Current Trends In Cleaning And Shaping

Dr. Siju Jacob

Dr. Siju Jacob completed his B.D.S From Bangalore institute of Dental Sciences Bangalore and M.D.S from Saveetha Dental College Chennai. He lives in Bangalore, India, where he has a practice limited to Endodontics. He also conducts limited attendance hands-on courses in Endodontics at his center in Bangalore. He can be contacted through his website www.rootcanalclinic.com. This is the second of a 3 - Part article on Endodontics.

Dedication

This article is dedicated to Prof. Herbert Schilder. His contribution to the growth of Endodontics is unmatched. Prof. Herbert Schilder passed away on Jan 25th 2006. The majority of concepts described in this article are based on his teachings.

Introduction

There are differences in opinion among Endodontists around the world regarding various aspects of Endodontics. However, if there was one statement that Endodontists around the globe would agree upon, it is this; "cleaning and shaping is the most important aspect of endodontic therapy". There are numerous techniques of cleaning and shaping. A description of each technique is beyond the scope of this article. The purpose of this article is to make readers aware about basic principles of cleaning and shaping. One should then choose a technique which best facilitates achievement of these principles.

Anatomically generated Endodontics

The rationale of Endodontics is based on simple biologic principles. Because the pulp is surrounded by dentin, it cannot benefit fully from the body's natural inflammatory response. Due to caries, iatrogenic errors, periodontal problems or trauma, a vascular pulp may degenerate into avascular necrosis. The necrotic material then seeps out of the portals of exit (POE) of the root canal system and generates lesions of endodontic origin (LEO) (Fig.1A). If the root canal system is cleansed, shaped and sealed three dimensionally, then resolution can be expected (Fig.1B).

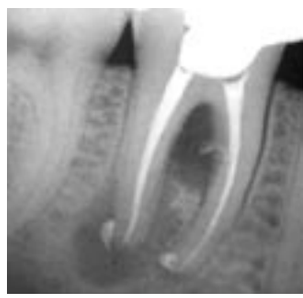

Fig.1A A vascular pulp may degenerate into avascular necrosis. The necrotic material then seeps out of the portals of exit (POE) of the root canal system and generates lesions of endodontic origin (LEO).

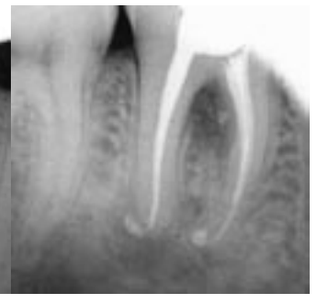

Fig.1B If the root canal system is cleansed, shaped and sealed three dimensionally, then resolution can be expected.

Virtually any endodontically diseased teeth can be treated successfully if the root canal system is cleansed, sealed in three dimensions and if the periodontal condition is healthy. Therefore the principles of contemporary Endodontic therapy must be based on the effectiveness of cleaning, shaping and packing the root canal system with a permanent, biologically inert root canal filling.

The critical issue is three-dimensionality. For years we have been optimistic in thinking of root canals as single straight cones when in reality they are not coned or cylindrical but consists of ribbons, fins, lateral branches and numerous ramifications (Fig.2). Eccentricity and abnormality should be considered normal. Clinicians should aim at treating this complex "pulp space" rather than a straight canal from orifice to apex.

Fig. 2A

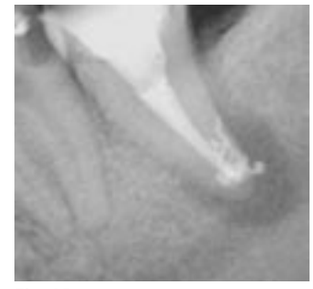

Fig. 2B

Fig. 2C

Fig. 2 Root canals are not always coned or cylindrical but consist of ribbons, fins, lateral branches and numerous ramifications.

Cleaning and shaping

About 40 years ago, Schilder introduced the concept and the term "Cleaning and Shaping". Cleaning refers to "the removal of all contents of the root canal system before and during shaping: organic substrates, food, micro flora, bacterial byproducts, caries, pulp stones, dense collagen, previous root canal filling material, and dentinal filings from root canal preparations".

Shaping refers to a specific cavity form with five design objectives.

