

Rotary Endodontics in Pediatric Dentistry: A Peek into the Future

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Abstract

Background: Pulpectomy is one of the most important procedures in maintaining the necrotic primary teeth until physiologic exfoliation. In clinical practice, time efficacy is important, especially in pediatric endodontics, where unpredictability and difficulty of root canal morphology adds to a clinician's challenge. The success of a pulpectomy procedure mainly depends on the chemomechanical preparation of the root canal systems. Adult endodontic procedures have been made easy with the introduction of nickel–titanium (NiTi) rotary files, however, its popularity in pediatric practice is constrained to a great extent. This article reviews the use of NiTi rotary files for root canal instrumentation in primary teeth.

Keywords: Nickel titanium, Pediatric endodontics, Pulpectomy, Rotary endodontics.

INTRODUCTION

Primary teeth also known as “baby teeth” are the valuable assets of a child and are important for eating, phonetics, and maintaining the arch length for the eruption of the permanent teeth. The major concern in the field of pediatric dentistry is the premature loss of the primary teeth, especially the molars, which may lead to lack of space, malocclusion, and midline discrepancies in the permanent dentition.^[1] The mixed dentition stage is the most dynamic phase in terms of changes in occlusion and final outcome of dentoskeletal relationship.^[2] Thus, the principal goal in pediatric dentistry is to retain the primary teeth in the oral cavity until its physiological exfoliation to preserve the arch integrity.^[3]

Endodontic intervention is considered to be the only viable option available to restore the dentition to a functional state.^[4] Pulpectomy aids in the retention of primary teeth with irreversible pulp pathology in a symptom-free state and is considered to be a conservative treatment approach, preventing the premature loss of primary teeth. Pulpectomy includes the removal of necrotic coronal and radicular pulp tissue with chemomechanical preparation of the canal space followed by obturation with a suitable resorbable material. The method and quality of instrumentation, irrigation, disinfection, and obturation are some of the important measures that define the success of the pulpectomy treatment.^[5]

Manual instrumentation has been used since many decades for cleaning and shaping in primary teeth,^[6] but there are limitations regarding length of the appointment, effective cleaning of root canals, possible ledge formation, perforations, dentin compaction, instrument fracture, etc.^[7] Considering the number of limitations posed by hand files, rotary files were introduced to pediatric endodontics by Barr *et al.*^[8] in the year 2000 which fulfilled the objectives of simplicity, speed, safety, and stress reduction for both the clinician and the patient.

Rotary instrumentation also showed certain limitations in pediatric endodontics. Drukteinis and Balciuniene^[9] proposed incomplete cleaning of the isthmus and fins of primary teeth by rotary instruments due to the centering of rotary instruments in the root canal. Nagaratna *et al.*^[10] reported that the increased risk of instrument fracture with rotary instruments is a potential limitation for its use in primary teeth. Rotary instrumentations are generally associated with cost overhead and damages which adds to the disadvantages.

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Table 1: Review on studies conducted on primary teeth using adult rotary file

