

Comfort Level of Utilizing Hall Crown Technique Amongst Practicing Pediatric Dentists

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Introduction

It is well known that dental caries is the most common chronic disease in children worldwide. According to the Centers for Disease Control and Prevention (CDC) in 2018, it is estimated that 21.4 percent of children in the United States (US) from the ages of 2-5 years old have dental caries, with up to 8.8 percent of that population untreated.² There are a number of reasons to explain this untreated population, including lack of access to care, challenging behavior management, and issues with patient follow-up.³ Appropriate retention of primary teeth are necessary for space maintenance, speech, mastication, and self-confidence. Traditional treatment modalities for treating carious primary molars are direct restorations, stainless steel crowns over prepped teeth, and extractions. Over the past 20 years, new methods of nonsurgical caries management have been introduced. Silver Diamine Fluoride (SDF) and the Hall Technique Preformed Metal Crowns (HTPMC) have become popular alternatives for treating primary teeth in children.⁸

It has been 15 years since the first article on the novel Hall technique was published in the British Dental Journal by Nora Hall, a general dentist from Scotland. Many practicing dentists have adopted this technique in treating carious primary molars due to its ease of use. The Hall Technique does not require local anesthesia nor the removal of hard or soft tissue. It only requires enough space interproximally to cement a preformed stainless steel crown while achieving an adequate seal to prevent bacterial penetration.³ The crown is seated using either digital pressure or the child's own biting force.

The Hall Technique was first introduced to dental schools and postgraduate pediatric dental education programs in the United Kingdom (UK) in 2010. It has since become the "Gold standard" treatment modality in the UK and New Zealand. Though initially faced with skepticism in the US, where the principles of operative dentistry by GV Black are heavily indoctrinated, current dental school and postgraduate pediatric dental program curriculums have now started including the Hall Technique. In a recent study by Dr. Yasami at NYU School of Dentistry, pediatric dental program directors, associate professors, and faculty members have reported an overall increase in the teaching and clinical use of both SDF and HTPMC.⁹ This is particularly good news in light of the recent global COVID-19 pandemic and the subsequent recommendations set forth in limiting aerosol-generating procedures.

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is spread primarily through respiratory droplets.¹ At the height of the COVID-19 pandemic, many dentists began deferring "non-urgent" dental care to avoid transmission of aerosols. By deferring the treatment of dental caries, patients often opted for premature extractions to avoid future dental pain. HTPMC is an effective way of treating carious lesions in primary teeth while decreasing aerosols, and may also ease pediatric patients' dental anxiety by introducing less invasive techniques. The author aims to assess the comfort level of dental practitioners utilizing minimally invasive HTPMC.

Objectives and Hypothesis

To assess the comfort level of practicing pediatric dentists on using the Hall Technique to treat asymptomatic carious lesions on primary molars.

The goals of this study are to:

1. Determine the comfort level of practitioners from different training backgrounds, regions, and years of practice on using the Hall Crown Technique
2. Determine how preferences for treatment with traditional stainless steel crowns vs the Hall Technique have changed since the COVID-19 pandemic

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Subjects

The target population is US pediatric dentists in clinical practice. There were no restrictions placed on how many years one practiced. Recruitment included an explanation of the study via email. There was no exclusion based on age, gender, race, ethnicity, region of practice, nor region of training.

Study Design and Methods

A national online survey was sent to all members of the AAPD, excluding current pediatric dental residents. The survey consisted of 18 questions regarding multiple variables to help characterize provider's comfort level and training in the Hall Technique.

This is a cross-sectional study in which data collection occurred over a period of 4 months from December 2021 to March 2022. Data collection and analysis was then completed by the research team and reported during the AAPD conference.

Following approval from the Institutional Review Board of Montefiore Medical Center (IRB), a membership list was obtained from the AAPD. Active AAPD members received notification of the survey via an email link to complete an 18-question survey using a web-based platform.

Survey questions were constructed to identify pediatric dentists' comfort level of performing the Hall Crown Technique on carious primary molars and whether the COVID-19 pandemic led to any changes in sentiment regarding this treatment modality.

All compiled information was anonymous and no identifying information was collected from participants. There was minimal risk to participants in this study. The aim of this study is to get a better sense of where pediatric dentists currently stand in regards to practicing the Hall Crown Technique.

