



Research Article

RETREATMENT METHODS AND FILES USED IN ENDODONTICS

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ABSTRACT

The retreatment aims to remove completely the root filling, to enable effective cleaning, shaping and filling of the root canal system. Instruments that have been used and tried for gutta-percha (GP) removal are many in number, including endodontic hand files, engine driven rotary files, ultrasonic tips and files, and heat carrying instruments. Chemicals are sometimes used as solvents. GP removal using hand files either with using solvents or without is time-consuming, especially when the filling materials are well condensed. Nickel-titanium (NiTi) rotary instruments have been used successfully in root canal cleaning and shaping. In the recent years, the ProTaperNiTi rotary system has been upgraded to the ProTaper Universal system, which includes shaping, finishing and retreatment instruments. The three retreatment instruments (D1, D2 and D3) are designed for removing filling materials from root canals, from the coronal, middle and apical portions of canals. The shaping and finishing instruments and the retreatment series have a convex cross section; however, D1 has a working tip that facilitates its initial penetration into filling materials. Present laboratory studies are done to evaluate the efficacy of ProTaper Universal retreatment files in removing GP from root canals. Root canal retreatment aims to eliminate or to substantially reduce the microbial load from the root canal.

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INTRODUCTION

In initial treatments healing is common for both dental and medical treatments. Treatment for narrow and curved canal is done during the initial procedure. Complication may occur during the first primary procedure. The placement of the crown or other restoration was delayed following the endodontic treatment. Salivary contamination will not be prevented by the restorations. Primary caries can express the root canal restorative material to infection, causing a new threat in the tooth. A false, damaged or non-adaptive crown or filling can express the tooth to new infection threat. A tooth sustains a fracture. During retreatment process, the opening of the tooth again and allow the filling materials to go out that were placed in the root canals during the primary procedure is done. And then infection is cleared, cleans and shapes the canals, and places new restorative materials. The opening is then closed with a temporary restorative material. New crown is fixed after treatment is done as placed on the tooth to protect it.

The nickel-titanium (Ni-Ti) is getting new to endodontics have brought new way for root canal preparation is performed, in both general and specialist practices. The most magnificent achievement lies on the probability with which a desired shape is achieved. It is important to know the use of rotary instruments, which requires attention to detail, eg, regarding the efficacy of antimicrobial regimes that further contribute to successful endodontic therapy [1,2]. Cases of different degrees of difficulty can be successfully achieved, with excellent long-term durations. For every clinician, the way of using instruments is different compared one another and not all bind together to rotary preparation, mainly because of varying different degrees of experience and complexity. As the rotary instruments are more prone to breakage rather unpredicted if they are cleaned and sterilized for reuse, issues of corrosion and persistent contamination may come into play. Therefore, knowledge of both clinical guidelines for and metallurgical properties of Ni-Ti rotary instruments is critical for their successful use. Hence, this topic is provided to summarize most advanced trends in Ni-Ti technology, instrument design, and usage parameters. Providing the gain and understand sign for clinician regarding identical based practice, thus increasing the benefits from the selection of Ni-

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Ti rotary instruments for root canal treatments. Rationale and goals of retreatment methods

