All roads lead south

By Dr Alfredo Iandolo, Italy

As usual in the human anatomy, root canals come in all forms and sometimes develop in very random structures. Lately, ED1 has developed a nickel titanium (NiTi) file allows us to prepare and clean the canal in next to no time. In this article, we will compare three different endodontic systems and discuss which one is quick and efficient. Root canal preparation is easy with the right set of instruments, regardless of the shape of the canal itself.

Reading endodontic case reports, you sometimes get the impression that root canals always seem to present a double curve morphology. With the latest technology and treatment acumen, the endodontic world has to offer, you should, of course, feel confident to take on even the most unusual shapes of canals. Would it not be nice though to have a simple and straightforward form ensuring appropriate exchange of the fluid and displacement into the recesses where airlocks may reside. This can be achieved through applying a CF point into the prepared canal to displace and dispense.

All photos of systems were taken using the HyFlex EDM file (Fig. 2). As usual in the human anatomy, the necrotic pulp of tooth 24 caused a GP point to dress. Some may argue that the canal is clearest at the end of instrumentation and that for convenience, obturating in a one visit arrangement is the optimal option. As we know, not all bacteria are removed or killed during treatment. Dressing the canal with sodium hypochlorite may continue the process of eradication of the residual microorganisms over a 2-4 week period. By then, the two schemes sometimes boil down to the presenting factors of the case. Where a tooth is difficult to instrument, has a large lesion or is quite obviously chronically infected with a history of pain, then dressing may be more of a consideration. If a tooth is treated in a de novo manner and treatment goals are achieved with no history of pain then a single visit treatment could be utilized.

The goal of obturation is to seal the canal system to prevent any reinfection and entomb any bacteria not eradicated by chemomechanical debridement. If the obturation is through the apex, this can have significant implications. If the apex can carry bacteria outwards of the canal and exacerbate symptomatology, any apical reaction could also develop.

We also have to remember that a beautiful obturation of a canal achieved without rubber dam and utilizing saline or local anesthetic irrigation is sub-standard treatment. It can be difficult to assess the “quality” of treatment when a radiograph of a patient’s mouth is the end result. In contrast, an obturation that is short of the radiographic apex having been treated under rubber dam and with copious amounts of irrigation is more likely to be successful than the sub-optimal scenario. Attributing too much significance to the radiographic appearance of the obturation is short-sighted. Indeed, Kateshumba and colleagues in the last years witnessed the occurrence of an absence of obturation where instrumented and irrigated optimally under isolation. Sealants are also antibacterial and aid filling the voids between the GP and the canal system. One further option would be to provide a sub-seal to each of the canal orifices. This can be achieved by removal of 1 mm of GP and packing a good thick mix of BIM packed with a plunger.

Covering the cusps

The provision of a coronal restora
tion (if provided optimally) can improve the coronal seal while also structurally protecting the underlying tooth tissue due to endodontic treatment, resulting in reduction of tissue bulk and decreased the risk of fracture increases. Where both mesial and distal margins have not been reached by the access cavity is confined to the occlusal surface, a new crown restoration may not be required. Once a margin is breached the tooth is more likely to fail in cracks or a tooth fracture. A commonly asked question, “When should the crown be provided?” Soon after the root canal treatment or when the treatment has proven to be the best option the access cavity may be filled with a gutta percha point. A refined obturation is significantly easier after the crown has been on. Doubt then this should be communicated to the patient and a well compacted direct restoration may then be placed over the access cavity. Alternatively an open orlay if tooth tissue is significantly reduced, a crown should be provided soon after completion.

Conclusion

Bacteria are public enemy number one in dentistry. Disinfecting the root canal system by irrigating in conjunction with mechanical in- strumentation is key to success in root canal therapy. Preventing fur ther re-infection or persistence of residual bacteria after the formal stages of treatment through dressing initially and a quality coronal seal subsequently is as important as the root canal therapy.