Results

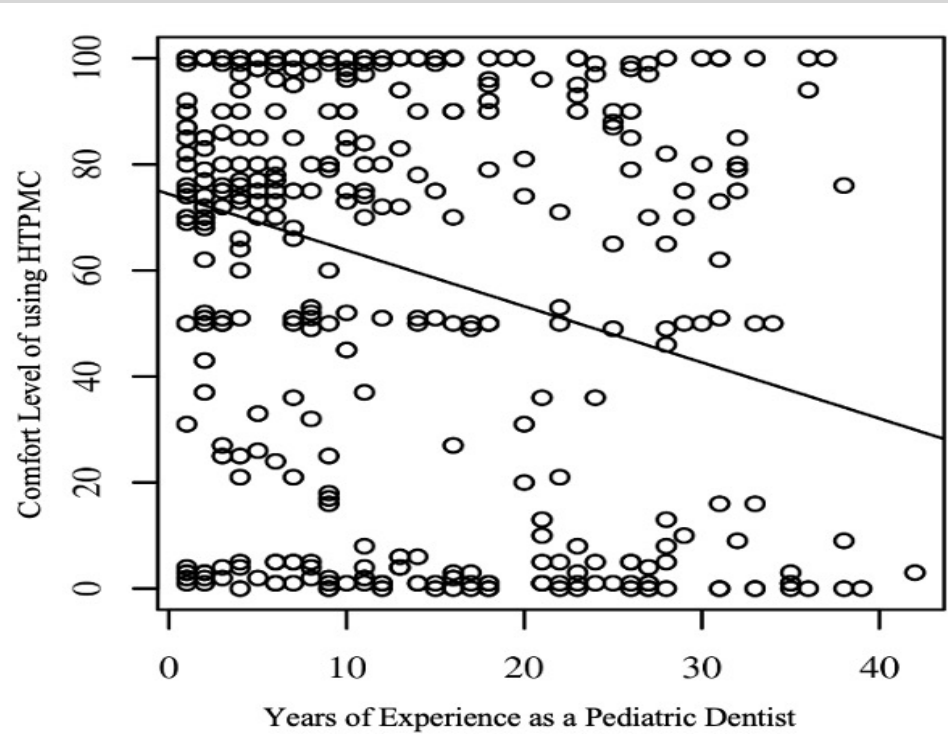


Figure 1 (Left): Using the Pearson Correlation Analysis, this figure is a scatter plot of each response regarding comfort levels in using HTPMC vs years of experience. A significant negative correlation was observed between number of years as a practicing pediatric dentist and the comfort level of using HTPMC with a correlation of -0.28, indicating a small effect size ($p < 0.001$, 95.00% CI = [-0.36, -0.19]). This suggests that as years of clinical experience increases, dentist's comfort level in utilizing HTPMC decreases.

Results

Table 1: Frequencies and percentages of the demographic of characteristics were calculated based off of 446 participants.

Table 1		
Demographics of Participants		
Demographic Characteristic	n	%
Certified Pediatric Dentist Status		
Active, Board Eligible Pediatric Dentist	95	21.40
Active, <u>Board Certified</u> Pediatric Dentist	349	78.60
Years of Practice Experience Post Dental School		
More than 10 years	200	45.25
≤ 10	242	54.75
Length of Experience Using Hall Technique		
No Experience	119	26.74
1 year	36	8.09
2 years	98	22.02
3 years	74	16.63
4 years	41	9.21
More than 5 years	77	17.30
Region of Dental Education		
Southwest	42	9.46
Western (AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, WY)	66	14.86
Southeastern (AL, FL, GA, KY, MS, NC, SC, TN, VA, WV, PR)	85	19.14
Northcentral (IL, IN, IA, OH, MI, MN, NE, ND, SD, WI)	107	24.10
Northeastern (CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT)	144	32.43
Region of Current Practice		
Southwestern (AR, CO, KS, LA, MO, NM, OK, TX)	69	15.51
Southeastern (AL, FL, GA, KY, MS, NC, SC, TN, VA, WV, PR)	74	16.63
Northcentral (IL, IN, IA, OH, MI, MN, NE, ND, SD, WI)	90	20.22
Western (AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, WY)	104	23.37
Northeastern (CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT)	108	24.27
Urbanicity of Practice		
Rural	53	11.94
Urban	111	25.00
Suburban	280	63.06
Type of Practice		
Government or Community/Public Health Center	16	3.59
Corporate	37	8.30
Institution (Hospital/School)	42	9.42
Private Practice	351	78.70
Own Practice		
Associate	214	49.08
Owner	222	50.92
Insurance Accepted		
Private (Fee for service)	110	24.77
PPO/DMO	150	33.78
Medicaid (state insurance)	184	41.44
Hall Technique Education Origin		
Continuing Education/Independent Study/Workplace Training	169	38.85
Dental School/Residency	266	61.15

Note. Only one participant accepted DMO insurance within the PPO/DMO category.

