

Knowledge and Practice of Rotary Instrumentation in Primary Teeth among Saudi Arabian Dentists: A Cross-sectional Study

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ABSTRACT

Background: Making use of rotary instruments for doing pulpectomies in the primary teeth is one of the most developing areas in the field of pedodontics. The primary aim of this study was to assess the understanding and the ease with which Saudi Arabian dentists could use rotary instrumentation in primary teeth.

Materials and methods: A cross-sectional observational study was conducted among dentists over 3 months. A structured self-explanatory questionnaire was given, and responses were obtained from the dental practitioners.

Results: The response rate for the survey was 92.45%. Only 21.4% of them were using rotary instruments, and ProTaper was most commonly used. The most common limitation factors that obstructed its usage included the taper and length of the existing files. On assessing the need for using an exclusive rotary file for performing root canal preparation in primary teeth, there was a significant difference observed statistically. The general thought that floated among most dental practitioners (p value = 0.01) and specialists who had 11–15 years of experience was that an exclusive rotary file is the need of the hour.

Conclusion: There is an absolute need for more education programs and workshops in the country to increase the knowledge and awareness of dental practitioners, and also to give hands-on experience regarding rotary instrumentation in primary teeth. In kids, it seems appropriate to use kid-specific rotary files that make it comfortable for children too during the procedure.

Keywords: Awareness, Knowledge, Primary teeth, Pulpectomy, Rotary instrumentation.

International Journal of Clinical Pediatric Dentistry (2022): 10.5005/jp-journals-10005-2333

INTRODUCTION

Poor oral hygiene and inadequate dental care among children lead to the development of deep carious lesions, and if it is left untreated, often results in deeper carious lesions with pulpal involvement. To maintain the integrity of arch form in primary dentition, preservation of the primary tooth has to be achieved until the eruption of the permanent successors. Premature exfoliation can be prevented by pulpotomies and pulpectomies, widely used procedures in pediatric dentistry, aiming at total eradication of microbes from the root canals of primary teeth with the help of instrumentation and prevention of the reoccurrence of infection.¹

Pulpectomy is the treatment of choice to prevent the loss of necrotic primary molars. Elimination of hard and soft bacteria comprising tissues, provides proper space for instruments, and creating a clear path toward the apical third followed by obturation and maintenance of the stability of the radicular structures are the primary objectives of root canal treatment. Success depends upon debridement by effective shaping and cleaning of root canals. Generally, files, burs, reamers, sonic instruments, nickel-titanium (NiTi) rotary file systems, and mechanical apparatus are used while carrying out root canal preparation. Some of the main iatrogenic errors that could occur while using hand instruments include zipping canal transportation, ledging, and apical blockage. Moreover, root canal preparation using hand instruments is time-consuming and quite tiresome.^{2,3} Considering the relevance of this issue, more focus was given on root canal preparations using NiTi. There are numerous studies available in literature stating the advantages of NiTi files over hand instruments. Unfortunately, all of the studies were conducted on permanent teeth.^{4,5} The practice of using rotary instruments in paediatric dentistry is still

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How to cite this article: Alowi WA, Maganur PC, Manoharan V, et al. Knowledge and Practice of Rotary Instrumentation in Primary Teeth among Saudi Arabian Dentists: A Cross-sectional Study. *Int J Clin Pediatr Dent* 2022;15(S-1):S97–S102.

Source of support: Nil

Conflict of interest: None

an emerging concept. To date, no studies have been conducted in Saudi Arabia evaluating the perception of using rotary instruments in primary teeth among dental practitioners. Hence, the primary focus of this study was to mainly estimate the insight and the use of rotary instrumentation in primary teeth among dentists in Saudi Arabia.

