for application?

A No dedicated tools are available. Use a cotton ball or brush for application.
Use a cotton ball for easy application of a large amount to multiple teeth.

Q4. How can the liquid stuck to a table or other dental equipment be removed?

A Wipe off the liquid using a dampen cloth or a paper towel several times.
Fluoroaluminosilicate glass used for this product consists of fine particles; therefore, white spots may still remain after wiping off the liquid. They can be removed by repeated wiping.

Q5. How can the liquid adhered to clothes be removed?

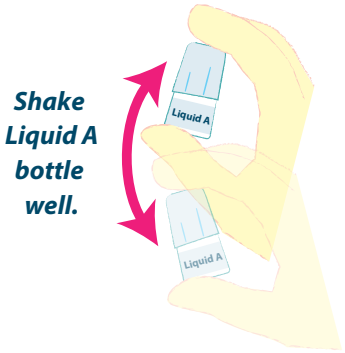
A Wipe off the liquid adhered to the clothes by getting them wet with water using a dampened cloth or a wet paper towel.
If possible, wash the adhered part by soaking it in water.

Q6. How should NANOSEAL be stored?

A Avoid direct sunlight and freezing. Store NANOSEAL at room temperature (1°C–30°C). Storage in a refrigerator is recommended if the temperature is expected to be 0°C or below.

Q7. Can the once-frozen product still be used for application?

A **Yes, it can.**
However, coagulated glass components of Liquid A are slightly likely to form precipitates after being frozen. Shake it well before use to ensure even mixing.

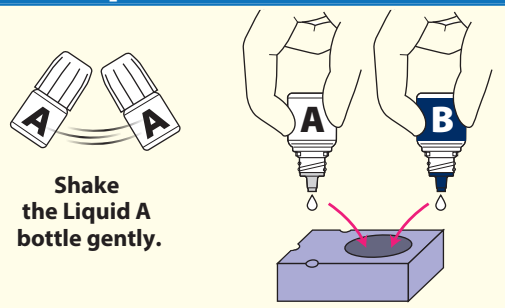


Q8. What should I do if the tip of the nozzle is clogged?

A Tighten the cap and place the bottle in the basket of an ultrasonic cleaner to run the cleaner for about 20 seconds. Ultrasonic vibration will clear the clog.

nanoseal User Guide

1 Dispense & Mix

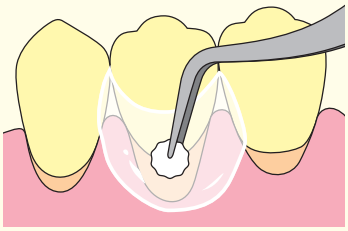


Shake the Liquid A bottle gently.
Place an equal amount of Liquid A and B in the dappen dish to mix them.

Apply the mixture
within one(1) minute after mixing.

＊In Liquid A dispensed after shaking the bottle gently, aggregated glass particles may rarely be found, which would not affect the properties of this product.

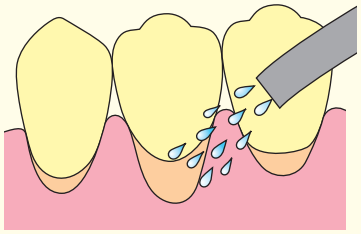
2 Apply



After cleaning tooth surface,
apply sufficiently.
(Repeat application for five (5) to twenty(20) secs.)

Follow the same procedures
when applied to prepared tooth surfaces.

3 Rinse



Wash or rinse.

★ Please read "Instructions for use" carefully before use.

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【Packaging】Liquid A 5mL, Liquid B 5mL, dappen dish 1 piece

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