

Comparison of Success Between Stainless Steel Crown and Composite Restorations on Primary Molars Under General Anesthesia.



Uotani T, Layvey-Tardalo A, Dowrich IA
BronxCare Health System, Bronx, NY

Purpose

The purpose of this study is to determine if there is a difference in success between stainless steel crown and composite resin class two restorations on posterior primary molars performed under general anesthesia in the BronxCare Health System patient population.

Introduction

- Dental caries is a prevalent disease affecting 621 million children worldwide and is a public health concern for dentists (Chisini et al., 2018).
- With the advancement of dental materials, composite resin (CR) has been introduced as an alternative to amalgam restoration material. CR are polymer-based materials. Due to its esthetic and adhesive properties, and the absence of mercury, CR has become a popular dental filling material comparable to amalgam (Zimmerli et al., 2010).
- Stainless steel crowns (SSCs) are recommended after pulp therapy, for teeth with developmental defects or fractures, and teeth with extensive caries of greater than two surfaces (Randall, 2002). They are durable and have high success rates of 90-100% after 2-10 years (Schüler et al., 2014).
- BronxCare Health System pediatric dentistry serves a diverse patient population in the South Bronx. Dental treatment under general anesthesia involves the use of composite resins for conservative restorations and preformed, pre-crimped SSCs (3M) for teeth that involve multiple surfaces and/or require pulp therapy. All dental treatment that is performed under general anesthesia is completed by pediatric dental residents under the direct supervision of pediatric dental attendings.

Methods

- Retrospective chart review
- Inclusion criteria: 1) ASA I-II children 3-12 years of age who underwent dental treatment under general anesthesia during the years 2013-2018, 2) Subjects who underwent clinical and radiographic follow-up at least once in the 6-, 12-, and 18-months post-treatment, 3) SSCs and Class 2 composite restorations on posterior primary molars.

- Exclusion criteria: 1) Non-ASA I-II patients and/or those with syndromes, 2) subjects who have missed two or more follow-ups.
- 278 children were eligible for the study
- Statistical Data Management and Analysis: Data will be analyzed via Chi-square and t-test, with a significance level of $p < 0.05$
- 1) SSC failure will be considered when there is: crown loss, margin defect, occlusal wear through the crown, pain, and radiographic pathology. 2) CR failure will be considered if there is: fracture of the restoration, restoration loss, secondary caries, and radiographic pathology.