Proper shaping helps in two ways:

1. Facilitates irrigants to flow through the entire root canal system.
2. Facilitates obturation material to flow and seal the entire root canal system.

In most cases, instruments primarily shape and irrigants primarily clean. In this issue we shall discuss shaping objectives and principles of using rotary Ni-Ti instruments. The importance of cleaning and shaping cannot be overemphasized. In most branches of dentistry, clinical success depends on variable factors, some of which are not within the control of the operator. In Endodontics, the clinician is the major clinical variable. Achieving predictability in shaping requires considerable skill, dedication and determination.

Schilder's mechanical objectives

Nearly 30 years ago, Herbert Schilder introduced the five mechanical objectives for cleaning and shaping. These objectives have stood the test of time and paved the way for better instruments and techniques today. The following are the five mechanical objectives of cleaning and shaping:

1. Develop a continuously tapering conical form in the root canal preparation: This shape should mimic the natural shape of the canals before they undergo calcification and formation of secondary dentin. The aim should be to create a conical form from access cavity till the apex (Fig. 3A). This funnel shape enables irrigant to flow freely to the apex and laterally. It also allows for compaction of gutta percha apically and laterally.

2. Make the canal narrower apically with the narrowest cross sectional diameter at the apex: The second objective is a corollary of the first objective. As the preparation advances apically, the diameter becomes narrower (Fig. 3B). This ensures free passage of instruments into the canal system, ensures thorough irrigation and provides retention for the gutta percha within the canal.

3. Make the preparation in multiple planes: Root canals normally follow the shape of the roots. If the roots are curved, then the root canals will also be curved (Fig. 4). Most root canals exhibit a certain degree of curvature. Some are obviously more curved than others. When dealing with curved canals, the preparation should be done in multiple planes to ensure that the natural curve or "Flow" is preserved (Fig. 5). Straightening is a common mistake when using large stainless steel files without pre-curving.

Fig. 3A final shape should be a continuously tapering conical form from orifice to apex.

Fig. 3B The canal should be broader at the orifice and narrower at the apex. The narrowest cross sectional diameter should be at the apex:

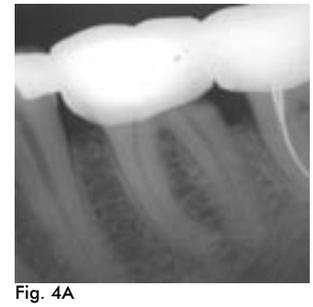

Fig. 4A

Fig. 4B

Root canals normally follow the shape of the roots. If the roots are curved, then the root canals will also be curved.

Fig. 5A

Fig. 5B

Fig. 5: When dealing with curved canals, the preparation should be done in multiple planes to ensure that the natural curve or "flow" is preserved.

4. Never transport the foramen: The foramen or foramina must be handled delicately during cleaning and shaping. Delicate foramina can be lost during shaping due to improper sequencing of instruments, failure to pre-curve instruments, insufficient irrigation and not being delicate enough. Transportation of canals may be internal or external. Both internal and external transportation can hamper the long-term prognosis (Fig. 6). Patency should be verified after each instrument use to ensure flow.

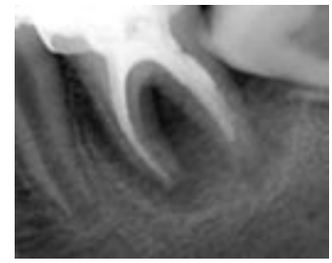

Fig. 6A Failed case due to transportation of foramen. Both foramens in distal root are transported internally resulting in short fillings. Mesio lingual canal is transported externally.

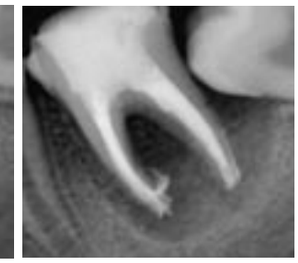

Fig. 6B Immediate post retreatment radiograph shows all foramina located, cleaned, shaped and filled.

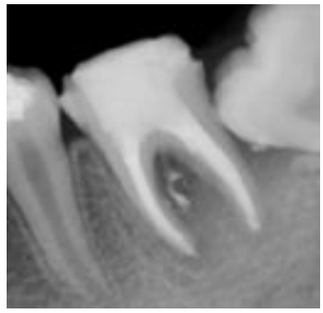

Fig. 6C 3 month follow-up radiograph shows healing in progress.

