

ACCEPTABILITY AND UTILIZATION FREQUENCY OF HALL TECHNIQUE AMONG A GROUP OF EGYPTIAN PEDIATRIC DENTISTS

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ABSTRACT

Introduction: Pediatric dentists around the world have been implementing Hall technique for the management of primary carious molars. However, there is a lack of information regarding adopting Hall technique among Egyptian pediatric dentists. **Aim:** This study aimed to evaluate the knowledge, attitude, and factors associated with the utilization of Hall technique among a group of Egyptian pediatric dentists. **Methods:** A cross-sectional questionnaire was distributed to active pediatric dentists members of the Egyptian Dental Syndicate. **Results:** Out of 191 responses, 94.2% were familiar with Hall technique, 67% were within the age group of 31-60 years, and 73.8% were females. 43.5% held a Master's degree while 23.0% held a Ph.D. and 50.8% practiced for less than 5 years. Several factors including practicing status, practice setting, qualification, work experience, and the number of patients seen per week were found to be significantly associated with the utilization of Hall technique. Dentists who had higher qualifications, worked in multiple locations and saw more than 12 patients per week were more likely to use Hall technique. Moreover, practice settings, higher qualifications, and number of pediatric patients seen per week were identified as the only statistically significant predictors. **Conclusions:** Hall technique has recently been embraced by Egyptian pediatric dentists for carious primary molars. Further training courses & research are needed, particularly for young dentists to promote and facilitate the widespread use of Hall technique.

INTRODUCTION

Dental caries, a highly prevalent ailment impacting the global population of children and adolescents, has experienced a transformation in its management of carious primary molars throughout the years. The traditional method of entirely extracting the carious tissue and subsequently implementing a restoration has given way to contemporary biologically oriented and minimally invasive methodologies that mandate minimal or zero caries removal, followed by the application of a suitable restoration⁽¹⁾.

Traditionally, the conventional approach to treating carious lesions in deciduous molars has been to completely remove the infected dental tissue. This process utilizes rotary instruments to prepare the cavity, followed by the application of conventional restorative treatment using materials such as composite, amalgam, or stainless-steel crowns (SSCs).

Retrospective studies have provided evidence that SSCs have a higher success rate compared to amalgam or resin-based restorations, particularly for carious lesions affecting multiple surfaces. However, it is important to note that this treatment pathway can often be invasive and necessitates the removal of healthy tooth structure, especially in the case of interproximal restorations⁽²⁾.

Hall technique (*HT*) represents a ground-breaking advancement in the realm of pediatric dentistry research over the past decade. It was formulated by Dr. Norma Hall, a general dental practitioner (GDP) hailing from Scotland, during her tenure in a region characterized by a heightened risk of dental caries. This innovative methodology entails the restoration of primary molars afflicted with extensive carious lesions, without necessitating any tooth preparation. In a study in 2006, a retrospective analysis⁽³⁾ of Dr. Hall's meticulously examined records spanning from 1988 to 2001, thus introducing the pioneering concept of employing preformed metal crowns to the broader dental community according to previous research⁽³⁻⁴⁾.

The success of *HT* is underpinned by the strategy of sealing caries rather than removing it. This approach involves depriving biofilm microbes of their main source of sustenance, dietary carbohydrates, and retaining the vital superficial plaque layer within the biofilm, which is crucial for the progression of caries. As a result, the composition of the plaque biofilm is altered to a less cariogenic flora, potentially halting or at least slowing down the advancement of caries in primary teeth and preventing their progression⁽⁵⁾.

This innovative method of caries management not only provides minimal restoration of teeth but also greatly enhances the cooperation of children with decayed molars. The technique is aimed at

improving the child's compliance and the comfort of the operator by eliminating the need for local anesthesia. Furthermore, in addition to caries sealing, it is anticipated that this approach will result in a less traumatic dental experience for children during their early years, increasing the likelihood of them seeking more extensive treatment in the future⁽⁶⁾.

Several studies have been conducted to compare the success rates of *HT* with non-restorative caries treatment (*NRCT*), conventional amalgam, resin-based restorations, and conventionally placed stainless steel crowns (*SSCs*)⁽⁷⁻⁹⁾. These studies have consistently reported higher success rates for *HT* compared to *NRCT*, conventional amalgam, and resin-based restorations. These findings are not surprising considering previous evidence supporting the superior efficacy of *SSCs* over conventional restorations for carious lesions affecting multiple surfaces. Currently, *HT* is mentioned in the American Academy of Pediatric Dentistry (*AAPD*) Recommendations: Best practice publication on restorative dentistry, although no specific recommendations have been made regarding its use⁽¹⁰⁾.

