

Preference and Perception of Pediatric Dentists about Usage of Hand and Rotary Endodontic Files for Treatment of Primary Teeth: A Cross-sectional Study

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ABSTRACT

Introduction: In the recent past, rotary files have been introduced for endodontic treatment of primary teeth. However, there is limited literature available which cite the preference of pediatric dentist toward the usage of the rotary and hand endodontic files.

Aims and objectives: To assess the preference and perception of pediatric dentists about hand and rotary endodontic files.

Materials and methods: A study tool comprising of 21 point questionnaire about pediatric dentist's preference of endodontic files and their perception about clinical effectiveness, advantages, and limitations of the files was administered to 202 pediatric dentists practicing in a metro city. The response was statistically analyzed.

Results: 39.7% preferred to use both files, 34.5% preferred to use hand files, and 25.9% preferred rotary files. A respondent felt rotary files are a better option for pulp removal (37.9%) and uniform root canal preparation (70.7%). However, in patients with limited cooperation hand files (62.1%) are preferred.

Conclusion: Pediatric dentists preferred to use both hand and rotary files depending upon the clinical situation. Rotary files were perceived to be more clinically effective and hand files were preferred in a patient with limited cooperation.

Keywords: Cross-sectional, Endodontic treatment, Hand files, Ni-Ti files, Pediatric dentists, Perception, Practitioners, Primary dentition, Primary teeth, Rotary nickel-titanium files.

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INTRODUCTION

In pediatric dentistry, one of the treatment options of the tooth with pupal involvement is pulpectomy. Traditionally, it is performed using different hand endodontic files.

As endodontics is a field, which is constantly evolving, in the year 2000, Barr et al.¹ introduced the usage of rotary instruments for endodontic treatment of primary teeth. Studies^{2,3} have reported that rotary files create smooth and predetermined funnel shape form with minimal lodging and transportation. The high flexibility of Ni-Ti rotary files allows them to closely follow the root canal path, especially in curved canals. However, both hand and rotary instruments have their own advantages and disadvantages. Disadvantages in the case of rotary files are high cost, need for training, and reduction in tactile sensitivity during apical preparation. Hand files are made up of stainless steel and are used for cleaning root canals of primary teeth and have limited flexibility. However, they are cost-effective, selective filing away from the furcation area is possible. Tactile perception is improved with hand files. According to some studies, hand files were similar in clinical effectiveness compared to rotary files.⁴⁻⁷

Several studies have compared the clinical efficacy of hand and rotary files for the endodontic treatment of primary teeth.⁷⁻¹¹ There is limited literature available regarding pediatric dentists' preference and perception about the usage of hand and rotary instruments. This study aimed to assess the preference and perception of pediatric dentists about the use of hand and rotary instruments.

AIMS AND OBJECTIVES

- To assess the preference of endodontic files among pediatric dentists.

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- To assess the perception of pediatric dentists about the clinical effectiveness of endodontic files.

MATERIALS AND METHODS

The present cross-sectional study was carried out in a metro city in September 2019. Ethical clearance was obtained from the institutional ethics committee. A 21 point questionnaire about pediatric dentists' preference of endodontic files and their perception about clinical effectiveness, advantages, and limitations of the files was sent to 202 pediatric dentists. Reminders were sent thrice at 3 days intervals.

Data were compiled and subjected to statistical analysis using Statistical Package for Social Sciences (SPSS v 21.0, IBM).

Comparison of frequencies of categories of variables with groups was done using Chi-square test. For all the statistical tests, $p < 0.05$ was considered to be statistically significant, keeping α error at 5% and β error at 20%, thus keeping power to the study as 80%.

RESULTS

The response rate to the survey was 35% (out of 202 pediatric dentists, 58 responded). 58.6% of respondents were male and 41.4% were female. With an age range from 25 to 44 years, 79% of the respondents were into clinical practice (Fig. 1). With the majority having 1–5 years of experience, 84% of them were into exclusive pediatric practice (Fig. 2). 43.1% of them performed 6–10 pulpectomies per week. 31% performed 0–5 per week (Fig. 3). The question wise results obtained were:

Preference

39.7% preferred to use both files most often, 34.5% preferred to use hand files, and 25.9% preferred rotary files (Fig. 4).

