Assessment of Class II Restorations Techniques on Primary Teeth: A Survey Investigating Failure Causes Among Practicing Dentists

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Background

- Dental caries is a highly prevalent disease that remains a worldwide public health problem affecting the primary teeth of 621 million children.[2]
- There are several different options of materials to restore decayed primary teeth, including composites, glass ionomer cements, or stainless-steel crowns.
- Class II composite restorations are among the most common esthetic treatments used to restore interproximal carious lesions in primary teeth.
- Even though composite material have shown satisfactory clinical properties, many failures of class II composites in primary teeth are still reported.[2]
- Longevity of class II restorations in primary teeth relies on several clinical factors, dental materials properties, operator ability, and patients' characteristics.[5]

Purpose

- Identify dental providers' preferences and techniques on restoring Class II lesions in primary teeth.
- Develop a better understanding of the causes of failure in Class II composite restorations from the perspective of practicing dentists.

Methods

- Membership emailing list was acquired from the American Academy of Pediatric Dentistry. A total of 8,164 surveys were sent. 8,052 surveys were deliverable. Over the one-month period that they surveys remained opened **333** surveys were **completed.**
- The survey consisted of 42 multiple choice questions in English.
- 42 questions were divided into six categories:
  - **Professional Background**
  - **Confidence and Education**
  - **Clinical Practice**
  - **Cavity Design and Preparation**
  - **Longevity and Outcomes**
  - **Failures and Complications**
- Descriptive statistics were used to analyze the survey responses.

Results

Professional Background

- Majority of correspondents (84%) were practicing pediatric dentists, with a smaller portion being pediatric dentistry residents (11%). Non-practicing dentists and others made up only 1% and 3% of respondents, respectively.
- Experience levels varied, with significant numbers having 20 or more years of practice (42%).
- Private practice was the primary work setting for most respondents (74%), followed by academic institutions (5%), hospitals centers (7%), public health settings (5%), and pediatric dental residents (8%).
- Geographically, respondents were distributed evenly across different regions within the United States.

Results (cont.)

Confidence and Education

A significant portion of respondents (52%) reported actively engaging in continuous learning and staying updated with their knowledge on Class II preparations. 39% of respondents indicated that they reviewed their knowledge occasionally, (8%) mentioned reviewing their knowledge rarely, only when required. Only 2% of respondents stated that they had not updated their knowledge on this topic recently.

Clinical Practice

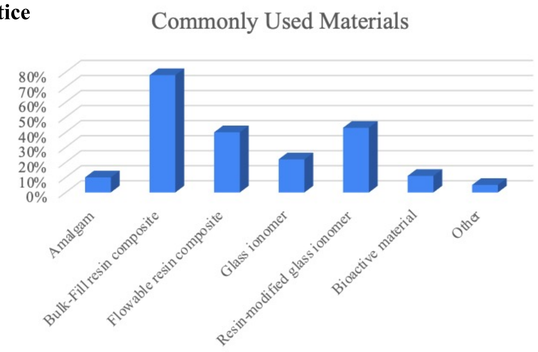

Figure 1. Materials Pediatric Dentists Use for Class II Restorations of Primary Molars

Factors influencing material choice for Class II fillings included durability (92%), ease of placement (77%), and aesthetics (48%).
Factors influencing the size and shape determination of Class II Preparations: Respondents unanimously considered the size of the carious lesion as the determining factor. Other important factors included the patient's age (60%), cooperation level (63%), and oral hygiene (56%).

Cavity Design and Preparation

Design Feature Prioritization: Retention form emerged as the most prioritized design feature (50%), followed by outline form (31%). Resistance form, convenience form, and other factors were comparatively less prioritized.
Moisture Control Management: Respondents utilized a variety of methods for moisture control during class II cavity preparations, with rubber dam (55%) and Isolite/Isovac systems (67%) being the most commonly employed.
Use of Caries-Detecting Dye and Magnification Tools: The use of caries-detecting dye was relatively low (17%), magnification tools such as dental loupes and microscopes were widely utilized (89%), with 45% of respondents using them always.

Failures

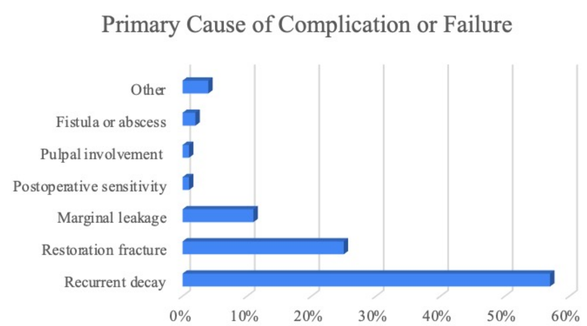

Figure 2. : Reasons (According to Pediatric Dentists) of Failure of Class II Restorations of Primary Molars

Results (cont.)

Of the surveyed dental practitioners, the majority, comprising 86%, reported encountering failures or complications.
Percentage of Restoration Failures or Complications in Class II Restorations: 64% of respondents reported encountering a range of 0-10% of their Class II restorations failing, 26% reported a range of 10-20%. Smaller percentages were noted for higher failure rates, with 8% reporting 20-30%, and 1% each reporting 30-40% and over 50% failure rates.

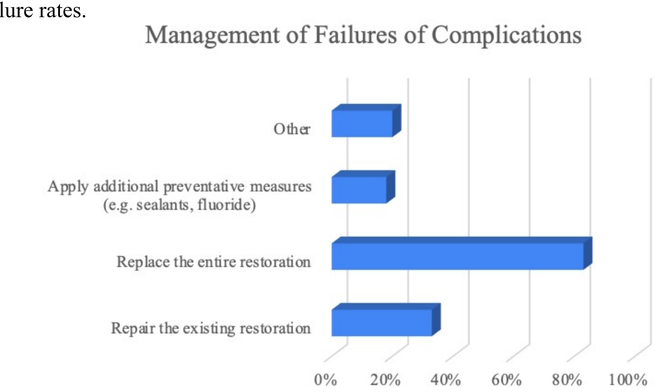

Figure 3. Ways Pediatric Dentists Manage Failures of Class II Restoration of Primary Molars

Conclusions

- Retention form was identified as the most crucial design feature influencing restoration longevity. Dovetail extension was the predominant preparation design used.
- Most respondents evaluated the longevity and success of Class II restorations regularly,
- Respondents commonly encountered challenges during Class II preparations, with recurrent decay, restoration fracture, and marginal leakage being the most observed complications.
- Inadequate isolation during placement, occlusal forces, and improper cavity preparation techniques were identified as primary causes of restoration failures.
- Strategies for managing failures included replacing or repairing the restoration and implementing additional preventive measures like sealants or fluoride.
- The results underscore the complex decision-making processes involved in Class II preparations, considering factors such as patient age, behavior, cavity extent, and material properties.
- The findings also highlight the ongoing pursuit of optimal clinical outcomes through continuous education, technological advancements, and evidence-based practices.

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