

Endodontics Portfolio

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DDS CLASS OF 2020

Case List

Tooth #4 - Symptomatic Irreversible Pulpitis with Normal Apical Tissues

Tooth #21 – Pulpal Necrosis with Chronic Apical Abscess

- Accessed through the buccal abfraction

Tooth #12 – Pulpal Necrosis with Chronic Apical Abscess

Tooth #3 – Symptomatic Irreversible Pulpitis with Symptomatic Apical Periodontitis

- Calcified MB2

Tooth #30 – Previously Initiated Endodontic Therapy

Tooth #22 – Retreatment

Tooth #4

Symptomatic Irreversible Pulpitis with Normal Apical Tissues



Pre-Op



Post-Op

Reflection

This was my first endodontic treatment on a patient.

Diagnosis:

- Patient presented to emergency clinic with pain on tooth #4. Pulpal vitality testing revealed that the tooth had lingering sensitivity to cold, no sensitivity to percussion or palpation.
- Patient was diagnosed with symptomatic irreversible pulpitis with normal apical tissues.
- Caries removal and pulpal debridement completed in emergency clinic and patient was assigned to me for completion of endodontic therapy tooth #4.

Tooth Build-Up for Isolation:

- The distal caries on the tooth extended subgingivally extensively making it difficult to place restorative material with proper contour for proper isolation and to prevent sodium hypochlorite leakage during the RCT and patient oral hygiene after completion of RCT. Patient was informed that this tooth will possibly need crown lengthening prior to placement of final restoration.

Reflection

Cleaning and Shaping:

- The tooth was cleaned and shaped to size 25 WaveOne. In hindsight and discussion with faculty, I could have cleaned and shaped to size 35, however, as the tooth was still vital, this is less likely to affect the outcome than it would for a necrotic tooth.

Obturation

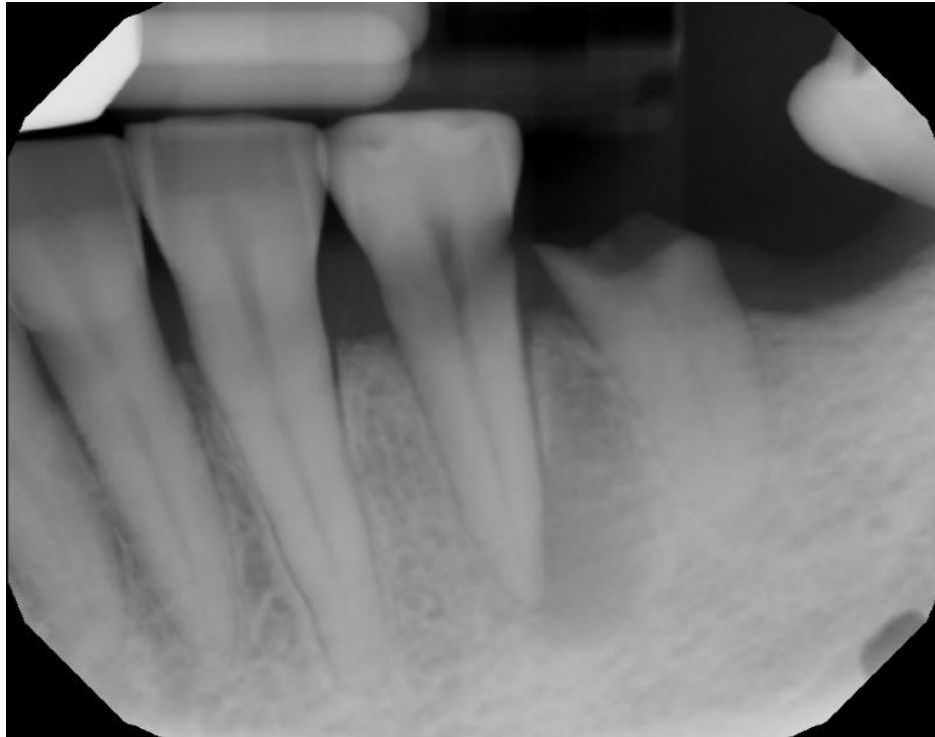
- The canal was obturated to proper working length and accessory cones were placed. During downpacking, the distal buildup debonded. On faculty suggestion we placed cavit over the orifice instead of an endo sponge or cotton ball as a spacer and replaced the buildup prior to dismissing the patient.