MATERIALS AND METHODS

A cross-sectional study was conducted among dentists from the Kingdom of Saudi Arabia. A total of 212 dentists who had either completed their bachelors or masters in dental surgery and currently practicing in Saudi Arabia participated in the study. Dentists who were not practicing dentistry, students pursuing bachelors in dental surgery, and students doing their internship in various dental colleges were excluded from the study. After going through the literature review, a total of 10 English questions were prepared and emailed to five experts to validate the content making use of the five-point Likert scale. The Aiken index for every question was calculated and its relevance to the study was determined. Only those questions that had a score ≥ 0.6 were included in the pro forma. The questionnaire was checked for reliability with the help of Cronbach's α value—any number between 0.78 and 0.86 with a median of 0.82 was taken as reliable. All the participants were asked to choose the best answer that seemed most relevant after which the questionnaires were taken back the very same day.

RESULTS

Of the 212 dental practitioners who participated in the study, only 196 returned the fully completed questionnaire taking the response rate to 92.45%. The participants were predominantly males (51.7%) belonging to the age group of 25–29 years (47.6%), and almost 74% of them were general dentists who had experience between 1 and 5 years (53.3%) as given in Table 1.

Of the study group, only a meager 21.4% of dentists (of whom 13.8% were a part of the Continuing Dental Education program about rotary instrumentation) dealt with root canal preparation of the primary teeth using rotary instruments (Table 2). ProTaper system was used by 27.5% (54) of participants for canal preparation in primary teeth (Fig. 1). Around 46.9% of dentists used other systems for rotary instrumentation, and the majority (88.8%) did not specify the name of the system they had used. Decrease in working time was the greatest advantage felt by 41.8% of dental practitioners (Fig. 2) whereas 25.5% of them considered cost as the greatest disadvantage of using rotary instruments (Fig. 3). Nearly 45.4% of dentists didn't know about the ease of

access of using rotary files on primary teeth whereas 30.6% of them agreed that ease of access was better seen in the mandibular arch. The limitations presented by the design of the current rotary instruments system remained unknown by almost 56.6% of them, while another 16.3% felt that the length and taper of the files were a limiting factor in the present rotary instruments system (Fig. 4). A majority of the dentists (80.1%) did not have any idea regarding the availability of minimally invasive files and the role played by them in easing the root canal preparation in the primary teeth. For one or two pediatric cases, almost 13.3% of them primarily used rotary files for doing root canal treatment. Around 55.6% of dentists preferred the availability of exclusive rotary files for root canal preparation on primary teeth (Table 2).

An analysis about the need for a unique rotary file that helps in preparing for a root canal in primary teeth showed that 50% of the general practitioners and 71% of specialists realized its requirement and this was found to be statistically significant ($p = 0.012$). Around 57% of dentists with no experience, 56% with an experience of 1–5 years, and 100% with 11–15 years of experience considered that it was necessary whereas 52% of dentists with 6–10 years of experience and 100% of dentists having more than 15 years of experience felt no need for an exclusive rotary file for preparation for a root canal in primary teeth and showed statistically significant difference with a p value of 0.01 as shown in Table 3.

DISCUSSION

Rotary endodontics in pediatric dentistry is relatively a new concept. The use of NiTi rotary instruments was one of the most important revolutions in the area of pediatric dentistry. The use of rotary files in permanent teeth has been successfully proven, whereas there is a lack of clinical data to compare the efficiency of rotary techniques with standard manual techniques for instrumentation in primary teeth.⁶ Hence, it is very important to understand the advantages and disadvantages regarding the use of rotary files in primary teeth among dental practitioners. As far as our analysis showed, this is the first study where dentists in Saudi Arabia gathered to evaluate their understanding and the predominant use of rotary instrumentation in primary teeth.

