Changes in the use of pit-and-fissure sealants

Sealants used by many clinicians as a minimally invasive caries treatment

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As concepts for the treatment of caries have evolved, the purpose and use of sealants have changed. In the 1980s, sealants were indicated only for the preventive sealing of pits and fissures. In other words, all teeth—even those with no clinical sign of caries—were considered for sealing.

Now it is understood that there is no need to seal the teeth of patients with good oral health and no sign of aetiological factors preventively. Owing to this new understanding about caries and its causes, the indications for the use of sealants must be reviewed and extended.

Sealing pits and fissures is no longer indicated for preventive reasons only, but is considered a therapeutic procedure to halt the progression of early caries. In this way, sealants are increasingly regarded as part of a minimally invasive philosophy that aims for early diagnosis and intervention, as well as prevention of future caries.

This treatment first aims at the control of the aetiological factors of caries (e.g. diet, oral hygiene and socioeconomic status). However, in the more advanced stages of caries, minimally invasive procedures are indicated to interrupt lesion progression and preserve the natural dental structure. In such cases, using sealants has proven to be a very effective treatment, not only for caries affecting enamel but also for caries affecting dentine.

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Case report

This case report concerns a 12-year-old female patient presented for a routine dental appointment. After a complete examination, clinical signs of caries were detected in the first and second right mandibular molars. Active caries involving the initial part of the dentine and 2 mm of cavitation was observed on the first molar, while the second molar exhibited only enamel involvement, with whiter opaque characteristics (Fig. 1).

After the diagnosis, it was decided to treat the patient based on the precepts of the minimally invasive philosophy. To start with, the patient was educated about proper oral hygiene and diet in order to help her control the caries. For both lesions, a resin sealant (UltraSeal XT hydro, Ultradent) was used. Both teeth were isolated with a rubber dam, retained with a clamp on the second molar. The occlusal surface of the teeth was conditioned using 35% phosphoric acid gel (Ultra-Etch, Ultradent) for 15 seconds and then rinsed off with water for another 15 seconds.

The surfaces were then dried with a powerful air-water spray until they had a matt and whiter aspect. On the first molar, with the carious lesion having already spread to the dentine, two separate layers of one-step adhesive (Adper Single Bond, 3M ESPE) were applied. The excess was removed with an air spray for five seconds, followed by three seconds of curing using an ultrahigh-energy broadband LED curing device (VALO, Ultradent). Afterwards, a natural-shade resin sealant (UltraSeal XT hydro) was applied to the surfaces of both teeth using an inspiral brush tip (Ultradent), which facilitates the delivery of the material into areas that are difficult to access, improves the sealant flow and prevents air bubbles. The sealant was then cured for three seconds using the same curing device.

Next, an ultraviolet light was attached to the VALO and the light was placed over the sealed areas (Fig. 2). This approach, taking advantage of the fluorescence properties of the sealant, enabled the clinician to check the sealed areas to ensure that the sealant was optimally adapted to prevent micro-leakage and to assess the immediate and future quality of the seal. After having achieved the marginal seal that is essential for the halting of caries (Figs. 3 & 4), the occlusion was checked.

Discussion

This case report demonstrates an alternative treatment for caries using a minimal intervention philosophy. A resin sealant was used to prevent the carious lesion from spreading. With this less invasive procedure, it is possible to ensure greater comfort for the patient and to achieve a simplification of dental treatment, resulting in greater preservation of dental structures.

Editorial note: A list of references is available from the publisher. The authors are paid consultants for Ultradent Products, Inc.