Hand files were preferred for primary maxillary and mandibular anterior teeth while rotary files were preferred for posterior teeth ($p < 0.05$) (Fig. 5).

Hand files were preferred for children below three years while rotary files were preferred in children between 3 years and 6 years and between 6 years and 9 years ($p < 0.05$) (Fig. 6).

62.1% of them preferred hand files in a patient with limited cooperation ($p < 0.05$) (Fig. 7).

74.1% of them preferred to use hand files in narrow canals. While 20.7% preferred rotary files ($p = 0.0001$) (Fig. 8).

In the comment section, some participants expressed that preoperative X-rays should be evaluated properly to decide whether to use rotary or hand files in primary teeth. Few participants also opined that case-dependent selection of files and chemical debridement is more important than mechanical preparation in primary teeth.

A combination of both the files was preferred rather than the anyone file system.

Perception

56.9% thought both files have better patient acceptance while 25.9% thought rotary files have better patient acceptance (Fig. 9).

37.9% thought rotary aids in better removal of the pulp tissue, 31% of them felt no difference in pulp removal efficiency of both

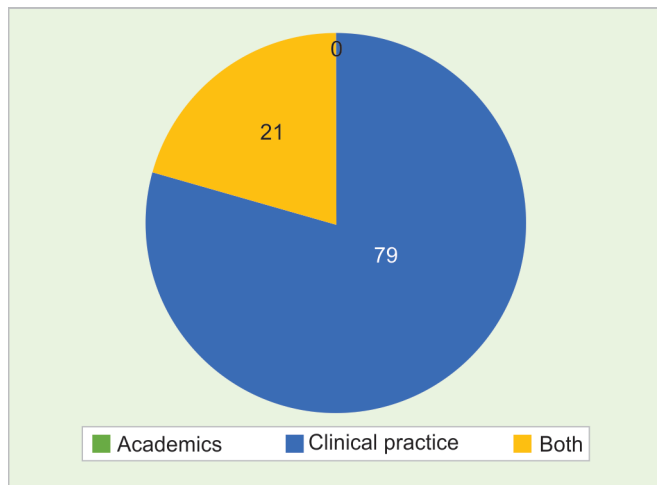


Fig. 1: Distribution of respondents

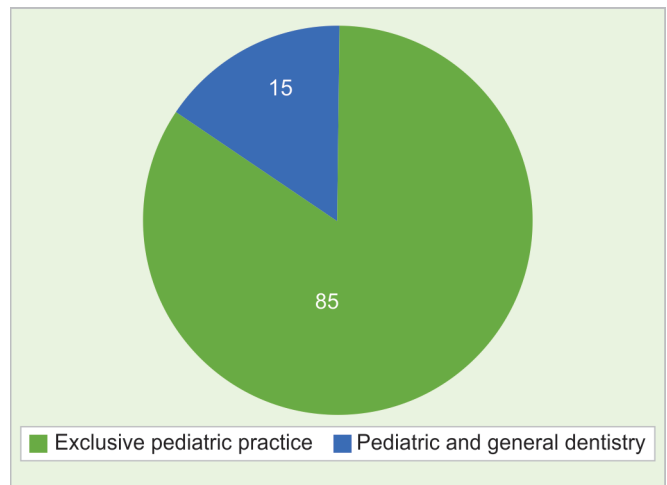


Fig. 2: Distribution of respondents according to the type of practice

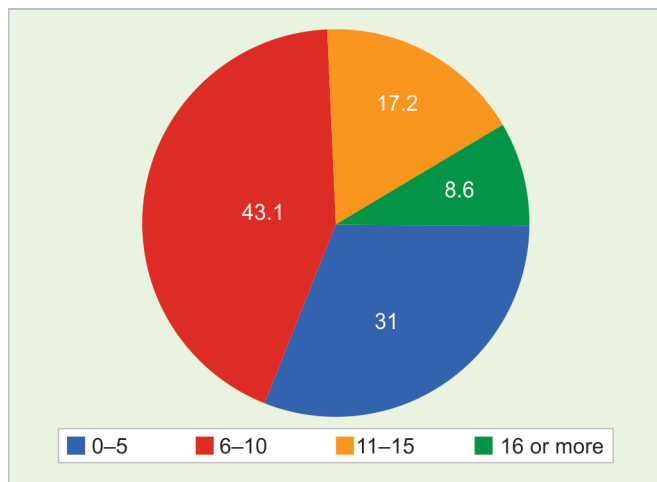


