The clinical case pictured in Figure 1 was referred to me for diagnosis and treatment. The endodontic treatment pictured was completed two years before presenting in my office. The patient described the treatment as extremely painful at the time the canals were filled, which was reported to be in the first two weeks of treatment. After the initial treatment, the patient’s symptoms went away and had returned approximately a week before her presentation into my office. When examined, the patient was extremely sensitive to percussion. The pain was spontaneous, nocturnal and the tooth was acutely sensitive to chewing. At the time of my examination, the tooth, No. 5, was extremely sensitive to percussion, and the patient was extremely sensitive to percussion, making new sealer in the canal and retitling the master cones.

Sealer puffs: mechanism of this iatrogenic event

It is noteworthy that the radiographic image was taken two years after the initial treatment and that the extrusion of sealer was in all likelihood greater than that present radiographically when examined by me.

It is unknown how the sealer puffs were created, but it is likely that one of two mechanisms were involved:

1) An excess amount of sealer was placed into the canals initially, and this sealer was extruded by repeated placement of the master cones (i.e., pumping the sealer out the end of the root by repeatedly placing new sealer in the canal and retitling the master cones).

2) The clinician injected sealer with a syringe without focus being placed on the location of the needle tip. Apical over enlargement and/or a very thin needle used incorrectly with a syringe could also explain such a gross extrusion of sealer. Incorrect in this context means that the needle was beyond or locked at the apical foramen and the clinician did not realise either how much sealer had been extruded or where the needle tip was during extrusion. It is also possible that excessive sealer was extruded from a syringe and pistoned through the root end with a single cone obturation technique.

Length control is vital at all stages of canal preparation

It is likely that the minor constriction of the apical foramen of each of these canals was violated in the canal preparation.

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Discussing these findings in the context of both obturation technique and avoidance of these outcomes has value.

Clinical

Assessing previous endodontic treatment radiographically: making clinical decisions

The cervical mesial root has a greater taper than the cervical lingual. This violates one of the principles of canal preparation (i.e., to create a tapering funnel with narrowing cross-sectional diameters).

Probing depths no greater than 2 mm were noted at the time of obturation. The obstruction in the coronal third of the palatal root appears slightly serrated, giving evidence that this obstruction is also parallel along its length and does not have a continuous taper.

The tip of the MB canal preparation did not have a continuous taper. Radiographically, the middle third of the root has a greater taper than the cervical third. This violates one of the principles of canal preparation (i.e., to create a tapering funnel with narrowing cross-sectional diameters).

Length control is vital at all stages of canal preparation. While it might have been able to stay patent at all stages of the process of canal enlargement (a desirable outcome), it is likely that the extrusion of sealer into the apical foramen of each of these canals was violated in the canal preparation making extrusion much more likely given the appearance of the obturation in the apical third. Figure 2 shows a case where the canal preparation comes to a definite stop, and while the canal is patent (and there is a sealer puff), it is clear that the minor constriction of the apical foramen has not been violated.

Whatever sealer application technique was used, it is a ringed technique or sealer placed onto a master cone, it was an excessive amount relative to the final prepared canal space that needed obturation.

Irrespective of the method used, the amount of sealer should be a minimum to coat all of the walls circumferentially around the canal and no more. I place sealer with the skin syringe (Ultradent, South Jordan, Utah) and apply it directly done under the surgical operating microscope (SOM) (Global Surg, St. Louis). The sealer is the RealSeal sealer of the RealSeal bonded obturation system (SybronEndo, Orange, Calif.). The smear layer is cleared with a liquid EDTA solution (SmarClear, SybronEndo, Orange, Calif.), and after the smear layer is removed the canal can be bonded with the materials above.

Ideally, coronal seal is placed after the root canal treatment. There should be no delay in the placement of coronal seal. With the rubber dam on and under the SOM, the tooth can be etched and sealed with a flowable composite at the time of treatment. It is ironic in this clinical case is that even with the flaws in treatment, had the tooth been sealed at the time of obturation the probabilities of a clinical success would have been much higher. Instead, having left the tooth untreated and the coronal microleakage, the clinical failure was virtually assured, especially with the perforation. Perforations should be repaired and sealed immediately to optimise the chances for clinical success. Once exposed to leakage, especially over the two-year period from the time that the perforation occurred to the patient’s visit in my office, there was no other clinical. This patient was presented with all the options – extraction and an implant or a bridge, or retreatment and a crown. Due to financial concerns, the patient refused treatment. It is unknown what was done to resolve this clinical situation. This clinical case underscores the importance of adequate length control, control of sealer, cone fit with tugback and down packing with the control over the master cone using a technique like Syntec delivered via the Elements Obturation Unit (SybronEndo, Orange, Calif.). The value of early coronal seal has been endodontic treatment adequate coronal seal, in this case, at the time of treatment, would have made clinical success more likely even with the technical deficiencies that were present.

About the author

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