

why do we do Root Canal Treatment?

- 1- To eliminate infections (if infected) and that is the Primary Objective
- 2- To prevent infections (if the tooth is still vital and not infected)
- 3- To relief pain (Secondary Objective)

\*Root canal Treatment mainly is chemomechanical disinfection and Fluid tight seal to prevent re-infection.

\*RCT is done for necrotic pulp and vital inflamed pulp

Methods used in Root canal treatment:

- 1- Manual Instrumentation
  - step back to create a tapered canal ( 3 files )
  - What is the point of STEP BACK technique? By manual instrumentation there will be parts of the canal that the file didn't touch, so we have to rely on something else to clean them. The taper of the file used is 0.02 (2%) and the taper of the canal increases by 0.05 (5%). If the step back technique was used by reducing 2mm instead of 1mm then the canal will have 2.5 taper. Remember! The more the canal is tapered the less the step
- 2- Rotary instrumentation:
  - 250-300 speed
  - 1.8 torque
  - Crown down
- 3- Reciprocating system:
  - single file techn
  - balance force (QUARTER of the turn is CLOCK WISE and THREE quarters of the turn is COUNTER CLOCK WISE": used in manual )
  - constant irrigation

4- Self-Adjustive File:

HOLLOW mesh that enters the canal and takes the canal shape of >vibrates and it has a very rough surface

-constant sodium hypochlorite irrigation.

- It was used first as a preparation system.

ProTaper System:

Two generations: - Next - Universal

The file is separated into parts: 1- The working part which is 16 mm 2- Black bands (different lengths 21mm, 31mm)

The first band is at 10mm and the second band is at 19mm if the file length is 21mm then there is no third band. If the file is 25mm or 31 mm then the third band is at 20mm If the file is 25mm it has a fourth band at 22mm If the file is 31mm it has a fifth band at 24mm

COLOR CODED; purple, white, yellow, red, blue and black. There is NO GREEN color in ProTaper system. D0 is the diameter of the tip. ProTaper: means PROGRESSIVELY taper

When we refer to taper we refer to the APICAL taper (3mm)

Shaping files: (Eiffel tower shape) The taper is small at the tip and increases along the length of the file.

Sx: is not color coded, its diameter is 0.19 and the taper is 0.04

S1: purple, its diameter is 0.17 and the taper is 0.02

S2: White, its diameter is 0.2 and the taper is 0.04

Finishing Files 4 Taper is large at the tip and decreases along the length of the file.

F1: Yellow, diameter is 20mm and the taper is 0.07

F2: Red, diameter is 25mm and the taper is 0.08

F3: Blue, diameter is 30mm and the taper is 0.09

F4: Black, diameter is 40mm and the taper is 0.06

F5: TWO yellow bands, diameter is 50mm and the taper is 0.05

F4 and F5 are mainly used in canines.

Cross section of files shape: ProTaper files Sx-F2 Its eccentric, it's not really centralized along the long axis of the file with rounded transition angles.

Protocol of using the ProTaper system:

- 1- A good access cavity.
- 2- Always start with hand files #10, #15 and #20 to create a gliding path.

- 3- 3- Shaping files starting with S1 it's going to be short won't reach the full working length but it will create the CORONAL FLARING. 5
- 4- 4- Sx is used because it has a bigger taper and will help in determining the working length

\*If the canal is infected, don't go to the full working length from the beginning because this will lead the bacterial debris to get impacted down at the apical area

\*The first 2 files will prepare CORONALLY (if the hand file #20 reached the apex you start the coronal preparation) with the IN & OUT technique until the tip is loose S2 file prepare the middle third of the canal so it's okay to keep going in and out with this file.

F1 > the tip is working with PECKING ACTION till the full working length is reached. The moment the full working length is reached, STOP and don't keep going in and out because the file is working apically and this will lead to over preparation. and so on f2 then f3

TORQUE: is created when an object is twisted in two directions.

So if a very high torque was set on the motor it will lead to file breakage; the tip is bonded to the canal and the shank is still rotating, the motor will not stop then eventually the torque will go to a high level where the file SNAPS. So these kind of motors will give some kind of protection, when the file is stuck in the canal and the shank is still rotating it will reach a certain torque then it will stop and rotates back.

An Electric motor with torque control and Auto-reverse function is the kind of motor that is used.

In ProTaper system; every single file has recommended settings S1 the torque is set between 2-3 S2 has the lowest torque is set which is 1.5

ProTaper system has certain files for retreatment cases , they are called the (D) files

D1 > 30/.09 it removes Gutta Percha from the coronal part

D2 > middle part 25/.08

D3 > 20/.07

In ProTaper system there are files that have a really small taper 0.02 that are used in severely curved canals to achieve a glide path. The ProTaper systems have rotary files, hand files, matching paper points and matching Gutta Percha

There is a special Gutta Percha type that comes with a carrier and it's heated in a small oven just before obturation, then it's placed in the canal and the handle should be broken. This type is REALLY BAD because: 1- It will not seal the canal properly. 2- It is really hard to remove it if the tooth needed a re-treatment.

## HOW TO ASSESS ROTARY INSTRUMENTS?

1. Material: Ni/Ti system/ M-wire system/ Gold-wire system. Stainless steel files can't be used in the rotary instruments because it's NOT ELASTIC.
2. Number of files: There are systems with one file, but it only works for straight forward cases
3. Cost: ProTaper is expensive.
4. Tip: Active/ Non-active (cutting/ non-cutting) The advantage of the cutting tip: it's faster but more aggressive and it force is applied a new canal will be created! It's better to use the non-cutting tip.
5. Research: Read some researches and articles before you buy any system.
6. Rake angle: The angle between the surface itself and the cutting part of the file, if its  
90 : neutral  
More than 90 : positive /cutting ( act as a blade ), more efficient , more dangerous and very aggressive.  
Less : negative / non cutting (scraping), safer but produces more debris.  
Hero system has a positive rake angle that cuts into the dentine. ProTaper (F3, F4, F5) has a negative rake angle. K3and profile GT-files light speed all have negative rake angle

The shape of the canals is NOT ROUND all the time, most of the times it is oval so the file might be touching two surfaces and the other two might not be prepared

The initial binding file: is the first file that binds at the apex.

The advantage of larger size preparation is to create more room for the irrigation materials, medicaments and the obturation materials.

DISADVANTAGES of larger size preparation:

1. Increase the risk of procedural errors (ledges, zipping, separation)
2. Cutting more tooth structure

How much apical preparation is needed? After finishing file F1 (the yellow one) Use size 20 k-file > the file will reach the apical preparation if the file come out with resistant > the canal is ready to be obturated. If not use F2, F3, and so on. If the tooth was VITAL, it's better to make small preparation, so stop at F2. If the canal is infected with apical radiolucency then F2 is not enough, a larger apical preparation is needed depending on the case.

\* Use the shaping files with BRUSHING MOTION, and the finishing files with PECKING MOTION.