Fig. 3: Number of pulpectomies performed per week by the respondents

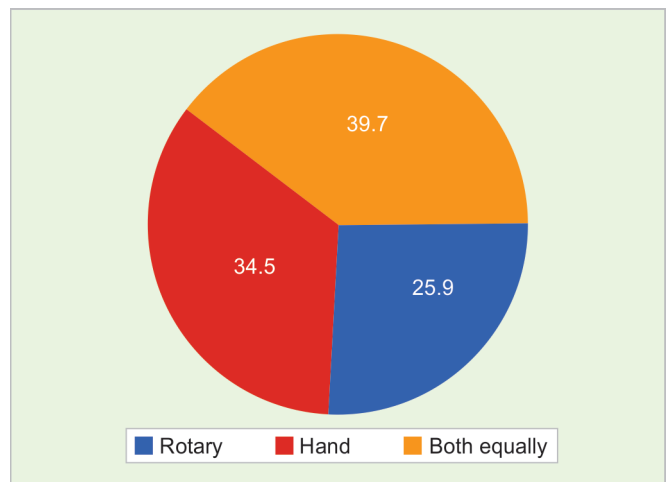


Fig. 4: Distribution according to the frequent preference of endodontic files

files. Nineteen percent of participants felt hand files are better at the removal of pulp tissue ($p = 0.023$) (Fig. 10).

46.6% found that both the files are easy to use. 43.1% found rotary files to be easy to use compared to hand files and 10.3% felt hand files are easy to use ($p = 0.0006$) (Fig. 8).

75.9% of pediatric dentists perceived rotary files to be less time-consuming. 70.7% felt it aids in uniform root canal preparation ($p = 0.0001$). 20.7% of them perceived no difference in canal preparation by the rotary and hand files (Fig. 8).

Fifty-five percent thought it facilitates good quality obturation ($p = 0.0001$). 39.7% found no difference in the quality of obturation caused by canal preparation by rotary files and hand files (Fig. 8).

58.6% of participants felt rotary files are more likely to separate in the canal, while 22.4% found no difference in chances of file separation among rotary and hand files (Fig. 8).

84.5% of participants felt rotary files are more likely to cause canal perforation ($p = 0.0001$) (Fig. 8).

74.1% found hand files to be cost-effective, 19% of them found both files to be cost-effective ($p = 0.0001$) (Fig. 8).

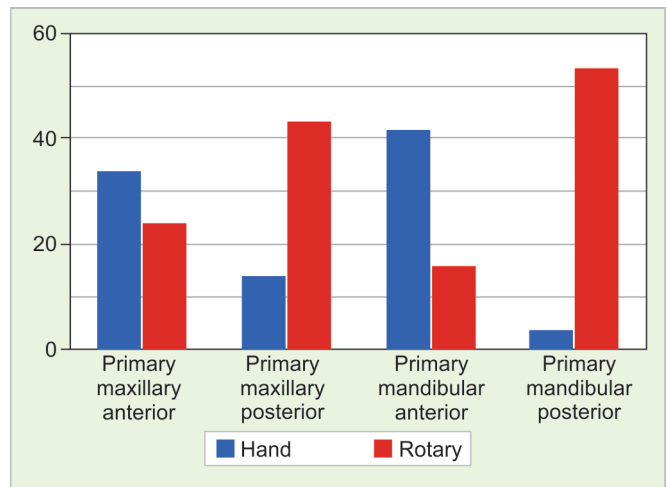


Fig. 5: Preference for rotary or hand endodontic file according to the tooth requiring pulpectomy