Research evidence has indicated that *HT* is an effective method for managing dental caries in primary molars and is more satisfactory to both patients and their parents compared to other restorative techniques. In a previous study⁽¹¹⁾, *HT* was chosen as a treatment option for anxious children and as the preferred treatment for non-anxious children⁽¹²⁾. A systematic review and meta-analysis on the effectiveness of *HT* concluded that it achieved higher success rates than conventional restorations⁽¹³⁾.

HT is widely utilized in developed countries such as the UK, the USA, and Germany⁽¹⁴⁻¹⁵⁾. Research indicates that 48% of general practitioners

currently use HT, and an additional 51% who do not currently use it have expressed interest in adopting the technique for managing carious primary molars. Furthermore, a study⁽¹⁶⁾ revealed that 96% of pediatric dentists in the United Kingdom were familiar with *HT*, with 58% using it as a treatment option and 23% using it as their treatment of choice. Another study indicated that a significant proportion (92%) of pediatric dentists from various countries were cognizant of the use of Hall Technique (*HT*) in their practice, with approximately half (50.6%) implementing it. Furthermore, a sizeable portion (17%) of these dentists preferred *HT* as their treatment modality, and a majority (54%) included it as one of their treatment options⁽¹⁷⁾.

Despite the presence of robust global evidence supporting the efficacy of *HT*, such as studies from New Zealand⁽¹⁸⁾, Germany⁽⁸⁾, and the United States of America⁽¹⁹⁾, as well as clear guidelines regarding its use, concerns have been raised, particularly among pediatric dentists in the United States. These concerns encompass issues such as the sealing of carious tissue, marginal fit and microleakage, and high occlusion⁽²⁰⁾. While some Egyptian pediatric dentists have integrated *HT* into their management of primary carious molars, the extent of its implementation among this group remains insufficiently documented. International skepticism *HT*^(20,21,22) towards HT exists, necessitating further exploration of its acceptance and knowledge among Egyptian pediatric dentists.

MATERIALS AND METHODS

Ethical consideration:

Approval for the research was granted by the Research Ethics Committee at Cairo University, Egypt, under Protocol Nb 19423.

Data were obtained through the administration of a questionnaire accompanied by a cover letter. Due to the confidential and anonymous nature of the information and responses, access was restricted solely to members of the research team.

Subjects:

The survey was electronically distributed to active pediatric dentists members of the Egyptian Dental Syndicate.

Study design:

This research adopts a cross-sectional study design. The survey employed is an adapted version of previous surveys^(16,17,23) with necessary modifications made to suit Egyptian society.

The survey was administered using the Google form template and comprised 23 questions pertaining to the current practice status, demographics, utilization, knowledge, and attitudes concerning *HT*.

Pilot study:

Prior to the commencement of the survey, the questionnaire underwent testing on 10 pediatric dental specialists and consultants from Egypt to assess ease of completion and comprehensibility to the intended participants. Pilot testing revealed no significant flaws in the questionnaire design, and participating dentists reported no difficulties in answering the questions.

The survey was initially distributed to active pediatric dentists members of the Egyptian Dental Syndicate in May 2023, followed by a subsequent distribution to the same group three months later to enhance the response rate.

Sample size calculation:

In accordance with the findings of a previous study⁽⁸⁾ where the prevalence was determined to be 91%, a confidence interval of 95% and a margin of error of 5% were adopted, along with a finite population correction. The minimum required sample size (n) was determined to be a total of 126 cases. The sample size calculation was performed using EPI INFO version 7.2.5.0.

All data from the survey were collected, downloaded, imported, and statistically analyzed using SPSS 16® (Statistical Package for Scientific Studies). Demographic characteristics of survey participants, knowledge of the use of *HT*, and attitudes toward the use of *HT* were described using descriptive statistics. A Chi-square test was used in the comparison of demographic characteristics of respondents between current users and non-users of *HT*. Moreover, factors associated with predicting the use of *HT* were identified using logistic regression, the significant level was set at $P \leq 0.05$.

RESULTS

The survey was electronically dispatched to active pediatric dentists members of the Egyptian Dental Syndicate resulting in 191 members' responses. The majority (67%) fell within the age group of 31-60 years while 29.8% were between 25-30. Females constituted 73.8% of the respondents and (96%) practiced pediatric dentistry. 17.3% of the participants worked in university hospitals, whereas 19.4% in private clinics with more than half of the participants (58.10%) practicing in more than two locations.

