Evaluation of Sealants in Pediatric Patients Using a Bonding System

Shreya K. Desai, DDS[1], Elizabeth Berry, DDS, MSD, MPH[2], John H. Unkel, DDS, MD[3], Dennis Reinhartz, PhD[4], Judy Reinhartz, PhD[5]
[1]Bon Secours St. Mary's Hospital of Richmond, Richmond, VA, [2]The University of Texas at Arlington, Arlington, Texas, [3]The University of Texas at El Paso, El Paso, Texas

PURPOSE

- Investigate the potential benefit 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.

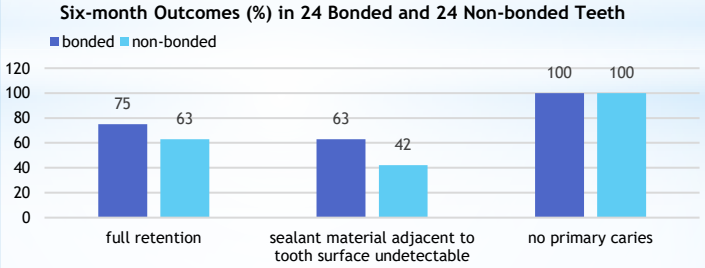
BACKGROUND

- 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.
- However, evidence is lacking on the benefit of sealants in the prevention of caries in primary molars *in vivo*.

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

- The study was organized as a randomized control trial in which children ages 3-10 year olds with four fully erupted sound permanent first molars and/or four fully erupted sound primary second molars 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 HydroTM 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

At the conclusion of the study, a chi-square analysis will be used to assess bonding and outcomes. Descriptive statistics and frequency summaries were generated.

RESULTS

- 24 patients were enrolled, 13 with 6 months follow-up, with a total of 48 teeth.
- 83% sealants were placed in OR and 17% were placed in clinic.
- The mean age was 7.8 years of age (range 4-13) with 50% female, 50% male.
- 75% of sealants were fully retained in the bond group and 63% in the non bonded group in six months.
- 63% of sealants in the bonded group had marginal integrity (sealant material was adjacent to tooth surface) and 42% in the not bonded group at 6 months.
- 100% of sealants had no caries formation in the bonded and nonbonded group at 6 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.
- Continued longitudinal data must be collected with the enrollment of additional study subjects to confirm these early trends.

LIMITATIONS AND FUTURE RESEARCH

- Limitations included:
  - small sample size.
  - 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.