Root canal system treatment plays an important role in endodontic success and failure. Root canal contains different ways that interact with the periodontal attachment apparatus apically, laterally, and often terminate apically into multiple portals of exit. It is mandatory to consider any root canal system opening to the periodontal ligament space should be thought of as a portal of exit through which endodontics break down products may eliminate out. Improvement in the diagnosis and treatment of lesions of endodontic origin occurs with the recognition of the interrelationships between pulpal disease flow and the release of irritants along these anatomical pathways. Failure in root canal treatments can be attributed to inadequacies in shaping, cleaning and obturation, iatrogenic events, or re-infection of the root canal system when the coronal seal is lost after completion of root canal treatment. Regardless of the etiology, the sum of all causes is leakage and bacterial contamination. Except in rare instances, lesions of endodontic origin will routinely heal following the extraction of pulpally involved teeth because the extraction not only removes the tooth, but more importantly serves to eliminate 100% of the contents of the root canal including debris and microbes. Endodontic treatment has proved to create better success rate on the tooth that are non-restorable, have hopeless periodontal disease or have radicular fractures. Before commencing with any treatment, it is profoundly important to consider all interdisciplinary treatment options in terms of time, cost, prognosis and potential for patient satisfaction. Failures in endodontics must be calculated so a decision can be made among surgical retreatment and non-surgical retreatment or extraction. The main purpose of nonsurgical retreatments are to remove debris from the root canal region and if present, identify deficiencies or repair defects that are pathologic or iatrogenic in origin.

Coronal Access

The chamber of the pulp is clinically assessed by the endodontist through an existing filling if it is magistateto be functionally designed, well-fitted and esthetically pleasing. If the restoration is deemed inadequate and/or additional access is required, then it should be sacrificed. In certain specific occasions, it may be desirable to remove the restoration intact so it can be re-cemented following endodontic treatment. Several important technologies exist which facilitate the safe removal of a restorative material. Coronal directions improves access, vision and the retreatment effects. The safe removal of a restoration depends on several factors such as the type of preparation, the restorative design and strength, the restorative material(s), the cementing agent and knowing how to use the best removal devices[3,4]. There are several important removal devices which may be divided into three categories:

1. Grasping instruments, such as Crown Gripper,
2. Percussive instruments and the Coronaflex,
3. Passive active instruments

Clinicians must clearly define the risk versus benefit with patients before commencing with the safe and intact removal of an existing restorative.

Missed Canals

Holding of the missing canals can be identified only through clinically, and sometimes the infections and related irritants

that unknowingly contribute to clinical symptoms and lesions of endodontic origin. Sometimes, a surgical treatment have been located towards apical end of the canal with the hopes that the retrograde material will incarcerate biological irritants within the root canal system over the life of the patient. Although this clinical scenario occurs accidentally, it is not as concluded as a non-surgical re-treatment. Duration of endodontic treatment is maximized in teeth whose root canals are shaped and root canal systems cleaned and packed in all their directions. There are multiple concepts, armamentarium and techniques that are useful to locate canals [5]. The most common method for identifying the canals is to have some knowledge regarding root canal system and achievement for the range of variation commonly associated with each type of teeth. Methods that are very common to indicate canals includes radiographic images, magnified lens and bright lighting ,complete access, firm explorer pressure, ultrasonics, Micro-Openers, dyes, sodium hypochlorite, color and texture, removing restorations, and probing the sulcus. Sometimes, a canal can be missed and is identified but cannot be readily identified and treated, then an endodontic referral may be prudent to avoid complications. Caution should be exercised when contemplating surgery due to the aforementioned concerns, but at times may be necessary to retain the tooth [6].

Obturation Materials

Commonly used obturation materials in endodontics to obturate canal by obturation materials found in root canals. These materials are gutta percha, carrier based obturators, silver points and paste fillers. Sometimes it is a condition where to remove an obturation material to achieve endodontic retreatment success or to accompany good review post for restorative reasons [7]. The effective removal of an obturation material requires utilizing the most proven methods from the past in conjunction with the best presently developed techniques.

