Sealants Survival Time on First and Second Molar of Adolescents

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Introduction

According to the WHO Global Oral Health Status Report 2022, oral diseases impact about 3.5 billion people globally, making it the most prevalent non-communicable disease. Pit and fissure caries account for 90% of caries in permanent posterior teeth and 44% of caries in primary teeth. Dental sealants, typically made from resin or glass ionomer materials, are a preventative, non-invasive treatment applied to pits and fissures of teeth to create a protective barrier that prevents or stops bacterial accumulation.

The aim of this study was to compare the survival rate of sealants placed on first and second permanent molars in adolescents over an 18 months period.

Materials & Methods

Deidentified claims data were included for 92,126 first and second permanent molars among adolescents who have received sealants as the initial treatment applied from a large dental support organization (DSO). The survival or failure of each tooth was assessed based on the presence or absence of dental procedures recorded in insurance claims. Sealed teeth were monitored over a 540-day period, with insurance records reviewed at 90-day intervals.

Kaplan-Meier Survival Curves and Cox Proportional Hazard Regression Models were conducted to determine the survival rate of sealants on first and second molars. Covariates analysis include sealants on first and second molars, age at first visit, and gender.

Results

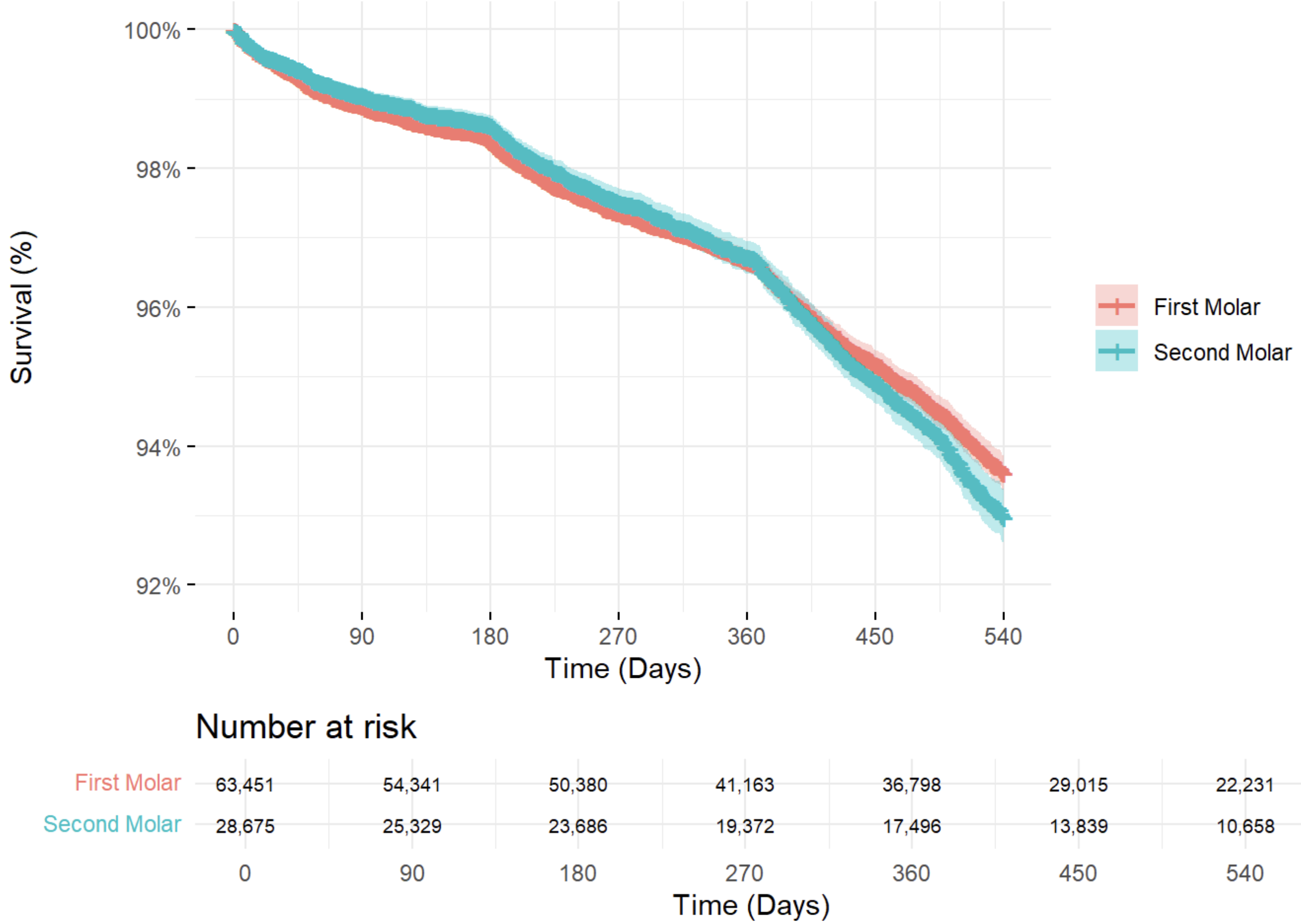Figure 1: **Kaplan-Meier Survival Curves by First/Second Molars**

Number at risk						
First Molar	63,451	54,341	50,380	41,163	36,798	29,015	22,231
Second Molar	28,675	25,329	23,686	19,372	17,496	13,839	10,658
	0	90	180	270	360	450	540

Table 1: **Cox PH Regression Model**

Characteristic	HR[†]	95% CI[†]	p-value
First/Second Molar			
First Molar	—	—	
Second Molar	0.91	0.85, 0.97	0.003
Age at Initial Visit	1.07	1.06, 1.08	<0.001
Gender			
Female	—	—	
Male	0.94	0.89, 0.99	0.015
Transgender	0.38	0.10, 1.53	0.17
Occlusal	0.88	0.83, 0.93	<0.001

[†] HR = Hazard Ratio, CI = Confidence Interval

A total of 63,451 sealants were placed on first and 28,675 on second permanent molars. This had been performed on 45,615 females and 46,421 males. The mean age at initial visit was 10 years with IQR range of 7 to 12 years.

The Kaplan-Meier analysis shows over 92% survival rate of sealants on both first and second molars after 18 months. The survival curve remains close initially, but a visible divergence appears after 180 days, favoring second molars.

The Cox PH Regression Model analysis revealed lower risk of failure for second molars compared to the first molars (HR=0.91, 95% CI: 0.85 to 0.97, *P*=.003). Males have a higher sealant retention rate compared to females (HR=0.94, 95% CI: 0.89 to 0.99, *P*=.015). The initial age at which patients received sealants directly impacted the rate of sealant failure. (HR=1.07, 95% CI: 1.06 to 1.08, *P*= <.001).

Conclusion

This study shows the survival rate of 97% for sealants on first and second permanent molars after 1 year follow-up. Based on the collected data, the survival rate of sealants appears to be longer on second molars. Additionally, the risk of sealant failures increases when sealant is applied at an older age. Males have slightly better sealant survival than females.

Acknowledgements