5. Keep the apical foramen as small as practically possible: Do not over-enlarge the foramen. It is not the size of the foramen that matters but the taper created before it (Fig. 7).

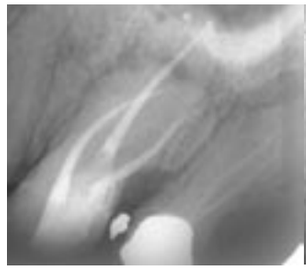

Fig. 7A

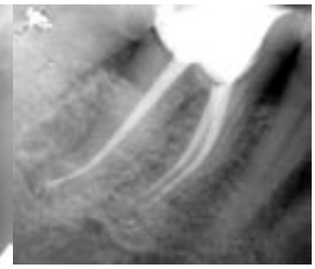

Fig. 7B

Fig. 7: All canals enlarged only to size 20 at the apex. It is not the size of the foramen but the taper coronal to the foramen that allows ideal cleaning, shaping and obturation.

It is difficult to set a fixed size for enlarging the foramen to. The final size of the foramen will vary depending on the canal. Some foramina are small while some are large. The aim should not be to unduly enlarge the foramen. Clinicians should be aware of the formula "Area of a circle = πr^2". For example, if the diameter of a foramen is increased from an ISO size 20 to an ISO size 40 instrument, the area of the foramen will be increased four times (Fig.8).

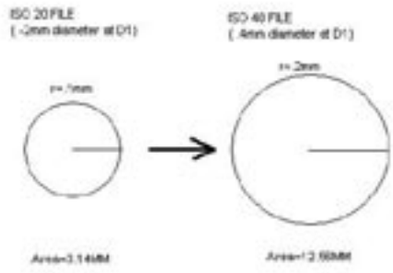

Fig. 8: "area of a circle = πr^2". If the diameter of a foramen is increased from an ISO size 20 to an ISO size 40 instrument, the area of the foramen will be increased four times.

Instruments for Shaping

There are a plethora of instruments used for cleaning and shaping. A textbook classification and description of each is beyond the scope of this article. For the general practitioner, the main choice is between using

a. ISO tapered hand instruments or **b.** Greater taper rotary Ni-Ti instruments. Let us discuss what the greater taper rotary nickel titanium revolution in Endodontics is all about.

ISO versus greater taper

ISO tapered instruments (2% tapered instruments) have been used for ages and are still being used. Earlier, the entire shaping had to be done with ISO tapered files. Today greater tapered rotary nickel titanium files can do the majority of shaping procedures in much less time and with much less effort. What exactly was the problem with ISO tapered instruments? The problem was that relatively less tapered instruments (2%) were used to create relatively more tapered (6 to 8%) canal shapes (Fig. 9).

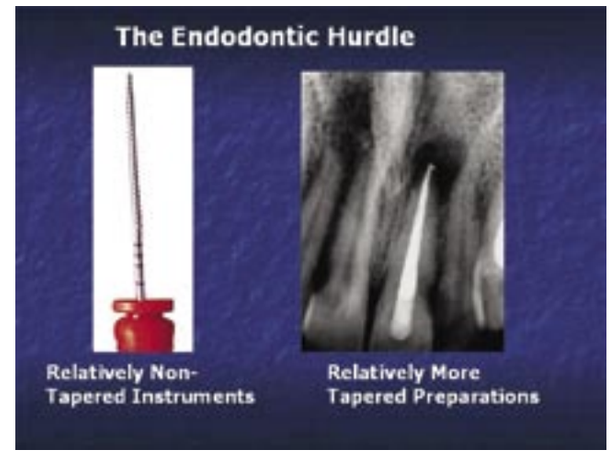

Fig. 9: The problem with ISO taper instruments; relatively less tapered instruments were used to create relatively more tapered preparations.

This obviously meant a lot of time. For example, A classic step back technique using hand instruments with gates glidden drills would require 15 to 18 instruments in about 47 to 63 steps per canal. Imagine doing that for a multi-rooted tooth! No wonder then that clinicians started resorting to short cuts. Most would end their apical preparation to say an ISO #25 file and forget about the coronal prep. This would obviously result in a canal preparation with 2% taper, anemic middle third shaping and minimal coronal enlargement (Fig. 10).

