Sealant Retention in Permanent Molars Using an Adhesive Bonding System

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PURPOSE

- Investigate the effect of using an adhesive bonding agent prior to sealant placement.
- Evaluate retention, marginal integrity, and caries occurrence in bonded vs. non-bonded sealants to improve clinical success and prevent caries in the pediatric dental community.

BACKGROUND

- Pit and fissure sealants have been used for decades to prevent and control carious lesions on primary and permanent teeth.[1]
- Permanent molars are more susceptible to caries formation due to plaque and food retention within the anatomical pits and fissures that are not easily cleansable.[2]
- One type of sealant material includes resin-based ones that contain a percentage of filler particles that improves their strength and wear-resistance properties and in turn, longer retained and more efficacious results.[3]
- While some previously published clinical trials have reported bonding agent improving sealant retention, others have shown there to be no clinically significant difference. [4,5]
- The guidelines for evidence-based sealant placement has been updated, however, both guidelines have shown the clinical effectiveness of sealants acting as a physical barrier to prevent caries in high-risk populations. [1,6]

References:

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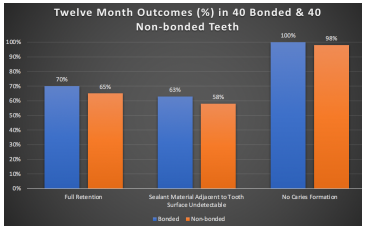
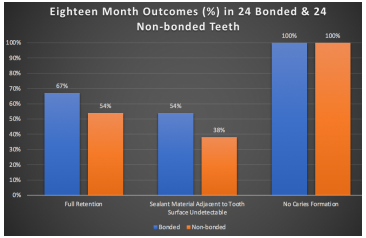
METHODS

- This randomized control trial recruited children ages 6-13 years old with four fully erupted non-carious permanent first molars in the dental clinic or under general anesthesia.
- A split-mouth study design was used in which occlusal, buccal, and lingual sealants were placed with an isolation system (Isovac or rubber dam).
- Toothbrush prophylaxis was completed, and teeth were etched with a 35% phosphoric acid total-etch technique. The maxillary and mandibular right permanent first molars were bonded with Scotchbond Universal Bond, while the permanent first molars on the left were not bonded. A 53% resin filled UltraSeal XT HydroTM sealant was placed in a thin layer according to the manufacturer's instructions in the pits and fissures of each molar.
- The sealants were checked for retention, marginal integrity, and caries formation. Sealed surfaces were evaluated at the 6, 12, and 18-month recalls.





DATA ANALYSIS

- Descriptive statistics were completed to show subject characteristics, 6-month and 12-month outcomes. Data was analyzed with SAS v9.4.

RESULTS

- 73 patients were enrolled, evaluating data for 42 patients at 6-month recall, 20 patients at 12-month recall, and 12 patients at 18-month recall.
- The mean age was 7.9 years of age (range 6-13) with 52% male and 48% female.
- 89% of sealants were fully retained in the bond group and 88% in the non bonded group in 6 months, 70% fully retained in the bond group and 65% in the non bonded group in 12 months, and 67% fully retained in the bond group and 54% in the non bonded group in 18 months.
- 85% of sealants in the bonded group had marginal integrity (sealant material was adjacent to tooth surface) and 83% in the not bonded group at 6 months, 63% of sealants in the bonded group had marginal integrity and 58% in the not bonded group at 12 months, and 54% of sealants in the bonded group had marginal integrity and 38% in the not bonded group at 18 months.
- 100% of teeth in the bonded sealant group did not exhibit caries formation at any recall and 98% of teeth in the non-bonded sealant group did not exhibit caries formation at the 12 month recall.

CONCLUSIONS

- Based on the preliminary results, teeth sealed with bond trend to show slightly superior retention and marginal integrity.

LIMITATIONS AND FUTURE RESEARCH

- Limitations include small sample size, non-blinded practitioners, and variability in patients' behaviors.
- Study will continue to enroll a larger number of subjects and compare long-term retention of sealants placed in the clinic and operating room.