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# Pediatric dentist preference in using hand or rotary instrument in multi visit RCT in first permanent molars

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ABSTRACT

Paediatric endodontics is an important clinical procedure used to manage pulpally involved or non-vital teeth. Endodontic procedures can be done using hand or rotary instruments for the canal preparation and removal of organic debris. The aim of the study is to evaluate the preference of hand or rotary instrument in multi-visit RCT done in permanent molars by pediatric dentists. The study was conducted in a university setting. A total of 300 samples were collected and the data was collected from the dental archives software. It was tabulated in an excel sheet and was analysed by SPSS software by IBM. The output was represented in the form of graphs and pie charts. A total of 300 cases were tabulated. 80.4% preferred rotary type of instrument. The most common gender preferred was male (p value=0.002) and the age was 17 years of age (p-value = 0.986). The most common type of tooth preferred was the mower molars( p value= 0.158). It can be concluded from the study that the Rotary instrument was the most preferred instrument in the permanent molars. The preference was more towards the male patient and mandibular molars with an age group between 16-17 years.

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## INTRODUCTION

Oral health plays a very important role in the well being of individuals (Gurunathan and Shanmugaavel, 2016). Dental caries is a complex process of demineralization of the substance of the teeth leading to cavitation (Subramanyam *et al.*, 2019). Paediatric endodontics is an important clinical procedure which is commonly used to manage pulpally involved or non-vital teeth (Katge *et al.*, 2014). Teeth play an important role in the self-esteem of the children and play a pivotal role in speech development, esthetic and function (Ravikumar *et al.*, 2017). The main purpose of instrumentation in pulpectomy procedures if the primary teeth are the removal of organic debris (Azar *et al.*, 2012). The success of the root canal treatment depends upon the methods and quality of instrumentation, irrigation, disinfection and proper three-dimensional obturation of the root canal. Primary teeth act as a natural space maintainer and guide the eruption of permanent teeth to their optimal position in the dental arch. Thus the retention and preservation of the primary tooth in the dental arch is of urgent importance (Panchal *et al.*, 2019). For ideal management of necrotic pulp in deciduous teeth, endodontic treatment is the treatment of choice. The treatment can take place either in a single sitting or in multiple sitting.

The conventional endodontic treatment techniques for primary teeth remain hand instrumentation. The use of hand instrumentation is often time-

consuming and can cause fatigue to the operator as well as the child. Rotary instrumentation was introduced in primary teeth by Barr et al. in 2000. Rotary instruments come with their own advantages and disadvantages in both primary as well as in permanent teeth. The introduction of rotary instruments has made the endodontic procedure in primary and primary teeth easier and much faster than compared to manual instrumentation. According to a study done by silva et al. reported a decreased duration of time for root canal preparation with a rotary in primary teeth. Many studies have shown that the use of nickel-titanium rotary instruments provides a good taper and preparation of the root canal, thus providing better Obturation quality with minimal risk of ledge formation or transportation. Although rotary instruments have been widely used for endodontic procedures in permanent teeth, their use in Pediatric dentistry is an emerging practice (Govindaraju *et al.*, 2017c). There is no evidence of literature present that evaluates the knowledge and preference on the type of instrumentation for pulpectomy in primary teeth.

The need for this type of research helps us to get better insight and data on the preference of rotary or hand instruments. The use of rotary instruments was less grime consuming and had a decreased chair time for pediatric patients. With the use of rotary instruments, the procedural time taken for pulpectomy procedure has decreased, which in turn has increased the cooperation of the children. The aim of this study is to evaluate the preference of hand or rotary type of instrumentation in multivisist RCT done in first permanent molars by Pediatric dentists.

## MATERIALS AND METHODS

This retrospective study was conducted in a university setting. The main advantage of this study includes easy access to data. The ethical approval was obtained from the institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The data of 86000 patients between June 2019 and March 2020 were reviewed and analysed. Inclusion criteria were children below the age group of 18 and complete database in the software. Exclusion criteria were children above 18 years of age and incomplete databases in the software. To minimise the sampling bias, simple random sampling was done. Therefore the total sample size taken for the study was 300. There are high internal validity and less external validity in the study.