Author/ investigator year	Rotary file system	Study design/methodology	Conclusion
Barr <i>et al.</i> (2000) ^[8]	Nickel–titanium Rotary files (NT; Profile .04 ISO Rotary Instruments, Dentsply/Tulsa, Tulsa, OK)	Reviewed the use of Ni–Ti rotary Profile .04 files for root canal instrumentation in primary teeth and described advantages and disadvantages of rotary files during pulpectomy along with specific recommendations regarding the selection of materials and devices	The use of Ni–Ti rotary Profile .04 files were faster than hand files and facilitates a uniform preparation and consistently dense fill
Silva <i>et al.</i> (2004) ^[13]	Rotary Profile .04 (Dentsply Maillefer, Ballaigues, Switzerland)	Evaluated the cleaning capacity and time needed for instrumentation of root canals of deciduous molars by K-files and rotary Profile 0.04 instrument	No differences were found for cleaning capacity but instrumentation time was less with rotary Profile instrument
Nagaratna <i>et al.</i> (2006) ^[10]	Profile .04 (Dentsply Tulsa Dental)	Compared the rotary Profile .04 and K-files on root canal preparation of primary and permanent molars for their efficiency in preparation time, instrument failure and shaping the canals	The Profile rotary instruments prepared canal rapidly but fracture was noted more than K-files
Elmsallati <i>et al.</i> (2007) ^[14]	EndoWave K3 (SybronEndo, Orange, California) Profile (Dentsply Tulsa Dental)	Compared three rotary instruments: EndoWave, K3, and Profile, and calculated weight of debris and wear of the file	K3 rotary system produces minimum wear of root canal walls and EndoWave retained more debris than K3 and Profile.
Ochoa-Romero <i>et al.</i> (2011) ^[15]	K3 (SybronEndo, Orange, California)	Compared the duration of instrumentation and obturation times and quality of root canal filling between K3 and K-files in primary necrotic teeth	Instrumentation time was less in K3 and obturation quality was better in K3 when compared to K files
Azar <i>et al.</i> ^[16] (2011)	Mtwo (VDW, Munich, Germany)	Compared the cleaning ability and preparation time of Mtwo and K-file in preparing primary and permanent molar root canals	Mtwo showed better cleaning ability in both primary and permanent teeth, and achieved results similar to those of K-files in less time
Ramezalani <i>et al.</i> (2015) ^[17]	Mtwo (VDW, Munich, Germany)	Compared the cleaning efficacy and instrumentation time of hand K-files and Mtwo rotary system for preparation in primary molars	No differences were noted regarding the cleaning efficacy and instrumentation time in Mtwo group was shorter
Pinherio <i>et al.</i> (2012) ^[18]	ProTaper (Dentsply Ltd., Addlestone, Weybridge, UK) Endowave (Endowave (Morita, Dietzenbach, Germany)	Compared the cleaning ability and instrumentation time between K-file, rotary system Endowave and ProTaper techniques in deciduous molars	ProTaper and Endowave showed similar cleaning ability and instrumentation time in deciduous molars was less in ProTaper when compared to K-files No difference was noted regarding the instrumentation time between K-file and Endowave
Prabhakar <i>et al.</i> (2014) ^[19]	Twisted files (SybronEndo, Orange, California) ProTaper (Dentsply/Maillefer Switzerland)	Compared the cutting efficiency of Twisted files with ProTaper files in primary teeth	Twisted files showed a better cutting efficiency than ProTaper
Moghaddam <i>et al.</i> (2009) ^[20]	Flex-Master (VDW, Munich, Germany)	Compared the cleaning efficacy and time taken for instrumentation of deciduous molars using hand K-files and Rotary Flex Master files	No difference in cleanliness efficacy at the apical and middle thirds, the coronal third was more effectively cleaned with K-files. Time taken was less with Flex Master Rotary technique
Makarem <i>et al.</i> (2014) ^[21]	Flex-Master (VDW, Munich, Germany)	Assessed the obturation quality and chair time of rotary FlexMaster System and H-files in the pulpectomy of primary second molar teeth	Obturation quality was superior and chair time was less with Flex-Master system when compared to H-files
Vieyra <i>et al.</i> (2014) ^[22]	LightSpeed LSK (Discus Dental, Culver City, CA, USA) ProTaper (Maillefer, Ballaigues, Switzerland)	Compared the instrumentation time efficiency of rotary Light Speed LSX instruments, ProTaper and K-files on necrotic primary teeth	Instrumentation time efficiency was less in Light Speed LSX instruments as compared to ProTaper
Kummer <i>et al.</i> (2008) ^[23]	Hero 642 (Micro-Mega, Besancon, France)	Evaluated the instrumentation time and dentin removal by K-files and Hero 642 in primary teeth	K-files removed more dentin as compared to Hero 642 and Hero 642 showed the shortest instrumentation time
Katge <i>et al.</i> (2014) ^[24]	WaveOne (Dentsply Maillefer, Ballaigues, Switzerland) ProTaper (Dentsply Maillefer, Ballaigues, Switzerland)	Compared instrumentation time and cleaning efficacy of K-file, ProTaper, and WaveOne in the preparation of primary molar root canals	WaveOne showed better cleaning efficiency in the coronal and middle one third of root canals. Furthermore, instrumentation time was less in WaveOne
Pinheiro <i>et al.</i> (2016) ^[25]	WaveOne (Dentsply Maillefer, Ballaigues, Switzerland), ProTaper (Dentsply Maillefer, Ballaigues, Switzerland)	Assessed the ability of the ProTaper and WaveOne systems to reduce <i>Enterococcus faecalis</i> contamination in roots of primary molars	ProTaper and WaveOne were equally effective in reducing <i>Enterococcus faecalis</i> in primary molars. Instrumentation time was less in WaveOne system

