

Original Research

Comparison of manual vs rotary instrumentation for pulpectomies in children

Nimrah Kawoos¹, Avantika Tuli², Ayush Pokhriyal³

¹Post Graduate Student, ²Professor Department of Pedodontics, Seema Dental College and Hospital Rishikesh;

³Private Practitioner, Rishikesh

ABSTRACT:

Background: The present study was conducted to compare manual vs rotary instrumentation in molar pulpectomy in children. **Materials & Methods:** The present study was conducted on 40 children age ranged 4- 10 years of both gender. Patients were divided into 2 groups. Group I (N = 20): The root canals were instrumented with manual files as per manufacturer's recommendation. Group II (N = 20): the root canals were instrumented with rotary. A postobturation radiograph was taken to assess the quality of obturation. **Results:** The mean instrumentation time in group I was 25.7 minutes and I group II was 19.2 minutes. Obturation time in group I was 5.6 minutes in group I and 4.2 minutes in group II. The difference was significant (P < 0.05). Quality of obturation was under fill in 16% in group I, 13% in group II, optimal 58% in group I, 60% in group II, over fill 26% in group I, 27% in group II The difference was significant (P < 0.05). **Conclusion:** Authors found that there was significant less instrumentation and obturation time in rotary instrumentation than manual instrumentation.

Key words: Manual, Rotary, Obturation

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Corresponding author: Dr Nimrah Kawoos, Post Graduate Student, Department of Pedodontics, Seema Dental College and Hospital, Rishikesh

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INTRODUCTION

Premature loss of primary teeth still remains a common problem. Retaining pulpally involved primary teeth preserves arch space which decreases aberrant tongue habits, maintains esthetics, and helps in normal eruption of succedaneous teeth.¹ One of the treatment options for pulpally affected primary molars is pulpectomy, which has several advantages over extraction. The procedure includes removal of irreversibly inflamed or necrotic radicular pulp tissue, cleaning the root canal system, followed by root canal filling. The success of pulpectomy treatment depends on the method and the quality of instrumentation, irrigation, disinfection and obturation of the root canal.²

Bacteria play an essential role in the initiation and perpetuation of pulpal and periapical disease. The primary objectives when cleaning and shaping the root canal system is to remove soft and hard bacteria-containing tissue, provide an irrigation path for to the apical third, instilling space for instruments, subsequent obturation, and retaining

the integrity of radicular structures.³ Thus, success of pulpectomy depends on elimination of irrigation pathway by cleaning and shaping the root canals.⁴

Root canal preparation is performed with reamers, files, burs, sonic instruments, mechanical apparatuses, and with nickel-titanium (Ni-Ti) rotary file systems.⁵ Since most hand preparation techniques are time consuming and can lead to iatrogenic errors (i.e., ledging, zipping canal transportation, and apical blockage), much attention has been directed toward root canal preparation technique with Ni-Ti rotary instruments.⁶ The present study was conducted to compare manual vs rotary instrumentation in molar pulpectomy in children.

MATERIALS & METHODS

The present study was conducted in the department of Pedodontics. It comprised of 40 children age ranged 4- 10 years of both gender. Ethical clearance was obtained prior

to the study. Consent was obtained from parents of all children before the procedure. Information such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I (N = 20): The root canals were instrumented with manual files as per manufacturer’s recommendation. Group II (N = 20): the root canals were instrumented with rotary. A postobturation radiograph was taken to assess the quality of obturation.

The assessment of obturation quality was graded as under filling-all the canals were filled more than 2 mm short of the apex, optimal filling- one or more of the canals having ZOE ending at the radiographic apex or upto 2 mm short of the apex, over filling any canal showing ZOE outside the root. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Methods	Manual	Rotary
Number	20	20

Table I shows that group I root canals were instrumented with manual files and group II with rotary. Each group had 20 patients.