Fig. 10A failing case with canal treated till the apex but having only 2% taper. Note minimal coronal flare and anemic middle third. Apex is treated to size 25.

Fig. 10B Retreatment of the same case with proper shaping allows for three-dimensional obturation including previously undiscovered lateral canal.

Needless to say, these shapes were often insufficient to satisfy the objectives of cleaning and shaping. Predictability of endodontic therapy was also low.

The greater tapered instruments as the name suggests, had much more taper than their ISO counterparts. With tapers like 4%, 6%, 8% (Fig. 11) and more, fewer instruments were required to obtain ideal shapes. Substituting stainless steel with nickel titanium increased their flexibility.

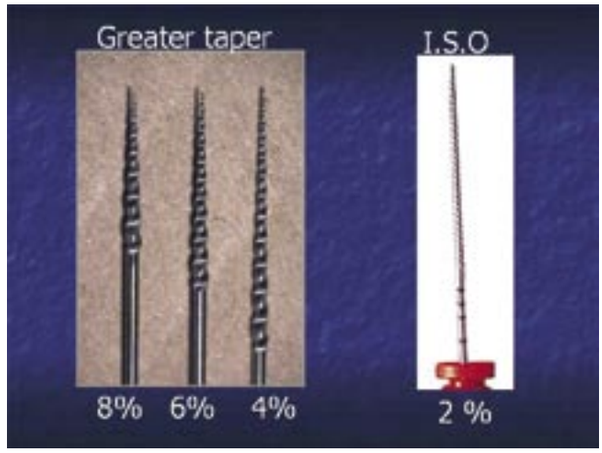

Fig. 11 Greater taper instruments compared to ISO taper instrument.

Once these greater taper nickel titanium instruments were available as rotary instruments, they initiated probably the greatest ever revolution in Endodontics. These instruments provided controlled coronal enlargement, ideal fullness in the middle third and minimal enlargement of the apex. The shapes obtained by these instruments were much more predictable and as a result, obturation techniques too became much more predictable. Today it is hard to imagine Endodontics without rotary Ni-Ti instruments.

In spite of the obvious advantages, many practitioners are reluctant to start using these instruments. The aim of the latter part of this article is to clear some common doubts and motivate clinicians to include rotary Ni-Ti as part of their Endodontic Armamentarium.

Rotary Ni-Ti rules

The following are some guidelines to be followed when using rotary Ni-Ti.

1. Rubber dam: Rubber dam is standard of care for endodontic therapy. The rubber dam protects the patient from iatrogenic mishaps and provides isolation and asepsis. With practice, applying a rubber dam takes less than a minute and can save the clinician hundreds of hours.

2. Straight-line access: Most of the fractures of rotary Ni-Ti instruments are due to improper access. Walls should diverge outward and dentinal collars should be removed. Instruments must pass in and out of the canals without coronal obstruction (Fig.12).

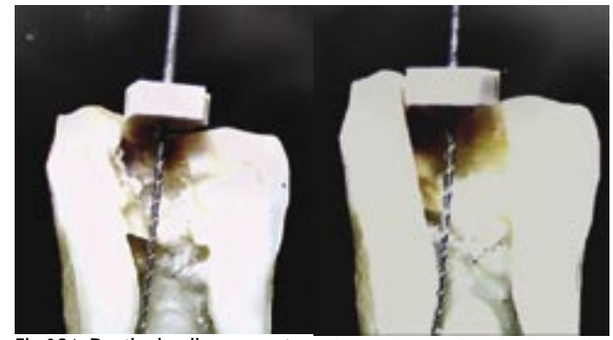

Fig.12A Dentinal collar prevents straight-line access.

Fig.12B Removal of dentine collar allows straight-line access for safe rotary Ni–Ti use. (Picture courtesy Dr. Yohan Chacko).

3. Initial negotiation: Initial negotiation must always be with a #10 K-file. Using large files initially in narrow canals can cause a pulpal plug, which blocks the canal and can be virtually impossible to remove. Small # 10 files tend to slice through the pulp like a sword rather than compress the pulp mass.

