CLINICAL CASE
Re-treatment of Thermafil carriers on #14 and #15

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Presentation Outline

1. Introduction: Thermafil obturator
2. Clinical presentation of a Thermafil carrier
3. How to remove Thermafil carriers using braided Hedstrom files
4. Clinical case presentation
5. Discussion

Introduction: Thermafil Obturator

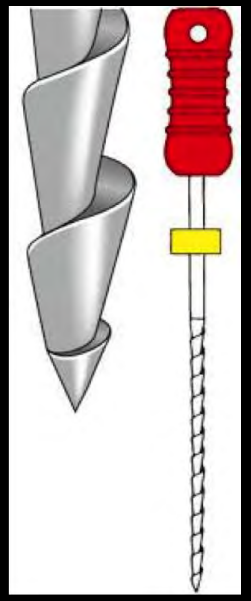
- First introduced in the late 1980s
- Consists of a central carrier, usually plastic, surrounded by a layer of gutta percha
- These can make re-treatment challenging due to the presence of a plastic carrier that must be removed to properly re-shape and adequately irrigate the root canal system

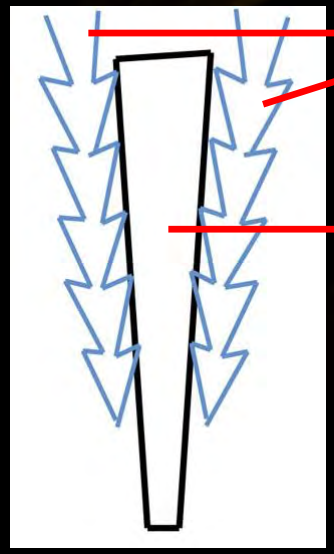
Clinical presentation of a Thermafil carrier

This is an example of what a Thermafil carrier looks like inside an access cavity. Inside the canal, a dark-gray plastic carrier is surrounded by gutta percha.

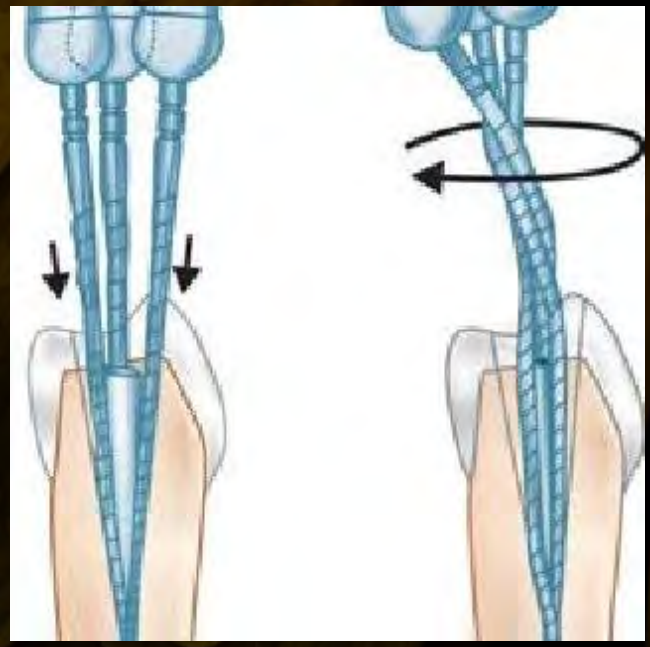
Thermafil carrier removal

- Braiding Hedstrom files is a commonly used method for removing Thermafil carriers
- Hedstrom files possess a positive rake angle→ this allows the file to engage the carrier with more friction and binding strength

