RICHMOND
ENDODONTIC CENTRE

THE F-BOMB IN ENDO

FEB 2016

Nobody likes a fractured file (F-Bomb). The rate for rotary files varies from 3 to 10% and it is lower for hand files. There are two types of fractures: torsional and cyclic fatigue.

Torsional fracture or 'taper lock' occurs when an apical portion of a file becomes bound. Meanwhile the coronal portion continues to rotate unabated. The resultant torque between the two segments leads to either deformation or an F-Bomb. This fracture typically occurs early during the instrumentation process when large files are in contact with significant sections of the canal wall.

Cyclic fatigue typically occurs later when a small file is negotiating an apical curve. When a file is rotating around a curve, the portion of the file on the inner aspect of the curve experiences compressive forces. The portion on the outside aspect experiences distraction forces. In other words, the inner edge of the file is being compressed while the outer edge is being stretched. Since the file is rotating this compression/expansion activity occurs rapidly, leading to fatigue and eventual fracture.

So what can we do to minimise F-Bombs?

- Discard stainless steel hand files if there is any unwinding or sharp kinks
- Visual cues are not reliable for NiTi files and some readily distort only to regain their original form after heating
- Gain a straight line access to the canal orifice, this minimises unnecessary stress
- Gain patency with 02 hand files and flare the coronal portion of the canal before using rotary files apically
- A reliable 'glide path' is necessary for all rotary files to work properly
- Never instrument a dry canal; liquid irrigants reduce friction for the file better than a lubricant and they are an efficient 'heat sink' for rotating files
- Frequently irrigate canals to clear débris
- Frequently reconfirm patency and glide path with a small hand file
- MB canals of maxillary and mandibular molars are high risk as they are small with tight curves
- Count the number of canals a file is used to treat not the number of teeth; the more often a file is used the greater its chance of fracture
- The 'tightness' of the curve is more important than degree of curvature, be careful
- The apical portion is the most common site for an F-Bomb
- Do not hold a rotating file still in a canal as it will quickly develop cyclic fatigue
- Do not push a rotary files apically against resistance
- Lower rpm and torque can provide a larger safety margin for most file types

Even brand new stainless steel and NiTi files have numerous microscopic imperfections and these can lead to a 'surprise' F-Bomb. The case above is one that I retreated in 2015. The fractured file in the MB canal is likely due to cyclic fatigue. Unfortunately, I was not able to remove or by-pass the F-Bomb, but I did gain patency on the previously undiscovered MB2. As a general rule, the more curved a root the more likely its canals will unite apically. I suspect the MB1 and MB2 unite apically in this tooth.

If you perform endodontic treatment you will experience an F-Bomb. Those who say they have never fractured an instrument have either not done enough endo or have selective memory. For most cases a fractured file does not adversely affect the success rate of the endodontic treatment or long-term prognosis of the tooth. So an F-Bomb will happen to you and when it does send it to Dr. F (me) for defusing. :)

Regards,

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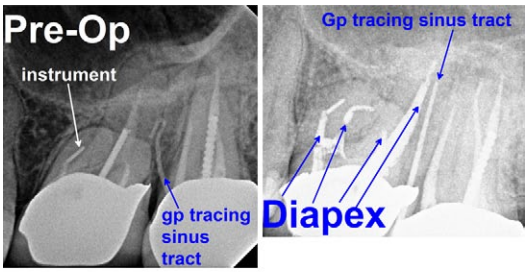

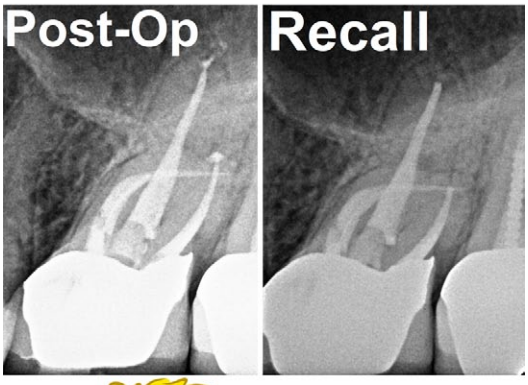

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