4. Lubrication: Always use a lubricant like **RC-Prep** or **Glyde**. Apart from preventing instrument binding, they also prevent the formation of pulpal plugs.

5. Glide path: The goal of shaping with rotary Niti is to enlarge an existing path and not to create a new one. The term "Glide path" means establishing a path in the canal with at least a size 15 file for the rotary instrument to follow. A rotary Ni-Ti file should never go into an area that a size 15 file has not gone. The larger the glide path, the safer it is to use rotary Ni-Ti. Using rotary Ni-Ti in the absence of a glide path is the harbinger of iatrogenic errors and reduces long-term prognosis. Maintaining a glide path ensures predictability in rotary Ni-Ti use.

6. Crown Down Technique: All greater taper rotary Ni-Ti instruments must be used in a crown down technique. The easiest way to fracture these instruments is to use them in a step back technique. Follow the sequence guide given by the manufacturer.

7. Irrigation: Irrigate after each instrument is used. Irrigation must be done with a 30 gauge or at least a 27-gauge needle to ensure that the irrigant reaches the apex. Ensure that the needle does not bind in the canal. Gentle pressure on the plunger should be enough to extrude irrigant. If back-pressure (resistance) is felt on the syringe plunger, then do not inject. Retract the needle and inject again. Injecting under pressure will cause extrusion of irrigant into the apical tissue. Side venting needles (Fig. 13) are a safe alternative to prevent irrigant extrusion.

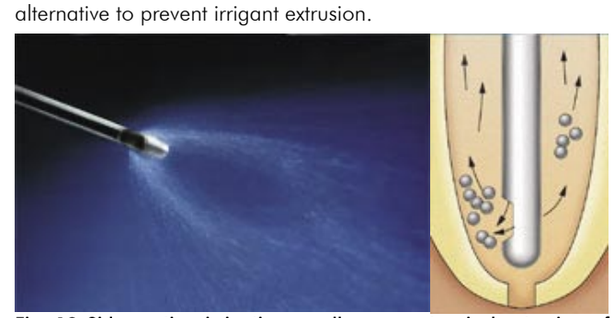

Fig. 13 Side venting irrigation needles prevent apical extrusion of irrigants.

8. Patency file: Select a size 10 or preferably size 15 file that will go 1mm beyond the apical foramen. This is called the Patency file. This will prevent internal transportation and ensure that the delicate foramen area is cleaned. After each rotary file is used, irrigate. Go back again with a size 15 file and circumferentially file against the canal walls in the presence of irrigant. Rotary Ni-Ti usage pushes dentinal debris against the walls. Agitation of the small size 15 k file removes dentinal debris and prevents dentinal mud from blocking the root canal system.

9. Light Touch: Never use rotary Ni-Ti in a forceful manner. Always use a light touch. The amount of force used should be no more than that of writing with a sharpened pencil (Fig. 14).

Fig. 14 The force exerted when using rotary Ni-Ti should be no more than that exerted when writing with a sharp pencil.

10. Constant Speed: Always use the recommended speed by the manufacturer. Connect the handpiece to a micromotor unit, which ensures a constant speed. Increasing or decreasing the speed can cause iatrogenic errors.

Managing Curvatures

All root canals exhibit some degree of curvature. It is ignorant to think of root canals as ultra straight canals. Some canals are obviously more curved than others. Tackling canal curvatures requires knowledge, skill and patience. Handling curvatures delicately is more important when using rotary Ni-Ti because chances of instrument fracture increases as the degree of curvature increases.

In addition to the ten Ni-Ti rules mentioned previously, the following strategies may help in managing canal curvatures.

Curvature classification

For clinical purposes, curvatures may be classified broadly into three types:

1. Single mild curvature.
2. Single moderate /severe curvature.
3. Multiple curvature or re-curvatures.

Single mild curvature (Fig. 15)

These are mostly seen in the apical part of the canal towards the last 1 mm. The canal curves at only one angle. Curvature is normally mild (about 15 to 30 degrees). Clinically, the file will stop 1 to 2 mm short of the apex and the operator will get a feeling of "hitting a wall" with the file. The common excuse given by clinicians will be that the canal is "calcified" apically. Calcifications almost always occur from coronal to apical. Most so-called "apical calcifications" are in fact apical curvatures.