To overcome such barriers, various modified files have been introduced to prevent any undesirable complications. Many authors have reported the clinical success of Profile (Dentsply Maillefer, Ballaigues, Switzerland), ProTaper (Dentsply Maillefer, Ballaigues, Switzerland), Mtwo (VDW, Munich, Germany), FlexMaster (VDW, Munich, Germany), Light Speed LSX (SybronEndo, Orange, California), Hero 642 (Micro-Mega, Endo, Orange, California), WaveOne (Dentsply Sirona) rotary files in primary teeth,^[11,12] and Twisted files (SybronEndo, Orange, California) (Table 1).^[8,10,13-25,26-31] Most recently, Kedo-S (Reeganz Dental Care Pvt. Ltd., India) (the first rotary pedodontic file) has made a major breakthrough in the field of pediatric endodontics due to its shorter length. Other recently introduced pediatric rotary files are Pro AF files (DentoBizz KIE Pvt. Ltd., India) and Prime Pedo (Sky International Enterprises, India).

Thus, this article aims to review different rotary file system and recent advances of rotary file system.

Table 2: Rotary Kedo file system (Reeganz Dental Care Pvt. Ltd., India)

Features	Kedo-S	Kedo SG	Kedo SG Blue
File generation	1 st Generation files	2 nd Generation files	3 rd Generation files
Metallurgy	Ni-Ti	Ni-Ti + Heat Treated	Ni-Ti + Heat Treated + Titanium oxide controlled memory
Taper	Variably variable taper (4–8%)		
Length	Total file length – 16 mm Flute length – 12 mm		
Files required	1 file – D1 (0.25 for mesiolingual and mesiobuccal canal of molar) or E1 (0.30 for distal or palatal canal of molar), U1 (0.40 for anterior teeth)		

RECENT ADVANCES

Ever since the emergence of rotary instrumentation in pediatric dentistry in the year 2000, there has been inundated *in vitro* and *in vivo* studies to demonstrate the cleaning efficacy, instrumentation time, and quality of obturation using lengthy adult rotary file system in the primary molars^[15,17,22,32,33]

Use of lengthy rotary files (i.e. 21 mm) designed for permanent teeth is difficult to use in primary teeth, especially in the mesiobuccal canal of maxillary and mesiobuccal and mesiolingual canal of mandibular primary molars, because of restricted mouth opening in children. Furthermore, the use of permanent rotary system for preparing primary root canals has led to increase rate of instrument separation. Shortening the length of existing rotary files along with appropriate taper and flexibility was the key consideration while designing rotary files for primary teeth.^[33]

A revolution has spearheaded in the arena of pediatric endodontics with the introduction of exclusive pediatric rotary file systems namely Kedo-S (Reeganz Dental Care Pvt. Ltd., India), Prime Pedo Files (Sky International Enterprises, India), and Pro AF baby files (DentoBizz KIE Pvt. Ltd., India) since 2016. Some of the commercially available pediatric file systems are as follows:

Kedo file system (Reeganz Dental Care Pvt. Ltd., India)

Kedo files system is the world's first files designed for root canal preparation in primary teeth. Kedo files were introduced by Ganesh Jeevanandan and came into existence in November 2016. Kedo files are available in Hand type (Kedo-SH) and rotary type (Kedo-S, Kedo-SG, and Kedo-SG Blue) (Tables 2 and 3).