Fig. 2: Specially hardened surface of the HyFlex EDM file

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Fig. 1: Pre-operative radiograph of case 2

Fig. 3: Cutting in the canal using a HyFlex EDM file under the microscope

Fig. 4: r/Flow/EDM at the orifice after the obturation

Fig. 5: Obturating all portals of exit turned out to be particularly challenging in our second case, therefore a modified three-dimensional obturation technique was applied using Gutta-Flow bioseal. The 3D obturation material combines fluid gut- ta-percha with a suitable sealer at low temperature and bioactivity in an autonomic syringe (Fig. 5). This composition results in an easy to handle material with excellent flow properties and working times of 10 to 15 minutes. What we call three- dimensional obturation in this case is, in fact, efficient and reliable way to fill even complex root canal structures.

(www.rwrestorativedentistry.org)
First, we warm the gutta-percha us-
ing system II heat source. For our purpose, we decrease the tempera-
ture to 130 degrees from the aver-
age 200 degrees, as this totally suf-
fices. Penetration depth is reduced to 3 seconds as well compared to the
usual 5 seconds with a heat carrier to
4 millimetres from working length.
This way the GuttaFlow does not set,
but keeps a sticky consistency which
allows us to push it further down the
canal with a pluggor, if necessary.
However, with a too low temperature
the gutta-percha itself does not have
to get inside the accessory canals, as
the bioresorptive material will already
flow into any hidden canals.

In previous test settings you can see
that the modified obturation tech-
nique allowed the sealer to advance
deeper inside lateral canals in com-
parison to a traditional single cone
technique [fig. 4]. Inserting the obtu-
ration material with more speed also
generates higher pressure: you do not
have to reach the desired work-
ning length in one go, but can use
another stroke until you reach the
desired length. The sealer sets only
around 2 minutes earlier than nor-
mal with the reduced heat settings
and fast penetration. Thanks to 3 D
obturation, you let the sealer do its
job in areas which are hard to reach,
while it gets pushed further down into
the canal by the slightly melted
gutta-percha on top. The fine white
line in the postoperative radiograph of
tooth number 45 showed the ob-
turated small lateral canal leading
away from the main canal (fig. 10).
Moreover, in the follow-up session,
we noted that healing of the affected
teeth 45 and 46 had already taken
place. The bioactive components
of the obturation material further
added to the regeneration process,
as they stimulated the rebuilding of
bone and dentine tissue, which was
desirable side effect to the actual
sealing of the canal (fig. 14).

Case 3: Severe double curvature
to finish off

Last but not least, we come to the
extraordinary S-shaped canal as
mentioned in the introduction. With
strong curves it is always good to
know that NiTi files with a so-called
“controlled memory” (CM) effect can
be prebent like classic stainless steel
files, but do not bounce back. Using
their unique material properties, you
work comparatively stress-
free, even under difficult conditions.

This time, the patient with the rath-
er challenging canal anatomy was a
40-year-old female patient with
complaints in her right side mandi-
ble. In our analysis, the clinical diag-
nosis revealed an irreversible pulpitis
in tooth 47. The radiograph indicated
that we needed to get around a very
sharp angle in the mesial root (fig. 12).
This multidisciplinary treatment
with our new technique allowed us to
push it further down the canal, as
the modified obturation tech-
nique allowed the sealer to advance
deeper inside lateral canals in com-
parison to a traditional single cone
obturation technique. We used
the HyFlex EDM help you to follow
the natural path of the root canal and
quickly remove debris for chemical
cleansing and long-term obturation
of the various root canal structures.

The extremely fracture resistant files
are literally “cutting edge” technol-
ogy which make an excellent travel
companion on virtually every road.

Conclusion

The latest generation of nickel tita-
nium files adapt easily to all shapes
of root canals thanks to their flexi-
ble design and unusual cutting power.
Whatever way you choose to reach
the apex, prebendable NiTi files like
the HyFlex EDM help you to follow
the natural path of the root canal and
quickly remove debris for chemical
cleansing and long-term obturation
of the various root canal structures.

In irrigation activation is widely published both nationally and internationally.

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Dr Iandolo was awarded Doctor of Dental Medicine by the University of Naples Federico II in 2006. As Professor A.C. he has continued speaking on endodontic issues at his home institute since 2014. Iandolo is a certified member of the ESE (European Society of Endodontics) as well as an active member of the IEEE (Italian Society of Endodontics) and AAG (Italian Academy of Microendo)
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