

## Separation Anxiety

A dentist who has never had a file break in a canal has not treated enough teeth. The incidence of instrument separation ranges from 0.4% to 5% for NiTi files. The canal space apical to the metal remnant warrants our worryment, not the file becoming one-with-the-tooth per se. This void is a safe harbour for a bacterial colony to unabatedly procreate.

Not all separated files must be removed, bypassed, or treated surgically. If the pulp was vital pre-operatively, then no viable bacteria are present and apical periodontitis is not expected. Such a favourable outcome is doubtful if the pulp was necrotic pre-operatively or the canal previously treated.

Research has found the optimal strategy for removing a separated instrument involves trowling around it with small ultra-sonic tips with the aid of a microscope. Factors that increase the likelihood of a successful retrieval are:

- Visualisation of the fragment
- Instruments can easily access the fragment
- The file is in the coronal third of the canal
- A short fragment (1-4mm)
- Stainless steel hand files, followed by NiTi rotary files, and then thermomechanically treated NiTi files
- Small file sizes with less taper (02 > 04 > 06)
- A straight canal or at least a mild curve with a long radius
- The fragment is coronal to a curve, less if it is in the crux of a curve, and infinitesimally small if it is apical to the curve

When considering an attempt to remove a broken instrument, evaluate the feasibility of such an enterprise. The expectation of a successful retrieval is reasonable if the lodged remnant is only a short segment of a small stainless steel hand file located coronally in the straight canal of a maxillary anterior. Heartily curb any enthusiasm for removal of a long piece of a large thermomechanically treated 06 NiTi rotary file lodged apical to a sharp curve in a buccally displaced maxillary third molar of a person with TMJ issues.

The second step is to prepare the access to the file tip. There are a plethora of possible means to achieve this. I prefer to use a variety of Muncie burs.

The third step is to loosen the coronal portion of the file by removing the dentine enveloping it. Small diameter ultrasonic tips are gently 'walked' around the file breaking away the encircling dentine. Avoid overheating the dentine and soften it by frequently irrigating with EDTA. A file is merely flexing and not loosening if its head returns to its original position after removing some dentine. When its tip relocates to a new position after ultrasonic activation, it is indeed loosening. Do not initiate retrieval efforts until loosening of the file is observed. Typically, at least one millimetre of dentine is removed before true loosening is realised.

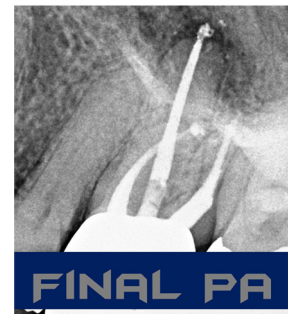
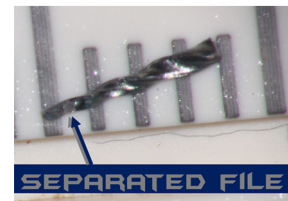
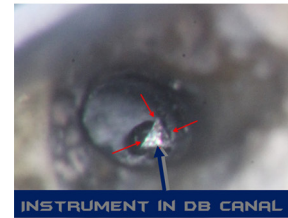
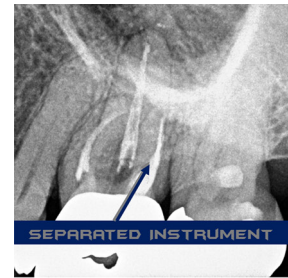
Retrieval efforts involve increasing the ultrasonic power by 15% and directing it to the inner wall of the canal. Vertically tap the dentine with short rasping motions. A file is easily broken by an ultrasonic tip, avoid contact at all times. Success rates experience exponential decay if the file remains in place after 60 minutes of retrieval efforts. Abandon the now fruitless endeavour and review the various viable options.

The images above are of the retrieval of a separated NiTi rotary file located at the crux of a curve in the DB canal of a maxillary first molar. Success was had, despite my initial misgivings. File separation is an unfortunate untoward incident that is invariably possible during endodontic treatment. Successful retrieval of a broken file can be an inordinately onerous technical challenge but may pale in comparison to the demands of patient management in such cases. "Uneasy lies the head that wears a crown." –William Shakespeare

Regards,



Joel N. Fransen  
BSc(OT), DMD, FRCD(C)  
Certified Specialist in Endodontics



**Richmond Endodontic Centre**  
Dr. Joel N. Fransen

110-11300 No.5 Rd  
Richmond, BC V7A 5J7  
office@endodonticcentre.com  
T 604.274.3499  
F 604.274.3477

Office Hours  
8am to 5pm - Monday to Friday  
Extended hours are also available

**Please support my 2021 B.C. Ride to Conquer Cancer. This will be my tenth year in the Ride and with your support, it will be the best yet! Thank you to the superheroes that have donated so far.**



WWW.ENDODONTICCENTRE.COM