Table 1: Demographic characteristics of the study participants

	Parameter	Frequency	Percentage
Age	20–24	60	30.6
	25–29	93	47.6
	30–34	20	10.2
	35–39	13	6.8
	40 and above	10	4.8
Sex	Male	101	51.7
	Female	95	48.3
Specialty	General Dentist	145	74
	Specialist	51	26
Years of experience	No experience	49	25
	1–5 years	105	53.3
	6–10 years	29	14.8
	11–15 years	8	4
	More than 15 years	5	2.5

Table 2: Distribution of perception about use of rotary instruments in primary teeth among study participants

Questions		Frequency	Percentage
1. Do you use rotary instruments for root canal preparation during endodontic treatment in primary teeth?	No	154	78.6
	Yes	42	21.4
2. Have you attended any workshop or continuing dental education regarding rotary instruments in primary teeth?	No	169	86.2
	Yes	27	13.8
3. Which rotary file system do you use for root canal preparation in primary teeth?	ProTape system	54	27.5
	Race	4	2
	K3	7	3.6
	Kedo S files	9	4.6
	Prime Pedro files	27	13.8
	Others	93	46.9
	Missing	3	1.5
	3 a. If multiple systems or other system used, Mention it.	I didn't use it before	15
	I use hand files	1	0.5
	ldk	1	0.5
	Manually	2	1
	One curve	2	1
	ProTaper but with permanent teeth	1	0.5
	Missing	174	88.8
4. What is the greatest advantage of using rotary files in primary teeth compared to Hand files?	a. Uniform root canal preparation	34	17.3
	b. Removal of pulp tissue is better	7	3.6
	c. Decrease in working time	82	41.8
	d. Patient acceptance	2	1
	e. I don't know	71	36.2
5. What is the greatest disadvantage of using rotary files in primary teeth compared to Hand files?	a. Minimal root canal preparation	10	5.1
	b. Doesn't remove the pulp tissue completely	7	3.6
	c. Fracture of instrument	48	24.5
	d. Cost	50	25.5
	e. I don't know	81	41.3
6. Ease of access using rotary files for primary tooth is more in?	a. Maxillary arch	20	10.2
	b. Mandibular arch	60	30.6
	c. Same in both	27	13.8
	d. I don't know	89	45.4
7. What is the limitation in the use of existing rotary file systems in primary teeth?	a. Length of the file only	20	10.2
	b. Taper of the file only	4	2
	c. Limited knowledge in using rotary files	29	14.8
	d. Both length and taper of the files are more	32	16.3
	e. I don't know	111	56.6
8. Are you aware of minimally invasive files and its use for root canal preparation in primary teeth?	No	157	80.1
	Yes	39	19.9
9. How often do you use rotary files for root canal procedures in pediatric case? (Out of 10 cases)	a. 1-2	26	13.3
	b. 3-5	10	5.1
	c. 6-10	4	2
	d. All	6	3.1
	e. I don't know	150	76.5
10. Do you think there is necessity for an exclusive rotary file for root canal preparation in primary teeth?	No	87	44.4
	Yes	109	55.6