Results

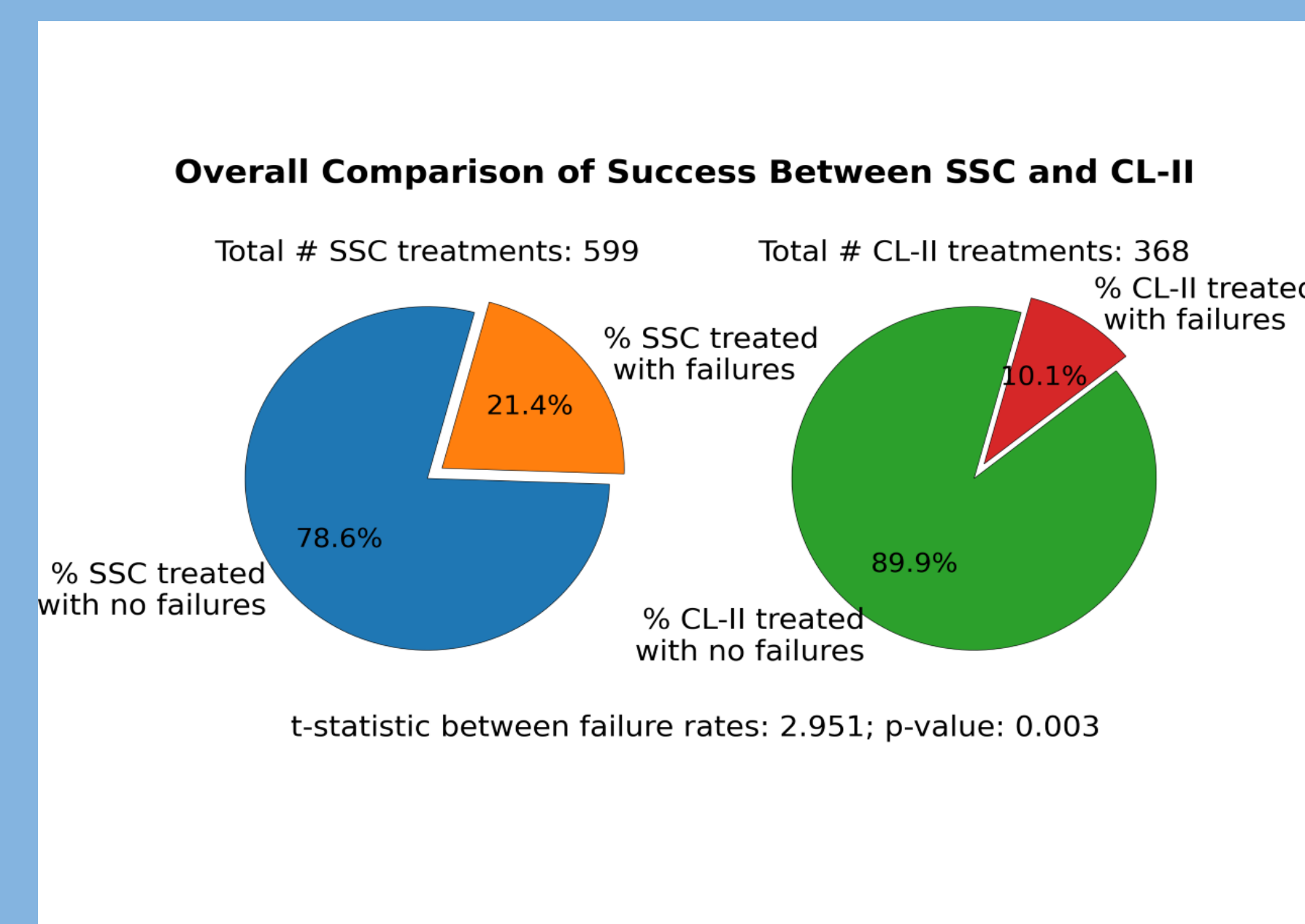


Figure 1: Overall SSC v CL II failure rate

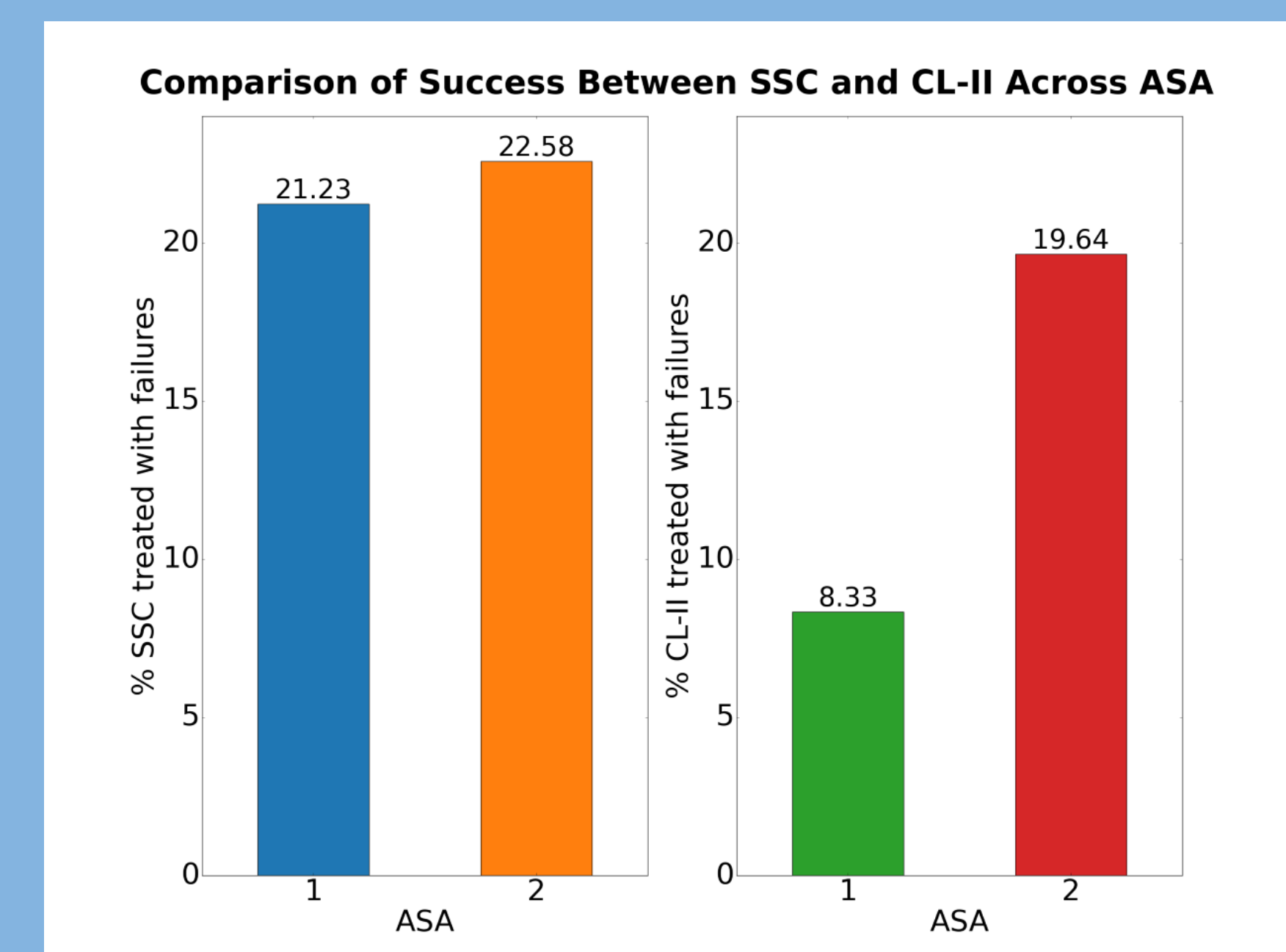


