

## Introduction

Dental anxiety is a prevalent problem in children that can lead to increased time for procedures, poor quality of restorations, and stress for both the patient and the operator.<sup>1,2</sup> Oral Conscious Sedation (OCS) is one of the pharmacologic treatment options to help children with dental anxiety tolerate dental procedures.<sup>3</sup> Additional studies on the survival rates of dental procedures performed using OCS would be useful to help clinicians determine which procedures may provide longer-lasting restorations.

**Aim of the Study:** The aim of this study was to determine, describe, and compare the survival rate of various dental procedures performed on healthy children ages 3-7 years who were treated using OCS by post-doctoral students of the Department of Pediatric Dentistry & Community Health at Rutgers School of Dental Medicine (RSDM).

**Null Hypothesis:** The survival rates of different dental procedures are the same in children ages 3-7 years who were treated using OCS.

## Materials & Methods

The study was approved by Rutgers University Institutional Review Board (IRB, Pro2022000990). The dental records of 300 patients ages 3-7 years who were treated using OCS at Rutgers School of Dental Medicine between January 1, 2014 and December 31, 2021 were examined. Data was obtained from the Axium electronic health record system. Subjects included had a follow-up of at least 6 months. Patient's age, gender, time of procedure survival or failure in months, tooth number, number of recall appointments, and type of dental procedure performed using OCS such as resin-based composites (RBC), vital pulp therapy (VPT), stainless steel crowns (SSC), and strip crowns (SC) were recorded. Failure was analyzed through recall appointment clinical notes and radiographs. Failure criteria of procedures included replacement of the restoration, complete dislodgement, recurrent caries, periapical pathology, furcation radiolucency, internal or external root resorption, and extraction of the tooth not due to natural exfoliation or orthodontic treatment. Statistical analysis of the data regarding the survival rate of procedures performed using OCS and time to failure were assessed using the Cox regression model, which controlled for age and gender.

