

Sealing Pits and Fissures Efficiently and Reliably

Easy and quick handling of pit and fissure sealants is an essential criterion in caries prevention.

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Pit and fissure sealants have to tightly and durably seal the tooth surfaces treated; this is critically important to reliable, long-term caries prevention. And materials that make treatments quick and “stress-free” for both dentists and patients (i.e. children or youngsters) are extremely helpful in dental practice. Active caries-protective effects provided by the sealant itself are another desirable characteristic.

Reducing the Caries Risk by Pit and Fissure Sealing

Sealing irregular occlusal surface contours, buccal and palatal pits and fissures, and foramina coeca in deciduous and permanent teeth with the aid of adhesive, flowable composite materials has been shown to be highly important to caries prevention.

The use of adhesive sealants helps to prevent caries development in these areas and avoid progressive demineralisation.

However, it should also be emphasised that sealing alone is not sufficient for general or local caries prevention in one or more teeth of a patient. It is necessary to use a well-coordinated approach, combining pit and fissure sealing – whether “normal” (non-invasive) or “extended” (including careful removal of defective fissure areas) – with other caries-preventive measures.

Ensuring a Reliable Seal

The quality of adhesive pit and fissure sealing with micromechanically retained composites – i.e. effective filling of gaps and voids and permanent protection of these areas against cariogenic influences from the oral environment – depends on various factors.

Today, composite sealant systems with one-component self-etch primers, such as BeautiSealant by Shofu (Japan), the product described in this article, are available. These systems definitely help to make the clinical sealing process much easier and quicker

without compromising the quality of the result.

Certain preparatory and accompanying steps are no longer essential, e.g. “absolute isolation” with the aid of a rubber dam, which is always a great challenge when treating little children. But of course “relative isolation” with absolute moisture control is still indispensable to a tight and durable fissure seal.

One of the special benefits of these easy and quick composite sealant systems is the fact that acid etching of the tooth structure, a step that is complicated, time-consuming and – especially for children – rather unpleasant, can generally be omitted without any appreciable reduction in the quality of the adhesive bond between the sealant and the tooth.

BeautiSealant Pit and Fissure Sealant System

From a clinician’s viewpoint, complete and ready-to-use sealant systems are highly advantageous, because they facilitate quality assurance, an integral part of modern-day dentistry.

The sealant system described in this case report is a sophisticated combination of materials and accessories, meeting all the technical, physical and clinical requirements of proper adhesive pit and fissure sealing with a flowable composite:

- 1.2 g syringe of flowable, medium-viscosity composite
- 3 ml bottle of primer

- 5 ultra-fine needle tips (0.4 mm in diameter)
- 50 microbrushes



(1) Containing all the materials and accessories needed for successful pit and fissure sealing: The new BeautiSealant system made by Shofu. The one-component self-etch primer quickly and reliably conditions the tooth structure, providing a durable bond to the composite sealant.

The primer can easily and accurately be applied to and distributed over the cleaned and dried tooth surface. Thanks to its liquid consistency, it can be brushed even into complex anatomical micro-contours. After proper application, the primer is left undisturbed for only 5 seconds and then gently air-dried. Separate light-curing is not necessary! The composite is immediately applied and distributed to all the tooth surfaces to be treated. Finally, the sealant system is light-cured; the minimum curing time should be 20 seconds when using traditional halogen lights or 10 seconds when using LED lights. According to the manufacturer, the shear bond strength is approx. 19.5 MPa, provided that the protocol of use is properly followed.

The needle tip, only 0.4 mm in diameter, allows users to accurately apply the sealant without any air inclusions. The material itself is a medium-viscosity composite paste, which is

easily extruded through the ultra-fine needle tip but does not run or slump into areas that should not be covered with a sealant.

The radiopacity of 0.92 mm Al is another clinical advantage, since it helps clinicians to easily detect any abnormalities or incipient tooth structure defects in radiographic examinations of sealed teeth.