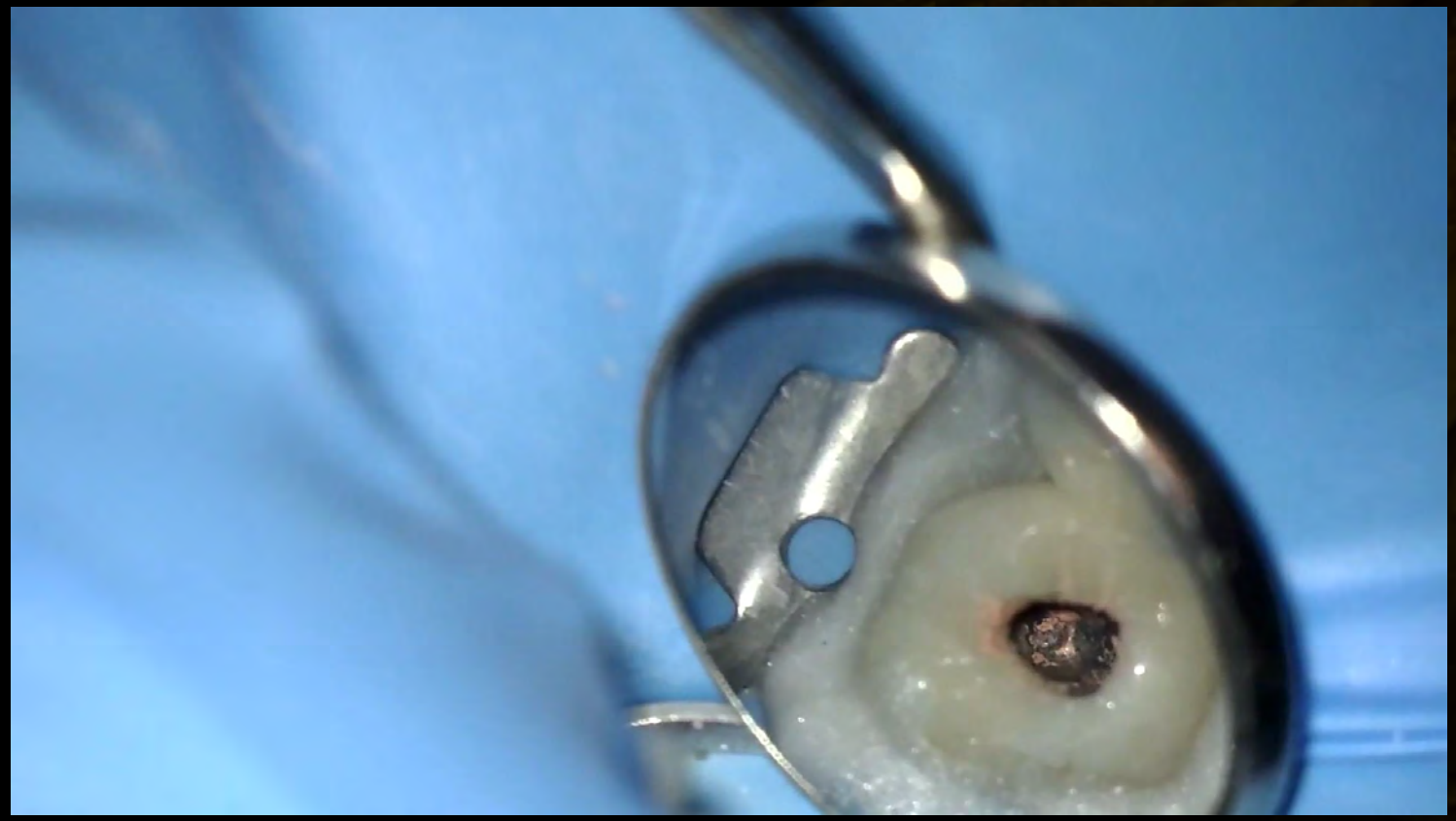




- The braiding technique involves entwining 2 to 3 Hedstrom files of sufficient length alongside the carrier followed by a removal attempt



Video: Thermafil carrier removal



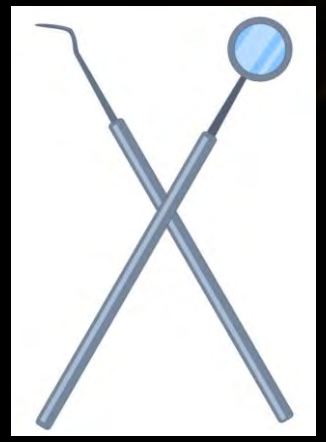
A video demonstrating the removal of a Thermafil carrier.

- Chloroform is first used to soften the gutta percha around the carrier
- K-files are inserted to create multiple pathways alongside the carrier
- 2 to 3 Hedstrom files are then inserted alongside the carrier, making sure to engage the plastic core
- Hedstrom files are then braided and pulled outwards with a controlled force to remove the carrier

Case Information

- A 33-year old female patient presented for #14 and #15 re-treatment of root canals performed 8 years prior
- The patient reported having pain to chewing in the upper left quadrant for the past year that has worsened in the past 2 weeks
- The patient reported the pain to be 6/10
- At the time of consultation, the patient was taking ibuprofen, 400mg prn for pain control
- The patient reported no significant contributory medical history, was not taking any other medications besides ibuprofen, and has an allergy to codeine
- BP: 118/75 mmHg, pulse: 81 BPM

Clinical Evaluation



EOE

- No extraoral swelling or asymmetry, no trismus, ROM ≥40mm, no palpable lymph nodes, and no TMJ clicking, popping, crepitus, or pain to palpation