Outcome

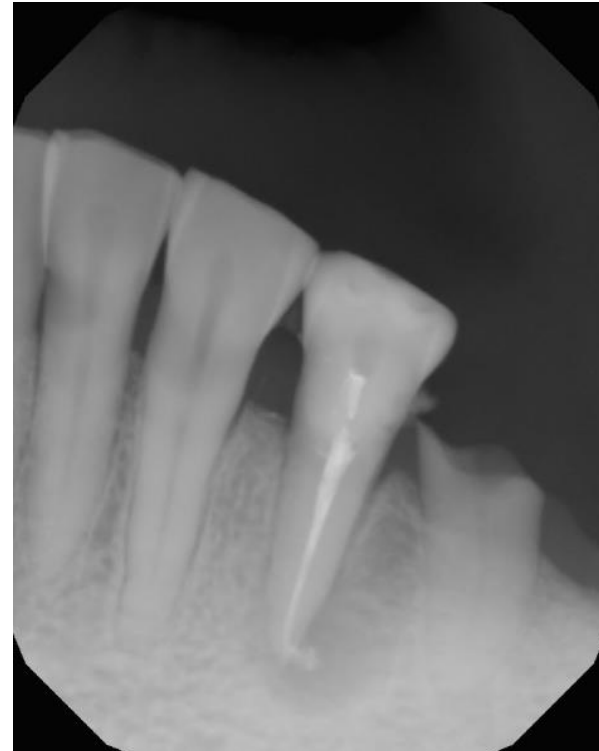
- I ideally would have liked to see a denser fill in the middle and apical third of this tooth. However, proper working length was established and obturation was completed to the desired working length. With proper disinfection of the canal and the use of sealer during obturation, the patient will hopefully remain asymptomatic.

Tooth #21

Pulpal Necrosis with Chronic Apical Abscess



Pre-Op



Post-Op

Reflection

This endodontic treatment of tooth #21 was completed through the buccal abfraction. The patient is aware that the root tip #20 will need to be extracted as the tooth is non-restorable.

Isolation:

- Isolation of this tooth was extremely challenging. Due to the subgingival location of the buccal margin, none of the rubber dam clamps stayed on without sliding off. Patient also had limited keratinized gingiva around tooth #21 so faculty and I were hesitant to place the clamp directly on gingiva as the nonkeratinized tissue is prone to tearing. After much trial-and-error, we were able to carefully place the clamp on the gingiva and prevent it from sliding. After talking with some of the endodontic residents after completion of this case, the suggestion of placing GI around the tooth/clamp interface away from the abfraction to create more retention was suggested. In future cases, I will give that option a try!

Access:

- No traditional occlusal access was done to preserve coronal tooth structure. Due to the curvature needed to access the canal through the abfraction, no rotary instruments were used.

Cleaning and Shaping:

- Canal was cleaned and shaped using hand files prior to obturation. Due to the angulation of working through the abfraction, the instrumentation was difficult and we ended up not using rotary instruments. A Gates-Glidden (and faculty assistance) was used to coronally flare the canal in the crown-down technique. After that, hand-files were used to size 25 before obturating.

Reflection

Obturation:

- Proper working length was established and obturation was completed to desired working length. A sealer puff was present, letting us know that the canal was patent. In necrotic cases, this lets us know that we were able to instrument down to the apex of the tooth. However, excessive extrusion of sealer can be detrimental to healing as depending on the sealer, biocompatibility is variable¹.
- The coronal portion of the obturation could have been packed down more which would have helped create a denser fill. However, with the angulation of the access, it was difficult to properly angulate the instrument to do so.