Table II Comparison of instrumentation and obturation time

Groups	Group I	Group II	P value
Instrumentation time (Mins)	25.7	19.2	0.05
Obturation time (Mins)	5.6	4.2	0.02

Table II, graph I shows that mean instrumentation time in group I was 25.7 minutes and I group II was 19.2 minutes. Obturation time in group I was 5.6 minutes in group I and 4.2 minutes in group II. The difference was significant (P< 0.05).

Graph I: Comparison of instrumentation and obturation time

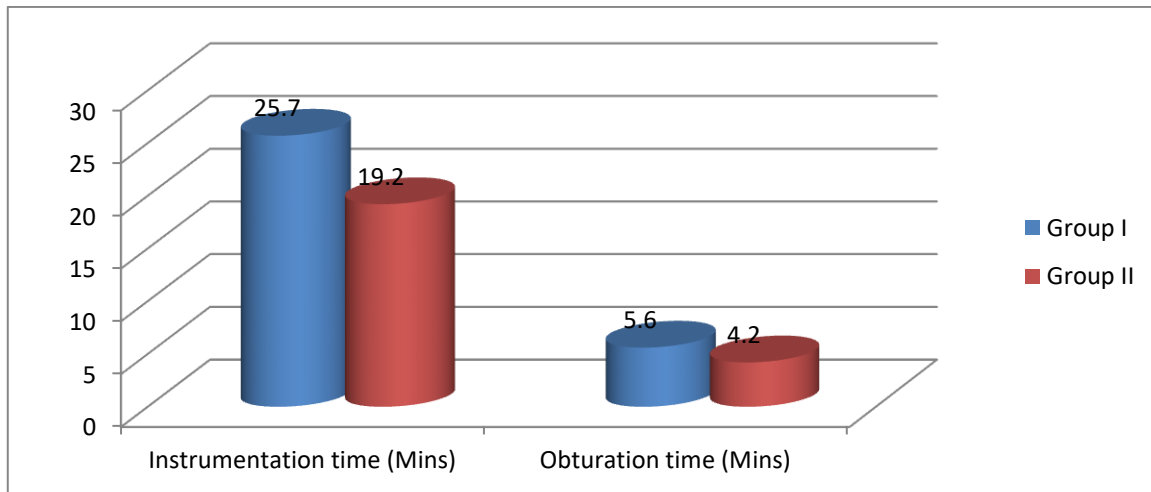
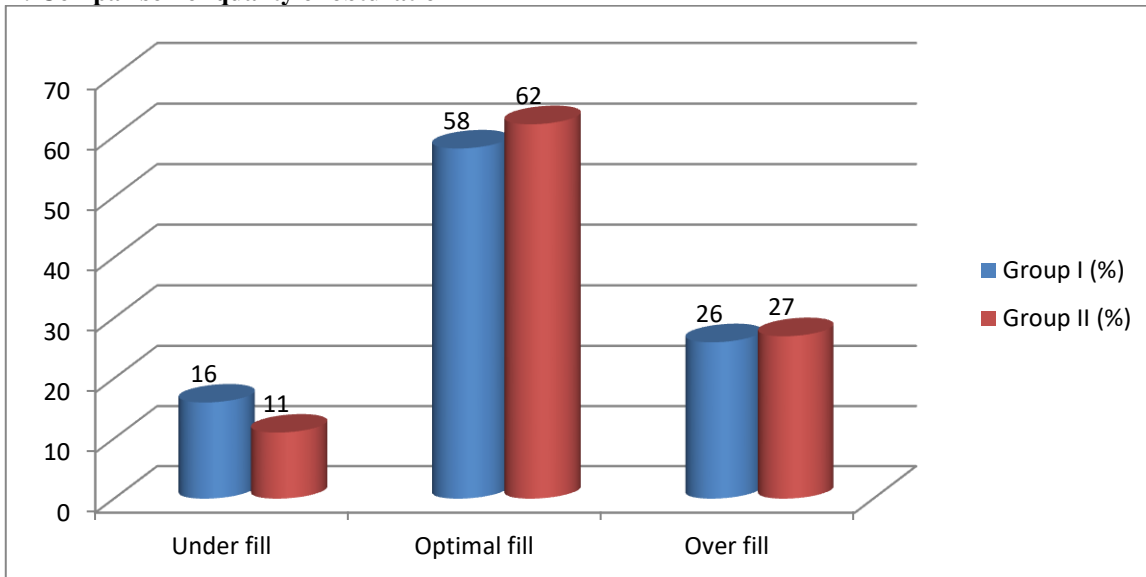