Less than half of the participants held a Master's degree (43.5%) or a Ph.D. in pediatric dentistry (23.0%). In terms of work experience, the distribution varied, with 36.1% having 11-20 years of experience, and 23.6% of dentists with less than

5 years of experience while (54.5%) of pediatric dentists attended more than 12 pediatric patients per week (Table 1).

- A significant majority of respondents 94% demonstrated familiarity with *HT*. The acquisition of knowledge regarding *HT* was predominantly from postgraduate curricula (46.6%) and undergraduate curricula (10.5%). Other notable sources include a combination of both curricula types (19.9%), published research (15.2%), and colleagues (6.8%). *HT* frequency of use varied, 42.9% practicing it sometimes, while 9.4% always practicing *HT*. (30.9%) rarely use it and 16.8% reported never practiced.

Various concerns among nonusers such as sealing on a decay (17.3%), high occlusion (23.0%). Additionally, 2.1% were concerned about damage to gingival tissue and high occlusion (1.6%). Yet 33.5% had no concerns

Opinions regarding the target audience for teaching *HT* varied. (40.8%) suggested postgraduate students and (21.5%) Undergraduate students Some respondents argued that the technique should be taught to both groups (33.5%), while (4.2%) should not be taught at all.

- More than half (50.8%) reported having practiced for <5 years, indicating a relatively recent *HT* adoption. (29.8%) had been practicing for > 5 years, while (19.4%) had not yet employ (Table 2).
- The inclusion of additional scientific evidence from public research (15.7%), patient satisfaction (19.9%) and other multiple factors (51.3%) influenced *HT* uptake. Moreover, respondents observed that *HT* is well accepted by both children and parents, and 57% that its usage is not limited to uncooperative children. However, 77% stated not to utilize *HT* under general anesthesia with (43%) considering *HT* as a viable

treatment option for carious primary molars, while 38% resorted to *HT* when conventional methods were not applicable.

- Most agreed on preoperative radiographs (86.5%). Furthermore, 65% of respondents believed that the life expectancy of a tooth treated with *HT* exceeds 3 years. Additionally, 49% of respondents expressed confidence in the continued relevance of *HT* in the next 10 years, while 42% expected its wider adoption.

HT adoption correlates with professional status, practice environment, qualifications, experience, and patient load. Practicing dentists (85.9%) and those with advanced degrees favor *HT*. Individuals treating over 12 patients weekly exhibit higher *HT* utilization. Age and gender show no significant association. Logistic regression highlighted practicing setting ($p=0.007$), qualification ($p=0.001$), and patient load ($p = 0.017$) as significant predictors of *HT* usage (Table 4&5).

Table (1) Demographic characteristic of survey participants:

		N	%
Age	25-30	57	29.8%
	31-60 years	128	67.00%
	>60	6	3.1%
Gender	Male	50	26.2%
	Female	141	73.8%
Graduation university	Governmental	141	73.8%
	Private	50	26.2%
Are you a practicing pediatric dentist?	No	7	3.7%
	Yes	184	96.3%
Where do you practice?	Private clinic	37	19.4%
	University hospital	33	17.3%
	Private hospital	3	1.6%
	Government hospital	5	2.6%
	Public health clinic	2	1.0%
	2 places or more	111	58.10%
Qualification?	Bachelor's degree	28	14.7%
	Diploma in pediatric dentistry (or equivalent)	6	3.1%
	Current master's degree student in pediatric dentistry	28	14.7%
	Master's degree holder in pediatric dentistry	83	43.5%
	PhD degree holder in pediatric dentistry	44	23.0%
	Statement	2	1.0%
Work experience	< 5 years	45	23.6%
	5-10 years	57	29.8%
	11-20 years	69	36.1%
	> 20 years	20	10.5%
Number of average pediatric patients seen per week?	<3	15	7.9%
	3-6	23	12.0%
	6-9	26	13.6%
	9-12	23	12.0%
	>12	104	54.5%

Table (2) Survey participants' knowledge of use of the Hall Technique (HT):