## Figures and Tables

Figure 1. Reasons for Procedure Failure

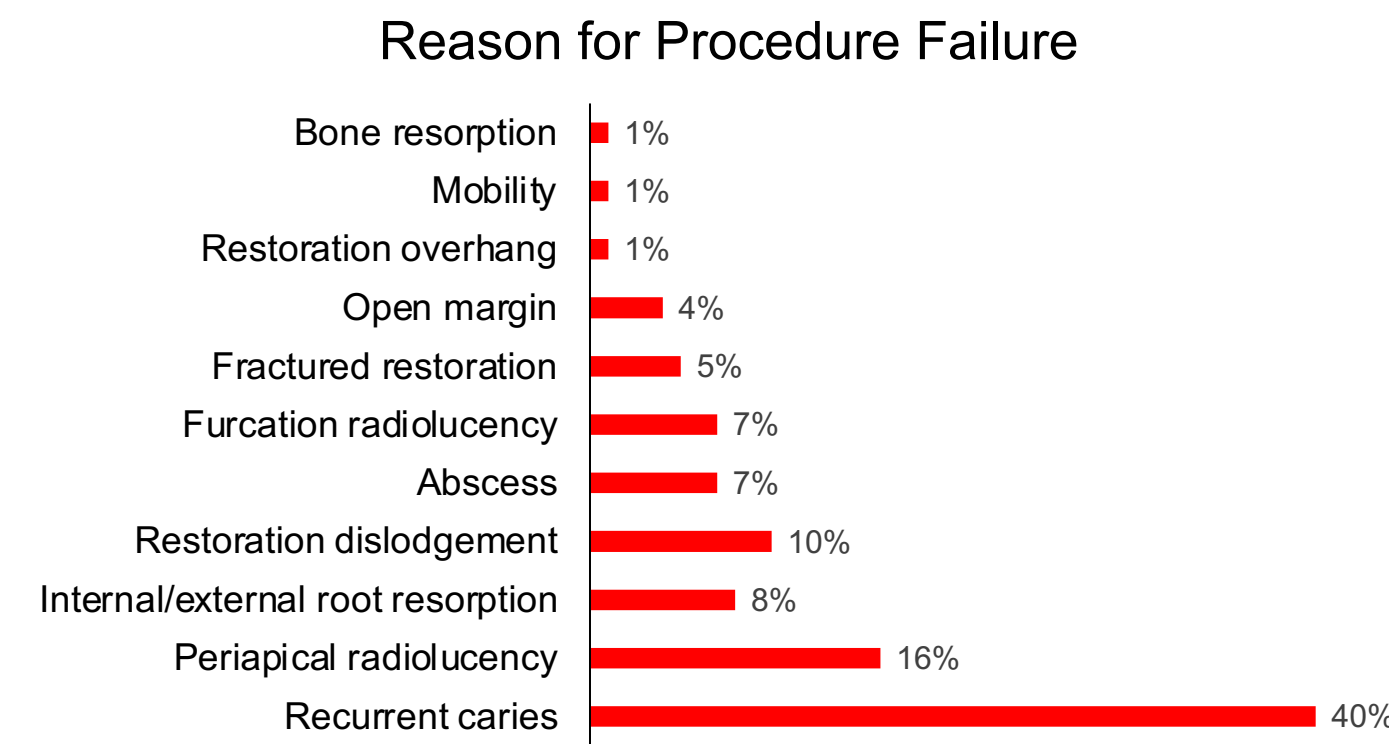


Figure 2. Cox Regression Survival Curve Based on Procedure Type

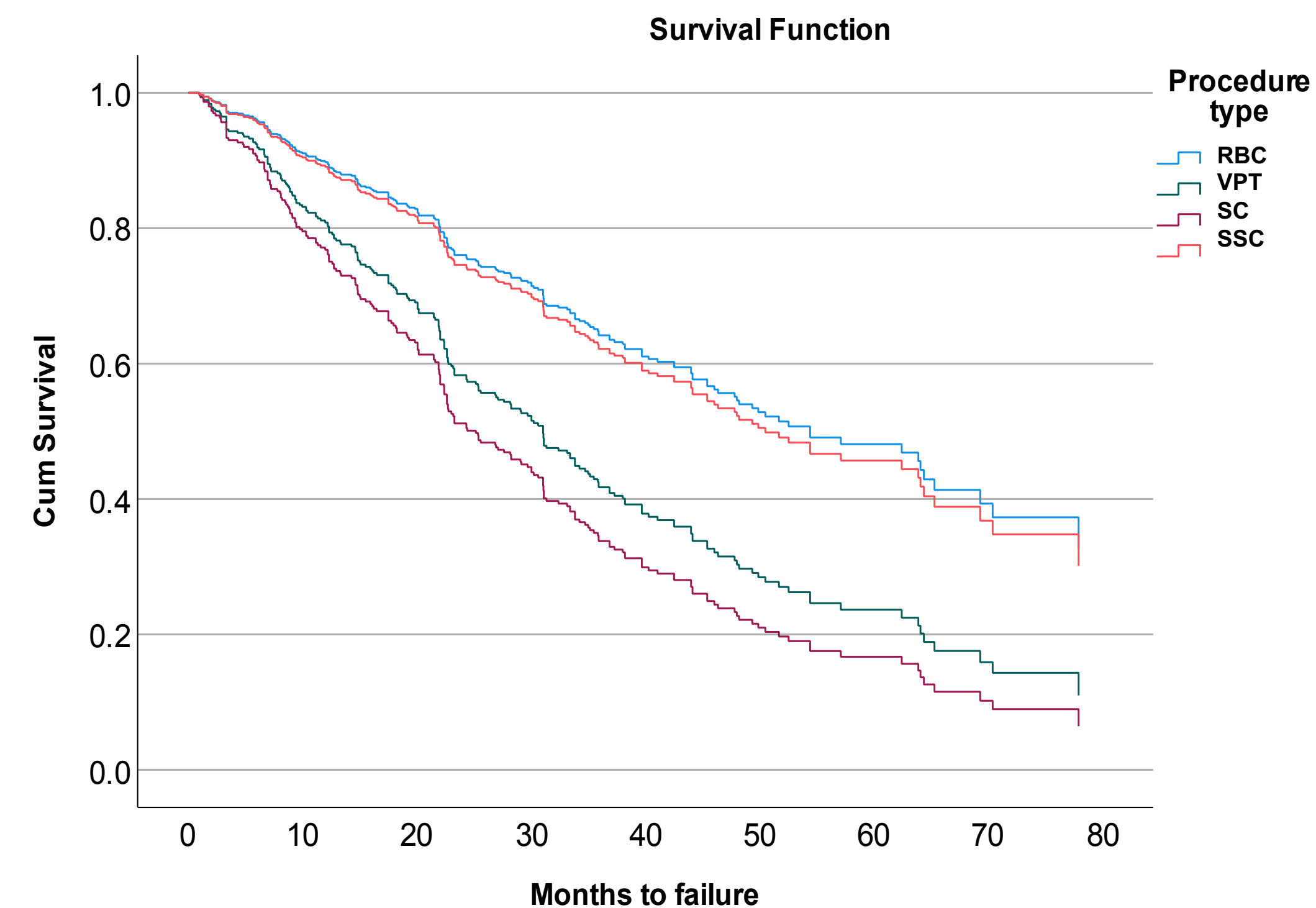


Table 1 Risk Ratios for Dental Procedures (300 children, 592 procedures)

	Risk Ratio	95.0% CI for Risk Ratio		Sig.
		Lower	Upper	
RBC				<.001
VPT	1.97	1.391	2.791	<.001
SC	2.446	1.458	4.103	<.001
SSC	1.071	0.736	1.558	0.722

## Results

From the 1453 procedures screened, a total of 592 procedures (384 RBCs, 76 VPTs, 36 SCs, and 96 SSCs) were included in the analysis. The descriptive analysis demonstrated that 364 (61.5%) procedures failed, and 228 (39.5%) procedures survived. Reasons for failure shown in Figure 1, included: recurrent caries (40%), periapical radiolucency (16%), internal/external root resorption (8%), restoration dislodgement (10%), abscess (7%), furcation radiolucency (7%), fractured restoration (5%), open margin (4%), restoration overhang (1%), mobility (1%), and bone resorption (1%).

The survival probability of dental procedures analyzed in the study over 80 months is depicted in Figure 2. RBCs had the highest survival rate followed by SSCs, while SCs had the lowest survival rate followed by VPT. The Cox regression model for different procedure types and failures (Table 1) show that VPT had a 2 times chance of failure compared to RBCs ( $P<.001$ ). SCs had a 2.5 times chance of failure compared to RBCs ( $P<.001$ ). There was no statistically significant difference between RBCs and SSCs ( $P<0.72$ ).