Gutta Percha Removal

The range of difficulty in removing gutta percha depends and varies according to the obturation technique previously employed and further influenced by the canal's length, cross-sectional dimension, curvature and internal configuration. This is one of the best outcome obturate material commonly used; gutta percha is best removed from a root canal in a progressive manner to prevent inadvertent displacement of irritants periapically [8]. Diverging the root into different directions, gutta percha may be primarily removed from the canal in the coronal one third, then the middle one-third, and finally eliminated from the apical one-third. If a single cone is present in a larger and straighter canals, it can be removed with one instrument in one motion. Some of the other canals are present, there are a number of possible ways for gutta percha removal methods. The removal techniques include rotary files, ultrasonic instruments, hand files with heat or chemicals, and paper points with chemicals. Of these options, the best techniques for a specific case is selected based on preoperative radiographs, clinically assessing the available diameter of the orifices after re-entering the pulp chamber, and clinical experience. Multiple methods in combination are generally required and, in concert, provide safe, efficient and potentially complete elimination of gutta

percha and sealer from the internal anatomy of the root canal system. [9,10]

Silver Point Removal

The relative ease of removing a silver point is based on the fact that chronic leakage reduces the seal and hence, the lateral retention. Access preparations must be thoughtfully planned and carefully performed to minimize the risk of inadvertently foreshortening any given silver point. Primary access is obtained with highspeed, surgical length cutting tools, then oftentimes ultrasonic instruments are used to different techniques have been developed for removing silver points depending on the length, diameter and position they occupy within the root canal space[11]. Certain removal techniques evolved to address silver points that bind in unshaped canals over distance. Some of the other techniques arises to clean silver points with large cross-sectional diameters, approaching the size of smaller posts. Finally, other techniques are necessary to remove intentionally sectioned silver points lying deep within the root canal space. The methods that are significant for removing silver points includes: grasping pliers utilizing the principles of fulcrum mechanics, indirect brush-cut away remaining restorative materials and fully expose the silver points. Some of the other instruments used are files, ultrasonic, solvent, chelators, hedstroem displacement technique, tap and thread option using the microtubular taps from the Post Removal System kit and microtube mechanics such as the Instrument Removal System [12].

Carrier Removal

Gutta percha carriers were originally metal and file-like, yet over the past several years they have been manufactured from easier-to-remove plastic carriers that have a longitudinal groove. Although metal carriers are no longer distributed, they are occasionally encountered clinically and can be more difficult to remove than silver points because their cutting flutes at times engage lateral dentin. Removal is enhanced successfully by identifying that the carrier is iced in a sea of hardened gutta percha and sealer [13]. Successful removal of gutta percha poses additional challenges to the aforementioned obturation techniques, in which the clinician must remove both the gutta percha and the carrier. The idea behind removal of a carrier is to appreciate the importance of first removing circularly the gutta percha which will facilitate removing the carrier based obturators.

Paste Removal

Patient with the condition for retreatment is useful to understand clinically that pastes can be derived into soft, penetrable and removable versus hard, impenetrable, and non-removable. Fortunately, the paste is more collaged in the upper portion of the canal and the material is progressively less dense moving apically due to the method of placement. Retreatment past a paste-filled canal, the dentist should anticipate calcifications, resorptions, and the probability that the removal efforts may be unsuccessful. More considerably, a patient should be told with the advice that there could be a higher incidence of flare ups associated with this retreatment cases [14]. An excellent technique for the safe removal of hard, impenetrable paste from the portion which is straight of a canal utilizes abruptly coated with ultrasonic instruments in conjunction with the microscope. The removal of paste apical

to canal curvature is done with hand instruments that should first be utilized to establish or confirm a safe glide path. The stainless steel hand file which is pre curve may be inserted into this secured place of the canal and when attached to a file adapter, may be activated utilizing ultrasonic energy. Other removal methods include hot use of end-cutting rotary NiTi instruments and small sized hand file with solvents such as Endosolv R and Endosolv E. Additionally, Micro-Debriders and paper points with solvents play a significant role in removing paste from canal irregularities[15].

Post Removal

In clinical practice, the teeth which are treated frequently contain posts that need to be removed to facilitate successful nonsurgical retreatment. Types of factors used by the post removal are post diameter, length and the cementing agent. Other things involved in the removal are whether the post is parallel versus tapered, stock versus cast, actively engaged versus non-actively retained, metallic versus non-metallic compositions, and the post head configuration. Subsequently, other considerations includes inter-occlusal space, existing in fillings and if the post head is supra or sub-crestal [16]. Past the time, many techniques have been advocated for removal of posts. Before initiating any post removal method, all materials circumferential to the post must be eliminated and the orifice to the canal seen.