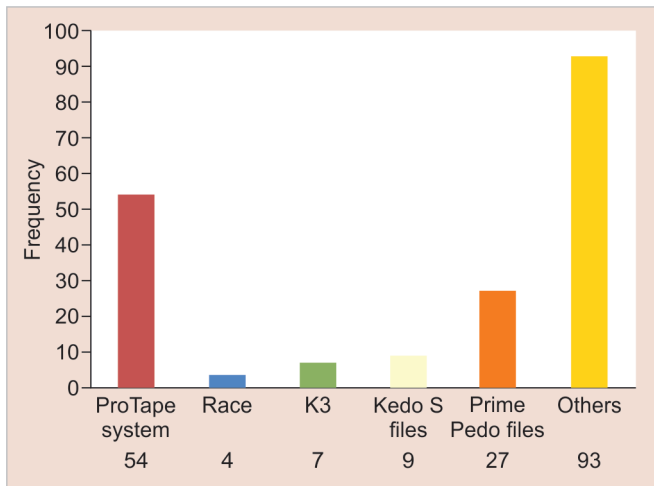


Fig. 1: Use of rotary file system in primary teeth

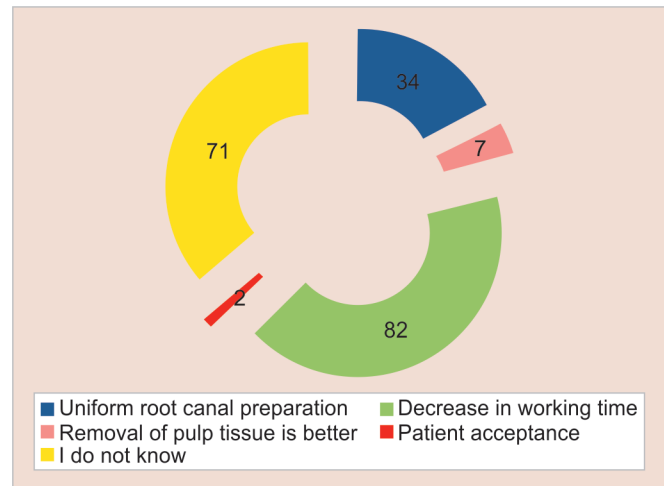


Fig. 2: Advantage of using rotary instruments in primary teeth

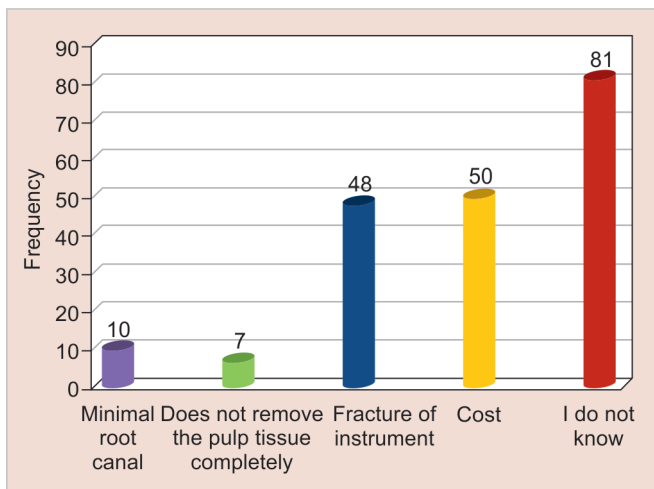


Fig. 3: Disadvantage of using rotary instruments in primary teeth

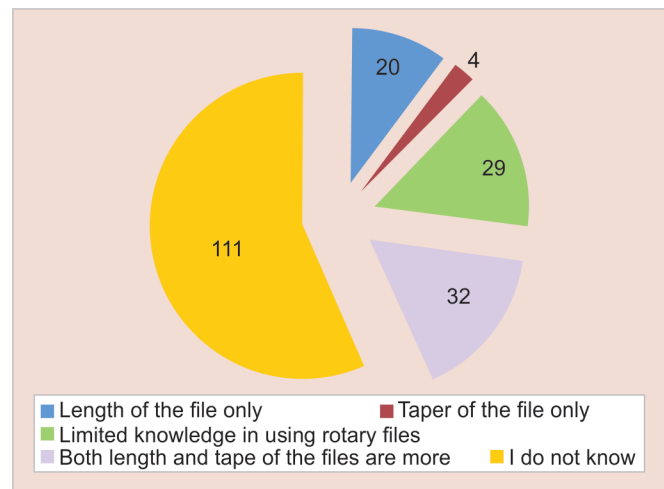


Fig. 4: Limitation in the design of the existing rotary instruments in primary teeth

In our study, we found that only 21.4% of dentists used rotary instruments for root canal preparation in the primary teeth, of which 13.3% of them used rotary files in root canal procedures for one or two pediatric cases. On the contrary, a study done by Govindaraju et al.⁷ showed that around half (50%) of the dental practitioners in India predominantly used rotary files for pulpextomy procedures on the primary teeth on at least 3–5 pediatric cases in their regular practice routine.