Table 2: The results of the linear regression model were significant, $F(5,435) = 74.92$, $p < 0.001$, $R^2 = 0.46$. This indicates that approximately 46.27% of the variance in comfort level of HTPMC is explainable by length of experience using HTPMC.

Table 2						
Results for Linear Regression with Length of Experience Using HTPMC and Comfort Level of HTPMC						
HTPMC Experience	B	SE	95.00% CI	β	t	p
(Intercept)	18.22	2.64	[13.02, 23.41]	0.00	6.89	< .001
1 year	51.48	5.41	[40.84, 62.12]	0.48	9.51	< .001
2 years	54.88	3.90	[47.23, 62.54]	0.51	14.08	< .001
3 years	59.24	4.22	[50.94, 67.54]	0.55	14.02	< .001
4 years	66.66	5.16	[56.53, 76.79]	0.62	12.93	< .001
More than 5 years	62.59	4.17	[54.38, 70.79]	0.58	15.00	< .001

Note. Results: $E(5,435) = 74.92$, $p < .001$, $R^2 = .46$

Unstandardized Regression Equation: Comfort Level of HTPMC = 18.22 + 51.48*Length of Experience Using HTPMC year + 54.88* Length of

Experience Using HTPMC 2 years + 59.24* Length of Experience Using HTPMC 3 years + 66.66* Length of Experience Using HTPMC 4 years + 62.59*

Length of Experience Using HTPMC More than 5 years

Results

Table 3

Ordinal Logistic Regression Results for length of experience using HTPMC predicting Likelihood of Using HTPMC Post-COVID19 Pandemic

Predictor	B	SE	χ^2	p	OR	95.00% CI
(Intercept)	2.28	0.32	52.09	< .001	-	-
1 year	2.62	0.46	32.03	< .001	13.75	[5.55, 34.07]
2 years	2.08	0.38	30.58	< .001	8.00	[3.83, 16.72]
3 years	1.67	0.40	17.51	< .001	5.32	[2.43, 11.63]
4 years	2.04	0.45	20.87	< .001	7.68	[3.20, 18.43]
5 or more years	1.61	0.40	16.39	< .001	5.01	[2.30, 10.92]

Table 3: The results of the model were significant, $\chi^2(5) = 55.48$, $p < .001$. The null hypothesis states that it is unlikely that length of experience and HTPMC usage post-COVID-19 are related. Therefore, the null hypothesis can be rejected.

Discussion and Conclusions

As dental schools and postgraduate pediatric dental education programs continue to incorporate the Hall Technique into their curriculums, it will be interesting to see if there is a paradigm shift on how to best treat carious lesions on primary molar teeth. Through this research survey, it can be concluded that dentists who have been practicing for fewer years are likely to be confident in utilizing HTPMC. The utility of this method as an alternative to other aerosol generating procedures is especially noteworthy given the rise of various strains of COVID-19.

Though this method is relatively new, over 73.26% of the participants in this research have reported using this technique within the past 5 years. It would be interesting to further investigate why certain practitioners are uncomfortable with using HTPMC. Some hypotheses may include a general distrust of novel techniques, the persistent influence of past recommendations to excavate all decay, the cost of CE courses, parental acceptance, staff training, and possibly insurance issues.

Some limitations of this study are small sample size, recall bias, unanswered questions, distribution of respondents, and author error in the form of unclear questions. Despite the limitations, it appears that more practitioners will continue to learn and adopt this Hall technique. In the future, a 10 year follow-up on this survey could help characterize a shift in the ways this method is utilized, as well as the general confidence level of practitioners. Therefore, the Hall technique may become more accepted in the future, especially with the lasting effects of COVID-19.

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