



## A NEW APPROACH TO SINGLE FILE ENDODONTICS: NEONITI ROTARY FILE SYSTEM

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<p><b>Article Info</b> <i>Received 15/06/2015</i> <i>Revised 27/06/2015</i> <i>Accepted 22/07/2015</i></p> <p><b>Key words:</b> Neoniti, Retreatment, Single file system.</p>	<p><b>ABSTRACT</b> The introduction of newer instruments and techniques has resulted in endodontic procedures becoming easier, faster and safe. The most important among the advances is Nickel Titanium (NiTi) rotary instrumentation that has resulted in consistent, predictable and reproducible shaping of the root canal system. The noticeable features of these file system include flexibility, cutting efficiency and safety. This case report is an attempt to enlighten the design features of a newly introduced nickel titanium single file rotary system NeoNiTi (Neolix, France) used for root canal preparation.</p>
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### INTRODUCTION

The main aim of root canal treatment is proper cleaning and shaping of the root canal system. This is possible only when there is continuous tapering of the root canal which helps the irrigating solution to flow easily within canal to remove debris and for the proper placement of the obturating material [1]. Considerable importance should be given not to cut excessive dentin to get adequate taper of the canal. So, the challenge for every file system is to clean and shape the root canal without cutting the excessive dentin. Various types of files are available for this purpose like K File, H file, rotary multiple file system, rotary single file system and reciprocating single file system. These files are made up of either Stainless steel, Nickel titanium or M-wire technology [2].

With the introduction of nickel titanium in endodontics, difficulties like curved canals leading to instrument fracture which were commonly encountered using stainless steel files, are solved. Nickel titanium files are flexible, have good elasticity and have more resistance to fracture. They also help to maintain the original canal anatomy [3]. The property of super-elasticity and strength of the Nickel Titanium alloy have made it possible to manufacture rotary instruments with double, triple and

quadruplet taper compared to the traditional standard .02 taper of the stainless steel hand instruments.[4]

Earlier nickel titanium files were used as multiple file system which are still in use. But these files are time consuming as series of files have to be used for the proper cleaning and shaping of the root canal. So, Single file system is introduced which is made up of Nickel titanium or M wire technology [5]. Single file system is more efficient and takes less time for the bio-mechanical preparation. Many new single file systems have been introduced in the market. These are the One shape single file system (Micro Mega, Bescanson, France), WaveOne (Dentsply-Maillefer, Ballaigues, Switzerland) and the Reciproc (VDW, Munich, Germany).

Recently a new file system, NeoNiTi (Neolix, France), has been introduced. It is made of a nickel-titanium alloy and is intended for the root canal treatment till the apex. The NeoNiti file system (Neolix, France) is an efficient file system to shape the root canal completely to a continuously tapering funnel shape. It has non-homothetic rectangular cross section. It not only fulfils the biological requirements for adequate irrigation to get rid of all bacteria, bacterial by-products and pulp tissue in the root



canal system, but also provides the perfect shape for obturation of the canals with gutta-percha [6].

Low cyclic fatigue fracture is a concern during the clinical use of rotary Nickel Titanium instruments [3]. This may cause instrument fracture. It is associated with rotational speed and the angle of curvature of the canal [4]. To prevent these complications a new technology EDM (Electric Discharge Machining) is introduced. The NeoNiTi file system is made up by the EDM (Electric Discharge Machining) process which is responsible for the unique behavior of the file. The process consists of sparks produced by high energy and high frequency electric discharges between the metal workpiece (e.g. the NeoNiTi file) and an electrode (e.g. the cutting wire). This leads to melting and evaporation of the workpiece material locally resulting in finished product of desired geometry. This exclusive process allows sharp cutting edges, built-in abrasive properties, variable changing profiles and a progressive flexibility.

This file system consists of two files NeoNiTi C1 for coronal enlarging and NeoNiTi A1 for canal shaping upto the apex. After preparation of the access cavity, the working length is established using a # no10 K file. Neoniti C1 is then used for widening the canal orifices and removing dentin interferences. This file is used in a circumferential brushing action in the coronal third only. Neoniti A1 is used for shaping the middle and apical thirds. First it is used till the middle thirds using 3 or 4 circumferential brushing actions. Then the file is used till the working length using pecking motion. In curved canals, glide path should be made using either hand or rotary glide path file systems.

Various systems used for glide path preparation are C Pilot files (VDW, Munich, Germany), Pathfinders CS (SybronEndo, USA), PathFiles (Dentsply-Maillefer, Ballaigues, Switzerland), G -files (Micro Mega, Bescanson, France), Safesiders (Essential Dental Systems), V GlidePath 2-files (SS White Technologies UK, Inc.), PreShapers (Specialized Endo, UK, Inc.) and the EndoWave MGP (Morita, Tokyo, Japan).The neoniti file system operates at a speed of 300 to 500 rpm and a torque limit of 1.5 Ncm. The file is used in a circumferential motion in the middle thirds and then in a pecking motion till the working length. The canal is irrigated constantly in