Prime Pedo files (Sky International Enterprises, India)

These files have a triangular cross-section, heat treated, and have controlled memory. These file system consists of four files

Table 3: Review on studies conducted on primary teeth using pediatric rotary file

Author/ investigator year	Rotary file system	Study design/methodology	Conclusion
Jeevanandan <i>et al.</i> (2018) ^[26]	Kedo-S	Compared and evaluated the instrumentation time and quality of obturation between Kedo-S and K-files in primary molars	Kedo-S was effective during root canal preparation of primary teeth with reduction in instrumentation time and better quality of obturation
Panchal <i>et al.</i> (2019) ^[27]	Kedo-S	Compared the obturation quality and instrumentation time of Kedo-S files, K-files, and H-files in primary molars	Kedo-S has better obturation quality and instrumentation time was less
Julliet <i>et al.</i> (2020) ^[28]	ProTaper Kedo-S RaCe	Compared and evaluated the quality of obturation and instrumentation time using ProTaper files, Kedo-S files, and Race files rotary file systems in primary mandibular molars	No significant difference was noted with respect to quality of obturation using S2 ProTaper files, Kedo-S files, and RaCe files in primary teeth The instrumentation time was found to be less with RaCe file followed by ProTaper file system and the Kedo-S rotary system
Showak <i>et al.</i> (2020) ^[29]	Kedo SG ProTaper Gold	Compared the instrumentation time and quality of obturation of Kedo SG, ProTaper Gold, and K-File in primary molar	Instrumentation time was less in Kedo-SG files and obturation quality was better in ProTaper Gold rotary files
Priyadarshini <i>et al.</i> (2020) ^[30]	Kedo-S Kedo-SG Blue	Evaluated the instrumentation time and obturation quality using pediatric manual (Kedo-SH) and rotary (Kedo-S and Kedo-SG Blue) with Hand K-files for pulpectomy in primary mandibular molars	Instrumentation time was reduced and superior quality of obturation was found with rotary Kedo-SG Blue file followed by Kedo-SH, Kedo-S, and hand K-files
Gadge <i>et al.</i> (2020) ^[31]	Prime Pedo ProTaper Universal	Compared the extent and quality of obturation in root canal of primary molars with Prime Pedo, ProTaper Universal, and H-files using photostimulated phosphor plates	Prime Pedo resulted in better extent and quality of obturation as compared to ProTaper Universal and H-files

starter (8%, 16 mm), P1 (6% #15 18 mm), P2 (6% #25 18 mm), and endosonic file (2%, 18 mm). Orifice enlargement is done with the starter file (8%, 16 mm) while endosonic file (2%, 18 mm) is used for apical preparation. The 6% taper offers optimum flare in canal preparation in primary molars to facilitate irrigation and debridement as well prevents weakening and inadvertent perforation of canal walls that happen commonly with high taper instruments.^[34]

Pro AF baby files (DentoBizz KIE Pvt. Ltd., India)

This is a five system which has a 4–6% constant taper. It has a unique orifice [B0] which helps to prevent cervical ledging and available in different sizes such as B1, B2, B3, B4, and B5. The total length of these files is 17 mm with constant taper 4% except B3 which has 6% taper. These files have advance nickel–titanium (NiTi) M wire with heat treatment for better canal centricity, high flexibility, and minimal chances of separation. Canal preparation of primary molars using this file system requires a sequential combination of only two files.^[35]

CONCLUSION

Rotary endodontics is improving rapidly with brilliant research across the world, efficient and capable systems are introduced periodically. With every passing day, newer systems with better efficiencies are introduced. NiTi rotary system in pediatric dentistry is considered as a double-edged sword. The design and flexibility of NiTi rotary instruments not only maintain the original anatomy of curved canals but also decreased procedural errors. It allows faster procedures, thereby enhancing patient cooperation, which is of paramount importance in pediatric dentistry. On the other hand, NiTi being an expensive and elaborate system, comes with a high learning curve, and requires training of the operator to control the working length with reduced tactile sensitivity. Ultimately, clinical experience, handling properties, usage safety, and case outcomes should decide the fate of a particular design. Considering that preparation time is an important clinical factor in pediatric patient management, the use of rotary instruments for pulpectomies procedure in primary teeth is recommended.