		N	%
Are you familiar with HT?	No	11	5.8%
	Yes	180	94.2%
Where did you learn about the HT?	Undergraduate curricula	20	10.5%
	Postgraduate curricula	89	46.6%
	Both	38	19.9%
	From published research	29	15.2%
	From a colleague	13	6.8%
	Others	2	1.0%
How often do you practice the HT	Never	32	16.8%
	Rarely	59	30.9%
	Sometimes	82	42.9%
	Always	18	9.4%
Concerns behind not using the HT(Select all that apply)	Sealing in decay could result in pulp necrosis	33	17.3%
	High occlusion	44	23.0%
	Damage to gingival tissue	4	2.1%
	Eruption interference of teeth	3	1.6%
	None	64	33.5%
	Two answers	32	16.8%
	More than 2	11	5.8%
In your opinion to whom should the HT be taught to?	Undergraduate	41	21.5%
	Postgraduate	78	40.8%
	Both	64	33.5%
	Should not be taught	8	4.2%
How long have you been practicing the HT?	>5 years	57	29.8%
	<5 years	97	50.8%
	I haven't used yet	37	19.4%

Table (3) Survey participants' attitudes toward the use of the Hall Technique (HT):

		N	%
What would encourage you to practice the HT more?	Additional scientific evidence from public research	30	15.7%
	Attending continuous education courses	13	6.8%
	Receiving positive comments from colleagues	12	6.3%
	Patient Satisfaction	38	19.9%
	More than 2	98	51.3%
HT is well acceptable by children. How strong do you agree with this statement?"	Strongly disagree	3	1.6%
	Disagree	28	14.7%
	Agree	136	71.2%
	Strongly agree	24	12.6%
HT is well acceptable by parents	Strongly disagree	1	.5%
	Disagree	51	26.7%
	Agree	120	62.8%
	Strongly agree	19	9.9%
When do you use the HT	Only treatment option for carious primary molar	4	2.1%
	One of my treatment options for carious primary molar	82	42.9%
	Only an option when unable to use conventional restoration in a carious primary molar	73	38.2%
	HT is rarely an option	23	12.0%
	HT is never an option	9	4.7%
Do you practice the HT only with your uncooperative child patients?	No	114	59.7%
	Yes	77	40.3%

		N	%
Do you practice HT under General anesthesia?	No	147	77.0%
	Yes	44	23.0%
What is your expectation for the HT over the next 10 years?	It would be widely accepted and applied	81	42.4%
	It would be limited and may be rejected	16	8.4%
	It will remain as is and will be used when indicated	94	49.2%
A preoperative radiograph is a must before HT?	Strongly disagree	4	2.1%
	Disagree	22	11.5%
	Agree	59	30.9%
	Strongly agree	106	55.5%
In your opinion, what is the life expectancy of a life of tooth receiving HT?	>3 years	124	64.9%
	2 years	50	26.2%
	<1 year	17	8.9%

Table (4) Comparison of demographic characteristics of respondents between current users and non-users of the hall technique (HT):

		Nonuser of HT		User of HT		P value	Chi square
		N	%	N	%		
Age	25-30 years	15	26.30%	42	73.70%	0.16	6.54
	31-60 years	17	13.30%	111	86.70%		
	>60	0	0.00%	6	100.00%		
Gender	Male	5	10.0%	45	90.0%	0.13	2.21
	Female	27	19.1%	114	80.9%		
Graduation university	Governmental	25	17.7%	116	82.3%	0.54	0.36
	Private	7	14.0%	43	86.0%		
Are you a practicing pediatric dentist?	No	6	85.7%	1	14.3%	0.0001*	24.7
	Yes	26	14.1%	158	85.9%		
Where do you practice?	Private clinic	15	40.5%	22	59.5%	0.0001*	33.97
	University hospital	4	12.1%	29	87.9%		
	Private hospital	0	0.0%	3	100.0%		
	Government hospital	2	40.0%	3	60.0%		
	Public health clinic	2	100.0%	0	0.0%		
	2 places or more	9	8.1	102	91.8		
Qualification?	Bachelor's degree	17	60.7%	11	39.3%	0.0001*	47.07
	Diploma in pediatric dentistry (or equivalent)	1	16.7%	5	83.3%		
	Current master's degree student in pediatric dentistry	2	7.1%	26	92.9%		
	Master's degree holder in pediatric dentistry	10	12.0%	73	88.0%		
	PhD degree holder in pediatric dentistry	2	4.5%	42	95.5%		
	Others	0	0.0%	2	100.0%		
Work experience	< 5 years	16	35.6%	29	64.4%	0.0001*	15.47
	5-10 years	7	12.3%	50	87.7%		
	11-20 years	6	8.7%	63	91.3%		
	> 20 years	3	15.0%	17	85.0%		
Number of average pediatric patients seen per week ?	<3	10	66.7%	5	33.3%	0.0001*	36.25
	3-6	7	30.4%	16	69.6%		
	6-9	4	15.4%	22	84.6%		
	9-12	1	4.3%	22	95.7%		
	>12	10	9.6%	94	90.4%		

*Significant difference as $P < 0.05$.