The data collected were tabulated in an excel sheet. Data analysis was done using SPSS software by IBM and the statistical analysis used was the chi-square test. The output obtained from the analysis was represented in the form of a pie chart and bar graphs.

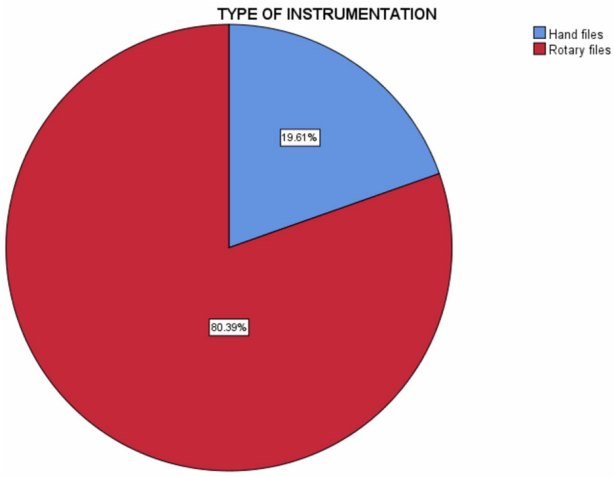


**Figure 1: piechart depicts the preference of rotary or hand type of instrumentation among Pediatric dentists.**

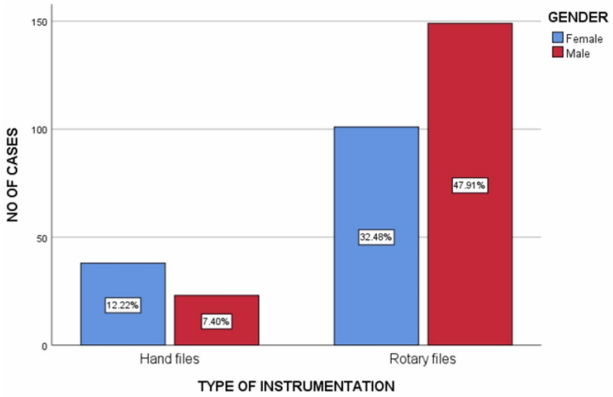


**Figure 2: Bar graph represents the preference of rotary or hand type of instrumentation based on patients gender**

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 9.510[a] | 1 | .002 | | |
| Continuity Correction[b] | 8.645 | 1 | .003 | | |
| Likelihood Ratio | 9.492 | 1 | .002 | | |
| Fisher's Exact Test | | | | .002 | .002 |
| N of Valid Cases | 311 | | | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 27.26.
b. Computed only for a 2x2 table

**Figure 3: Table shows the chi-square value for the association between type of instrumentation and the patient's gender.**

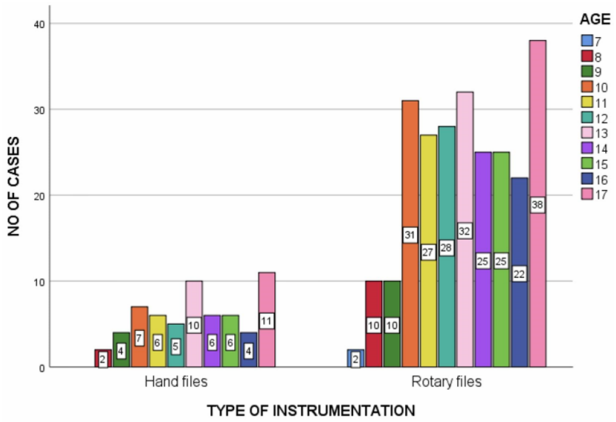


**Figure 4: Bargraph shows the preference of rotary or hand type of instrumentation based in different age groups.**

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 2.777[a] | 10 | .986 |
| Likelihood Ratio | 3.115 | 10 | .979 |
| N of Valid Cases | 311 | | |
| a. 4 cells (18.2%) have expected count less than 5. The minimum expected count is .39. | | | |