REFERENCES

1. Alamoudi N. The prevalence of crowding, attrition, midline discrepancies and premature tooth loss in the primary dentition of children in Jeddah, Saudi Arabia. *J Clin Pediatr Dent* 1999;24:53-8.
2. Grover N, Saha S, Tripathy AM, Jaisai JN, Palit M. Applicability of different mixed dentition analysis in Lucknow population. *J Indian Soc Pedod Prev Dent* 2017;35:68-74.
3. Ranly DM, Garcia-Godoy F. Current and potential pulp therapies for primary and young permanent teeth. *J Dent* 2000;28:153-61.
4. Garcia-Godoy F. Evaluation of an iodoform paste in root canal therapy for infected primary teeth. *ASDC J Dent Child* 1987;54:30-4.
5. Pratha AA, Jeevanandan G. Instrumentation techniques for pulpectomy in primary teeth-a review. *Drug Invent Today* 2018;10:3144-8.
6. Babaji P, Mehta V, Manjorran T. Clinical evaluation of rotary system over manual system in deciduous molars: A clinical trial. *Int J Pedod Rehabil* 2019;4:13-6.
7. Farhin K, Devendra P, Jitesh P, Mayur W, Pooja S, Shagufta D.

Application of rotary instrumentation in paediatric endodontics-a review. *Int J Prev Clin Dent Res* 2014;1:48-52.

8. Barr ES, Kleiner DJ, Barr NV. Use of nickel-titanium rotary files for root canal preparation in primary teeth. *Pediatr Dent* 2000;22:77-8.
9. Drukteinis S, Balciuniene I. A scanning electron microscopic study of debris and smear layer remaining following use of AET instruments and K-flexofiles. *Stomatologija* 2006;8:70-5.
10. Nagaratna PJ, Shashikiran ND, Subbareddy VV. *In vitro* comparison of NiTi rotary instruments and stainless steel hand instruments in root canal preparations of primary and permanent molar. *J Indian Soc Pedod Prev Dent* 2006;24:186-91.
11. Chauhan A, Saini S, Dua P, Mangla R. Rotary endodontics in pediatric dentistry: Embracing the new alternative. *Int J Clin Pediatr Dent* 2019;12:460-3.
12. George S, Anandaraj S, Issac JS, John SA, Harris A. Rotary endodontics in primary teeth-a review. *Saudi Dent J* 2016;28:12-7.
13. Silva LA, Leonardo MR, Nelson-Filho P, Tanomaru JM. Comparison of rotary and manual instrumentation techniques on cleaning capacity and instrumentation time in deciduous molars. *J Dent Child (Chic)* 2004;71:45-7.
14. Elmsallati EA, Wadachi R, Ebrahim AK, Suda H. Debris retention and wear in three different nickel-titanium rotary instruments. *Aust Endod J* 2006;32:107-11.
15. Ochoa-Romero T, Mendez-Gonzalez V, Flores-Reyes H, Pozos-Guillen AJ. Comparison between rotary and manual techniques on duration of instrumentation and obturation times in primary teeth. *J Clin Pediatr Dent* 2011;35:359-63.
16. Azar MR, Mokhtare M. Rotary Mtwo system versus manual K-file instruments: Efficacy in preparing primary and permanent molar root canals. *Indian J Dent Res* 2011;22:363.
17. Ramezanali F, Afkhami F, Soleimani A, Kharrazifard MJ, Rafiee F. Comparison of cleaning efficacy and instrumentation time in primary molars: Mtwo rotary instruments vs. hand K-files. *Iran Endod J* 2015;10:240-3.
18. Pinheiro SL, Neves LS, Imparato JC, Duarte DA, da Silveira Bueno CE, Cunha RS. Analysis of the instrumentation time and cleaning between manual and rotary techniques in deciduous molars. *RSBO* 2012;9:238-44.
19. Prabhakar AR, Yavagal C, Vallu RK. Twisted vs protaper files in contemporary pediatric endodontics. *Int J Clin Pediatr Dent* 2014;7:93-6.
20. Moghaddam KN, Mehran M, Zadeh HF. Root canal cleaning efficacy of rotary and hand files instrumentation in primary molars. *Iran Endod J* 2009;4:53-7.
21. Makarem A, Ravandeh N, Ebrahimi M. Radiographic assessment and chair time of rotary instruments in the pulpectomy of primary second molar teeth: A randomised controlled clinical trial. *J Dent Res Dent Clin Dent Prospects* 2014;8:84-9.
22. Vieyra JP, Enriquez FJ. Instrumentation time efficiency of rotary and hand instrumentation performed on vital and necrotic human primary teeth: A randomized clinical trial. *Dentistry* 2014;4:214.
23. Kummer TR, Calvo MC, Cordeiro MM, de Sousa Vieira R, de Carvalho Rocha MJ. *Ex vivo* study of manual and rotary instrumentation techniques in human primary teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105:e84-92.
24. Katge F, Patil D, Poojari M, Pimpale J, Shitoot A, Rusawat B. Comparison of instrumentation time and cleaning efficacy of manual instrumentation, rotary systems and reciprocating systems in primary teeth: An *in vitro* study. *J Indian Soc Pedod Prev Dent* 2014;32:311-6.
25. Pinheiro SL, Pessoa C, da Silva JN, Gonçalves RO, Duarte DA, da Silveira Bueno CE. Comparative analysis of protaper and waveone systems to reduce enterococcus faecalis from root canal system in primary molars-an *in vitro* study. *J Clin Pediatr Dent* 2016;40:124-8.
26. Jeevanandan G, Govindaraju L. Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: A double blinded randomised clinical trial. *Eur Arch Paediatr Dent* 2018;19:273-8.
27. Panchal V, Jeevanandan G, Subramanian E. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial. *J Indian Soc Pedod Prev Dent* 2019;37:75-9.
28. Azar MR, Safi L, Nikaein A. Comparison of the cleaning capacity of

