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Dental caries has long represented a significant oral health issue for children and adults. In the 1980s, however, the prevalence of coronal caries in children steadily declined in segments of the population after the implementation of fluoride supplements and toothpastes, increased public oral health education, and the application of dental sealants.1

Since they were first utilized in dental offices in the 1970s, dental sealants (resin based or glass ionomer cement) have been effective in caries prevention. Acting as a barrier, they are typically applied to the premolars and molars where decay is most likely to develop. They have been proven effective in preventing pit and fissure caries,2 as well as caries on the occlusal surfaces of permanent molars and in high-risk cases.3

Over the years, sealants have been implemented in public programs as a way to reach children of low socio-economic status, who are not able to afford and are therefore at risk of having a high prevalence of caries. Studies regarding the retention rates and clinical benefits of community sealant programmes conducted by county health departments determined that children who received sealants had a 71 per cent successful retention rate and considerable protection from occlusal decay up to fifth grade.4

This trend continued over the years, even though the American Dental Association widely advocated the use of dental sealants as a recommended component of maintaining good oral health.5 In fact, children who do not receive sealants have a greater probability of developing carious lesions and needing restorative dental care in the future, costing the health care system more in the long-term.6, 7 Perhaps that explains why research regarding caries risk assessment and the use of preventive techniques in children aged 6 to 18 years found that dental sealants and in-office fluoride are the most frequently used caries preventive regimens.8

Currently, new and improved dental sealants that are beneficial and cost effective are available for use. They reflect an evolution in which sealants have advanced to become more cost effective, and research shows that properly placed and retained sealants can decrease the occurrence of carious lesions and avoid restorative costs.

Characteristics of dental sealants
The earliest generations of sealants were vulnerable to flaws, bubbles and failure to adapt to dentition, which contributed to earlier wear. As a result, they required replacement over time, which is an essential component of caries prevention to avoid bacterial infiltration that can lead to carious lesions. Early sealants typically lasted six months to a year.9

First- and second-generation sealants demonstrated a high resistance to flow and low viscosity, causing the material to run over the margins of the tooth and other surfaces. These sealants were usually clear and resembled caries in subsequent radiographs. Additionally, early generations of sealants were incompatible with moisture and required application in a dry environment to prevent contamination and sealant failure caused by a weakened sealant bond.

Although third-generation sealants showed improvements, they still had some shortcomings. These sealants were more viscous and easier to handle, and as a result the sealant remained on the tooth surface until it was light cured. However, research showed that light-emitting diodes or halogen lights were insufficient for curing 2 mm-thick opaque sealants or sealants with a high filler content, potentially causing microleakage and insufficient microhardness.10

Adhesion is one of the most important features of a dental sealant. Studies have shown that self-adhesive sealants do not have as defined an etching pattern as etch-and-rinse adhesives.11 A pre-treatment conditioning protocol with an appropriate acid is necessary to obtain adequate penetration of a sealing material.12

Newer generations of sealants can be cured in a moist environment and do not require complete drying of the tooth surface after etching. This is possible owing to the hydrophilic agents in today’s sealants. Nowadays, dental profes-
Sealants today can last up to as long as ten years if regularly cared for after application. Additionally, the traditional step of pre-treating teeth with a drying agent is eliminated, resulting in faster and more efficient procedures.

UltraSeal XT hydro
This 55 per cent highly filled and light-curable pit and fissure dental sealant (Ultradent) is radiopaque, methacrylate based and thixotropic. It also contains diurethane dimethacrylate, tri-ethylene glycol dimethacrylate, and methacrylic acid. Its adhesive properties increase the bond strength of the material to the enamel, enhancing marginal retention and reducing microleakage. The thixotropic nature of the material, combined with its hydrophilic chemistry, prevents sealant failure by pushing moisture deep into the pits and fissures of the tooth on a microscopic level. This prevents moisture-related sealant failure common with earlier generations of hydrophobic sealants. Additionally, the standard step of pre-treating teeth with a drying agent is eliminated, resulting in faster and more efficient procedures.

The sealant’s fluorescent properties enable visual verification of the sealant’s margins under a UV black light, making it easier to verify and view marginal retention at the time of placement and subsequent examinations. The chemical composition contains and releases fluoride, so no additional treatments are necessary.

Case study
A 9-year-old patient presented with deep pits and fissures upon examination. It was determined that applying UltraSeal XT hydro to deep pits and fissures would be the best course of preventive treatment. The tooth was cleaned with pumice and a prophylaxis angle to remove any debris prior to sealant placement. The brush tip was attached to the Ultra-Etch etchant syringe (Ultradent) containing a 55 % phosphoric acid solution. The Inspiral Brush tip was attached to the UltraSeal XT hydro syringe for later application of the sealant.

The fissures of the teeth were cleaned using a micro-brush from Ultradent. The selected teeth were isolated with cotton rolls to avoid saliva contamination. Etchant was applied to the fissures of the teeth for 20 seconds. The teeth were thoroughly rinsed with a water spray unit and dried with an air abrasion unit. It was necessary to repeat etching and rinsing in cases in which sodium bicarbonate was used.

Prior to applying the sealant, a small drop of UltraSeal XT hydro was expressed on to the Inspiral Brush tip. In order to prevent premature polymerisation of the dental sealant, the overhead light was redirected, and the sealant was applied using a painting action, followed by light agitation. The sealant was light cured using the VALO LED curing light (Ultradent) for 10 seconds. It is recommended that clinicians and patients wear UV protective eyewear when the sealant is cured to prevent injuries. The sealant margins were examined with a Black Light lens (Ultradent) to verify marginal retention visually. The occlusion was examined and appropriately adjusted.

Conclusion
Sealant placement remains an integral component of preventive dentistry. UltraSeal XT hydro is an innovative dental sealant that is easy to use, cost effective, and clinically proven to help prevent the formation of cavities in pit and fissure areas.

Contact Info
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