Mechanical Option

A number of different devices have been designed to mechanically remove a post. However, many of these devices, such as the Masserann kit and the Post Puller have had limited success because they require quickly and the excessive removal of tooth structure, which predisposes the ledges, perforations or root fractures. The post extractor represents a definite improvement over the canals and the Post Puller devices in that is less invasive and has enjoyed good success, but gratefully, for different reasons, by a low number of clinicians. As such, the Post Removal kit was developed to provide significant improvements in simplicity, versatility, and sizing during post removal procedures [17]. The Post Removal kit is designed to mechanically engage and remove different kinds of post types or other intracanal obstructions whose cross-sectional diameters are 0.50 mm or greater. This kit contains extracting pliers, a transmetal bur, five trephines of varying internal diameters, five corresponding tubular taps whose internal diameters range from 1.60 to 2.60 mm, a torque bar, and a selection of rubber bumpers. The procedures which are done before utilizing the kit that requires straightline access and complete circular visual of the post within the chamber of the pulp. A transmetal bur is used to round-off, chamfer or taper the coronal most aspect of the post. Flying the head of the post will serve to effectively guide the subsequent instruments over the post. A drop or two of chelator is then placed on the head of the post to act as a lubricant to facilitate the machining process. To confirm circular milling, the big trephines that are adjusted to involve with the post is selected. The latch type trephines should evolve at approximately 20,000 rpm in a clockwise direction, in a slow-speed, high torque hand piece. The trephine is used with a drilling in pickle motion to maintain speed and to keep the head of the post cooler so it does not work hard and become more difficult to rotate. The trephine is used to machines down a 3to 4 mm length of the most upper

aspect of the exposed post. The chosen trephine fits accordingly, thus a sequentially smaller size trephine is selected to ensure proper circumferential milling. In some of the cases the configuration of the coronal most aspect of the post, such as a cast post/core, replicates the use of a transmetal bur or diamond to chew down the lid of the post to create a replicate round cylinder. The trephine can pull the machine accordingly round cross-sectional diameter on the post. Generally, the trephine used for machining the post dictates the subsequent selection of a correspondingly sized tubular tap. A small sized rubber bumper is selected and placed over the distal end of the tap. The bumper serves to trephine, evenly distribute the loads and protect the tooth during the removal procedure. The tubular tap is pushed against the head of the milled down post and is manually turned rotative to form threads. Apical pressure is strong and small quarter turn rotative motions will generally draw down and subsequently engage the tap to the post. The screwed tap is placed over the post as little as or, more optimally, up to a maximum. The part should be running down so that the tap is not drawn down too far over the post because of its maximum internal depth. If the lower of the tap is out against the head, it can be kept aside breaking the threads, breaking the wall of the tap, or shearing off the obstruction inside the lumen of the tap. When the tubular tap is kept on the post, the protective rubber bush is pushed down onto the biting surface of the tooth. The pliers are taken down and are then selected and the extracted parts are mounted onto the tubular tap. The instrument is held securely with one hand, while the fingers of the other hand begin opening the jaws by turning the screw knob CW. The parts of the instruments slowly begin to open; increasing power will be noted on the screw part. The dentist should frequently check that the compressing rubber part is properly protecting the tooth. Further, when utilizing this removal method, the dentist should see and confirm the post is being safely withdrawn along the long axis of the root canal. If turning of the screw knob becomes increasingly difficult, the dentist should either hesitate a few seconds before continuing and/or use the indirect ultrasonic technique to vibrate on the post engaged tubular tap. When including the indirect ultrasonic techniques enhance post retention failure, encourage the part of the screw to turn faster and are actively adjusted to successful post removal. Ultimately, the PRS provides clinicians an important post removal method that can be safely employed when ultrasonic techniques are unsuccessful. Clinicians also encounter actively engaged threaded posts that require removal. This specifically designed to this condition because each tubular tap turns in a Circular rotation. The post head is milled down as previously described and a tubular tap threaded until snug where thread of the post are done and the use of the extracting pliers is not indicated [18].

