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Comparison of Hand Files and NiTi Rotary in Primary Teeth: A Randomized Controlled Study

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ABSTRACT

Background: Primary teeth are different from permanent teeth in canal morphology and tendency for root resorption therefore they need special attention. The present study was conducted to compare the hand files and NiTi rotary instrumentation techniques in deciduous teeth.

Material and methods: The present study was conducted in the Department of Pedodontics & Preventive Dentistry. The sample size of 40 patients were selected in the age range of 5–9 years. General information such as name, age, gender, systemic condition, and dental history was recorded. Patients were divided into two groups of 20 each. Group I patients were treated with rotary endodontic technique and Group II patients with hand files. In all patients, deciduous first molar was selected. The quality of filling was labeled as optimal, underfilled, and overfilled. Statistical analysis was done using SPSS software for Windows, Version 21.0. Chicago: SPSS Inc.

Results: Group I was K3 NiTi files in which total patients were 20 whereas in Group II i.e. Stainless steel K files total patients were also 20. In group I boys were 7 whereas girls were 13 whereas in group II boys were 13 whereas girls were 7. In group I mean instrumentation time was less than group II. In group I obturation quality was optimal in 15(75%) patients whereas in group II obturation quality was optimal in 13(65%) patients.

Conclusion: Our study concluded that rotary files were better than hand files in both instrumentation time and obturation quality.

Keywords: Rotary files, hand files, obturation.

INTRODUCTION

Primary teeth act as a natural space maintainer and guide the eruption of permanent teeth to their optimal position in the dental arch. The retention and preservation of the primary tooth in the dental arch in its normal function and free of pathology is of utmost importance. Preserving the integrity of primary dentition will aid in mastication, prevent aberrant tongue movement, prevent speech problems, maintains esthetics, prevents psychological effects associated with tooth loss, and maintains the normal eruption of the succedaneous teeth.[1] For ideal management of the necrotic pulp in deciduous teeth, endodontic treatment (pulpectomy) remains the treatment of choice.[2] The primary aim of pulpectomy in deciduous teeth is to debride the root canal and maintain the nonpathologic state until the exfoliation of the tooth.[2] This can be achieved by the careful manipulation of the root canal with the instruments and adherence to the biologic principles essential for cleaning and promote healing.[3] Pulpectomy is the choice of treating symptomatic decayed primary

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teeth and is a challenging and time-consuming procedure in pediatric dentistry.[4] An efficient chemomechanical preparation is essential for effective canal disinfection and thereby contributes to the success of the endodontic procedure.[5] Conventionally, hand files are used for cleaning and shaping and are time-consuming.[6] The length of the appointment is strongly associated with the child's behavior.[7] Removal of organic debris is the primary goal of canal preparation in primary teeth.[8] Rotary instrumentation has been introduced in primary teeth by Barr *et al*. in 2000.[9] Rotary instrumentation pose its own advantages and disadvantages in both primary as well as permanent teeth. The use of rotary system aids in uniform preparation and adequate debridement of root canals. Silva *et al*. reported decreased duration of time for root canal preparation with a rotary in primary teeth.[10] Therefore, the present study was conducted to compare the hand files and NiTi rotary instrumentation techniques in deciduous teeth.

MATERIAL AND METHODS

The present study was conducted in the Department of Pedodontics & Preventive Dentistry. The sample size of 40 patients were selected in the age range of 5–9 years. Parents were informed regarding the study, and written consent was obtained from the parents. The study protocol was approved by the Institutional Ethical Committee. The patients with one or two teeth with necrotic pulp, teeth with the presence of 2/3rd of root portion, and teeth with the presence of periapical radiolucency were included in the study. Patients having mobile teeth, perforation in pulpal floor, teeth with resorbed roots, and uncooperative patients were excluded from the study. General information such as name, age, gender, systemic condition, and dental history was recorded. Patients were divided into two groups of 20 each. Group I patients were treated with rotary endodontic technique and Group II patients with hand files. In all patients, deciduous first molar was selected. Tooth was isolated using rubber dam. Local anesthesia was administered following standardized technique. Once anesthesia was achieved, access opening was started using round carbide bur (No. 4). Working length was determined with no. 10 file. In Group I, tooth was prepared using K3 Ni-Ti files and in Group II with stainless steel K files. Crown-down technique was used by using tapered files. Simultaneously, irrigation with 1% NaOCl was done. After completion of the procedure, the canals were filled with iodoform paste. Coronal portion was restored with glass ionomer cement. The time taken for instrumentation and obturating the canals in both groups was recorded. The quality of filling was labeled as optimal, underfilled, and overfilled. Statistical analysis was done using SPSS software for Windows, Version 21.0. Chicago: SPSS Inc.