Outcome:

- In hindsight, I should have seared down the gutta percha more apically and done a better job of cleaning up the excess materials in the coronal portion of the tooth as remnants of these materials can cause discoloration of the tooth following RCT². This case illustrates why straight line access is important in endodontic cases. It not only allows you better access of the entire pulp chamber for disinfection and clean-up after completion of the endodontic therapy, but it also allows for better instrumentation and obturation. This was a difficult case given that we chose to forgo straight line access in favor of conserving coronal tooth structure. The sinus tract has since resolved following the endodontic therapy and the patient has remained asymptomatic on the tooth and at her 6 month recall, we hope to see some radiographic signs of healing. The excess piece of Fuji IX on the distal of the tooth was also cleaned up at the following visit.

¹Fonseca D.A., Paula A.B., Marto C.-M., Coelho A., Paulo S., Martinho J., Carrilho E., Marques-Ferreira M. Biocompatibility of Root Canal Sealers: A systematic review of in vitro and in vivo studies. *Materials*. 2019;12:4113. doi: 10.3390/ma12244113.

²Krastl G, Allgayer N, Lenherr P, Filippi A, Taneja P, Weiger R (2013) Tooth discoloration induced by endodontic materials: a literature review. *Dental Traumatology* 29, 2–7

Tooth #12

Pulpal Necrosis with Chronic Apical Abscess



Pre-Op



Post-Op

Reflection

This was my first experience treating a multi-rooted premolar and I feel it was during this case that I started to become more comfortable with the work-flow from start to completion of a RCT. This was also my first case done under microscope.

Access:

- A traditional access was completed to establish straight line access to the orifices. The rotation of the tooth was taken into account when determining access location. Both the buccal and palatal canals were easily identified. The access near the palatal canal could have been more conservative looking at the radiograph but it is still clinically acceptable.

Cleaning and Shaping:

- The canals were cleaned and shaped to WaveOne size 25. Due to persistent purulent exudate in the canals, calcium hydroxide was placed and the patient was reappointed for another follow-up visit for obturation. At the second appointment, the exudate had resolved and the canals were able to be cleaned and dried for obturation.

Obturation:

- I was happy with the density of the obturation in both the buccal and the palatal canals as well as the length to which the canals were obturated to. The canals were obturated one at a time and a paper point was placed in the palatal canal while obturating the buccal to prevent sealer from occluding the palatal.

Reflection

Outcome:

- I was pleased with the outcome of this RCT, although the coronal chamber could have been better cleaned of excess sealer prior to sealing the access opening. The gutta percha could also have been seared off and downpacked more apically. The patient's sinus tract has since resolved and the patient is asymptomatic. The tooth will be followed up on and we hope to see radiographic evidence of healing at her 6 month recall appointment.
- This was my first RCT completed using a microscope. After using the microscope, it made me realize that having better visibility made a huge difference in ease of treatment and also treatment outcome. My cleaning and shaping and obturations improved greatly after discovering the benefits of using the endodontic microscope. The rest of the cases I completed were all done under the microscope.

Tooth #3

Symptomatic Irreversible Pulpitis with Symptomatic Apical Periodontitis



Pre-Op



Post-Op

Reflection

This was my first molar RCT experience. The patient presented with a large existing build-up and severe lingering pain to cold.

Access:

- A traditional access was done through the existing build up material to establish straight line access to the canals.
- MB1, DB and P were identified at this time. Due to this tooth being a maxillary first molar, there was a high chance that the patient would have a MB2 canal as it can be located in up to 93.0% of maxillary first molars with sufficient provider experience, use of the dental microscope and other specific instruments³.
- Slight troughing was done with a slow speed and a round bur on the chamber floor parallel to the mesial marginal ridge to attempt to locate MB2.

Cleaning and Shaping:

- MB2 was located but was severely calcified. The use of 10 C-file and a great deal of patience allowed us to successfully navigate the canal to working length.
- The MB1, DB and P canals were more easily navigated and clinically was less calcified than anticipated from the radiograph.
- All the canals were cleaned and shaped to proper working length.