**Figure 5: Table depicting the chi-square test between the relation between the type of instrumentation and the patient's age.**

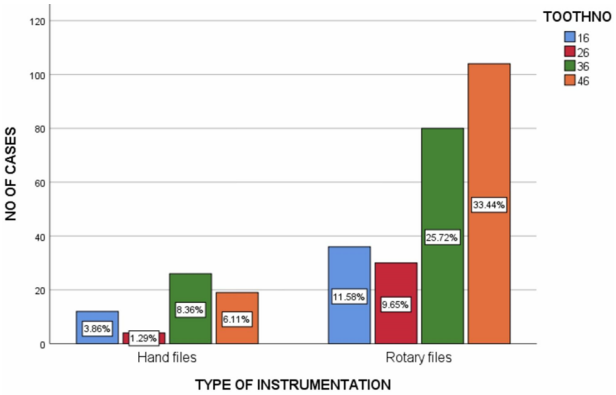


**Figure 6: Bargraph represents the preference of rotary or hand type of instrumentation based on different permanent teeth**

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 5.190[a] | 3 | .158 |
| Likelihood Ratio | 5.300 | 3 | .151 |
| N of Valid Cases | 311 | | |
| a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.67. | | | |

**Figure 7: Table depicting the chi-square test between the type of instrumentation and the tooth number.**

## RESULTS AND DISCUSSION

A total of 300 cases were collected and tabulated, in which 80.4% preferred the rotary type of instrument and 19.6% preferred the hand type of instrumentation (Figure 1 ). The preference of instruments based on gender showed that rotary instruments were more commonly preferred in male (149) and hand type of instrument was preferred in females(38). Chi-square test was done and the association was found to be significant statistically. Pearson's chi-square value: 9.510, DF- 1, p-value: 0.002 hence significant Figure 2 shows that Based on gender distribution, the rotary type of hand instrument was more preferred in male patients (149) compared to female patients(101). Hand instruments were more preferred in females (38) compared to Male (23)Figure 3. The preference of hand or rotary instrument based on the patient's age revealed that the rotary instrument was more preferred and commonly used in 17 years of age. Chi-square test was done and the association was found not to be significant statistically. Pearson's chi-square value:2.777, DF-10, p-value: 0.986 hence not significant (Figures 4 and 5). The preference of the rotary type of instrument based on different permanent teeth showed that the rotary instrument was more preferred in lower right first molar (104%) and hand instrument was preferred in lower left first molar. (26%). Chi-square test was done and the association was found not to be significant statistically. Pearson's chi-square value:5.190, DF-3, p-value: 0.158, hence not significant Figure 6 shows that Based on the tooth number, the rotary instrument was preferred in 46(104%) and the hand instrument was preferred in 36( 26%),Figure 7 .

Early childhood caries is one of the most prevalent diseases of children worldwide. It is driven by a dysbiotic stare if oral microorganisms mainly caused by a sugar-rich diet. ECC does not only lead to destruction and dental plan but also affects the quality of life of the caregivers (Meyer and Enax, 2018). The dentist should correlate the morphological variations during a clinical examination to avoid any misdiagnosis and wrong treatment (Christabel, 2015). Imaging techniques can be employed to know the extent of the lesion (Packiri, 2017). There are various for prevention of dental caries such as the use of topical fluoride (Somasundaram *et al.*, 2015). Fluoride by far is one effective way in declining the prevalence of caries (Ramakrishnan and Bhukri, 2018). Proper brushing habits should be taught to remove plaque formation and prevent dental caries (Govindaraju, 2017). A pulpectomy is the most preferred treatment of choice for non-vital teeth (Jeevanan-