RESULTS

In the present study, total participants were 40. Group I was K3 NiTi files in which total patients were 20 whereas in Group II i.e. Stainless steel K files total patients were also 20. In group I boys were 7 whereas girls were 13 whereas in group II boys were 13 whereas girls were 7. In group I mean instrumentation time was less than group II. In group I obturation quality was optimal in 15(75%) patients whereas in group II obturation quality was optimal in 13(65%) patients.

Table 1: distribution of patients.

Group	Technique	No. Of patients
Group I	K3 NiTi files	20
Group II	Stainless steel K files	20
Total		40

Table 2: Distribution according to gender.

Gender	K3 NiTi files	Stainless steel K files
Boys	7	13
girls	13	7

Table 3: Mean instrumentation time.

Group (n)	Mean instrumentation time	SD
Group I(20)	8.18	0.56
Group II(20)	11.70	0.94

Table 4: Obturation Quality.

Obturation Quality	Group I n(%)	Group II n(%)	Total	P-value
Optimal	15(75%)	13(65%)	28(70%)	<0.001
Over	4(20%)	3(15%)	7(17.5%)	
Under	1(5%)	4(20%)	5(12.5%)	
Total	20 (100%)	20(100%)	40(100%)	

DISCUSSION

Pulpectomy should be the treatment option to maintain the integrity of facial tissue. Cleaning and shaping of the root canal is an important step in pulpectomy. The success of an endodontic procedure depends on the proper mechanical debridement and obturation quality.[11] In pediatric dentistry, the duration of the treatment is very essential in decreasing the anxiety among children. Shorter treatment duration decreases the anxiety, thus rendering optimal treatment protocol.[12]

In the present study, Group I was K3 NiTi files in which total patients were 20 whereas in Group II i.e. Stainless steel K files total patients were also 20. In group I boys were 7 whereas girls were 13 whereas in group II boys were 13 whereas girls were 7. In group I mean instrumentation time was less than group II. In group I obturation quality was optimal in 15(75%) patients whereas in group II obturation quality was optimal in 13(65%) patients. Makarem *et al*. has reported decreased chair side time with rotary instrumentation than with hand instrumentation.[13]

Jeevanandan in his study suggested that, though Ni-Ti instruments are widely used for root canal preparation in permanent tooth than primary teeth, there is effective and accurate filling with rotary system. The time taken for root canal preparation with the rotary method is less compared to conventional manual method.[14] Katge *et al*. in their study compared instrumentation time and cleaning efficiency between manual and rotary systems. Ninety primary molars were divided into three groups. In Group I, H-files were used for instrumentation; in Group II, Mtwo files were used; the authors found Mtwo files better than H-files.[15]

Elnagar *et al.* in their study evaluated and compared the cleaning efficacy of rotary and manual systems for root canal preparation in primary teeth. It comprised thirty single-rooted human primary teeth. Teeth were divided into two groups. In Group I, teeth were manually instrumented with Ni-Ti K files. In Group II, Revo-S™ rotary instruments were used. There was better cleanliness with Revo-S rotary system than that obtained by manual system.[16]

Govindaraju *et al*. in their study compared hand files, Protaper, and Mtwo files for canal instrumentation. The authors observed less canal instrumentation time with rotary files. There was no significant difference in the quality of obturation among the three groups.[17] Govindaraju *et al*. in another study found that there was a decrease in the instrumentation time with Protaper files followed by K3 rotary files. There was no statistically significant difference in the quality of obturation between rotary and hand instrumentation.[18]

CONCLUSION

Our study concluded that rotary files were better than hand files in both instrumentation time and obturation quality.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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