

Prevalence of pulpotomy treatment failure performed in primary teeth in a hospital setting versus dental office environment: a 2-year follow up



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INTRODUCTION

Early childhood caries (**ECC**) is the most common chronic childhood disease requiring early intervention. If caries is left untreated in a primary tooth, the tooth may require more invasive procedures such as a pulpotomy. Though pulpotomies have a relatively high success rate (87.5-100% over 2 years)^{1,2}, certain factors may lead to failure, bringing success rates down to as low as 46.1-66.6%.^{3,4}

Dental treatment in the pediatric population often requires utilization of various environments and behavior management techniques.^{5,7} Non-pharmacological behavior management (**NPBM**)⁶, nitrous oxide (**NOX**)⁸, or oral conscious sedation (**OCS**)⁹ may be utilized in the dental office, while general anesthesia (**GA**)⁹ often requires a hospital setting. Along with providing a safe environment, a pediatric dentist aims to perform optimal dental treatment. Previous studies have shown that less successful procedures resulting in need for retreatment are found to be higher in OCS patients.⁸

Despite these studies, there is a lack of research evaluating the long-term prognosis for primary tooth pulpotomies performed in different treatment settings.

PURPOSE

- To investigate whether there is a difference in prevalence of pulpotomy treatment failure in primary teeth of dental patients treated in a hospital setting versus an office environment.
- This study hypothesized that in patients between ages 2-8, pulpotomies performed in an office environment were associated with a higher prevalence of treatment failure compared to a hospital setting over a 2-year follow-up.

METHOD

- A retrospective chart review was completed by convenience sample with data from 106 teeth.
- The study population included patients ages two to eight from the NYU Langone Health-affiliated health center located in Massachusetts who underwent therapeutic pulpotomies under NPBM, GA, OCS, or NOX and presented for a 2-year follow-up.
- The data was collected from 01/01/2013-12/31/2018
- Chi-square and t-test analyses were used to evaluate treatment outcomes.

TABLE 1: PATIENT DEMOGRAPHICS

	Overall (106 teeth)	In-Office (55)	Hospital (51)	p-value
Age (mean (SD))	4.92 (1.27)	5.42 (1.21)	4.39 (1.11)	<0.001
Gender (%)				1
Male	61 (57.5%)	32 (58.2%)	29 (56.9%)	
Female	45 (42.5%)	23 (41.8%)	22 (43.1%)	
Ethnicity (%)				0.479
Non-Hispanic White	24 (22.6%)	15 (27.3%)	9 (17.6%)	
Non-Hispanic Black	6 (5.7%)	2 (3.6%)	4 (7.8%)	
Hispanic	66 (62.3%)	32 (58.2%)	34 (66.7%)	
Non-Hispanic Asian	9 (8.5%)	5 (9.1%)	4 (7.8%)	
Other	1 (0.9%)	6 (10.9%)	4 (7.8%)	

TABLE 2: ENVIRONMENT/ BEHAVIOR MANAGEMENT

In-office	55 (51.9%)
Non-pharmacological behavior management	7 (6.6%)
Nitrous Oxide	35 (33.0%)
Oral Conscious Sedation	13 (12.3%)
Hospital	
General Anesthesia	51 (48.1%)

TABLE 3: OUTCOMES AT 2-YEAR FOLLOW-UP

	Total (106 teeth)	In-Office (55)	Hospital (51)	p-value
Radiographic findings				0.147
Furcation Radiolucency	28 (26.4%)	13 (23.6%)	15 (29.4%)	
Periapical Radiolucency	6 (5.7%)	3 (5.5%)	3 (5.9%)	
Pathological Root Resorption	29 (27.4%)	10 (18.2%)	19 (38.0%)	
No radiographic signs of failure	61 (57.5%)	36 (65.5%)	25 (49.0%)	
No radiographic findings noted	1 (0.9%)	0 (0.0%)	1 (1.9%)	
Clinical findings				0.13
Spontaneous Pain	5 (4.7%)	2 (3.6%)	3 (5.9%)	
Pain on Percussion	2 (1.9%)	1 (1.8%)	1 (1.9%)	
Abscess/ Draining Fistula	15 (14.2%)	7 (12.7%)	8 (15.9%)	
Excessive Mobility	5 (4.7%)	3 (5.5%)	2 (3.9%)	
No clinical signs of failure	24 (22.6%)	8 (14.5%)	16 (31.4%)	
No clinical findings noted	64 (60.4%)	39 (70.9%)	25 (49.0%)	
Outcomes at 2-year follow-up				0.046
No treatment necessary	25 (23.6%)	10 (18.2%)	15 (29.4%)	
Treatment Failure (Monitored)	35 (33.0%)	14 (25.5%)	21 (41.2%)	
Treatment Failure (Extracted)	10 (9.4%)	5 (9.1%)	5 (9.8%)	
Early Pathological Exfoliation	1 (0.9%)	1 (1.8%)	0 (0.0%)	
Natural Exfoliation	35 (33.0%)	25 (45.5%)	10 (19.6%)	
Clinical Treatment Success				0.19
Successful/ Acceptable	73 (68.8%)	42 (76.4%)	31 (60.8%)	
Unacceptable	33 (31.1%)	13 (23.6%)	20 (39.2%)	

RESULTS

- Patients treated were younger in the hospital (4.39 years old on average) compared to in-office (5.42 years), which was a significant finding (p-value <0.01). Teeth treated were highest in the Hispanic ethnic group. (Table 1)
- While teeth treated were divided almost evenly in the in-office vs. in-hospital groups, most treatments in-office were performed under NOX. (Table 2)
- Treatment was found to be unacceptable in 23.6% of teeth treated in-office versus 39.2% treated in-hospital. This difference in outcomes between treatment environments was not significant (p-value 0.19). (Table 3)
- Overall, success rates in this study (76.4% in-office, 60.8% in-hospital) were found to be consistent with success rates in other studies. (Table 3)

CONCLUSIONS

- Though success rates of dental treatment are generally higher for teeth treated in the hospital compared to teeth treated in a dental office, this study found that pulpotomy success rates were higher in teeth treated in-office (**76.4%**) versus in a hospital setting (**60.8%**). However, the difference was not significant.
- Different factors may lead to varying treatment success rates, including attempts to perform “heroics”, operator technique or level of experience, choice of pulpotomy materials, or quality of final restorations.
- Proper case selection, provider training, and material selection is key. Pulpal status of teeth should be determined through radiographic and clinical evaluation, with consideration of reported signs and symptoms. Furthermore, 6-month follow-ups should be stressed in order to closely monitor pulpotomy-treated teeth.

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