³Stropko J. J. Canal morphology of maxillary molars: clinical observations of canal configurations. *Journal of Endodontics*. 1999;25(6):446–450. doi: 10.1016/S0099-2399(99)80276-3

Reflection

Obturation:

- I was satisfied with the density of the obturation filling on all of the canals. The DB canal looks like it is radiographically short, but the obturation was done to the full working length established by the apex locator. As the radiographic apex does not always correspond with the anatomic apex of the canal, this is one possible explanation for the discrepancy⁴.

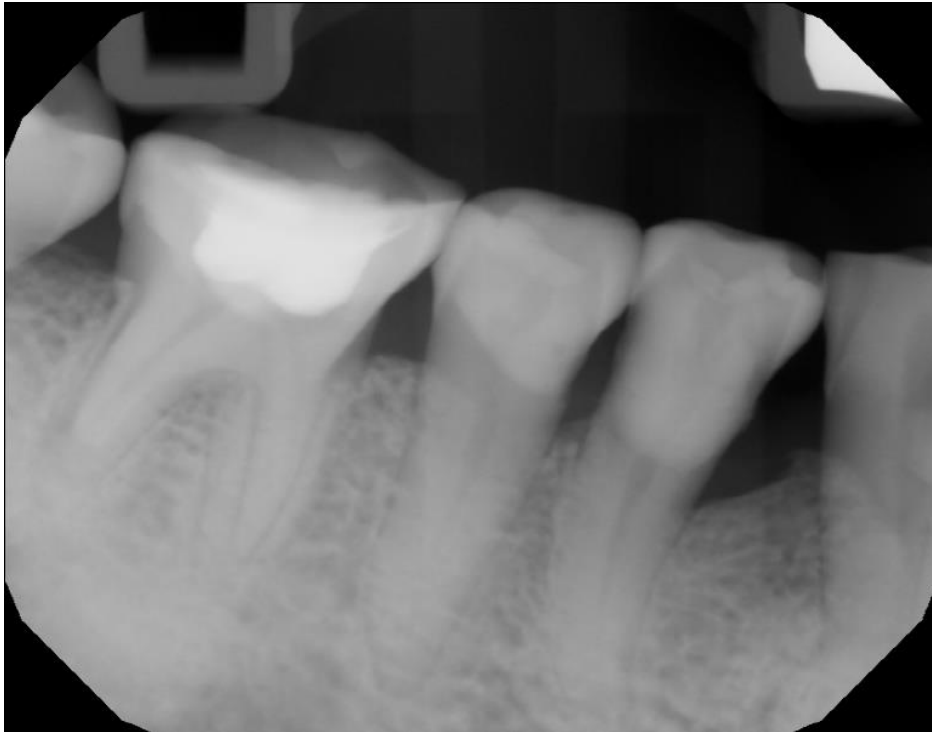
Outcome:

- After completion of RCT #3, the patient reported that his symptoms have resolved. This tooth will require a full coverage restoration as soon as possible as the patient previously fractured a root canal treated #15 over the summer break when clinic was not in session.
- I had difficulty maintaining anesthesia on this patient as towards the end of the appointments he would become sensitive and require supplemental dosing of septocaine.
- I was satisfied with the outcome of this case. One difficulty that I experienced during this process was taking radiographs that captured the apex of the roots as the roots were all quite long, especially the palatal root. Luckily this patient had a wide opening which made it so much easier working on this tooth under the microscope.