A large number of specialists (28%) preferred this rotary technique in comparison to practitioners having a bachelor's degree in Dental Surgery (18%). Around 13.8% of practitioners involved in our study had the experience of attending workshops or CDE on rotary instrumentation of the primary teeth. This finding suggests that there is a need for conducting and organizing such programs in Saudi Arabia to increase their knowledge and to provide more practice-oriented sessions, which in turn can increase the total number of dental practitioners using rotary instruments in primary teeth. The results of our study were similar to a study conducted by Mozayeni et al.⁸ where lack of education was considered an important reason for not using NiTi instruments by dental practitioners. Our study results showed that only 27.5% of practitioners made use of ProTaper file system in contrast to the

study results shown by Govindaraju et al.⁷ where the major dentist population favored the use of ProTaper file system (34%).

Decrease in working time was the greatest advantage felt by 41.8% of dentists who use rotary files in primary teeth. Similar findings were reported in previous studies.^{9,10} Barr et al.¹¹ In his study showed that the use of NiTi files in primary teeth for rotary instrumentation led to funnel-shaped canals (which in turn resulted in better obturation quality) was similar to the results that 17.3% of dental practitioners favored the use of uniform root canal preparation using NiTi files. But, the expensive costing of rotary instruments was the biggest disadvantage that prevented a majority of the practitioners from choosing it, but a study by Gambarini et al.¹² showed that instrument separation was the biggest advantage of NiTi files. The current rotary instrument system had a design limitation none other than the increased taper and file length, a general concern raised by 16.3% of the study group. Almost 55.6% of dentists preferred using an exclusive rotary file for root canal preparation in the primary teeth as this provided better accessibility and accurate preparation. The same findings were supported by another study done by Jeevanandan et al.¹³ where using pediatric-specific rotary files resulted in better-quality obturation and preparation of the root canal. A study by Kuo

Table 3: Perception about the necessity for an exclusive rotary file for root canal preparation in primary teeth

			Do you think there is necessity for an exclusive rotary file for root canal preparation in primary teeth?		p-value
			No	Yes	
Age	20–24	N	29	31	0.129
		% within age	48.30%	51.70%	
	25–29	N	37	56	
		% within age	39.80%	60.20%	
	30–34	N	13	7	
		% within age	65.00%	35.00%	
35–39	N	3	10		
	% within age	23.10%	76.90%		
Above 40	N	5	5		
	% within age	50.00%	50.00%		
Sex	Male	Count	42	53	0.961
		% within sex	44.20%	55.80%	
	Female	N	45	56	
		% within sex	44.60%	55.40%	
Specialty	General practitioner	N	72	73	0.012*
		% within specialty	49.70%	50.30%	
	Specialist	N	15	36	
		% within specialty	29.40%	70.60%	
Experience	No experience	N	21	28	0.01*
		% within experience	42.90%	57.10%	
	1–5 years	N	46	59	
		% within experience	43.80%	56.20%	
	6–10 years	N	15	14	
		% within experience	51.70%	48.30%	
	11–15 years	N	0	8	
		% within experience	0.00%	100.00%	
More than 15 years	N	5	0		
	% within experience	100.00%	0.00%		

*Statistical Significance set at 0.05

et al.¹⁴ proclaimed that it would lead to better results when dentists used exclusive rotary files for primary teeth, along with modified length and taper. These findings suggest that exclusive pediatric files, with the said modifications, would help practitioners perform pulpectomies on primary teeth with better precision and speed.

The small sample size and homogeneity of the population can be considered as a limitation of the study. Further studies should be conducted with more sample size directed towards pedodontists and endodontists, analyzing different rotary systems and exclusive pediatric file systems available to come to a definitive conclusion about the efficiency of both.

CONCLUSION

The study focused mainly on assessing the understanding and the use of rotary instrumentation in primary teeth among dentists in Saudi Arabia. Results of our study stated that only a limited number of dental practitioners were using rotary techniques on primary teeth. Knowledge and awareness regarding the same were less among a majority of the dentist population who preferred the use of an exclusive pediatric rotary system for root canal preparation in primary teeth, which would increase

the acceptability rates in children. There is a need to conduct more CDE programs and workshops in the country to increase the knowledge of dental practitioners about the practice of rotary instrumentation in primary teeth and also give hands-on experience regarding the same.

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