



EVALUATION OF PATIENT BEHAVIOR, INSTRUMENTATION TIME AND QUALITY OF OBTURATION OF KEDO S ROTARY FILES IN PRIMARY MOLARS: AN IN VIVO STUDY

Pedodontics

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ABSTRACT

INTRODUCTION: Complex root morphology of primary molars makes the endodontic treatment difficult and sometimes impractical. Advancing technology has brought rotary system to reduce manual agility and improve the quality of treatment in Paediatric Dentistry. Aim: To evaluate the behavior of patient, instrumentation time and quality of obturation with rotary Kedo-S files in deciduous molar. **METHODS:** An evaluative study was conducted, in which twenty pulpectomies were performed on deciduous molars in twenty patients using Kedo-S rotary files. Patients showing definitely positive (++) and positive (+) behavior according to Frankl's behavior rating scale rating were included in the study. The behavior of the patient and instrumentation time, and assessed clinically. Obturation quality was assessed radiographically.

RESULTS: 19 patients has no change in behaviour from the initial behavior. Instrumentation time was 8.486+/- 1.232 minutes and overall Obturation had good success.

CONCLUSION: Kedo-S has good obturation quality and patient acceptance.

KEYWORDS

INTRODUCTION

Retain the primary teeth in the oral cavity until its physiological exfoliation to preserve arch integrity is the principal goal in Paediatric dentistry (Ranly and Garcia-Godoy 2000).¹ Pulpectomy is the treatment procedure for symptomatic primary teeth with chronic inflammation or necrosis of the radicular pulp. The pulpectomy procedure involves complete removal of the pulpal tissue, debridement and preparation of the canal space followed by obturation with a suitable restorable material (Fuks and Papagiannoulis 2006).² The success of pulpectomy is greatly determined by the biomechanical cleaning and shaping (Haapasalo et al. 2005). Adequate removal of the infected tissue and shaping of the canals that provide a pathway for the irrigating to reach the apical third of the root can be achieved by proper cleaning and shaping.⁴

Apart from the meticulous cleaning and shaping, time taken for the procedure is one of the important consideration in Paediatric dentistry.⁵ Various factors affects the behavior of the child in the dental chair, of which duration of the procedure is a factor which can alter the mood of the child. By considering these objectives Baar et al introduced rotary instrumentation in primary teeth.⁶ Various studies in the literature about the rotary file suggest that use of rotary files provides the adequate debridement and uniform preparation of the root canal that leads to achieving a good quality of obturation.^{7,8,9} Time to time various file system have been introduced in the dentistry which all are meant for the use in permanent teeth. Until 2016 there were no files specifically designed for primary teeth. In 2016 a file system developed by Ganeesh Jeevanandan, was an exclusive Paediatric rotary files with varying taper according to root canal anatomy of primary teeth and reduced length. A case-report presented by Ganeesh jeevanandan in 2017 suggest the use of Kedo-S files due to its better root canal preparation and quality of obturation.¹⁰ Veerale Panchal, Ganeesh Jeevanandan and EMG Subramanian in their comparative study observed good quality obturation with less instrumentation time for the Kedo -S file.⁹ Some other studies also in the literature by using Kedo -S file but none of the study did not directly evaluate the behavior of the child while using the Kedo-S rotary files for cleaning and shaping.

So this study aims to compare the behavior changes while using Kedo-S for root canal preparation along with evaluation of the instrumentation time and quality of obturation.

MATERIALS AND METHODS

The present evaluative study was conducted in the department of

Paediatric and Preventive dentistry HPGDC Shimla.

Information: Information regarding the study and obtained a written consent prior to the procedure from them. The inclusion criteria were children with definitely positive and positive according to Frankl's behavior rating scale aged 4-6 years, no history of systemic conditions, and asymptomatic deciduous molars with presence of two-third of the roots with diagnosis of pulpal necrosis due to carious lesion. Children special health care needs were excluded from the study.

Procedure were started on 22 children of which 2 children did not follow up after procedure. So finally 20 children were selected for the study. Initial behavior before procedure according to Frankl's behavior rating scale was noted by another Paedodontist who was unaware of the study. After access cavity preparation instrumentation done with Kedo-S file based on the manufacture instructions. Local anaesthesia was administered prior to the procedure. After application of topical anaesthetic agent, the tooth was anaesthetized using 2% Lignocaine hydrochloride (LOX*2% ADRENALINE, Neon Laboratories limited, India) with 1:80000 adrenaline using a 2 ml syringe. Isolation of the tooth was made with rubber dam (GDC, Hoshiarpur, Punjab, India). After access cavity preparation patency of the root canals were established with No.10 K file (MANI) and working length was determined from the preoperative radiograph. Root canals were prepared using Kedo-S files (Figure 2) (Reeganz Dental Care, Pvt, Ltd). Initial instrumentation was performed using #15 size K-file followed by D1 and E1 of Kedo-S file system using X-Smart endomotor (Dentsply Maillefer, OK, USA) The torque and speed were set as 2.2-2.4 N cm and 250-300 rpm respectively in lateral brushing motion.. The canals were irrigated with 2mL of 3% sodium hypochlorite with 29 gauge syringe. During instrumentation any change from the initial behavior was checked and recorded and instrumentation time also noted by using stop watch. The root canals were dried using paper points and obturated using metapex (META Biomed Co, PA, USA). The teeth were restored with GIC.