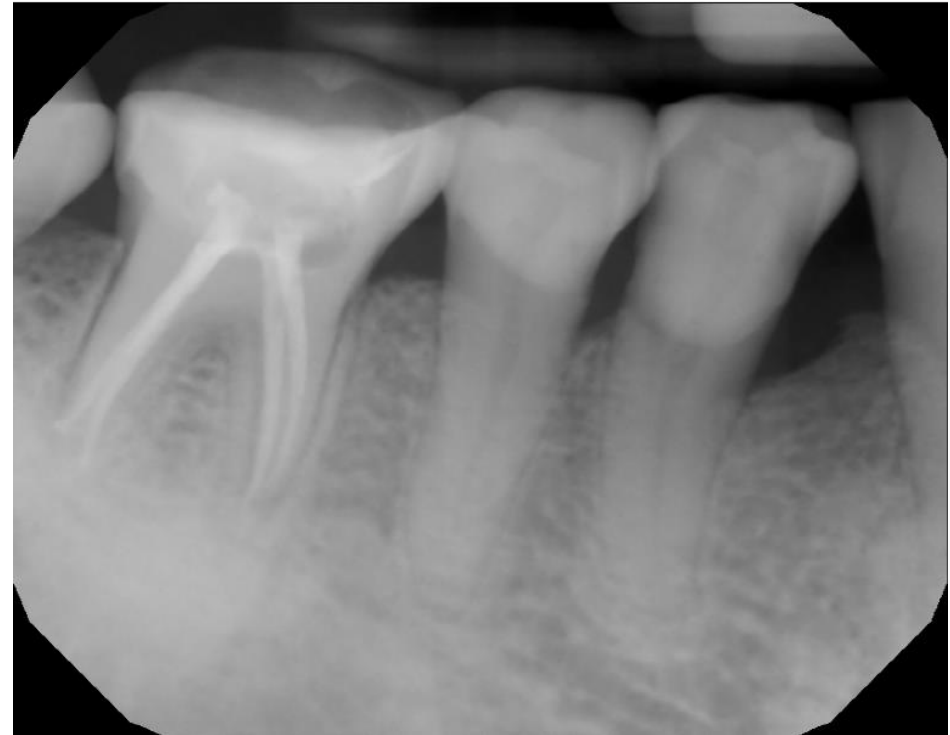
⁴Sharma M, Arora V. Determination of working length of root canal. Med J Armed Forces India. 2010;66:231-4

Tooth #30

Previously Initiated Endodontic Therapy with Normal Apical Tissues



Pre-Op



Post-Op

Reflection

This was my first mandibular molar case.

The tooth had been previously accessed by an “unlicensed dentist” (per the patient and referral form). The patient had interesting anatomy in terms of her orifice location as they were located very centrally in the tooth. You can see where the previous dentist went searching for the mesial canals resulting in removal of excess tooth structure.

Access:

- From the pre-op radiograph, it was clear that there was already excess peri-cervical tooth structure removed during previous treatment. With this in mind, during access, we were careful to remove the temporary while leaving solid tooth structure alone. In this case, there was a large buccal abfraction which we sealed with Fuji IX GI prior to initiating endodontic therapy in order to provide better isolation and prevent leakage of sodium hypochlorite.

Cleaning and Shaping:

- Working on a molar on this patient was exceedingly difficult as the patient had a small opening. It was not only difficult to get the files into the canals, but it was also difficult to take radiographs as well. We ended up using the paddle instead of the XCP sensor holder to take radiographs during treatment.
- The patient had short roots (WL all around 16mm), which I found more difficult to treat than longer roots. Angulation into the mesial canals was more difficult than angulation into the distal canals and at times I had to use the cotton forceps to help me place the files into the proper canals. One tip I picked up later from an endodontic resident was to use Endolce on the NiTi rotary file to change its phase to a martensite structure which has greater flexibility to navigate around the mesial marginal ridge for better working access⁵. However, I was informed that this can be technique sensitive and improper usage of the technique can result in file separation.