IOE

- Negative oral cancer screening, generalized mild plaque accumulation, #14 PFM crown with intact margins, #15 PFM crown with an open mesial margin, ≤4mm PDs, physiologic mobility, no furcation involvement, no swelling, and no sinus tract

Clinical Testing

Test	#12	#13	#14	#15
Cold	+	-	-	-
Percussion	-	-	+	+
Palpation	-	-	-	+
Probing	(323,323)	(212,323)	(324,423)	(323,323)
Mobility	1	1	1	1

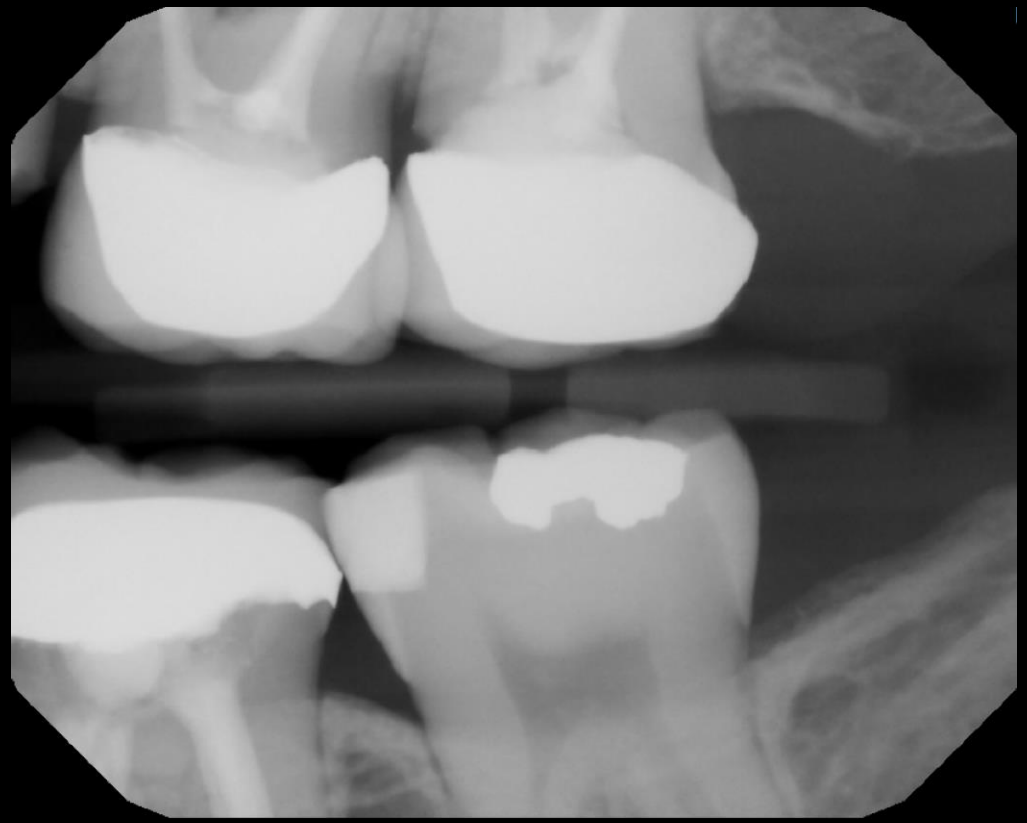
Pre-op PAs

#14

#15

- #14 and #15 have coronal radiopacities that are consistent with resin core build-ups and PFM crowns
- #14 and #15 have radicular radiopacities that are consistent with root canal fillings
- A PARL is associated with the MB roots of #14 and #15