Quality of the obturation was assessed using radiograph. Criteria to assess the quality of obturation depicted in table .1

Quality of obturation	Inference
Optimal obturaion	Obturation at or within 2 mm of radiographic apex
Over obtuartion	Obturation beyond the apex
Under obturation	Obturation 2-mm short of radiographic apex

Follow up the patient after 2 weeks and evaluated the behaviour of the patient.

STATISTICAL ANALYSIS

Following evaluation of the patient behaviour, instrumentation time and the results score were recorded on the excel sheet and means and standard error was enlisted for the same. Mean instrumentation time was calculated and Friedman test was used to analysed the patient behavior. For the evaluation of radiographic quality of the obturation chi square test was used.

RESULTS

Out of 20 treated patients 12 were male children and rest were females. 14 patients were showed initial positive behaviour and 6 were showed positive behavior, out of these, 19(91.1%) patients showed no change from the initial definitively positive and positive behavior, 1 (9.9%) of the patient changed from the initial positive behaviour to negative behavior during the procedure and on follow up visit. Comparison between before and during the procedure and on follow up visit was carried out by Friedman test and there was no significant difference (p>.05).

Table 2: Evaluation of instrumentation time

Sample size (N)	Mean instrumentation time	Standard deviation	Range	Maximum	Minimum
20	8.486	1.232	4.318	6.102	10.42

Table 3: Evaluation of patient behavior

Behaviour of child before procedure		Behaviour of child during procedure		Behaviour of child on follow up visit	
Definitively positive	Positive	Definitively negative	Negative	Definitively Negative	Negative
6	14	0	1	0	1
P= .64; NS					

Statistical Analysis: Friedman test. Statistically significant if P<0.05

Evaluation of the radiographic obturation quality depicted that significantly more number optimal obturation as compared to under and over obturation after instrumentation with Kedo-S file system.

Figure 1,2 and 3 showing the over obturation, optimal obturation and under obturation of the root canals.



Fig.1: Over obturation in the distal canal



Fig.2: Optimum obturation



Fig.3: Under obturation in distal canal

Table 4: Evaluation of radiographic obturation quality

Obturation	Number of subjects	Percentages	Chi-square value	P value
Optimum obturation	15	75	15.7	<0.001*
Under obturation	3	15		
Over obturation	2	10		
Total	20	100		

Optimum obturation	15	75	15.7	<0.001*
Under obturation	3	15		
Over obturation	2	10		
Total	20	100		

Statistical Analysis: Chi-square test. P<0.05: Statistically significant. * denotes mean difference is significant at the 0.05 level.

DISCUSSION

The morphology of the primary teeth differs greatly from that of the permanent teeth as the roots of the primary teeth are short, thin, curved and have softer and less dense root dentine with undetectable root resorption.¹¹ In addition, the morphology of the root canals is ribbon-shaped which necessitates the need for an exclusive rotary file for cleaning and shaping of the primary teeth.¹² In 2016 Jeevanandan G presented a case report on Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth. In that case report, the Kedo-S Ni-Ti rotary instruments were used to prepare the root canals of the primary molars.¹⁰

Various studies reported in the literature which showed the reduction in the instrumentation time of Kedo-S file as compared to hand files.^{5,7} The present study designed to evaluate the behaviour of the patient, instrumentation time and quality of obturation using Kedo-S file in primary mandibular molars. After the consideration of all the inclusion and exclusion criteria 20 patients were selected in the study. Root canals were instrumented with D1 and E1 files according to diameter of the canal and obturation done with calcium hydroxide and iodofom paste (metapex).

Gauging patient behavior no significant difference was observed at pre, mid and post procedure intervals. Only one patient changed the behaviour from the initial positive behavior to negative behavior during the procedure and on follow up visit. It means that the acceptance of the patients to the Kedo-S file is significantly better. In search of research we could not find similar kind of study which evaluated the patient behaviour by using rotary files for instrumentation.

Rosa et al 2014 stated that length of the appointment had a paramount influence on the behavior of the children.¹³ Musale PK and Mujawar were of the opinion that decreased instrumentation time reduces the fatigue of the operator.¹⁴

Mean instrumentation time observed in our study was 8.486. In a comparative study by Panchal v et al observed that mean instrumentation time of Kedo-S file in primary molars was 9.380.⁵ Thomas e et al reported that mean instrumentation required for instrumentation of a canal was 11.58 minutes.¹⁵ Both of these observation also showed that instrumentation time of Kedo-S file was significantly less than hand files,

The evaluation of the obturation in this study showed that 75% obturation was optimal. It was significantly more as compared to under and over obturation. Panchal V et in 2018 and Govindaraju et al in 2019 found that quality of obturation after instrumentation with Kedo-S file is significantly more better than manual files.⁵

CONCLUSION

Patient acceptance of the rotary Kedo-S file is significantly good and quality of the obturation is also decent. This study paves a way to comparatively evaluate these parameters with other file system in primary teeth.

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