



Persistence pays

Tenacity is an admirable quality and one endodontic clinicians should use to achieve and maintain apical patency. Apical patency is a cornerstone of excellent endodontics, along with copious irrigation, correct determination of true working length, and three-dimensional obturation, among other critical principles. Patency is a valuable component of endodontic treatment because its attainment and maintenance gives a cleaner canal, minimizes the chance of iatrogenic events, and facilitates the use of rotary instruments, amongst other benefits.

Apical patency refers to the ability to pass a small No. 6-10 K file through the apical foramen to assure that the canal is predictably negotiable. In other words, patent. Forcing large instruments before they are indicated risks loss of patency by packing pulp, dentinal shavings, and other canal contents (dentin mud) into the narrowing cross sectional diameters of the root. Such "mud" compacted into the apical third can be time consuming to bypass and nearly impossible to remove. Once created, blockages are often the precursors of ledges, apical perforations, transportations, and zips among other iatrogenic complications.

Achieving apical patency can be difficult, as canals may possess multiplanar curvatures and significant calcification. Prevention of apical blockage is paramount. It requires a determined mental focus throughout the process from start to finish to ensure that you do everything possible to move pulp coronally out of the tooth. It is much easier to achieve and maintain patency than it is to recapture it after a blockage.

Adherence to and awareness of a number of core principles can go a long way toward achieving and maintaining patency.

▲ **Files make way for irrigants.** Files shape; irrigants clean. A lack of irrigation predisposes a canal to blockage since subsequent shaping instruments can pack pulpal contents apically.

▲ **Irrigants remove pulp tissue from all the complexities of the root canal system that files never touch.** The longer the irrigants are allowed to remain in the canal and the more frequent the irrigation, the better.

Removal of the smear layer after digestion of organic canal contents with sodium hypochlorite irrigation is desirable for optimal clearing of the dentinal tubules

(SmearClear, SybronEndo, Orange, CA) and leaves the cleanest canal.

▲ **Maintain the canal and apical foramen in their original position.**

▲ **Maintain the apical foramen at its original size.**

▲ **Facilitate obturation, yet keep the canal as small as is practical.**

▲ **Preparation should resemble a tapering funnel.** Principles 3-6 are facilitated in part by a careful scouting of the canal with K files and the creation of a glide path (again with K files), which should take place before rotary files are used, especially in the middle and apical thirds.

A separated file is the antithesis of patency. Such scouting and glide path creation will go a long way toward preventing rotary nickel titanium fracture and the maintenance of patency. I am a strong advocate of the K3 rotary nickel titanium file system (SybronEndo, Orange, CA) for its robust sense of tactile control, cutting efficiency and its resistance to fracture clinically.

▲ **Adequate coronal access.** Leaving tags of pulp, dentin, and debris in the occlusal access and working through a dirty chamber can only lead to more debris inadvertently inserted into the canals.

▲ **Use EDTA early in the instrumentation of a vital tooth.** EDTA gel early in a vital case will hold the pulp in suspension so that it might be flushed by subsequent irrigation. Clinically, EDTA gel should be put into the chamber until at least the middle third is treated and/or the bulk of the pulp is removed. In some calcified and long roots, it may be desirable to have EDTA gel in place throughout the entire procedure in addition to the sodium hypochlorite irrigation.

Persistence will pay off! Achieving patency is in the best interests of our patients, and providing high-quality care is truly the path to excellence.

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