Sustained Remineralisation by S-PRG Filler Particles

The fact that the BeautiSealant composite is a “Giomer” – a material whose solid, inorganic filler component includes S-PRG particles – is a benefit that should not be underestimated. This “Surface Pre-Reacted Glass Ionomer” filler, manufactured by means of Shofu’s proprietary S-PRG filler technology, is a surface-modified fluoro-boro-alumino-silicate glass releasing six different ions with known bioactive properties: fluoride, sodium, strontium, aluminium, silicate and borate. Unlike glass ionomers and compomers, however, which require water absorption after curing to release fluoride, Gionomers contain special filler particles with multifunctional glass cores that undergo an acid-base reaction during manufacturing and are then protected by a surface-modified layer. This unique trilaminar structure forms a type of stable glass ionomer, which can recharge and release ions without being substantially damaged by water absorption. Thanks to this property, the composite sealant provides sustained remineralisation benefits to the adjacent tooth structure.

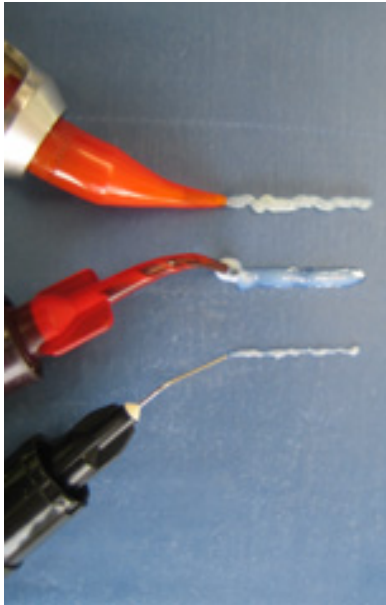
This new, flowable pit and fissure sealant system now adds to the range of Giomer products developed by Shofu, which is doubtless a strong argument for its use in clinical routine.

Conclusion

In the author’s practice, the BeautiSealant system is used for preventive treatments of caries-free fissures and pits in all kinds of teeth. Easy and convenient handling and unvaryingly successful results make it a very satisfying product. Because of its practical medium viscosity and high-quality filler, this composite sealant is also frequently used for extended fissure sealing in areas that are rather small and therefore bear only little stress.

The shade and translucency properties of the sealant are a clinically sensible compromise between “Nicely tooth-coloured but hard to identify in examinations” and “Why do there have to be these ugly white spots on my teeth”.

Only one aspect of this otherwise highly recommendable product still needs improvement: The manufacturer should include more than just five needle tips in the system!



(2) Comparison of two other commercially available tips designed to accurately apply flowable composites for “preventive adhesive composite restorations” (left) and fissure sealing (centre) with the ultra-fine needle tip of BeautiSealant, which is only 0.4 mm in diameter (right). This needle tip and the ideal viscosity of the sealant ensure highly precise application without any air inclusions.



(3) Thanks to its optimised viscosity and special filler load, this composite sealant offers durable and reliable results when used for conventional (right) and extended (left) fissure sealing.



(4) The composite sealant is accurately applied to fissures using the ultra-fine needle tip. This sealant can even be used on patients, or teeth, with an increased caries risk, since the S-PRG filler particles continually recharge fluoride ions from the oral environment and release them to the tooth structure, ensuring sustained remineralisation (see article for details).



(5) Of course, thorough cleaning of the tooth surface to be sealed – which may include the removal of deposits from pits and fissures, e.g. with the aid of an ultrasonic tip – is indispensable to optimal adhesion of the composite sealant.



(6) Just a few more steps are necessary for high-quality pit and fissure sealing. The BeautiSealant primer is applied, left undisturbed for only 5 seconds and then gently air-dried. There is no need for separate light-curing.



(7) Using the needle tip, only 0.4 mm in diameter, the composite sealant is accurately applied and pressed into the fissures without any "overflowing" of excess material. Finally, the sealant is light-cured for 20 seconds with a halogen light or only 10 seconds with an LED light. That's all!

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