

In search of the lateral canal

Raphael Bellamy explores the issue of multiple portals of exit

Lateral canals are like stars – you can't always see them but you know that they are there! In the healthy tooth these interruptions in the cementum dentine layers of the root are occupied by blood vessels that supply nutrition to the tooth and facilitate drainage from the tooth. In that respect they are of equal importance to the main portal of exit (POE), which is normally associated with the apical extent of the root, adjacent but not exclusive to the radiographic terminus. Damage to any portal of exit by a trauma or microbial ingress can result in the death of the tooth. Some 20% of teeth possess apical deltas (more than three apical foramina). In one study, a single apical foramen was found only in 37% of the cases, while two or three apical foramina were present in 23% and 20% of the cases respectively.

In the diseased tooth, it is widely accepted that the removal of all contaminated tissue within the structure, its disinfection and obturation will result in the preservation of the natural tooth, the elimination of pathosis and the regeneration of a healthy periodontium. We know this because extraction of teeth with periapical pathosis results in prompt healing of bone lesions, since extraction eliminates the root canal system, the necrotic tissue and, regrettably, the tooth itself.

So, we can also then deduce that where cleaning and shaping are practical and performed with equal thoroughness, equivalent healing of periapical tissues may be anticipated with healthful retention of the treated tooth. The corollary of this precept is that if we are to preserve the tooth and restore it and the supporting structures, we have to clean, disinfect and obturate all the canals within the tooth including the lateral.

That is why the informed clinician will speak of 'eliminating the root canal system' rather than the root canal. If we do not acknowledge this then we limit our thoughts. The danger is that if we limit our thoughts, we will limit our actions. Vertucci stated in 2005 that a major cause of post-treatment disease is the inability to locate, debride or fill all canals of the root canal system properly.

Dr Herbert Schilder was once in the company of an endodontist viewing the defining work of Walter Hess (1925) on a projector, who was marvelling at the complexity and 3D nature of root canal systems.

The endodontist asked him: 'Why don't my root canals look like that?'

'Mine do!' Schilder responded confidently.

At the Schilder CE courses held at The Goldman School of Dental Medicine in Boston that I attended (on at least 12 occasions), participants of the warm vertical compaction course would treat anterior teeth with this technique. Even using this technique for the first time, when the final film of each case was reviewed on a projector at the end of the day, very often 40 to 50 lateral canals were shown in only 10 anterior teeth – an average of four or five per tooth. The newest participants were amazed; the rest of us were not, because we know what the technique can do. Certainly the warm vertical compaction technique of

root canal obturation as proposed by Schilder is more likely to demonstrate this anatomy but there are many factors that help.

Each day I carry out endodontics, my barometer for excellence is governed by adhering to the five mechanical and five biological objectives of Schilder. (What I have called the 10 commandments.) The number of lateral canals that I can demonstrate in my cases is a good indicator as to whether things are going well. If I am not routinely filling lateral anatomy then I will question my technique. What changed? What did I do differently? Should I have spent more time? We should all challenge ourselves in this way.

If we are to be serious about the business of endodontics and its role in the preservation of the natural tooth, we should endeavour to demonstrate to ourselves regularly that we are filling the main portal of exit and all the other portals of exit that any particular tooth may have. This action alone will increase our success rate in endodontics. The existence of obturated lateral canals on our final images is a physical demonstration of a reality that areas of the root canal system have been cleared of tissue content and filled with an antibacterial sealer, and often gutta percha itself. It is a basic law of physics that two masses cannot occupy the same space at the same time. It should be noted, of course, that the reverse is also true – i.e. if the root canal system is not eliminated, for example by filling the root canal short, then failure is sure to follow. This will not show itself by chance but by strict attention to detail throughout the endodontic procedure.

Of course, there are many factors that contribute to endodontic success but for me personally there is nothing more gratifying than viewing a final radiographic that shows the lateral canals have been filled.

Below are 10 factors that I believe will help you to attain the goal of filling lateral anatomy:

1. Change to warm vertical compaction. Warming gutta percha throughout the system will allow it to mould and adapt more closely to the internal anatomy of the tooth and drive the sealer into the fins, flags, banners and portals of exit
2. Adhere to the Schilder principles as outlined in his five mechanical objectives
3. Choose a tissue-dissolving irrigant – I suggest sodium hypochlorite 2-5% or Chlor-X
4. Keep dentine mud suspended in solution throughout treatment; no dry chips
5. Do not use chlorhexidine, because precipitate formation will occlude the anatomy
6. Increase the frequency of irrigation from access cavity to completion
7. Consider passive and active irrigation, sonic or ultrasonic agitation
8. Use rotary instruments with a positive rake angle to reduce the smear layer
9. Avoid radial landed rotary instruments in order to reduce the smear layer



Figure 1: Multiple POEs



Figure 2: A lesion adjacent to a lateral POE



Figure 3: Apical delta and loop



Figure 4: A lesion adjacent to a lateral

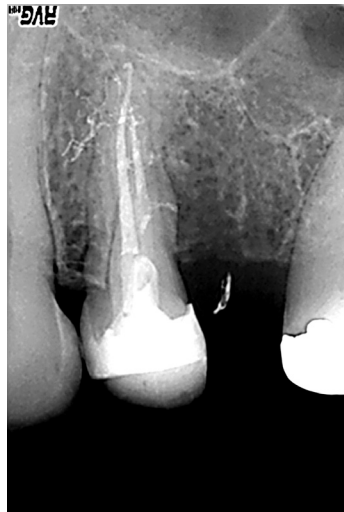


Figure 5: Innumerable portals of exit



Figure 6: Inverted for greater visibility

10. Use 17% aqueous EDTA (ethylenediaminetetraacetic acid) throughout the case.
So, get the rubber dam on and make the move today! ■

References

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Figure 7: Molar treated by Dr H Schilder circa 1970 demonstrating significant lateral anatomy

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Figures 1 to 6 captured with Carestream Dental's Kodak RVG 6100 and 6500 digital radiography systems.