Table (5) Factors associated with predicting use of the hall technique (HT) using logistic regression:

	Exp(B) - Odds ratio	95% Confidence Interval for Exp(B)		P value.
		Lower Bound	Upper Bound	
1. Age	1.215	0.698	2.115	0.492
2. Gender	1.587	0.467	5.392	0.459
3- Graduation university	0.404	0.119	1.368	0.145
4- Are you a practicing pediatric dentist?	0.276	0.025	3.043	0.293
5-Where do you practice?	0.748	0.607	0.922	0.007*
6-Qualification?	0.440	0.273	0.709	0.001*
7-Work experience	1.196	0.535	2.675	0.663
8- Number of average pediatric patients seen per week ?	0.660	0.469	0.928	0.017*

The reference category is: yes.

*significant difference as $P < 0.05$.

DISCUSSION

Over a decade ago, the utilization of *HT* as a means to manage carious primary molars was introduced. This particular approach does not entail the removal of any portion of the decayed area of the tooth. Instead, a sealing process is employed, wherein the decayed area is sealed utilizing glass ionomer cement, subsequently followed by the placement of an SSC without any form of tooth preparation⁽²³⁾. In this study, which took the form of a questionnaire-based cross-sectional analysis, the acceptability and knowledge of the use of *HT* in the restoration of primary molars were assessed among a group of Egyptian pediatric dentists. It is important to note that, to the best of our knowledge, this particular analysis marks the initial instance in which the perspectives of Egyptian pediatric dentists have been analyzed within this specific context.

Our study consisted of 191 participants who were active pediatric dentists members of the Egyptian Dental Syndicate. The majority of respondents were within the age range of 31-60 years, accounting for 67% of the sample, while those within the age group of 25-30 years represented 29.8%. Although there was a higher percentage of *HT* users among indi-

viduals aged 31-60 years (86.7%) compared to non-users (13.3%), this difference was not statistically significant. Additionally, age was not found to be a statistically significant predictor of *HT* usage among pediatric dentists ($p=0.492$). These findings align with the responses of half of our participants, where 50.8% have been practicing for less than 5 years, 46% learned about *HT* from postgraduate curricula, and 15% learned from published research, which is consistent with previous findings⁽²³⁾. Furthermore, Some studies⁽²⁴⁾ reported that 90 percent of program directors taught *HT*, which supports our results.

The exposure and adaptability of individuals within the age group of 31-60 years to the advancements in pediatric dentistry can be observed through their continued education. This is particularly evident considering that a significant proportion of the participants possess either a Master's degree (43.5%) or a Ph.D. (23.0%) in pediatric dentistry. Furthermore, there is a noteworthy association between the level of qualification and the utilization of *HT*, with a p-value of 0.0001. Pediatric dentists who hold higher qualifications, such as a master's degree or a Ph.D., are more inclined to use *HT*. Thus, qualification serves as a statistically significant predictor of *HT* usage, with a p-value of 0.001.

The majority of participants in this study were females, accounting for 73% of the total. Among the users of *HT*, females comprised the highest proportion, reaching 90.0%. This finding aligns with the results of previous research⁽²³⁾. However, it is important to note that this association between gender and *HT* usage is not statistically significant, as indicated by a p-value of 0.13. Therefore, gender does not serve as a statistically significant predictor of *HT* usage, with a p-value of 0.45.

Regarding the educational background of the participants, a significant percentage (73.8%) have graduated from governmental universities. However, there is no significant association between the type of university (governmental or private) and *HT* usage among pediatric dentists, as indicated by a p-value of 0.54. Moreover, the type of graduation university is not a statistically significant predictor of *HT* usage, with a p-value of 0.145.

The majority of participants (96.3%) are currently practicing pediatric dentists. Notably, there is a significant association between their practicing status, practicing setting, and *HT* usage, with a p-value of 0.0001. This suggests that practicing dentists are more likely to utilize *HT* in their practice. Additionally, a considerable number (58.10%) of participants practice in more than two places, with pediatric dentists in private clinics, university hospitals, and those practicing in multiple settings being more inclined to use *HT*.