- Mtwo and Pro Taper rotary systems and manual instruments in primary teeth. *Dent Res J (Isfahan)* 2012;9:146-51.
29. Govindaraju L, Jeevanandan G, Subramanian EM. Clinical evaluation of quality of obturation and instrumentation time using two modified rotary file systems with manual instrumentation in primary teeth. *J Clin Diagn Res* 2017;1:ZC55-8.
30. Juliet S, Jeevanandan G, Govindaraju L, Ravindran V, Subramanian EM. Comparison between three rotary files on quality of obturation and instrumentation time in primary teeth-a double blinded randomized controlled trial. *J Orofac Sci* 2020;12:30-4.
31. Showkat I, Chaudhary S. Comparison of instrumentation time and obturation quality between hand K-files, rotary Kedo SG and rotary Protaper gold files in root canal treatment of primary teeth. *Int J Sci Res* 2020;9:79-81.
32. Priyadarshini P, Jeevanandan G, Govindaraju L, Subramanian EM. Clinical evaluation of instrumentation time and quality of obturation using paediatric hand and rotary file systems with conventional hand K-files for pulpectomy in primary mandibular molars: A double-blinded randomized controlled trial. *Eur Arch Paediatr Dent* 2020;21:693-701.
33. Ghadge S, Katge F, Poojari M, Jain K, Patil D. Clinical evaluation and comparison of obturation quality using pediatric rotary file, rotary endodontic file and h file in root canal of primary molars: A double blinded randomized controlled trial. *International J Res Rep Dent* 2020;3:12-9.
34. Katge F, Ghadge S, Poojari M, Jain K, Patil D. Comparative evaluation of cleaning efficacy of prime Pado™ and DXL-Pro™ pado rotary files with conventional H files in root canals of primary teeth: An *in vitro* study. *J Clin Diagn* 2019;13:ZC06-9.
35. Thakkar TK, Naik S, Ghule K. Advances in rotary endodontics in pediatric dentistry. *EC Dent Sci* 2019;18:1320-30.