dan *et al.*, 2019). Pulp therapy can be performed using various instrumentation techniques (Govindaraju *et al.*, 2017a). Root canal treatment consists of removal of bacteria debris from the canal by biomechanical means like and shaping, to prevent infection (Patturaja *et al.*, 2018). The cleaning and shaping of the canal are one of the most important steps in endodontic therapy. Root canal anatomy is quite complex and to clean and shape these canals successfully requires appropriately designed instruments (Byström and Sundqvist, 1981). This can be achieved by the use of hand and rotary type of instrumentation. The following details can be summarised from the results obtained shows that the mean age was observed to be at 13.8 years. The most common gender included male, which showed 55.3% and female showed 44.7%. It was found that about 80.4% of dentists preferred rotary instruments. The most common age group preferred for a rotary type of instrumentation was 17years of age, with Male being the most preferred gender. The most commonly preferred tooth for rotary instruments included the lower molars.

Rotary biomechanical preparation for deciduous teeth was first introduced and described by Barr et al. There are no proper and clear guidelines for the instrumentation of primary teeth root canal instruments with rotary files. Rotary files show a better quality of Obturation compared to other instruments (Govindaraju *et al.*, 2017b). In the present study, the most commonly preferred type of instrumentation included the rotary type of instrumentation which showed 80.9%. Rotary instruments had a greater ability to negotiate curved canals and reduce the iatrogenic errors by maintaining the original path and allowing larger apical preparation of the canals. Rotary instruments are faster, cost-effective and give a predictable filling (Nair *et al.*, 2018). A study by kathariya et al. In 2013 agreed that 67.3% of the 3rd year postgraduates prefered NiTi rotary files for canal preparation in primary teeth. Whereas a study conducted by Jyothy et al. among practitioners in Chennai, non-rotary manual files were found to be the most commonly preferred type of instrumentation used. The rotary instruments are flexible, have the excellent cutting ability, time-saving and help in perfect shaping of the canal. The most common gender in the study was found to be Male which showed 55.3%. According to a study conducted in the Bundelkhand region, reported a high prevalence of dental caries in boys compared to girls in both primary and permanent dentitions. The prevalence of caries could be high due to lack of socioeconomic status, poor oral hygiene practises, lack of Awareness and improper food intake.

The study also shows the most common age group to be 17 years of age. For individuals who are less than 20, the larger canals do not require additional widening. Rotary instruments allow efficient cleaning of the large and oval canal. Rotary files have reduced instrumentation time and better quality of obturation (Jeevanandan and Govindaraju, 2018). Children at this age are highly cooperative and easy to handle; this can be explained by the formal operational stage which begins approximately from the age of 12 and lasts into adulthood. This is the final stage of Jean Piaget theory of cognitive development. At this point of development, the thinking becomes advanced and more sophisticated. The child understands better and is able to comprehend and understand, thereby making the treatment easier. According to the study, the most common teeth preferred for rotary instruments included the lower molars. According to Wyne, reported that 87% and 86% of the 12-year-old children had lower premolar affected by caries. The reason for high caries prevalence could be due to various reasons, such as deep pits and fissures on the occlusal surface, the large size of the crown which leads to accumulation of the acid produced by the bacteria, early eruption of the tooth. Wyne reported that, as the age of the child increased, they are more exposed to cariogenic factors, thereby, more and more teeth become carious. It could be due to their anatomical structure, early eruption, and position in the mouth as well as the amount of Streptococcus mutans levels in the mouth.

The benefits of the study include easy data collection and internal validity. The limitations of the present study were reduced sample size, limited geographic data and unequal distribution of cases. The future scope of this study will include a large sample size with different ethnicity, which can provide better results.

## CONCLUSION

Within the limitations of the study, it can be concluded from the study that rotary instruments were the most preferred technique for root canal treatment in permanent molars. The preference was more towards the male patients and mandibular molars with an age group of age between 16-17 years.

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**Conflict of Interest**

The authors declare that they have no conflict of interest for this study.

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