EMBRACE™ WetBond™ Pit and Fissure Sealant

Prevents cavities in occlusal areas of molars.

Resin Acid-Integrating Network (RA-IN)
- an improved hydrophilic resin technology

Features
- Water activated and pH controlled
- Continuous fluoride release for extra protection
- Self-priming
- Self-adhesive
- Hydrophilic and hydro-balanced
- Water miscible

Specification:
Colour: white opaque
Compressive strength: 34,800 (3800) p.s.i., 240.0 (26.1) MPa
Diametral tensile strength: 6300 (725) p.s.i., 43.4 (5.0) MPa
Percent filler by weight: 36.6%
Percent solubility: 0.06%
Film thickness: 12 microns
Depth of cure: meets ANSI/ADA Spec No.39

Indications for fissure sealing with EMBRACE™
- Narrow, deep fissures
- Immature teeth in eruption
- Reduced ability for appropriate oral hygiene
- Caries activity or fillings in deciduous or permanent teeth
- High caries risk

Product benefits
Wet-bonding
EMBRACE™ is the first wet-bonding pit and fissure sealant. It chemically bonds to the moist tooth. It is easy to apply and does not require a dry field.

Tooth-integrating
EMBRACE™ forms strong chemical bonds to the tooth, integrating with tooth structure to form a long lasting, protective surface that resists chipping, cracking and pitting.

Margin-free
After curing, the clinician can neither see the margin nor find it with an explorer due to this tooth integrating technology. At the recall visit, there is no deterioration of the sealant at the margin.

Application

Clean, isolate, etch tooth for 20 seconds. Rinse well. Remove excess water. Leave tooth surface moist.

Apply EMBRACE™ sealant on the moist occlusal surface.

Light cure.

Package
5 x 1.2 ml syringes with EMBRACE™
30 applicator tips
In vitro evaluation of EMBRACE™ WetBond™ Pit and Fissure Sealant

Degrange et al. internal report (2002)

Aim:
To evaluate penetration into pits and fissures and marginal leakage of EMBRACE™ WetBond Pit and Fissure Sealant and compare the results with four other commercially available sealant products.

Trial conditions

Products under investigation
EMBRACE™ WetBond
Sealant A
Sealant B
Sealant C
Sealant D
(Sealants A to D are all commercially available pit and fissure sealant products).

Test material
Recently extracted, unerupted human third molars (stored in 1% chloramine T at 4°C)
10 teeth were used per product, except for test product D (15 teeth)

Methodology
Each tooth was first cleaned with pumice using a brush mounted on a contra-angle handpiece. The same operator applied all the different sealing materials. In order to simulate the conditions in the oral cavity more closely, specimens were systematically subjected to a thermal cycling procedure (hydrothermal aging for 1800 cycles alternating between 5°C and 55°C). The teeth were immersed in 50% silver nitrate solution under chemically inactive light, and placed on a vibrator for two hours. The teeth were rinsed with distilled water and exposed to visible light for at least 12 hours. Each specimen was embedded in acrylic resin and cut into 3-5 sections. Sections were examined under a binocular microscope at 10-fold magnification, evaluated and photographed.

Evaluation
Penetration: The penetration depth of the material into the pits and fissures of the permanent teeth was measured and the results expressed as a percentage of the total depth of the fissure.

Microleakage: The dyeing method used was first described by Øvrebo and Raadal in 1990. The probes were evaluated with the scoring system given below. In the present study, only the worst section score for each tooth was used as a result.

- Score 0: no penetration of the dye seen in the section
- Score 1: penetration into the part around the sealant
- Score 2: penetration to the part below the sealant
- Score 3: penetration at the base of the fissure.

Results

With respect to the penetration of the different materials, EMBRACE™ WetBond gave the best results with a particularly high penetration of 97.3% (Figure 1). This value was significantly higher than the other materials. Also, the standard deviation and coefficient of variation were lower for EMBRACE™, suggesting for this material less technique sensitivity during application.
Regarding microleakage there was a statistically significant difference between EMBRACE™ and test product C on one side and the other test products on the other side, with EMBRACE™ and product C showing the least microleakage. (The difference between EMBRACE™ and product C lies within the statistical accuracy of the test). The two had also the greatest number of scores showing no leakage – or a score of zero (Figure 2). The absence of silver nitrate penetration indicates an extremely tight interface and is associated with almost complete filling.

**Figure 2:** Histogram of the marginal leakage scores (microleakage) in percent.

## Conclusion

The fact that EMBRACE™ is compatible with residual humidity (wet-bonding) partly explains these good results. It certainly represents an advantage for its clinical use in children, where a perfectly dry occlusal surface is sometimes difficult to obtain.

Good isolation during application of the sealant is always necessary – this hydrophilic resin has a clear advantage over traditional sealants, which are mostly hydrophobic. Examination of the tooth / EMBRACE™ interface indicates that EMBRACE™ shows good resistance to polymerization retraction in an unfavourable geometry (such as pits and fissures) and under simulated adverse hydrothermal conditions.

EMBRACE™ was shown to protect a tooth from microleakage during thermocycling. The penetration depth and marginal sealing offers a significant advantage to EMBRACE™ as a pit and fissure sealant material when compared with other products.
In vivo evaluation of EMBRACE™ WetBond™ Pit and Fissure Sealant


Aim:
To test the effectiveness of the pit and fissure sealant material EMBRACE™ WetBond

Trial conditions

Product under investigation
EMBRACE™ WetBond Pit and Fissure Sealant

Test material
Primary and permanent posterior teeth of children if they were non-carious and unrestored

Study sample
Approximately 2000 teeth have been sealed with EMBRACE™ WetBond Pit and Fissure Sealant in two dental clinics in the USA. Evaluations are carried out during regular visits at the intervals of six, twelve and twenty-four months.

Methodology
Four pediatric dentists are the clinicians involved in placing and evaluating the sealants. All four dentists are employing the same clinical technique according to the standard instruction for use of the supplier. The evaluation takes place during regular visits. It started with a > 6 months check, followed by the > 12 months check. The final objective will be to get > 24 months data. Teeth were / are evaluated with regard to marginal gaps (visual control and explorer) and caries (bite wing X-rays), according to the following criteria:

- Intact (good marginal integrity)
- Pitting (bubbles)
- Marginal breakdown
- Partial loss of sealant
- Total loss of sealant
- Caries present

The evaluation protocol is fixed and all evaluations are done by the same 4 certified dentists.

Results

Of the 161 teeth evaluated thus far at the six-month recall visit, the sealant remained intact with good marginal integrity in 157 teeth (97.5%). Two teeth showed slight pitting of the sealant material. Three teeth exhibited partial loss of the sealant material. One tooth showed marginal breakdown. None of the 161 teeth had dental caries on the sealed surface.

Of the 136 teeth currently evaluated during the twelve-month recall visit, the sealant remained intact with good marginal integrity in 133 teeth (97.8%). Two teeth showed slight pitting of the sealant material and one showed marginal breakdown. None of the 136 teeth had dental caries on the sealed surface.

Conclusion

The high percentage of sealant retention (>97%) and caries inhibition (100%) can be attributed to the strength of the bond of EMBRACE™ to enamel and the resultant excellent marginal adaptation.