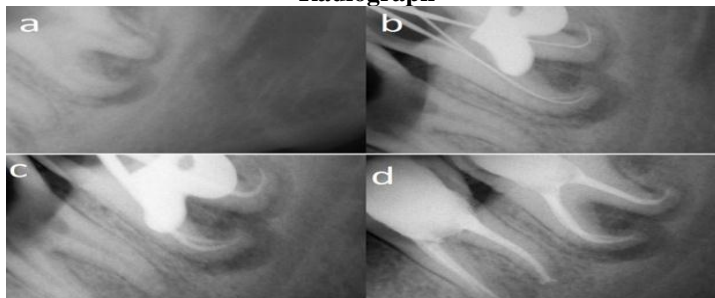
each canal everytime the file system is used. There is a standardized protocol for the sterilization of the instrument system. The instruments are washed in an appropriate detergent solution (eg: Quaternary Ammonium) and then brushed with a metallic brush. The instruments can be placed in an ultrasonic bath for 15 min. Properly dried instruments are then placed in sterilization bags and autoclaved at 134 °C/273.2 °F for 18 minutes. The manufacturer claims that the NeoNiTi file system can also be used for retreatment procedures. Solvent may be used for removal of obturating material using NeoNiTi file system if required. It is more efficient and less time consuming as compared to the other retreatment file systems used. A series of cases have been done in the department using this file system:

**Case 1:** A 28 year old female patient came with the complaint of pain in lower left back area since 1 month. The pain was dull, constant and localized in nature. It was increased on biting & chewing and relieved by taking medication. On clinical examination caries were seen with respect to 46. Radiographic examination showed caries exposing the pulp chamber and periapical radiolucency with respect to 37. There was extensive curvature in all the roots. Treatment planning was endodontic treatment with respect to 37.

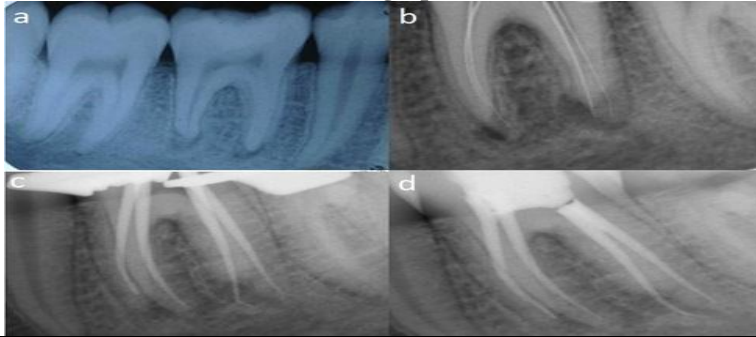
**Case 2:** A 37 year old female patient came with the complaint of pain in lower right back area since 1 month. The pain was dull, constant and localized in nature. It was increased on biting & chewing and relieved by taking medication. On clinical examination caries were seen with respect to 46. Radiographic examination showed restoration exposing the pulp chamber and periapical radiolucency with respect to 46. Treatment planning was endodontic treatment with respect to 46.

**Case 3:** A 40 year old female patient came with the complaint of pain in lower left back area since 1 month. The pain was severe, constant and localized in nature. It increased on biting & chewing and relieved by taking medication. On clinical examination caries were seen with respect to 46. Radiographic examination showed caries exposing the pulp chamber and periapical radiolucency with respect to 36. Treatment planning was endodontic treatment with respect to 36.

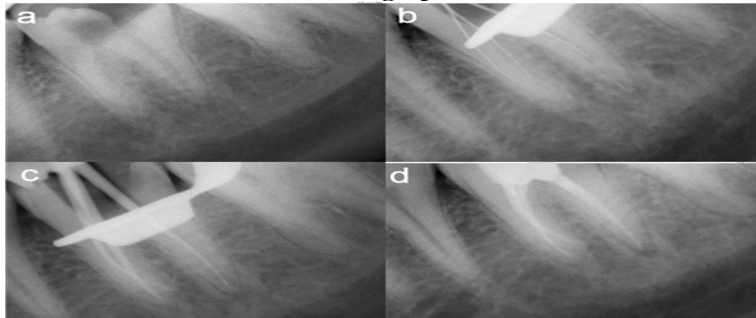
**Case 1. a. Preoperative radiograph, b. Working length radiograph, c. Master cone radiograph, d. Obturation Radiograph**



**Case 2. a. Preoperative radiograph, b. Working length radiograph, c. Master cone radiograph, d. Obturation Radiograph.**



**Case 3. a. Preoperative radiograph, b. Working length radiograph, c. Master cone radiograph, d. Obturation Radiograph.**



**CONCLUSION**

In Conclusion, the NeoNiTi rotary file may be a good alternative for biomechanical preparation of the root canal system.

**REFERENCES**

1. Schilder H. (1974). Cleaning and shaping the root canal. *Dent Clin North Am*, 18, 269-296.
2. Bergmans L. (2001). Mechanical root canal preparation with NiTi rotary instruments, Rationale, performance and safety. *Am J Dent*, 14, 324-333.
3. Rodrigues R. (2011). Influence of different manufacturing methods on the cyclic fatigue of Rotary Nickel Titanium Endodontic instruments. *J Endod*, 37, 1533-1557.
4. Metzger Z, Teperovich E, Zary R, Cohen R, Hof R. (2010). The Self-adjusting File (SAF). Part 1, Respecting the Root Canal Anatomy—A New Concept of Endodontic Files and Its Implementation. *J Endod*, 36(4), 679-690.
5. Martín B, Zelada G, Varela P, Bahillo JG, Magán F, Ahn S, Rodríguez C. (2003). Factors influencing the fracture of nickel-titanium rotary instruments. *Int Endod J*, 36(4), 262-266.
6. Yared G. (2013). Single file reciprocation, a literature review. *Endo*, 7(3), 171-178.

