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## **Exclusive Primary Endodontic Rotary File Systems**

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#### ABSTRACT

A natural tooth is considered as the best space maintainer. Premature loss of primary teeth is due to delayed treatment of pulp infection. The main etiological factor for tooth loss in primary dentition is dental caries. According to AAPD guidelines, pulpectomy is indicated in primary teeth with carious pulp exposures in which, coronal and radicular pulp exhibits clinical signs of hyperaemia, or evidence of pulp necrosis with or without caries involvement. The introduction of nickel titanium (NiTi) rotary instrumentation has made endodontics in permanent teeth easier and faster than manual instrumentation resulting in consistent and predictable root canal shaping. The same principles of canal debridement and dentin shaping with rotary NiTi instruments can be applied to primary teeth. Successful pulpal therapy in the primary dentition requires a thorough knowledge of primary pulp morphology, root formation, and the special features associated with physiologic resorption of primary tooth roots.

# **Keywords**: debridement, dental caries, hyperaemia, nickel titanium, pulpectomy **INTRODUCTION**

Preservation of primary teeth until their exfoliation and replaced by their permanent successors is important to preserve the integrity of dental arch. Primary teeth contribute to mastication, phonation and esthetic in children. Early loss of infected primary teeth especially molars lead to malocclusion and development of deleterious oral habits in children<sup>1</sup>. Among the causes of premature loss of primary teeth dental caries contributes the main etiological factor for the higher loss in children due to inappropriate oral hygiene<sup>2, 3, 4</sup>.

According to the AAPD guidelines, pulpectomy is indicated in primary teeth with carious pulp exposures in which, coronal and radicular pulp exhibits clinical signs of hyperaemia, or evidence of pulp necrosis with or without caries involvement<sup>5</sup>.

Managing the behaviour or understanding the anxious, fearful and uncooperative child is one of the most challenging aspects of pediatric dentistry. The cooperation of the child during of deciduous teeth is related to several factors, among which the important being the chair side time. Owing to its anatomical and physiological limits, such as proximity to permanent tooth germ, irregular physiological root resorption, and its tortuous canals, a pause during the pulpectomy procedure may be induced in deciduous tooth. For this purpose, in-depth anatomical knowledge of the region and the use of precise techniques are important for rapid and successful care. Nickel-titanium alloy has been introduced in endodontics to solve some of these problems, fulfilling the objectives of simplicity, speed, security

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and reduction of tension for both physicians and patients $^{6}$ .

Barr.et al. introduced rotary instruments to Paediatric endodontics in 2000<sup>7</sup>. Manual stainless steel files provide outstanding tactile control and sharp, longlasting surfaces for cutting. But due to the inherent restricted versatility of stainless steel, curved manual preparation canals is difficult. To enhance the shaping procedure, several rotary NiTi endodontic file systems have been developed. The use of a series of files to achieve the final shape was, however, suggested by all these systems. Recently, the idea of single-file systems has been implemented, and its applicability in contemporary endodontics is currently under discussion.

#### Morphologic difference

Effective pulp therapy in primary dentition needs a detailed understanding of the primary pulp morphology, root development, and the unique features associated with primary tooth roots physiological resorption. Enamel is thinner (about 1 mm) on the surface of the primary teeth than the permanent teeth. Primary teeth are more uniform in depth than permanent teeth, giving primary teeth a lighter colour compared to permanent teeth. In primary teeth, the dentin thickness between the pulp chamber and the enamel is less than that in permanent teeth. Thus, a carious lesion starts in the primary tooth, it can progress rapidly through thin enamel, thin dentin and infect the pulp faster a permanent tooth.

At the dentino-enamel junction (DEJ), primary teeth are markedly more constricted than permanent teeth. Due to cervical constriction the chance of pulp exposure is maximum during proximal cavity preparation if cavity depth is increased. The contact areas in primary teeth are broader, flatter and situated gingivally, whereas in permanent teeth they are narrower and are situated occlusally. Hence, proximal preparations should be wider at the gingival aspect in primary than in permanent teeth. Also, the roots of primary molars are comparatively more slender and longer than the roots of permanent molars<sup>8</sup>. The pulp chambers in primary teeth are comparatively larger than those in permanent teeth. The pulp horns, especially the mesial horns, are higher in primary molars than in permanent molars.

Hence, pulp exposures can occur very easily in primary molars<sup>8,9</sup>.

#### **Pediatric Endodontic Rotary File Systems**

Various file systems have developed recently and some are designed especially for Pediatric endodontics. Here exclusively Pediatric rotary file systems will be discussed in details.