Fig. 15A initial working length radiograph stops with loose resistance 2 mm short of apex.

Fig. 15B
Size 10 K file precurved.

Fig. 15C Precurved size 10 K file negotiates curve and reaches apex.

Management

Make sure the coronal part of the canal is flared out. Pre-curve an ISO tapered size 10 K-file and insert it into the canal. Turn the file10 degrees, move the file in a watch-winding motion and look for an apical catch. If apical catch is not felt, retract 1 mm, turn

the file a further10 degrees and watch wind again. Repeat till a catch is felt. Once a catch is felt push the file as far as possible and circumferentially file the curvature. Once this is done, a size 15 K file is similarly pre-curved to about 15 degrees and the same motions are repeated. For mild curvatures, once a glide path of size 15 is established around a curvature, rotary Ni-Ti can then be introduced safely. If a rotary Ni-Ti instrument does not get to length, then precurve a size 20 K-file and refine the glide path. Follow it with a rotary Ni-Ti.

Single moderate / Severe curvatures (Fig. 16)

These curvatures may be seen at the orifice (coronal curvature) or mostly at the apical one third. The canal curves at only one angle.

Fig. 16 Single case with 3 canals showing varying degrees of curvature. The mesio lingual (left) has mild curvature, mesio buccal (middle) has moderate curvature and the distal (right) has severe curvature. All three canals should be managed differently.

Curvature however is more pronounced (mostly between 30 to 90 degrees and sometimes more). Clinically, the file will stop at the curvature and the operator will get a feeling of "hitting a wall" with the file. Clinically these curvatures are easier to recognize because they follow the external curvature of the root.

Management

Initial entry into the curve after precurving is the same as that for mild curvatures. The precurve imparted on the K-file should be more exaggerated and should resemble the curvature of the root. However, before using rotary files, the curve should be negotiated with at least a precurved ISO tapered size 20 K-file. In moderate to severe curvatures, a rotary Ni-Ti file should be used around a curve only once. Never ever go back to length with the same rotary Ni-Ti. Breakage is almost guaranteed.

Multiple curvatures or re-curvatures (Fig. 17)

The term re-curvature implies more than one curvature in the same canal. These are the most difficult to treat. The recognition of the problem is pretty straightforward because even the roots exhibit multiple curvatures.

Fig. 17 Re-curvature cases. Rotary Ni-Ti should be used with extreme caution. High risk of instrument separation. Rotary Ni-Ti should only be used till the first curve and not beyond.

Management

These canals should be treated in multiple planes. The golden rule is "one curve at a time." Rotary Ni- ti should be used only till the first curve. All instrumentation beyond the first curve should be with hand instruments. ISO tapered nickel titanium hand files should be used along with precurved stainless steel instruments. These cases are difficult to treat and practitioners should consider referral to a specialist.

Minimizing Instrument Breakage

One of the deterrents to people using rotary Ni-Ti is the risk of instrument fracture. This is obviously a good news, bad news story. The bad news is that rotary Ni-Ti may not show signs of deformation like stainless steel files and can break without warning. The good news is that most breakages are due to operator errors and can be prevented. Ni-Ti Instruments break due to two reasons;

1) Cyclic fatigue

2) Torsional stress.

Cyclic fatigue is due to repeated use of the instrument. Torsional stress is due to improper use resulting in excessive stress on the rotary Ni-Ti that is beyond the elastic limit of the instrument. The operator can create torsional stress by using excessive force or by forcing rotary Ni-Ti into curvatures without preflaring. Both torsional stress and cyclic fatigue can be minimized by judicious usage. The following are some strategies to minimize instrument breakage (also refer Ni-Ti rules discussed previously):

1. **Proper access:** As previously mentioned, access is everything when using rotary Ni-Ti. Most instrument breakage happens because of improper access. Straight-line access is a must when using rotary Ni-Ti.

2. **Limit the number of times an instrument is used:** Determining when to throw away a rotary Ni-Ti requires experience. When we ask practitioners who complain about instrument breakage, the number of times they re-use a rotary Ni-Ti file, most of them say they "use it till it breaks". Clinicians must develop a habit of disposing rotary files after a limited usage. This is why it is so important to work on extracted teeth to get a feel of these instruments. It is all right to break any number of instruments in extracted teeth but not on patients. "When in doubt, throw them out" is a good policy to follow when using rotary Ni-Ti. If one is not sure about the number of times an instrument has been used, then one should discard it. If one can afford it, it is best to dispose off all rotary Ni-Ti after a single use.