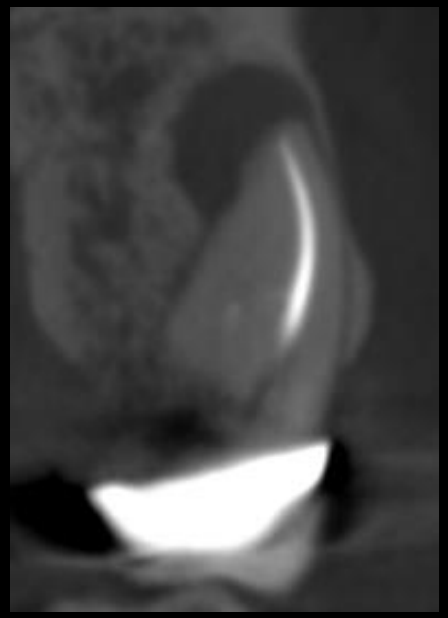
Pre-op BW



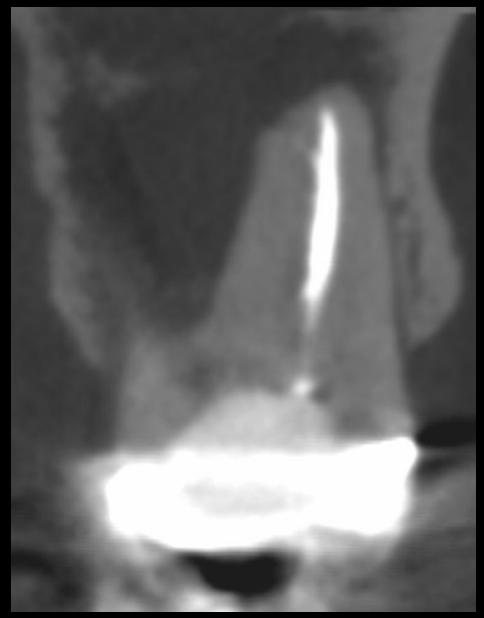
- The margins of the PFM crown on #14 appear intact
- An open margin is present on the mesial aspect of #15

Pre-op CBCT slices

Coronal view of MB roots



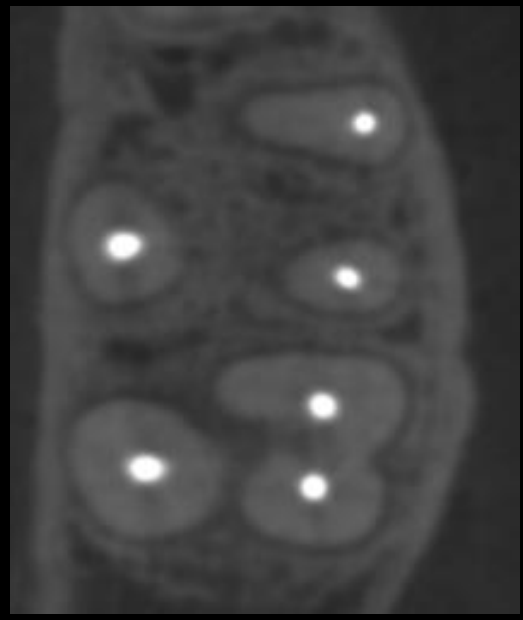
#14



#15

- PARLs present on MB roots of #14 and #15
- The off-centered position of the filled MB1 canals in #14 and #15 suggests the possible presence of untreated MB2 canals in the MB roots

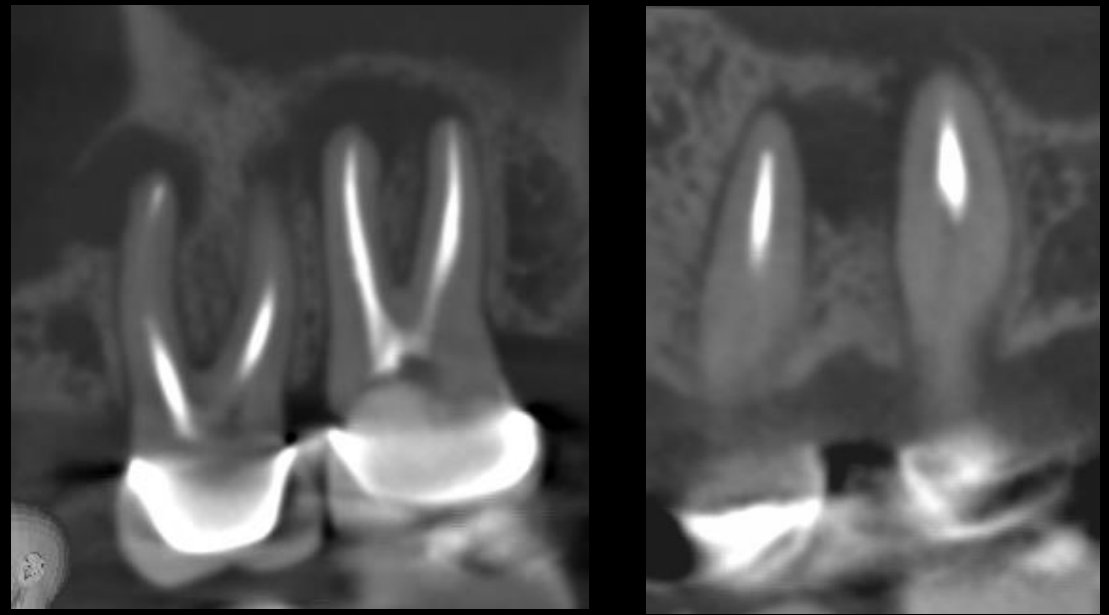
Axial view



- Although an MB2 canal is not visible, the shapes of the MB roots suggest the possible presence of an untreated MB2 canal in #14 & #15