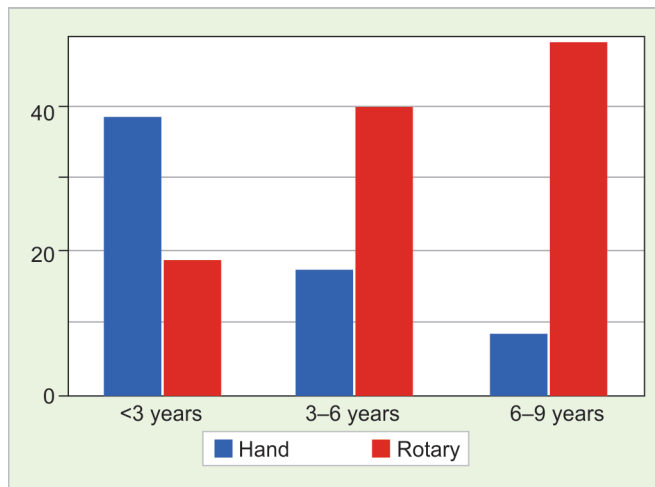


Fig. 6: Preference for rotary or hand endodontic file according to age group

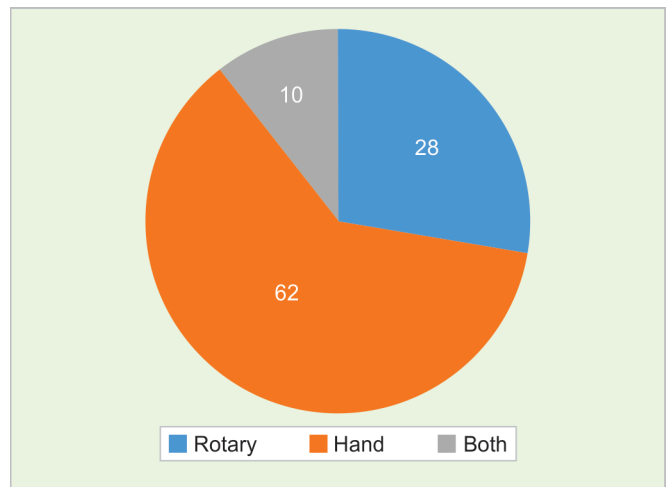


Fig. 7: Preference in patient with limited cooperation

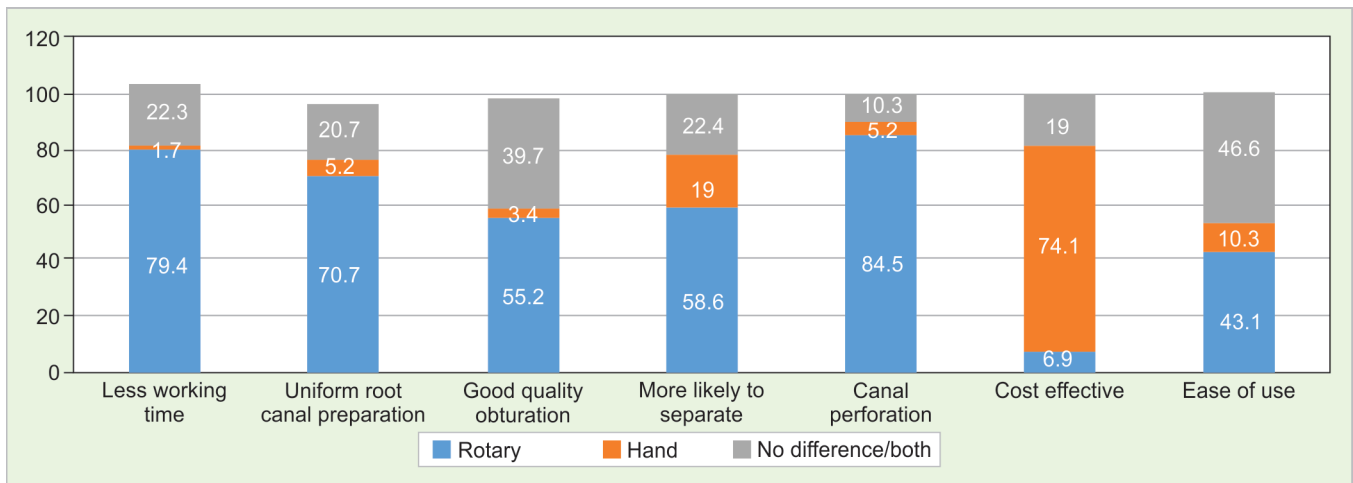


Fig. 8: Pediatric dentists' preference of hand and rotary files

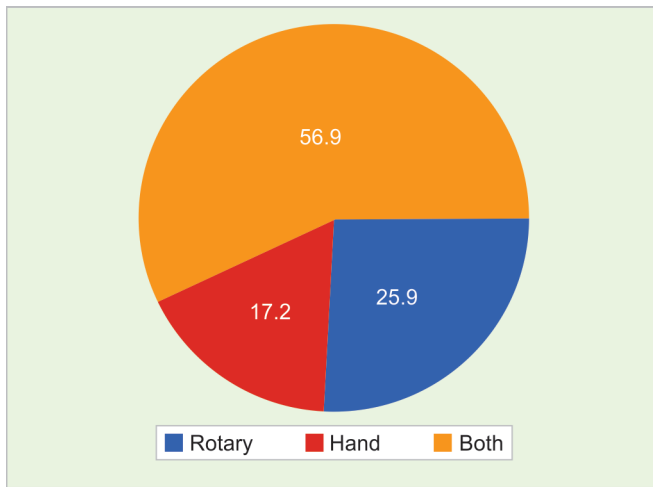


Fig. 9: Distribution according to patient acceptance

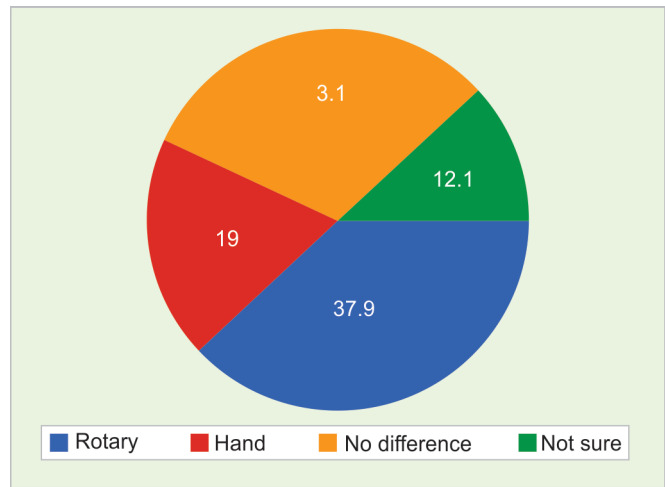


Fig. 10: Distribution according to better removal of pulp tissue

DISCUSSION

In our study, the perception and preference of pediatric dentists toward the usage of hand and rotary endodontic files in different clinical situations were evaluated. Also, the perception of pediatric dentists toward their clinical effectiveness was evaluated through a quantitative and qualitative assessment.

In our study, pediatric dentists perceived rotary files to consume less working time (79.4%), result in less hand fatigue, uniform canal preparation, and enabling good quality obturation (55.2%). Silva et al.⁹ conducted an *in vitro* randomized controlled trial and reported no difference in a clinical capacity with hand and rotary files. However, they reported a reduction in instrumentation time with the usage of rotary files. Panchal et al.¹² reported a higher number of optimal obturation with rotary instrumentation compared with hand files. Similar findings are reported by Govindaraju et al.¹³ and Romero et al.¹⁴ Gradual progression of taper coronally gives a conical shape to the canals resulting in a consistently uniform preparation and fill.^{1,3}

However, pediatric dentists perceived rotary files to be more likely to separate in the canal. Nagaratna et al. have pointed out that a higher fracture rate is the greatest disadvantage of using rotary instrumentation in primary teeth.

In our study, the majority (84.5%) of them felt rotary files are more likely to cause canal perforation. Further research is needed to support this.

While hand files are preferred in patients with limited cooperation, in narrow canals. Hand files are also found to be cost-effective. Advantages that were listed by the participants for hand files were good control and tactile sensation. However, chances of slippage of hand files are thought to be more while doing patient under physical restraint, operator hand fatigue is listed as the major disadvantages.

While Ni-Ti usage of rotary instruments decreases working time thereby increasing the patient cooperation and physician hand fatigue.¹⁵

LIMITATIONS

One of the limitations of our study was the small sample size. A study with a larger sample size from encompassing clinicians and academicians from different regions with varied experience levels is recommended. And the perception of pediatric dentists has to be further verified by *in vitro* studies and clinical trials.

CONCLUSION

Pediatric dentists preferred to use both the file systems rather than any single system depending upon the clinical situation.

The majority of them perceived rotary files to be more clinically effective.

They preferred hand files in case of narrow canals and in patients with limited cooperation.

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