#### **Kedo File System**

- World's first files designed for root canal preparation in primary teeth.
- Available in Hand type (Kedo SH) and rotary type (Kedo S, Kedo SG and Kedo-S2)
- Kedo-S pediatric rotary file system (Reeganz dental care Pvt. Ltd. India)
- Consists of three Ni-Ti rotary files having total length of 16 mm each with non-cutting tip.
- The working length (flute) of the files is 12 mm.
- The files are named as D1, E1, U1, respectively. All the files have a variable taper corresponding to the use in primary teeth.
- **D1 file:** Has a tip diameter of 0.25 mm with a variable taper. It can be used in primary molars with narrow canals (mesial canals in mandibular molars and disto-buccal canal in maxillary molars).
- E1 file: Has a tip diameter of 0.30 mm and can be used in wider molar canals (distal canal in mandibular molars and palatal canal in maxillary molars).
- U1: Has a tip diameter of 0.40 mm and used in primary incisor teeth.
- Recommended rotary motor speed is 250-300 rpm and torque is 2.2-2.4 Ncm.
- **\*** Kedo SG Blue (controlled memory files)
- Consists of three Ni-Ti rotary files having total length of 16 mm each with non-cutting tip.
- The working length of the files is 12 mm.

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- The files are named as D1, E1, U1, respectively. All the files are heat treated with titanium oxide coatings and have controlled memory and have a variably variable taper corresponding to the use in primary teeth.
- It has super flexibility and 75% greater resistance to cyclic fatigue.
- The ideal rotational speed is 250 300 RPM. The torque required is 2.2 - 2.4 Ncm.

### **\*** Kedo-S<sup>2</sup> Rotary file system

- 4th generation Kedo files.
- Consists of 2 heat treated NiTi files coated with titanium oxide.
- Have dual cross section and dual color coding.
- Files are named **P1** and **A1**. **P1** is having a total length of 16 mm and is used for canal preparation in molars. **A1** is having a total length of 17 mm and is used for canal preparation in anteriors.

#### PRO AF baby gold file

• Pro AF Baby Gold file (Dentobizz) consist of 5 files made up of NiTi CM wire- Flexible with Constant taper of 4%, 6%.

#### **Features:**

- Short 17mm length especially for deciduous tooth Pulpectomy.
- Made from advanced NiTi wire for better canal centricity.
- A special heat treated NiTi alloy wire gives excellent mechanical strength.
- Improved resistance high cyclic fatigue resistance.
- Enhanced cutting efficiency.
- Unmatched flexibility.

#### **ADVANTAGES:**

- 2 file system easy to use.
- High durability almost no chance of separation.

- PRO AF-GOLD BABY C M wire fully adopt to root canal morphology- allowing negotiating most complex curvature.
- Unmatched cleaning efficiency with conservative canal preparation in ribbon shaped canals as compared to variable taper rotary system.
- Compatible with all major rotary motors in the market.

#### **INDICATIONS:**

- Pediatric rotary endodontics.
- Adult rotary endodontics in conditions of limited accessibility like third molars and OSMF, Restricted mouth opening.

#### **PROTOCOL:**

- Use at 2N torque and 300 RPM
- Explore the canal by using # 10 stainless steel hand files
- Establish working length with apex locator or in combination with radiograph
- Confirm patency with #10 K file and verify a smooth reproducible glide path
- Use # 15 stainless steel hand files.
- Use **OPEN FILE** to prepare access opening @ Speed 300RPM & Torque 3.0 N.
- For **NARROW CANALS** Use #20-04 and #25-04 to prepare canal till working length
- For **MEDIUM CANALS** Use #25-04 and #25-06 to prepare canal till working length
- For **WIDE CANALS** Use #25-04 and #30-04 to prepare canal till working length
- For **ANTERIORS** Use # 30-04 AND #40-04 to prepare canal till working length

#### Neoendo Pedoflex Pediatric Rotary Files

#### Features

- 16 mm length and 4% taper.
- Simple file sequence for quick & easy treatment procedure

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- Unique file design with efficient cutting efficiency & flexibility makes it compatible with all types of canals of primary teeth
- Speed: 350 RPM | Torque: 1.5NCm
- Pack of 3 files

#### **Directions for Use**

- Prepare the access cavity, identify & establish orifice of the canal.
- Explore the canal using #10,#15 k-files and determine the working length with the help of radiograph.
- Use the file in brushing motion:take the file passively to the point of light resistance & brush out of canal & repeat the procedure until working length is achieved.
- Always clean the cutting flutes after every few strokes irrigate the canal & recapitulate with the k-file.
- Use Pedoflex files with gentle touch, never force the file and always use the recommended speed and torque settings.

#### Conclusion

The clinician must select techniques, methods and equipment to overcome these challenges and to monitor the design, duration and width of the preparation. A quick and market-driven process is the creation of new files. As new versions are increasingly becoming available, it can be difficult for a clinician to select the most appropriate file and procedure for an particular case. Practitioners must always bear in mind that all file systems have advantages and disadvantages. Ultimately, the fate of a specific design should be determined by clinical experience, handling properties, protection of use, and case results, rather than by the advertisement or name of the creator.

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