In our study, the respondents exhibited a high level of familiarity with the technique, with 94.2% reporting familiarity. The current use of *HT* among participants was assessed in terms of frequency, revealing that a large proportion of participants practice *HT* sometimes (42.9%), followed by rarely (30.9%), and always (9.4%). These findings are consistent with previous studies⁽¹⁵⁻¹⁶⁻¹⁷⁻²³⁾ which reported a high level of familiarity with the technique and a usage rate of nearly 40%. The frequency of *HT*

usage in our study was employed to categorize the actual use of participants. However, these findings differ from a previous study⁽⁸⁾ which found that most German dentists were unfamiliar with (*HT*).

There are diverse opinions regarding the target audience for *HT* education. The most common groups suggested for *HT* education are postgraduate students (40.8%) and undergraduate students (21.5%). However, a small percentage (4.2%) believe that *HT* should not be taught at all. These results are consistent with previous findings⁽¹⁶⁾ which reported that 40.1% believe *HT* should be taught to postgraduates, and comparable to the other results⁽²³⁾ in which 17.1% believe *HT* should be taught to undergraduate students, and 2.5% should not be taught.

Regarding the respondents who did not utilize (*HT*), they expressed various concerns that were in line with the previous findings⁽²³⁾ such as “high occlusion,” “sealing in decay resulting in pulp necrosis,” “eruption interference of teeth,” and “damage to gingival tissue”⁽²⁰⁻²³⁻²⁵⁾. However, a (33.5%) of participants did not have any concerns about not using *HT*. Our findings regarding sealing in decay resulting in pulp necrosis were not consistent with a previous systematic review⁽²⁶⁾, which demonstrated that maintaining an optimal quality seal is an effective caries management method. *HT* achieves caries arrest by sealing the carious lesion under the crown and isolating bacteria from a carbohydrate-rich oral environment.

Lastly, a few respondents expressed concerns about the gingival health surrounding the tooth when using *HT*, which aligned with the previous findings⁽²³⁾. However other findings reported⁽²⁷⁾ no difference in plaque or gingival index between subjects with *HT* and those with conventional technique SSCs, and both measures improved over the course of the study. Less than half of the participants (42.9%) utilize *HT* as a treatment option

for carious primary molars, and 38.2% use *HT* when unable to use conventional restoration.

Only 2.1% use *HT* as the sole option, and these findings are consistent with previous reports⁽²³⁾ that over three-quarters of respondents considered *HT* as a treatment option. Respondents have used *HT* for varying durations, with the majority (64.9%) believing that the life expectancy of a tooth receiving Hall Technique is greater than 3 years, which aligns with previous studies⁽¹⁶⁻¹⁷⁾.

A significant proportion of respondents (83.8%) either agree or strongly agree that *HT* is well accepted by children, and 72.7% reported that *HT* is well accepted by parents. Furthermore, a considerable portion of respondents (59.7%) do not limit the use of *HT* to uncooperative child patients, which is supported by the ease and acceptability of the technique, as reported by dentists, child patients, and parents in previous studies⁽²⁸⁾, where 81% considered it a very important factor in decision-making. Considering patient and parental preferences is crucial in planning restorative dental care for young patients, aligning with evidence-based dentistry principles, thus easing the treatment burden on children.

Regarding periapical findings before placing *HT*, most of the respondents either strongly agree (55.5%) or agree (30%) with always obtaining a pre-operative radiograph, as supported by previous research⁽¹⁶⁾ that 59% of their respondents always took a preoperative radiograph. Similarly, others reported⁽¹⁷⁾ that 62% always obtained a preoperative radiograph and disagreed with other studies⁽²³⁾ who reported that less than half of respondents always took a preoperative radiograph. Furthermore, (77.0%) did not practice *HT* under general anesthesia, aligning with dental providers' preference for efficient care, risks linked to general anesthesia, and parental expectations for comprehensive treatment. One study⁽²⁷⁾ suggested that *HT* may be a more

efficient and cost-effective procedure for high-risk, low-access pediatric populations.

Finally, regarding the participants' views on the future of *HT*, almost half believed it would remain as is and be used when necessary, while less than half believed it would be widely accepted and applied.

CONCLUSIONS

- *HT* is recently utilized by a majority of active participants, particularly among the older generation and female dentists who possess advanced qualifications and provide care to a larger number of patients across various settings.
- The utilization of *HT* is expected to predominantly increase or remain stable in the coming years; however, it requires heightened awareness and integration into educational curriculums and training programs for younger dentists.
- To determine the optimal utilization of *HT*, future research should be conducted, encompassing more comprehensive investigations to guide dentists in either augmenting or reducing its usage.

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