## Discussion/Conclusion

SSCs had a slightly higher chance of failure (1.1 times) compared to RBCs; however, the difference was not statistically significant ( $P=.72$ ). In contrast, a study by Blumer et al.<sup>4</sup> showed that SSCs performed using OCS had higher survival rates compared to RBC, which were 1.76 times more likely to fail, but the difference was not statistically significant ( $P=.291$ ). SCs had the lowest survival rate. This may be due to factors such as the technique-sensitive nature of SCs, difficulty maintaining isolation which affects restoration bonding, short working times using OCS, and operator experience.<sup>4</sup> VPT had the second lowest survival rate. The survival rate may have been affected by operator experience, short working times, patient cooperation, and inadequate restoration seal.<sup>5</sup>

**Conclusions:** Among the dental procedures performed using OCS, RBCs and SSCs had higher survival rates compared to VPT and SCs. Short working times and operator experience may impact procedure survival rates.

## References

- Morgan AG, Rodd HD, Porritt JM, et al. Children's experiences of dental anxiety. *International Journal of Paediatric Dentistry*. 2017;27:87-97.
- Klingberg G, Berggren U, Carlsson SG, Noren JG. Child dental fear: cause-related factors and clinical effects. *Eur J Oral Sci*. 1996;103:405-412.
- Dean JA, Jones JE, Vinson LAW, Sanders BJ, Yepsen JF, Scully AC. *McDonald and Avery's dentistry for the child and adolescent*. Eleventh edition ed. St. Louis, Missouri: Elsevier; 2022.
- Blumer S, Costa L, Peretz B. Success of Dental Treatments under Behavior Management, Sedation and General Anesthesia. *Journal of Clinical Pediatric Dentistry*. 2017;41:308-311.
- Tseveenjav B, Furuholm J, Mulic A, Valen H, Maisala T, Turunen S, Varsio S, Auero M, Tjäderhane L. Survival of primary molars with pulpotomy interventions: public oral health practice-based study in Helsinki. *Acta Odontol Scand*. 2021 Nov;79(8):636-641. doi: 10.1080/00016357.2021.1928747. Epub 2021 Jun 4. PMID: 34087081.