

An Evaluation of Sealants Retention in Permanent Molars Using an Adhesive Bonding System

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PURPOSE

- Investigate effect of using adhesive bonding agent prior to resin 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

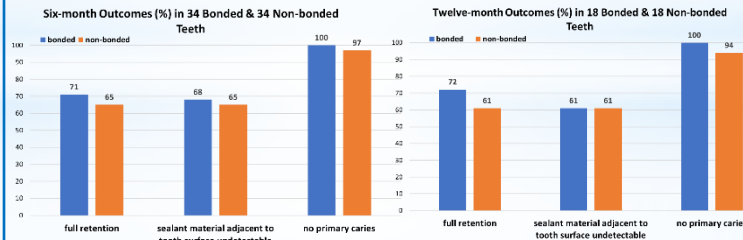
- Pit and fissure sealants are used broadly as a prevention technique to treat caries susceptible surfaces on permanent molars in the pediatric population.¹
- The anatomic pits and grooves present on molars facilitate food retention and the accumulation of bacterial biofilm in primary and permanent teeth.¹
- Resin sealants are a type of sealant material polymerized by a photoinitiator and contain a percentage of resin fill that improves their strength and wear-resistance properties.²
- Previous clinical trials have reported the use of a bonding agent in improving sealant retention, however other studies did not observe a difference in retention with the application of a bonding agent prior to sealant placement.^{3,4}
- The AAPD has published evidence-based guidelines for the placement of sealants on permanent molars to act as a physical barrier to prevent caries in high-risk populations.

References:

1. McMurphy A, et al. Effect of Cured Versus Uncured Adhesive Inclusion on the Microtensile Bond Strength of Sealants. *Journal of Dentistry for Children*. 2017; 84(2):58-64.
2. Ahovuo-Soloranta A, et al. Pit and fissure sealants for preventing dental decay in permanent teeth. *Cochrane Database of Systematic Reviews*, 2017; (7):1-145.
3. Mascarenhas AK, et al. Effectiveness of Primer and Bond in Sealant Retention and Caries Prevention. *Pediatric Dentistry*, 2008; 30(1):25-28.
4. Pinar A, et al. Clinical performance of sealants with and without a bonding agent. *Quintessence Int.*, 2005; 36(5):355-360.
5. Wright JT, et al. Sealants for Preventing and Arresting Pit-and-fissure Occlusal Caries on Primary and Permanent Molars. *Pediatric Dentistry*, 2016; 38(4):282-294.

METHODS

- This randomized control trial recruited children ages 3-10 years old with four fully erupted sound permanent first molars.
- Subjects were recruited 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 upper and lower right molars were bonded with Scotchbond Universal Bond. The upper and lower left molars were not bonded. A 53% resin filled UltraSeal XT Hydro™ sealant was placed in a thin layer according to the manufacturer's instructions in the pits and fissures of each molar.
- The sealed surface was checked with an explorer for complete coverage and cure. Sealed surfaces were evaluated at the 6, 12, and 18-month recall for retention, marginal integrity, and presence of caries.



DATA ANALYSIS

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

RESULTS

- 27 patients were enrolled, evaluating data for 17 patients at 6-month recall and 9 patients at 12-month recall.
- The mean age was 7.7 years of age (range 5-13) with 59% female, 41% male.
- 71% of sealants were fully retained in the bond group and 65% in the non bonded group in 6 months, with 72% fully retained in the bond group and 61% in the non bonded group in 12 months.
- 68% of sealants in the bonded group had marginal integrity (sealant material was adjacent to tooth surface) and 65% in the not bonded group at 6 months, with both bonded and non bonded groups at 61% marginal integrity at 12 months.
- 100% of sealants had no caries formation in the bonded group at 6 months and 12 months, however 97% of nonbonded teeth had caries at 6 months and 94% at 12 months.

CONCLUSIONS

- Based on the preliminary results, teeth sealed with bond trend to show slightly superior retention and marginal integrity to teeth that were sealed without bond for the 6 month time period, however equal margin integrity for the 12 month time period.
- Teeth sealed with bond trend to show superior caries prevention to teeth that were sealed without bond for the 6 month and 12 month time period.

LIMITATIONS AND FUTURE RESEARCH

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