Files Used in Endodontics

K file

The K-type file is more productive by rotating or gliding a square or triangular tapered shaft so that the cutting part of the file are almost perpendicular to the long access of the instrument. This instrument is mainly used for cleaning and shaping. The K-file works on the pull stroke that is, by scraping the canal walls as it is withdrawn from the canal. The advancement to the full working length rotated to turn clockwise, and while being pressed against one of the

walls. The process is repeated against each of the walls in turn until the canal is sufficiently enlarged to proceed to the next size instrument. The treatment should not be too fast because it is more acceptable to utilize an instrument to the maximum extent possible before proceeding to the next instrument during the treatment. A cleaning of file is more important and regularly during use; never use an instrument engaged with filings or debris. The reamer should be placed in contact with the walls of the canal in order to get proper angulation, but it must not bind or it may break [19].

Hedstroem File

The Hedstroem file is machined and manufactured from a round tapered blank. A spiral groove is cut into the shank, producing a sharp blade. A true filing action should only be used with this instrument as the blade is at an angle. The probability of strong fracture can occur if a reaming action is used and the blades are engaged into the dentin for removing gutta-percha root fillings [20].

Other Hand Files

Different types of hand file have been introduced from time to time with varied structure and cutting action. The types of files are Unifile and Helifile were modifications of the Hedstroem design [21]. The Mani Flare file is made from a triangular blank, and features a greater taper than conventional files. It is important when requiring the use of new file designs that the dentist knows the basic principles of canal preparation, and compares the properties with the file manipulation technique being used regularly [22].

Reamer

A reamer is square shape constructed or triangular, machine twisted into a spiral but with fewer cutting machines than a file. The reamer would slice only dentin layer when it is rotated into the canal; the mode of action is inacted for its use is a quarter to a half turn to pick out dentin layer, and take out to remove the debris. The reamers have great grip which increases with each larger size, so the larger reamers in curved canals will tend to slice a wider channel near the apical end of the root canal [23].

DISCUSSION

The pre-existing filling material is removed fully from canals is a presented filling material for successful nonsurgical root canal retreatment. This procedure can cleared residual necrotic layers or infection that may be responsible for persistent periapical inflammation, and allow further cleaning and refilling of the root canal system [24]. Remaining filling debris has been assessed by radiography, splitting teeth longitudinally or making teeth transparent. In the present study, teeth were made transparent after treatment to allow measurement of the area covered by root filling remnants. NiTi rotary instruments have been proposed for removing GP from root canals. There have been few studies investigating the behavior of ProTaper Universal retreatment instruments in nonsurgical endodontic retreatment. In recent study, the ProTaper Universal rotary instruments left a smaller percentage of area covered by GP/sealer remnants which is treated with other techniques. The improved efficiency and performance of ProTaper Universal retreatment instruments may be attributable to their design. D1, D2 and D3 have three progressive tapers and lengths. Therefore, it can be achieved that the rotary movements of

engine driven files create a certain degree of frictional heat which might be corrosive to GP. The plasticized GP would thus present less resistance and be easier to remove [25].

CONCLUSION

This article has identified a variety of techniques to successfully retreat endodontically failing teeth. It should be praised and welcomed certainly in endodontics. The failing teeth are not able to achieve the successful retreatment [26]. In these instances, the various interdisciplinary treatment options can be thoughtfully considered to ensure each patient is best served. Therefore, the potential of health accommodated with treated teeth in endodontics has been praised and been welcomed naturally retained root that is recognized as the ultimate dental implant [27].

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