Comparing Dental Needs in Sickle Cell Disease and Healthy Children

Parnian Salehi DDS, Changyong Feng, Ph.D, Suzie A Noronha, MD, Cynthia L Wong, DMD, MS.
Eastman Institute for Oral Health - University of Rochester Medical Center, Rochester, NY, USA

Introduction

Sickle cell disease (SCD) is an inherited disorder affecting hemoglobin synthesis, leading to systemic complications, including oral health issues. Patients with one defective gene have Sickle Cell Trait (SCT), while those with both defective genes develop SCD. Due to increased oral health risks, children with SCD require modified dental treatment plans, emphasizing regular dental exams, fluoride treatment, and routine care.

Purpose

This study compares the dental needs and treatment compliance of children with SCD to healthy ASA I children, paired by gender, ethnicity, and age, in three categories:

- Emergency dental visits
- Routine dental care compliance
- Dental operating room (OR) referrals

Additionally, SCT patients were analyzed to determine if their dental needs align more closely with SCD or healthy patients.

Methods

From January 1, 2014, to September 30, 2024, a retrospective chart review identified 52 patients with sickle cell disease (SCD) and 159 with sickle cell trait (SCT). To form a comparative control group, 211 healthy patients were selected based on demographic and clinical relevance. All patients were followed for five years to evaluate differences in dental emergencies, routine dental visits and number of OR referrals. Statistical analyses were performed using one-way analysis of variance (ANOVA) to compare means across groups, followed by Tukey's post-hoc test for pairwise comparisons. Categorical variables were analyzed using Pearson's chi-square test, and Fisher's exact test was applied when expected cell counts were low. All statistical analyses were conducted to determine differences among the study groups.

Variable	Disease			Healthy			P-value
	N	Mean	Std Dev	N	Mean	Std Dev	
Emerg	52	0.6	0.87	211	0.38	0.68	0.001
Resto	52	1.27	1.29	211	0.91	1.14	0.03
Exam	52	2.62	1.22	211	2.24	1.4	0.21

Table 1. Comparison of SCD vs Healthy in five year follow up

* Disease patients had more emergency visits than healthy patients *P* value: .001

* Disease patients had more restorative visits, possibly due to higher dental needs or better compliance *P* value: .03

* No significant difference in exam/recall visits over five years.

Group	OR		
	0	1	Total
Disease	40	12	52
	76.92	23.08	
Healthy	171	40	211
	81.22	18.78	
Total	213	52	265

Table 2. Comparison of OR Referrals: SCD vs Healthy in five year follow up

*Pearson's chi-square test shows no significant difference between two groups (p-value =0.56).

Pairwise comparison	*Difference of between means*	*Simultaneous 95% Confidence limit*		
Trait - Disease	*0.083*	*-0.211*	*0.377*	
Trait - Healthy	*0.299*	*0.106*	*0.492*	***

Table 3. Pairwise Comparison of SCD vs trait and trait vs Healthy-EMG

*Comparisons significant at the 0.05 level are indicated by ***

Pairwise comparison	*Difference of between means*	*Simultaneous 95% Confidence limit*		
Trait-Disease	*0.364*	*-0.089*	*0.816*	
Trait-Healthy	*0.310*	*0.014*	*0.607*	***

Table 4. Pairwise Comparison of SCD vs trait and trait vs Healthy-Restorations

*Comparisons significant at the 0.05 level are indicated by ***

Pairwise comparison	*Difference of between means*	*Simultaneous 95% Confidence limit*		
Trait-Disease	*0.351*	*-0.176*	*0.879*	
Trait-Healthy	*0.025*	*-0.321*	*0.371*	

Table 5. Pairwise Comparison of SCD vs trait and trait vs Healthy-Recalls/exams

*Comparisons significant at the 0.05 level are indicated by *** No significant differences

Results

SCD patients had significantly more emergency visits (0.6±0.87 vs. 0.38±0.68, *P*=.001) and restorative appointments (1.27±1.29 vs. 0.91±1.14, *P*=.03) than healthy patients. Recall and OR visit rates were similar, and difference was not significant. Insurance status (Medicaid, *P*=.04) was a significant factor, however. Notably, 25% of SCD patients' first dental visit was an emergency, compared to 2% of healthy patients (*P*<.0001).

Conclusions

This study highlights the increased dental care burden for SCD patients, particularly in emergency and restorative treatment, with many seeking their first visit due to urgent issues. Despite comparable recall and OR visit rates, they often face greater barriers to preventive care. Similar challenges exist in medical care, where social determinants—such as limited transportation, poor employment support, and housing or food insecurity—hinder appointment adherence. Integrating proactive dental care into SCD management and fostering collaboration among pediatricians, hematologists, and dental professionals is essential for comprehensive care.

References

1. da Fonseca M, Oueis HS, Casamassimo PS. Sickle cell anemia: a review for the pediatric dentist. Pediatr Dent. 2007 Mar-Apr;29(2):159-69. PMID: 17566539.

2. Karna, B. (2023) *Hemoglobin C disease, StatPearls [Internet].* Available at: https://www.ncbi.nlm.nih.gov/books/NBK559043/ (Accessed: 18 October 2024).

3. Amanda M. Brandow, C. Patrick Carroll, Susan Creary, Ronisha Edwards-Elliott, Jeffrey Glassberg, Robert W. Hurley, Abdullah Kutlar, Mohamed Seisa, Jennifer Stinson, John J. Strouse, Fouza Yusuf, William Zempsky, Eddy Lang; American Society of Hematology 2020 guidelines for sickle cell disease: management of acute and chronic pain. *Blood Adv* 2020; 4 (12): 2656–2701.

4. American Academy of Pediatric Dentistry. Management of dental patients with special health care needs. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2023:337-44

5. Eleftherou, D., Arhakis, A., & Davidopoulou, S. (2021). Sickle Cell Disease: An Overview of Oral Health Considerations for Pediatric Patients. *European Journal of Dental and Oral Health*, *2*(3), 9–17.