Variability of Sealant Placement Techniques Among Providers

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Introduction

Dental sealants are a cornerstone of preventive dentistry, effectively reducing the risk of occlusal caries in pediatric patients. Their clinical success, however, depends on the consistent application of best practices—including appropriate material selection, meticulous tooth preparation, and stringent moisture control. Not having a worldwide protocol, variability in clinical techniques remains, potentially impacting the long-term retention and performance of the sealants. This study provides an in-depth examination of the current sealant application methods among pediatric care providers at the University of Louisville School of Dentistry (ULSD), to enhance training and improved preventive care outcomes.

Objectives

- Assess the variability in sealant placement techniques among ULSD providers.
- Document commonly used sealant materials and application methods to support ongoing and retrospective clinical studies.
- Inform evidence-based training practices that enhance clinical outcomes in pediatric dentistry.

Methods

This cross-sectional, survey-based study was conducted at ULSD over a three-month period. An anonymous digital questionnaire was disseminated via password-protected servers to dental students, residents, expanded duty auxiliaries (EDAs), and faculty members who are actively involved in sealant placement. Out of 72 initial respondents, 68 participants were included in the final analysis after excluding incomplete, duplicated responses and those from individuals not involved in sealant placement. The survey instrument collected data on provider demographics, sealant material preferences, tooth preparation techniques, isolation methods, and the perceived effectiveness and challenges in sealant placement, using multiple-choice, Likert-scale, and open-ended question formats. Data analysis comprised descriptive statistics to summarize clinical practices, regression analysis to identify factors associated with superior retention, and thematic analysis of open-ended responses to elucidate common challenges and knowledge gaps. All responses were securely stored and encrypted to maintain complete confidentiality.

Figure 1: Respondent Roles Overview

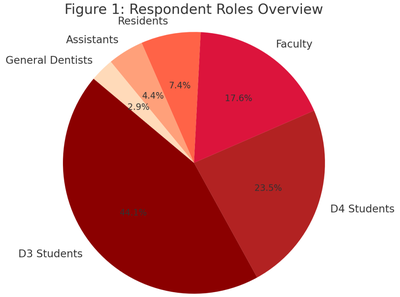


Figure 2: Type of Sealant Material Used

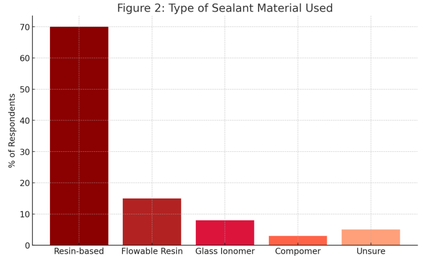


Figure 3: Tooth Preparation Methods

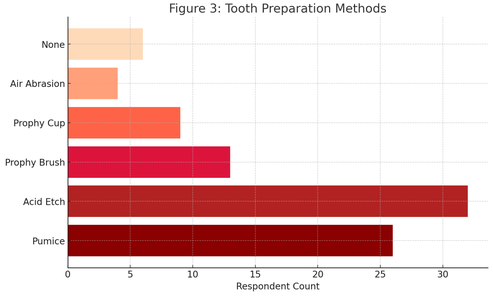


Figure 4: Use of Bonding Agent

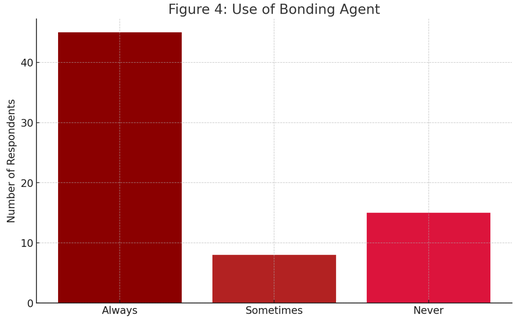


Figure 5: Isolation Techniques Used

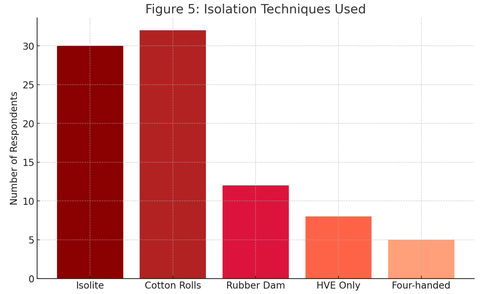


Figure 6: Sealant Curing Times

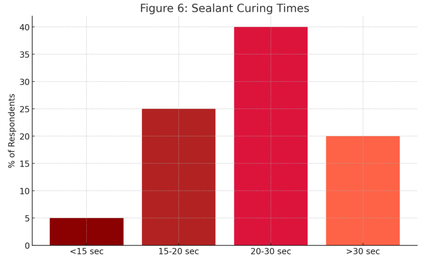


Figure 7: Sealant Evaluation Method

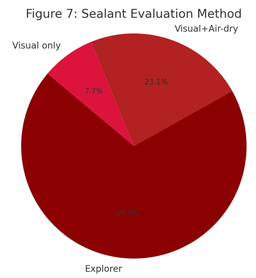
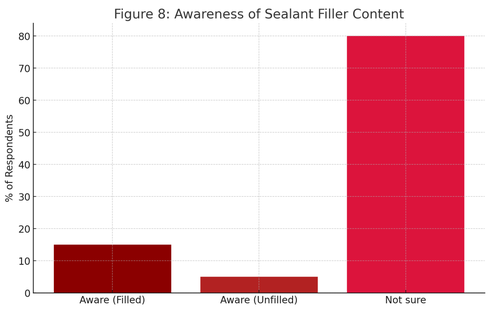


Figure 8: Awareness of Sealant Filler Content



Results

A total of 68 respondents participated, with third-year dental students representing the largest group (44%), followed by fourth-year students (24%), faculty (18%), residents (7%), dental assistants (4%), and general dentists (3%) (Fig. 1). Resin-based sealants were overwhelmingly preferred (70%), with minimal use of flowable resin (15%) and glass ionomer (8%), and only negligible usage of compomers or uncertainty regarding materials (Fig. 2). Tooth preparation frequently involved acid etching (32 respondents), pumice prophylaxis (26 respondents), or prophy brush techniques (13 respondents), with air abrasion rarely used (Fig. 3). Bonding agent use was common, with 66% always applying a bonding agent and 12% sometimes applying, while 22% never bonded prior to sealant placement (Fig. 4). Isolation primarily utilized cotton rolls (47%) and Isolite systems (44%), while rubber dams (18%) and high-volume suction alone (12%) were less frequent (Fig. 5). Sealant curing times predominantly ranged from 20–30 seconds (40%), with fewer curing under 15 seconds or over 30 seconds (Fig. 6). Sealant evaluation primarily involved tactile exploration (90%), supplemented by visual inspection with air-dry (30%), while purely visual methods were rare (10%) (Fig. 7). Awareness of filler content in sealants was low, with 80% unsure, despite nearly all respondents routinely checking occlusion and adjusting if needed, indicating a significant knowledge gap regarding the materials being used (Fig. 8).

Conclusion

This study revealed notable variability in sealant placement techniques among providers at UofL. While foundational practices such as acid etching and adequate curing times are widely adopted, substantial differences exist in the use of bonding agents, methods of sealant evaluation, and provider awareness of material properties like filler content. These inconsistencies suggest a gap between evidence-based recommendations and day-to-day clinical application. Enhancing education around material selection and technique standardization especially in predoctoral and continuing education settings could improve long-term sealant retention and overall preventive care outcomes in pediatric dentistry. Addressing these gaps through targeted educational interventions may lead to more consistent clinical practices and better patient care.

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References