⁵Shen Y., Zhou H.-M., Zheng Y.-F., Peng B., Haapasalo M. Current challenges and concepts of the thermomechanical treatment of nickel-titanium instruments. *Journal of Endodontics*. 2013;39(2):163–172. doi: 10.1016/j.joen.2012.11.005

Reflection

Obturation:

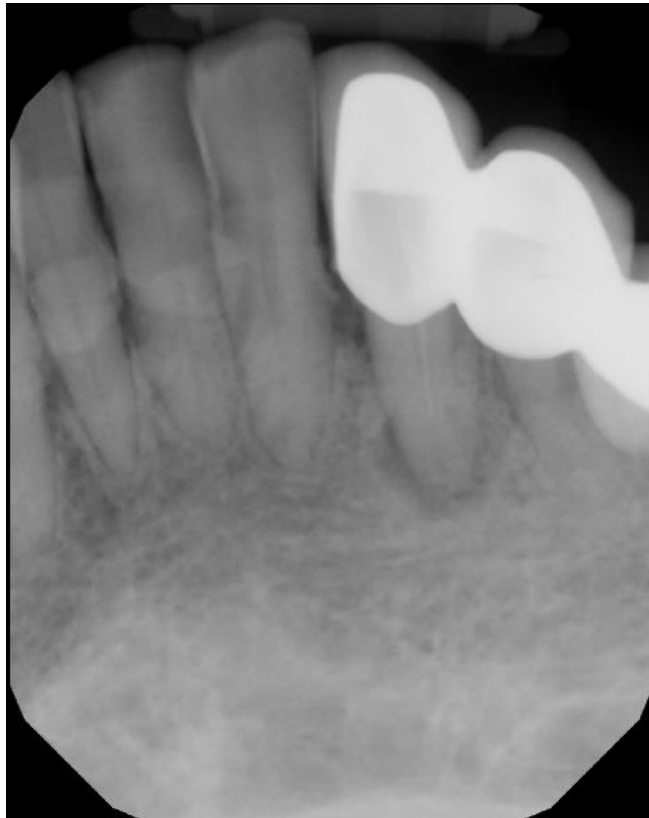
- As the patient's opening was limited, this made obturation challenging as well.
- I was able to obturate to working length however, the obturation itself could have been denser. There are small voids present in the mesial canals which although not ideal, are coronal enough that I do not believe the integrity of the RCT will be compromised. The angulation needed on the mesial canals made it more tricky to get the finger spreader into the canals, which I believe resulted in more voids being present on those two canals.

Outcome:

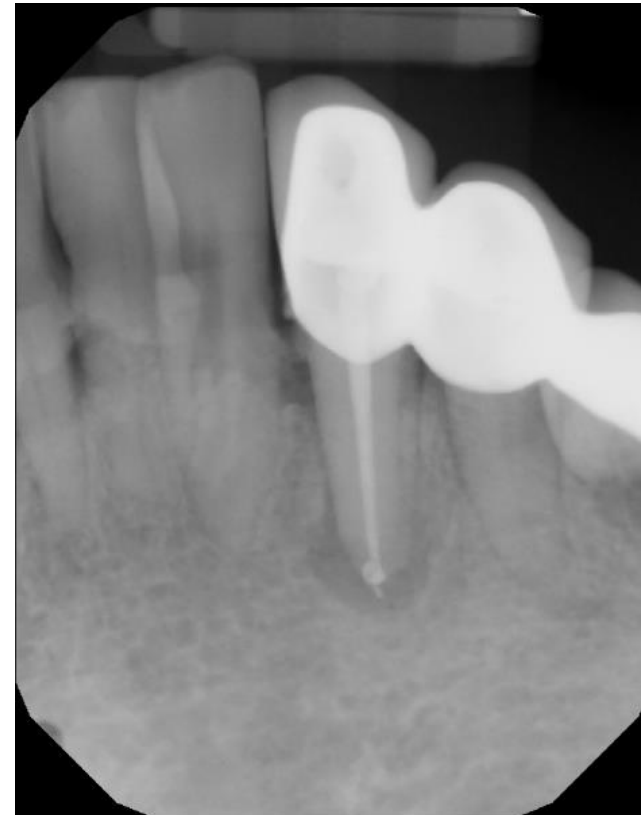
- The patient has not reported any symptoms on this tooth since the RCT was completed and she is scheduled for delivery of a full coverage restoration to protect the remaining tooth structure as there was coronal tooth structure lost on the mesial surface during the previous access.
- I am satisfied with the outcome of this RCT #30. I could have condensed the gutta percha more for a more dense fill and to fill the voids that are present in the mesial canals. However, given the working circumstances I believe that we had a good outcome.
- This case made me realize how much more difficult a limited opening can make treating molar teeth!

