Association Between Pediatric Dental Restorative Procedures and Their Longitudinal Survival

UCLA Dentistry Pediatric Dentistry

Vishnu Reddy, DDS[1]; Sean McGivern, DDS, MPH[1]; Matthew Beymer PhD, MPH[2]; Eric P. Tranby, PhD[3]; Francisco Ramos Gomez, DDS, MS, MPH[1]

1.Section of Pediatric Dentistry, 2.School of Public Health, University of California Los Angeles School of Dentistry, CA, USA; 3.DentaQuest Partnership for Oral Health Advancement, Boston, MA, USA

Introduction

Dental caries affects nearly one in two preschool children globally.[1] Caries is a chronic disease which is often a result of a sugary diet or a lack of oral hygiene and can be exacerbated by genetic factors.[2] Caries can lead to tooth pain, infection, and can reduce quality of life. In the United States, 45.8% of children ages 2-19 have had dental caries.[3] Dentists treat these caries by replacing the missing tooth structure with restorative dental materials. Most studies conducted to measure longevity of dental restorative procedures have been conducted mostly in adults, while studies in children have been limited and conducted primarily in randomized clinical trial settings.[4,5]

The objective of this research project is to investigate the longevity of restorative procedures in children in clinical settings on a large population level.

Materials & Methods

Deidentified administrative claims data was used from the DentaQuest Database from the years 2012-2020 for 41,870 teeth with restorations in children between the ages of 0-6 years (primary dentition stage) and 129,230 teeth from 6-12 years (transitional detention stage) with restorations. The population in this study data represented all 50 states in the U.S. and were privately insured.

Inclusion criteria *- Teeth were included in this study if the children:*

1). Were less than 12 years of age at baseline
2). Had 1 initial oral health exam completed by a dentist
3). Had dental restorative treatments performed
4). Had at least one follow-up recall exam visit within two years after restorative treatment

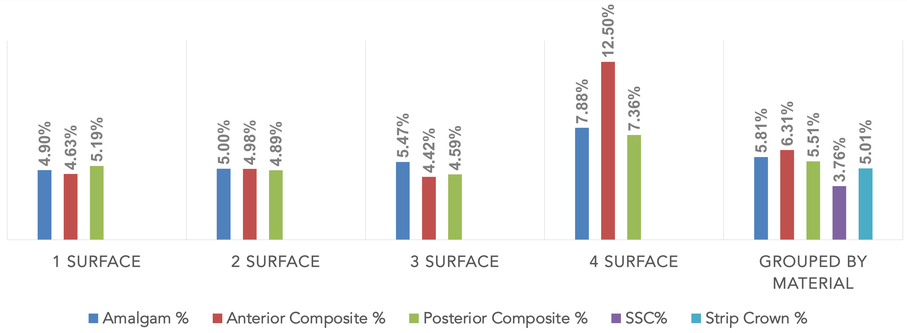
Exclusion criteria:

Teeth that have been root-treated (since failure of root treatment versus failure of restorative material cannot be determined by claims data alone without access to clinical notes and radiographs).

Results

A total of 171,100 teeth with restorative treatment were examined in children under 12 years of age of which 8,918 needed restorative treatment.

Figure 1- Percentage of restorations needing re-treatment by material and number of surfaces in patients aged 0-12 years



Roughly half (48.17%) of protective restorations needed re-treatment.

Figure 2 - Kaplan Meier survival curve for time needed prior to re-treatment of restoration in months stratified by material type for patients aged 0-6 years

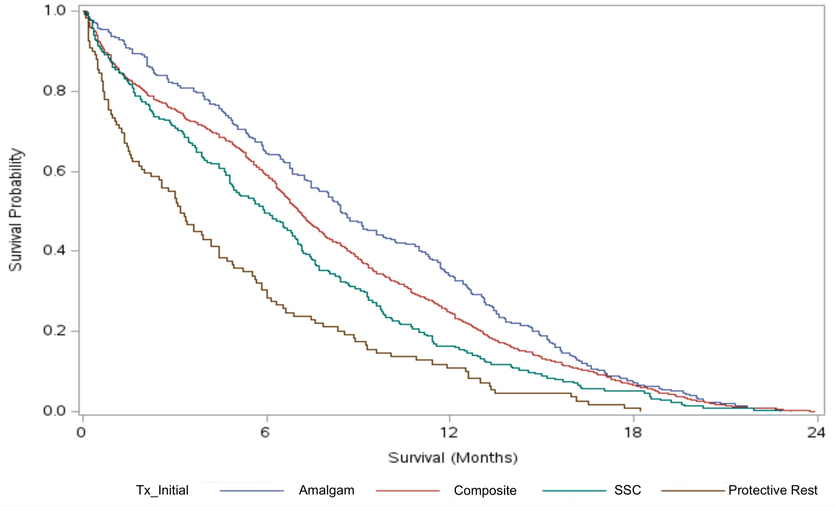


Table 1. Cox Proportional Hazards model of age at initial treatment, provider type performing the restoration, type of material used, and location of restoration in patients aged 0-6 years

	Std. Error	p-value	Hazard Ratio (95% CI)
Age At Initial Treatment	0.02963	<.0001	1.387 (1.309, 1.470)
Pediatric Dentist (Ref: General Dentist)	0.05327	0.206	0.935 (0.842, 1.038)
Posterior (Ref: Anterior)	0.05965	0.3061	0.941 (0.837, 1.057)
Materials (Ref: Protective Restoration)			
Amalgam	0.1159	<.0001	0.399 (0.318, 0.501)
Composite	0.10134	<.0001	0.495 (0.406, 0.603)
Stainless Steel Crown	0.11893	<.0001	0.58 (0.459, 0.732)

Conclusion

- *Amalgams and composites showed a similar survival rate and time for re-treatment, while full-coverage stainless steel crowns showed the least need for re-treatment. Approximately half of protective restorations needed re-treatment.*
- *Based on our findings and considering the non-zero risk of mercury exposure with amalgam restorations during a child's growth and development as established by the Minamata Convention on Mercury,[6] composite restorations are a safer alternative to amalgam with comparable longevity.*

References

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