3. **Segregate instruments:** Instruments must be separated depending on the canal anatomy. For example rotary Ni-Ti used in a relatively straight and wide canal (like maxillary central incisor) can be sterilized and re-used many more times than a rotary Ni-Ti used in a narrower, more curved canal (say mesiobuccal canal in a mandibular molar). These instruments should not be mixed together. They should be kept separately with notes made as to the number of cases they have been used.

4. **Use Torque control handpieces or electric Torque control motors:** Handpieces and motors with enhanced torque control stops instruments from binding excessively and minimize both torsional stress and cyclic fatigue. Torque control motors are especially useful for beginners.

5. **Constant speed:** Fluctuation of speed is another reason for instrument breakage. Always use a micromotor that delivers constant speed. Avoid air-motor attachments as the speed depends on the amount of air in the compressor. The motor should be rotating at full speed before it enters the canal and should not stop rotating till it is out of the canal. For micro motors with foot control, do not release the foot when the file is in the canal.

6. **Pre-enlarge with hand instruments:** Pre-enlarging the canals with hand instruments and gates glidden drills minimizes cyclic fatigue and torsional stresses thereby prolonging the life of the instrument. For those worried about economics of rotary Ni-Ti, preparing the canal to ISO #25 at the apex will place very minimal stresses on the rotary instrument and thereby prolongs its longevity.

7. **Irrigation:** Always use rotary Ni-Ti in the presence of irrigants. Irrigants and lubricants reduce the binding of instrument and thereby minimize stresses. Never use rotary instruments in a dry canal.

8. **Remove debris after each use:** Every time a file is used in the canal, make sure the debris in the flutes is removed before re-insertion.

9. **Inspect for deformation:** Sometimes Ni-Ti can deform before it breaks. Carefully observing for any deformation after each use can help prevent a mishap.

10. **Never bypass broken Ni-Ti instruments with rotary Ni-Ti:** Bypassing a rotary Ni- ti should always be done with hand files. Trying to bypass a broken Ni-Ti with another rotary Ni-Ti will only result in two broken Ni-Ti files.

Basic FAQ S on Rotary Ni-Ti.

The following are some commonly asked questions regarding rotary Ni-Ti

Can I afford rotary Ni-Ti?

The question to be asked is whether one can afford not to use rotary Ni-Ti. The benefits of incorporating rotary Ni-Ti into one's practice far outweigh the investment, learning curve and recurrent costs.

Which is the best rotary Ni-Ti system in the market?

This is a personal choice. The best ways to figure out is to use each of them and decide which one suits you best. Numerous hands on courses on rotary Ni-Ti are available through out India. Attending a hands on course would definitely cut down the learning curve. Companies are normally willing to lend their gear reduction hand pieces to deserving practitioners for a few days trial. Practitioners can try them out on extracted teeth and then decide which rotary Ni-Ti system suits them the best.

What is my initial investment to get into rotary Ni-Ti?

To start with you need to buy a gear reduction handpiece (Fig. 18A). This is your initial investment. The Gear reduction handpiece you buy will depend on the rotary Ni-Ti system that you plan to use. Most companies now have torque control gear reduction handpieces

Fig. 18A Gear reduction handpiece without torque control.

Fig. 18B Gear reduction handpiece with torque control.

(Fig. 18 B). This simply means that the torque is adjusted on different gears according to the rotary Ni-Ti instrument system used. This reduces instrument breakage to a significant extent. It would be wise to consult a colleague or a teacher who has already been using rotary Ni-Ti systems before investing in a handpiece.

If one can invest a bit more, then one could buy an Electric Torque control motor (Fig. 19).

Fig. 19 Electric torque control motor

These are microprocessor controlled and are much more sensitive to instrument binding. These are obviously more expensive than simple gear reduction handpieces with torque control.

