

Endodontics: Stepback Shaping of the Root Canal (Maxillary Central Incisor)

Armamentarium

Ruler
Unmounted tooth
K files (numbers 8, 10)
Stoppers
Stopper box
Initial radiograph
X-ray film

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

Step 1: File Sequence

Recall the working length of the canal and the size of the last file used. Subtract 1mm increments from the original working length with each larger file size used until the instrument reaches within 4-5 mm of the canal orifice. In this case, the working length is 24.5 mm; cleaning was begun with a 35 K-file and ended with a 50 K-file. Stepback shaping will then be completed with the following sequence of file sizes and lengths:

- 55 K: start instrumentation at 23.5 mm
- 60 K: start instrumentation at 22.5 mm
- 70 K: start instrumentation at 21.5 mm
- 80 K: start instrumentation at 20.5 mm

Note that after 60, the K files increase in increments of 10, rather than 5.

Step 2: First Shaping File

Begin with the first shaping file, measured to the working length minus 1 mm; in this case it is the 55 K file at 23.5 mm. Shape the canal using a combination of reaming and filing actions within the canal (similar to the combination used in cleaning). Begin with a reaming action; insert the first shaping file, rotate the file one-quarter turn, pull out of the canal, and repeat: "quarter-turn and out, quarter-turn and out, quarter-turn and out. The emphasis is on the in stroke; the quarter-turns engage the file within the dentin and the file is passively pulled out of the canal. Reaming action permits efficient shaping of the canal walls, and is repeated until the file no longer encounters resistance within the canal.

To help the file reach the working length, watch-winding may be used. Watch-winding is similar to reaming, but involves quick back-and-forth turns inside the canal, as though one were "winding" a watch. This action is used to get to your working length.

Instruments should always be placed into the canal with extreme caution before the canal has been opened sufficiently with cleaning and shaping. A chelating agent such as RC Prep may be used as both a chelating agent, binding with calcium to soften canal walls, and a lubricant for narrower canals. Simply place a small amount on the end of the file before inserting the file into the canal.

Continue shaping with the starting file using a filing action. Filing action is used to widen the canal and is done circumferentially around the canal walls. This ensures that contact force is applied to the entire surface of the wall, 360 degrees around. While reaming works best at the narrowest portion of the canal near the apex, filing works best in the wider part of the canal.

Step 3: Irrigate

Again, copious irrigation is important throughout the shaping of the canal walls, as the filing and reaming actions used during cleaning and shaping generate debris, which also can lead to infection and inflammation of the root canal or apical region. Copious irrigation helps to clear the loosened debris out of the canal and also serves to facilitate instrumentation by lubricating the canal walls and by removing materials that can create blockage in the canal.

Remember to use the irrigating syringe with a 45-degree bend at the tip and do not force it beyond the apex.

Step 4: Repeat Filing

In stepback filing, each succeeding file must reach the correct length. If the specified canal length cannot be reached with the corresponding K-file size, DO NOT start shaping at the shorter length, or force the instrument further down into the canal. Go back to the previous instrument and continue to shape using filing action, until the canal is sufficiently loose enough to accept the succeeding file.

Repeat steps 2-4 for each successively shorter length until you have reached within 4-5 mm of the canal orifice. After shaping with the last file, verify that the canal walls are smooth and that there is no blockage from the coronal portion down to the apex.

Step 5: Dry Canal

Once shaping is completed, the canal is dried using appropriately-sized absorbent paper points. Select the paper point size that best corresponds to the relative size of the canal. In this case the canal is very large and will require the use of coarse size paper points.

Using the cotton pliers, remove a single paper point from the package and insert the paper point in the canal up to, but not beyond, the working length. Measurement control for paper points is achieved by grasping the point at the correct measurement, at right angles to the beaks of your cotton pliers. Sterile paper points should be handled with cotton pliers ONLY to prevent infection.

Repeat this step until the cotton points appear dry when removed from the canal. If paper points continue to appear wet after several placements, the canal may be wet with exudates from an infection, or, the apex has been overinstrumented and the paperpoint is in contact with the root.

Step 6: Confirm Shaping

Recall the last file size used at the working length. In this case, the last file used at 24.5 mm was the 50 K-file. Place this file in the canal and take a radiograph to confirm that the entire length of the canal has been properly shaped.

Use this file to also check for patency, to ensure that the principle of resistance form has been met, and the integrity of the apical foramen maintained.

The properly shaped canal should have an evenly tapering funnel shape with smooth walls. To check resistance form, place the working length file into the canal and turn it one-quarter turn; the file should engage firmly at the apical constriction without going through it.