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 the patient’s worst excrusion. 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 chewing. At the time of my examination, the tooth, No. 5, was extremely sensitive to percussion, moderately sensitive to palpation, mobility was slight, and the tooth had probing depths no greater than 6. The patient attributed the pain to the sealer puffs that had resulted from the previous treatment.

The radiograph revealed the following features:

1) There were three large sealer puffs present apically as well as obvious tracks of sealer leading to two of the puffs. It was unknown which type of sealer was used in the previous obturation.

2) The master cone obturating the mesial buccal root canal filling appeared to be extended approximately to the radiographic apex with a sealer puff that leads to the largest extreme extrusion of sealer apparently in the sinus above the tooth. There is evidence of a second, untrated canal in that there is visible canal at the mesial of the existing MB root canal filling. The MB canal preparation did not have a continuous taper. Radiographically, the middle third of the root has a greater taper than the coronal third. This violates one of the principles of canal preparation.

3) 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 excess sealer was extruded from a syringe and pipetted into the root end with a single cone obturation technique.

4) A coronal seal was not placed in this tooth after the endodontic treatment. A small remnant of the original temporary was present upon my examination, but there was no barrier to the ingress of bacteria down the root canal system and/or into the periodontium.

5) The cervical dentinal triangle was not removed in the access to the DB canal, nor was straight-line access obtained.

6) The clinician injected a paste as the sole obturation material that was inadvertently extruded. While this is possible, it is unlikely because the opacity of the sealer puff and the opacity of the canal fillings are not identical.

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

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

Length control is vital at all stages of canal preparation. While the patient was able to stay patent at all stages of the process of canal enlargement (a desirable outcome), it is likely that the apical constriction of 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 gross extrusion of sealer. In these cases, the sealer was 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 Skini syringe (Ultradent, South Jordan, Utah) and application is done under the surgical operating microscope (SOM) (Global Surgical, 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 (SmearClear, 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 placement. 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 exposed to 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 of the perforation occurred to the patient’s visit in my office, there was no other opportunity to optimise treatment.

Clinically, this patient was presented with all the options – extraction and an implant or a bridge, or retreatment and a crown. Due to finacial 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 Syntropendal delivered via the Elements Obturation Unit (SybronEndo, Orange, Calif.). The value of early coronal seal by 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.

‘Length control is vital at all stages of canal’

Assessing previous endodontic treatment radiographically: making clinical decisions

FIG. 1: The clinical case described. Note the lack of coronal seal and the radioluency in the furcation, indicative of a perforation (noting the opacity to the distal aspect of the canal at the cervical level).

FIG. 2: Placement of a coronal seal at the time of treatment. Treatment performed with the Twisted File, Bead-and SystemX Technique delivered via the Elements Obturation Unit (SybronEndo, Orange, Calif.). Note that the canal preparation stage at the middle constriction of the apical foramen, with the sealer puff resulting from the warm obturation technique.