The other major investment is TIME. We spend the whole of second year B.D.S cutting cavities on extracted teeth. One whole year before you cut a cavity on a patient! How many of us are willing to spend a few months learning a new technique on extracted teeth? The reluctance to practice on extracted teeth and the anxiety to try out rotary Ni-Ti on patients has resulted in thousands of patients roaming around with broken Ni-Ti files as obturation material in their canals. Mastering cleaning and shaping procedures takes time and one should allot adequate time to learn new techniques.

How much gear reduction do I need? What do the numbers 1:64; 1:128, etc. stand for?

The number denotes the division of the micromotor speed. For example if you have a micromotor that runs at 40000 r.p.m, and attach a 1:128 handpiece, the speed of the file will be 40000 / 128 = 312 r.p.m. This is important because many a times people buy gear reduction handpieces without checking the speed of their micromotor unit. For example, if your micromotor has a speed of only 20000 r.p.m, and you connect a 1:128 gear reduction handpiece to it, then the maximum speed you would get is 156 r.p.m. This would be insufficient to run most rotary Ni-Ti systems and would certainly risk fracture in some rotary Ni-Ti systems. Check with your dental mechanic and evaluate the speed of your micromotor unit before you buy a gear reduction handpiece.

Why can't I use rotary Ni-Ti in my ordinary micromotor handpiece? Why buy an expensive gear reduction handpiece?

This has to do with torque. Torque (in rotary Ni-Ti) is the ability of the handpiece to withstand lateral pressure on the revolving file without decreasing its speed. Consider the following scenario: your car is zooming at 100 km per hour. You will most likely be in either fifth or fourth gear. You reduce the speed to 20 km per hour. Is it possible to do this in the fifth gear? Of course not! You need to reduce the gear to ensure that the vehicle keeps on running.. Gear reduction handpieces work on the same principle. Running rotary Ni-Ti at high speeds invite risk of fracture. Hence they are run at very low speeds. Most rotary Ni-Ti systems work ideally in the 300 to 350 r.p.m range and almost all of them work under 1000 r.p.m. If we run these files at these speeds in an ordinary micromotor handpiece, the minute the files come in contact with the canal walls, they stop rotating because they do not have enough torque. Gear reduction handpieces come with greater torque thereby enabling files to be rotated at low speeds like 300 r.p.m without the file stopping. This is the reason why gear reduction handpieces are required for rotary Ni-Ti.

I practice in a rural area. Can I afford rotary Ni-Ti. I don't mind the initial investment, but what about the recurring costs?

Rotary Ni-Ti is not restricted to posh urban clinics. They can and should be incorporated into the rural setting as well. Many years ago, ultrasonic scalers, Light cure units and x ray machines were considered "urban equipments". Today, they are an integral part of any rural practice. When using rotary Ni-Ti, one can reduce the number of instruments and develop a rotary Ni-Ti protocol that is feasible in one's practice. Of course there is a learning curve, but this can easily be overcome. Several practitioners who have attended my hands-on courses practice in rural areas and have successfully incorporated rotary Ni-Ti into their practice.

It is a bit like ultrasonic scalers. One invests in an ultrasonic scaler although it is twenty five times more costly than a hand scaler. One does this because one sees the huge savings in time and the improved efficiency and patient comfort it brings. Today I doubt any body would stick to hand scalers just because he or she was practicing in a rural area. The same mentality should come into rotary Ni-Ti instrumentation as well.

In fact the patient in a village should get the same quality of treatment as the patient in the city. Quality in Endodontics is a decision made by the clinician and should not depend on how much the patient pays. Clinicians should be able to incorporate rotary Ni-Ti into their practice irrespective of what they charge for endodontic therapy.

Are hands on courses a must before starting rotary Ni-Ti?

Hands on courses are not a must but they do make things much easier. Without proper guidance, two things could happen:

- One could easily get disillusioned with newer techniques
- One could spend years practicing the wrong technique.

What hands on courses do is to cut down on the learning curve. Some hands on courses in India are well-structured and cost one tenth of similar courses in the west. It makes sense to take advantage of these learning opportunities our country offers. One must also remember that attending a hands on course on a weekend will not make one a rotary Ni-Ti expert on Monday. Expertise comes with constant practice. Under no circumstances should one start using these instruments directly on the patient.

Proper shaping facilitates proper cleaning by irrigants. Cleaning (irrigation) will be discussed in the next issue.

References

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