Endodontics: Root Measurement (Unmounted Maxillary Central Incisor)

Armamentarium

K files (numbers 35-80)
Ruler
RC Prep
Irrigating syringe
Irrigating needle (with 45 degree bend at tip)
Stoppers
Sodium hypochlorite (tap water for preclinic exercise)
Paper points (various sizes, i.e. coarse, sterile)
Cotton pliers
X-ray film

The following script has additional content not included in the audio.

Step 1: Initial Estimate

With the unmounted teeth the root is exposed and an initial estimate can be made by placing the tooth against the edge of the ruler and measuring the length from incisal edge to root tip.

Another method of measuring an unmounted tooth is to place the file against the incisal edge and adjust the stopper on the file until the file length equals the estimated length of the canal from the occlusal landmark to the apex.

Place a No. 8 or No. 10 file over the image of the canal in the initial radiograph (taken prior to coronal access preparation). Estimate the working length of the canal and use the stopper box to place a stopper on the file, measuring the correct length.

Check the measurement by inserting the file in the canal. If the file extends beyond the apex, slowly pull it back until it is no longer visible, and push the stopper down to mark the length. This will give you the anatomic length of the canal and you may then proceed to step #4.

Step 2: Determine Landmarks

Place a file in the canal to an estimated length. With the file in the canal, note the occlusal landmark that you will use to establish the length. This landmark must be easy to see. Avoid using the lingual on incisors if possible, as it can be difficult to see on an angle; instead, find an incisal edge that you can readily see. The most clinically relevant working length landmark for both clinical cases and mounted t eeth is the apical constricture.

Step 3: Radiograph

Take a radiograph and examine the developed film. You should see the instrument inside the canal. If the tip of the file does not reach the apex, adjust the length of the file or use a longer one and repeat step # 2, using the radiograph to estimate how much longer the file should be. If the file is too long,adjust the stopper or use a shorter one and repeat step # 2.

When the tip of the file just reaches the apical constricture, this file length is the anatomic length of the canal. This particular tooth has a measured anatomic length of 25.5 mm.

Step 4: Working Length

The working length of the canal will be measured 1 mm short of the radiographic apex of the root. The initial file used to take the diagnostic measurement will be set to the anatomic length (i.e., the measurement from the occlusal landmark to the radiographic apex). Other than this anatomic length file, all subsequent file measurements will be set to the working length measurement, i.e., the radiographic apex depth minus 1 mm.

In this example, the anatomic length of the canal is 25.5 mm; therefore, the working length is 25.5 mm minus 1 mm, or 24.5 mm.

Step 5: Document Length

Document the correct working length and continue with the radicular preparation, or cleaning and shaping, of the canal.