Tooth #22

Previously Treated with Chronic Apical Abscess



Pre-Op



Post-Op

Reflection

This was my first re-treatment case and it was also my first case that was accessed through an existing restoration (PFM bridge).

Access:

- Accessing this tooth was trickier than on a tooth without a full coverage restoration as we do not know what the actual tooth underneath the restoration looks like. In order to determine the angulation for access, a perio probe was used to trace the CEJ in order to determine angulation at the root.
- With the angulation of access properly determined using a periodontal probe, we were able to make a conservative access in the center of the root directly over the existing gutta percha giving us straight line access without needing to remove the existing restoration at this time and without excess removal of tooth structure.

Cleaning and Shaping:

- The existing gutta percha was removed using hand files and c-solution. After working through the existing gutta percha, we were able to clean and shape the canals to working length. We shaped up to WaveOne size 35 to ensure that all the residual sealer on the walls was removed. This was the first time that I smelled the infection coming from the tooth and it definitely has a distinctive smell.
- One thing that was difficult during this treatment was the fact that the restoration the patient had was a PFM crown. The metal framework also conducts electric impulses and thus the apex locator would jump around. I ended up wrapping the top portion of the file with PTFE tape in order to insulate it to get a more accurate reading.

Reflection

Obturation:

- During the access, I was too conservative with the opening that I created. During obturation, I ended up having to enlarge the access more in order to actually get the gutta percha and the finger spreader into the canal at the same time. This taught me that although we need to be conservative to protect tooth structure, it is also important that we create an access large enough that we can properly perform treatment.

Outcome:

- Since completion of the endodontic retreatment of tooth #22, the patient has remained asymptomatic and the sinus tract has since resolved. We hope to see radiographic evidence of bone healing at the 6 month recall appointment.
- I am satisfied with the outcome of this RCT retreatment of #22. The sealer puff at the end of the apex lets us know that we were able to thoroughly clean and shape the canal to the apex and the amount of sealer extruded is not excessive.
- I was really glad that I was able to have the experience of doing a retreatment case on a patient! Although many of the steps are similar to an initial treatment, there are more points along the way where additional problem solving is needed.

Summary of Experiences

Molars:

- Tooth #3
- Tooth #30

Premolars:

- Tooth #4
- Tooth #21
- Tooth #12

Anterior:

- Retreatment tooth #22

3 Pulpal Debridements

4 Resident Endodontic Case Assisting

I would have also loved the chance to have done an RCT using the warm vertical technique with Dr. Scott in clinic after the Warm Vertical Lab this year but I'm looking forward to more learning opportunities in the field of endodontics in the future!

References

- ¹ Fonseca D.A., Paula A.B., Marto C.-M., Coelho A., Paulo S., Martinho J., Carrilho E., Marques-Ferreira M. Biocompatibility of Root Canal Sealers: A systematic review of in vitro and in vivo studies. *Materials*. 2019;12:4113. doi: 10.3390/ma12244113.
- ² Krastl G, Allgayer N, Lenherr P, Filippi A, Taneja P, Weiger R (2013) Tooth discoloration induced by endodontic materials: a literature review. *Dental Traumatology* 29, 2–7
- ³ Stropko J. J. Canal morphology of maxillary molars: clinical observations of canal configurations. *Journal of Endodontics*. 1999;25(6):446–450. doi: 10.1016/S0099-2399(99)80276-3
- ⁴ Sharma M, Arora V. Determination of working length of root canal. *Med J Armed Forces India*. 2010;66:231–4
- ⁵ Shen Y., Zhou H.-M., Zheng Y.-F., Peng B., Haapasalo M. Current challenges and concepts of the thermomechanical treatment of nickel-titanium instruments. *Journal of Endodontics*. 2013;39(2):163–172. doi: 10.1016/j.joen.2012.11.005