Figure 2: Comparison of success across ASA classification

Comparison of Success Between SSC and CL-II Across Gender

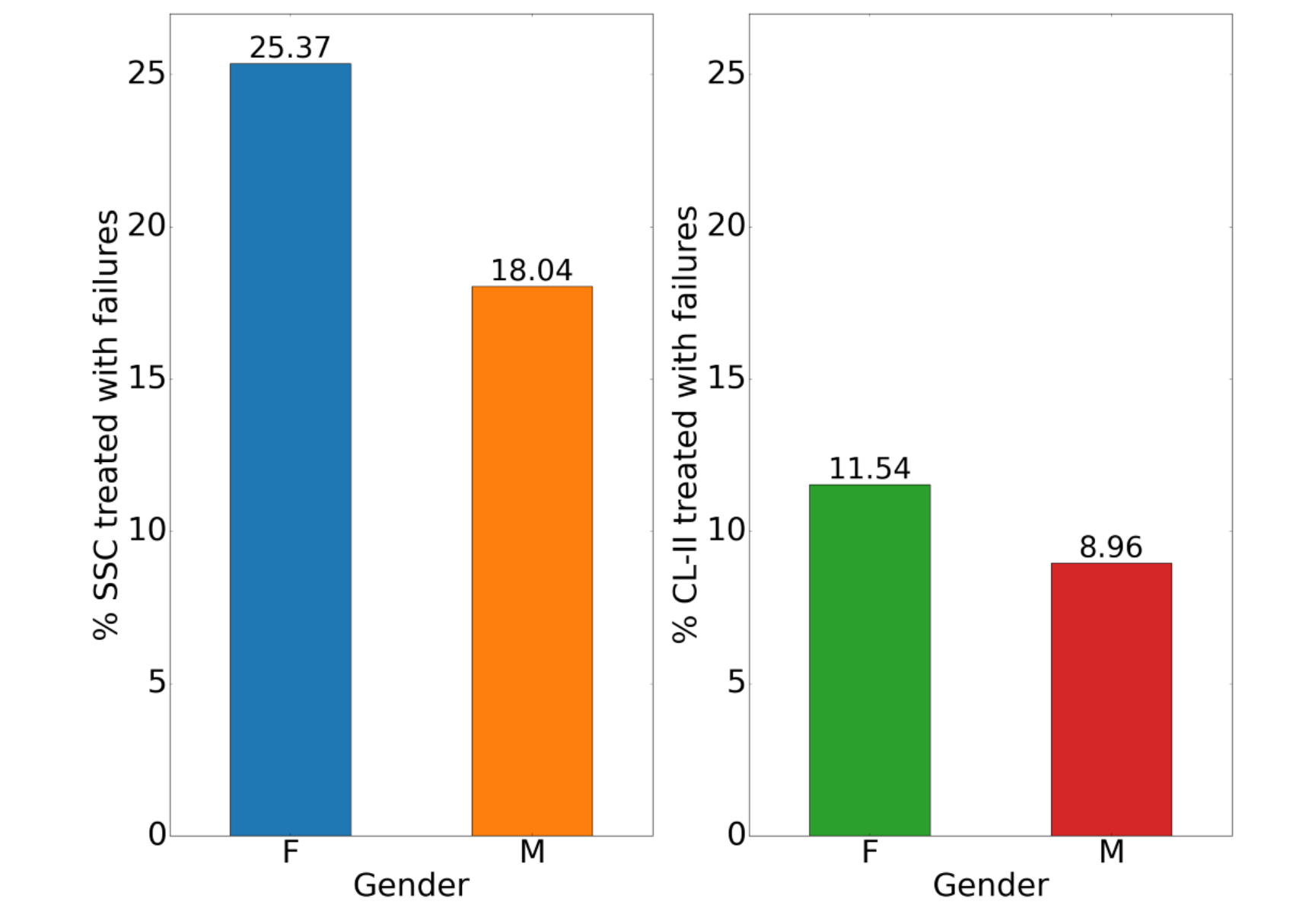


Figure 3: Bar plot of SSC vs. CL-II failures by gender.