Table II Comparison of quality of obturation

Quality	Group I (%)	Group II (%)	P value
Under fill	16	11	0.01
Optimal fill	58	62	0.15
Over fill	26	27	0.02

Table II, graph I shows that quality of obturation was under fill in 16% in group I, 13% in group II, optimal 58% in group I, 60% in group II, over fill 26% in group I, 27% in group II The difference was significant (P< 0.05).

Graph II: Comparison of quality of obturation



DISCUSSION

In children, the objective of root canal treatment is to completely remove the infected tissue and seal the canal(s) with a biocompatible material.⁷ Completing the root canal procedure in a shorter time and at the same time providing good quality treatment is the choice of interest for most practitioners. A decreased instrumentation time reduces the patient's and dentist's fatigue, thereby allowing a faster, safer and quality procedure. On the contrary, Madan et al⁸, demonstrated an increased instrumentation time in primary teeth on comparing rotary profiles to manual K-files. According to the authors themselves, this could be attributed to the operator's experience and number of files used during rotary instrumentation. The present study was conducted to compare manual vs rotary instrumentation in molar pulpectomy in children.

In this study, group I root canals were instrumented with manual files and group II with rotary. Each group had 20 patients. Bahrololoomi et al⁹ conducted a study in which sixty pulpally involved primary mandibular second molars requiring pulpectomy treatment were randomly assigned for manual or rotary instrumentation in children aged 4e7 years. The endodontic procedural steps were similar except the method of root canal instrumentation i.e. manual group (Stainless steel files 2% taper) and rotary group (Hyflex CM NiTi rotary files 4% taper).The mean instrumentation time for the manual and rotary groups were 25.71 ± 3.84and 19.37 ± 4.94 min respectively with a statistically significant difference (p < 0.001) between the groups. The differences between the groups' obturation time, quality of obturation, and complications during instrumentation were not statistically significant(p > 0.05). At 24 months, the clinical success was 92.3% and 85.2% (p ¼ 0.52) whereas theradiographic success was 65.4% and 66.7% (p ¼ 0.78) comparing the manual and rotary groups respectively.

Rotary instrumentation takes significantly less time than manual. There was no difference in obturation time, quality of obturation, or success rates after 24 months.

We found that mean instrumentation time in group I was 25.7 minutes and I group II was 19.2 minutes. Obturation time in group I was 5.6 minutes in group I and 4.2 minutes in group II. The difference was significant (P< 0.05). The quality of obturation was under fill in 16% in group I, 13% in group II, optimal 58% in group I, 60% in group II, over fill 26% in group I, 27% in group II The difference was significant (P< 0.05).

Moghaddam et al¹⁰ in their study compared the quality of obturation and instrumentation time during root canal preparation using hand files and modified rotary file systems in primary molars. Forty-five primary mandibular molars were randomly assigned to three experimental groups (n=15). Group I was instrumented using k-hand files, Group II with S2 ProTaper universal file and Group III with 0.25 tip 4% taper K3 rotary file. Standardized digital radiographs were taken before and after root canal instrumentation. Root canal preparation time was also recorded. No significant differences were noted with regard to the quality of obturation (p=0.791). However, a statistically significant difference was noted in the instrumentation time between the three groups (p<0.05). ProTaper rotary system had significantly lesser instrumentation time when compared to that of K3 rotary system and hand file system.

CONCLUSION

Authors found that there was significant less instrumentation and obturation time in rotary instrumentation than manual instrumentation.

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