Comparison of Success Between SSC and CL-II Across Age

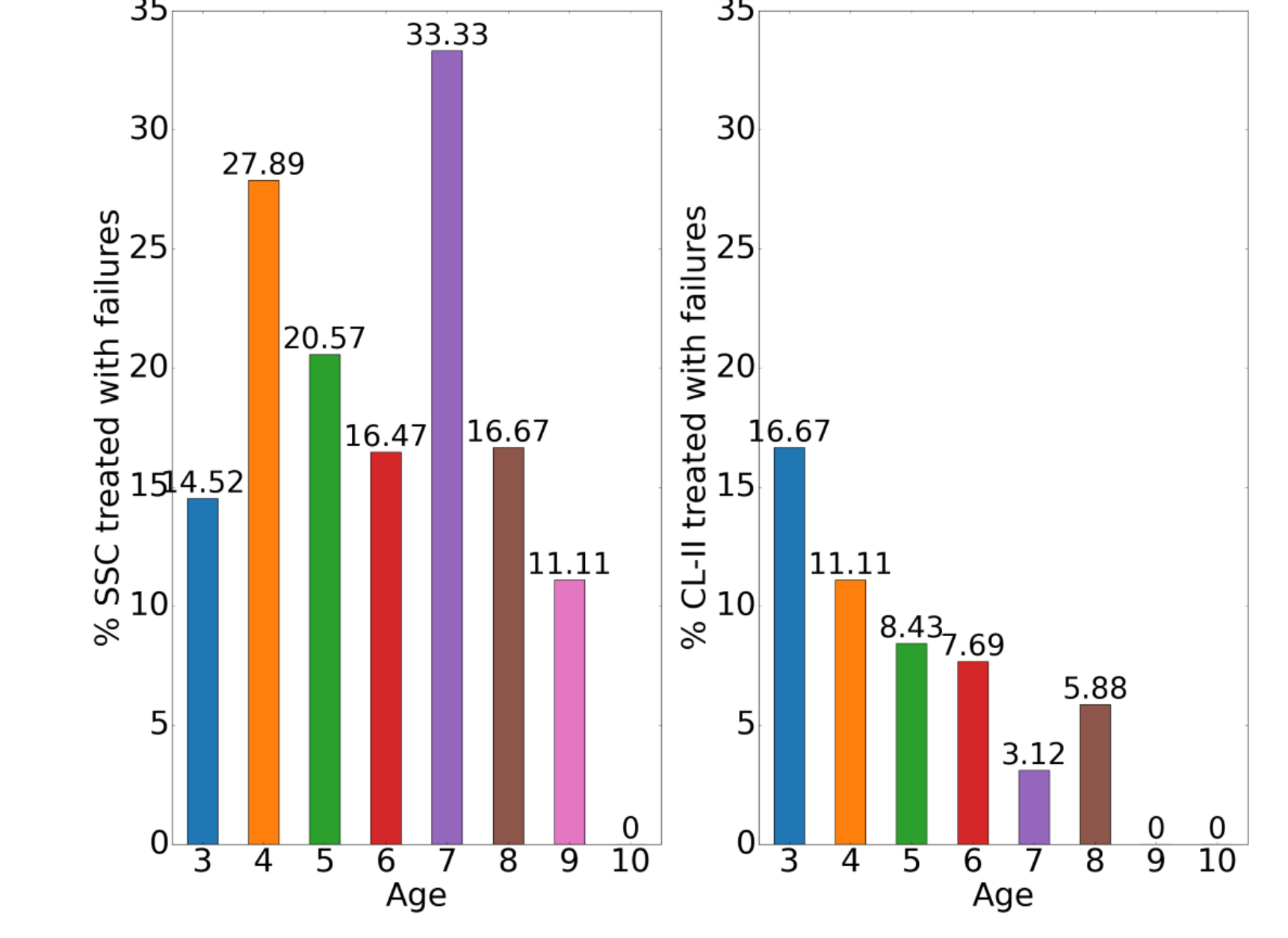


Figure 4: Bar plot of SSC vs. CL-II failures by age

Discussion

- Total number of SSC's evaluated were 599 and total CL-II restorations were 368. Comparing the two, the p-value of .003 and t test 2.951 shows that we can reject the null hypothesis.
- Success of SSC did not change with ASA 1 v ASA 2, whereas with CL-II there was more failure associated with ASA 2.

- Young girls have slightly higher failed treatment rates compared to boys in both treatment groups.
- Failure rates are constant for SSC by age (i.e. showing not much decline as one gets older), but the failure rates are declining with age for CL-II.
- This shows a better outcome for CL-II when one is older. SSC failures are more independent of age possibly due to factors such as having better manual dexterity for oral hygiene as one grows older.

Conclusion

- SSC had lower survival rate than Class-II in children 3-12 treated under GA at BCHS.
- Females have more failure treatment rates than boys.
- SSC failures are more independent of age whereas CL-II failures show better outcome as one gets older.
- More studies are needed to understand this population and what the correlation with age and success of CL-II could be and if oral hygiene is a big factor in this age bracket.

References

- Chisini LA, Collares K, Cademartori MG, et al. Restorations in primary teeth: a systematic review on survival and reasons for failures. *Int J Paediatr Dent.* 2018. 28(2):123-139.
- Bohaty BS, Ye Q, Misra A, Sene F, Spencer P. Posterior composite restoration update: focus on factors influencing form and function. *Clinical, Cosmetic and Investigational Dentistry.* 2013. 5:33-42.
- Dye BA, Thornton-Evans G, Li X, Iafolla TJ. Dental caries and sealant prevalence in children and adolescents in the United States, 2011-2012. *NCHS data brief, no 191.* Hyattsville, MD: National Center for Health Statistics. 2015.
- O'Sullivan EA, Curzon MEJ. The efficacy of comprehensive dental care for children under general anaesthesia. *Br Dent J.* 1991. 171:56-58.
- Papathanasiou AG, Curzon MEJ, Fairpo CG. The influence of restorative material on the survival rate of restorations in primary molars. *Pediatr Dent.* 1994. 16:282-288.
- Randall RC. Preformed metal crowns for primary and permanent molar teeth: review of the literature. *Pediatr Dent.* 2002. Sep-Oct;24(5):489-500.
- Schüler I., Hiller M, Roloff T, Kühnisch J, Heinrich-Weltzien R. Clinical success of stainless steel crowns placed under general anaesthesia in primary molars: An observational follow up study. *Journal of Dentistry.* 2014. 42(11):1396-1403.
- Seale NS. The use of stainless steel crowns. *Pediatr Dent.* 2002. Sep-Oct;24(5):501-5.
- US Department of Health and Human Services. Oral Health in America: a Report of the Surgeon General. Rockville (MD): US Department of Health and Human Services. 2000. Accessed November 12, 2021.
- Zahdan BA, Szabo A, Gonzalez CD, Okunseri EM, Okunseri CE. Survival Rates of Stainless Steel Crowns and Multi-Surface Composite Restorations Placed by Dental Students in a Pediatric Clinic. *J Clin Pediatr Dent.* 2018. 42(3):167-172. doi: 10.17796/1053-4628-42.3.1. Epub 2018 Apr 26.
- Zimmerli B, Strub M, Jeger F, Stadler O, Lussi A. Composite materials: composition, properties and clinical applications. A literature review. *Schweiz Monatsschr Zahnmed.* 2010. 120(11):972-86. PMID: 21243545.