Pre-op CBCT slices

Sagittal view of MB, DB, and P roots



- PARLs present on MB and DB roots of #14 and #15
- PARLs present on P roots of #14 and #15 with bone loss in between the roots

Diagnosis & Treatment Plan

<u>#14</u>

Dx: Previously treated, symptomatic apical periodontitis

Tx plan: NS re-tx w/ core build up

<u>#15</u>

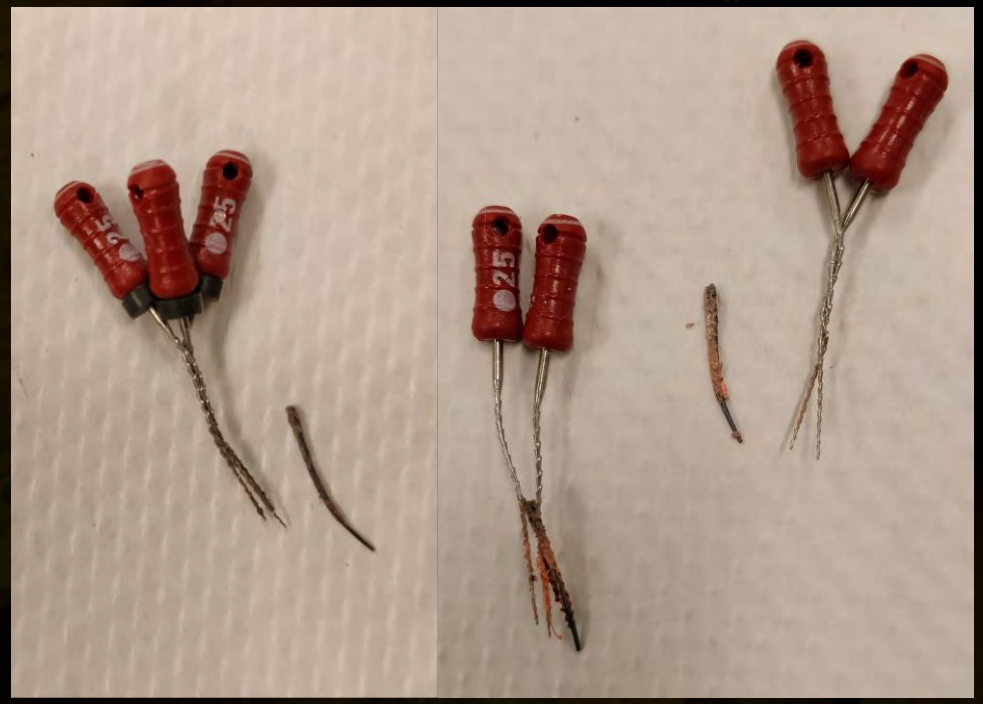
Dx: Previously treated, symptomatic apical periodontitis

Tx plan: NS re-tx w/ core build up

- *#15 was causing the patient more pain than #14 and was thus re-treated first. #14 re-tx was subsequently completed.*
- *The endodontic treatment of both cases, however, will be presented simultaneously.*

Access cavity and Thermafil carrier removal

- Accesses for #14 and #15 were accomplished through the crowns
- The crowns remained intact and absence of caries was confirmed with caries indicator dye
- Thermafil carriers were observed in the MB1, DB, and P canal orifices in both #14 and #15
- Chloroform and K-files were used to soften the surrounding gutta percha and to create pathways alongside the carrier
- Hedstrom files were then inserted and braided to remove each Thermafil carrier in #14 and #15



Thermafil carriers removed from the MB1, DB, and P canals of #14.

Removal of Thermafil carriers in #14 and #15

#14

#15

PA radiographs of #14 and #15 were obtained to confirm the removal of Thermafil carriers.

Locating MB2 canals & instrumentation

- EDTA and troughing with an ultrasonic tip was used to identify mineralized MB2 canal orifices
  - An MB2 canal was identified in #14, but not in #15
- Once the MB2 orifice was located, RC prep and a series of #6, 8, and 10 k-files were used to achieve patency
- Working lengths for all canals were determined using an EAL
- Cleaning and shaping was performed in all canals using rotary instrumentation
  - TruShape was used in previously treated canals
  - Vortex Blue was used in the MB2 canal
- Apical patency was confirmed with EAL
- Final irrigation was performed with 17% EDTA followed by 8% NaOCl + PUI

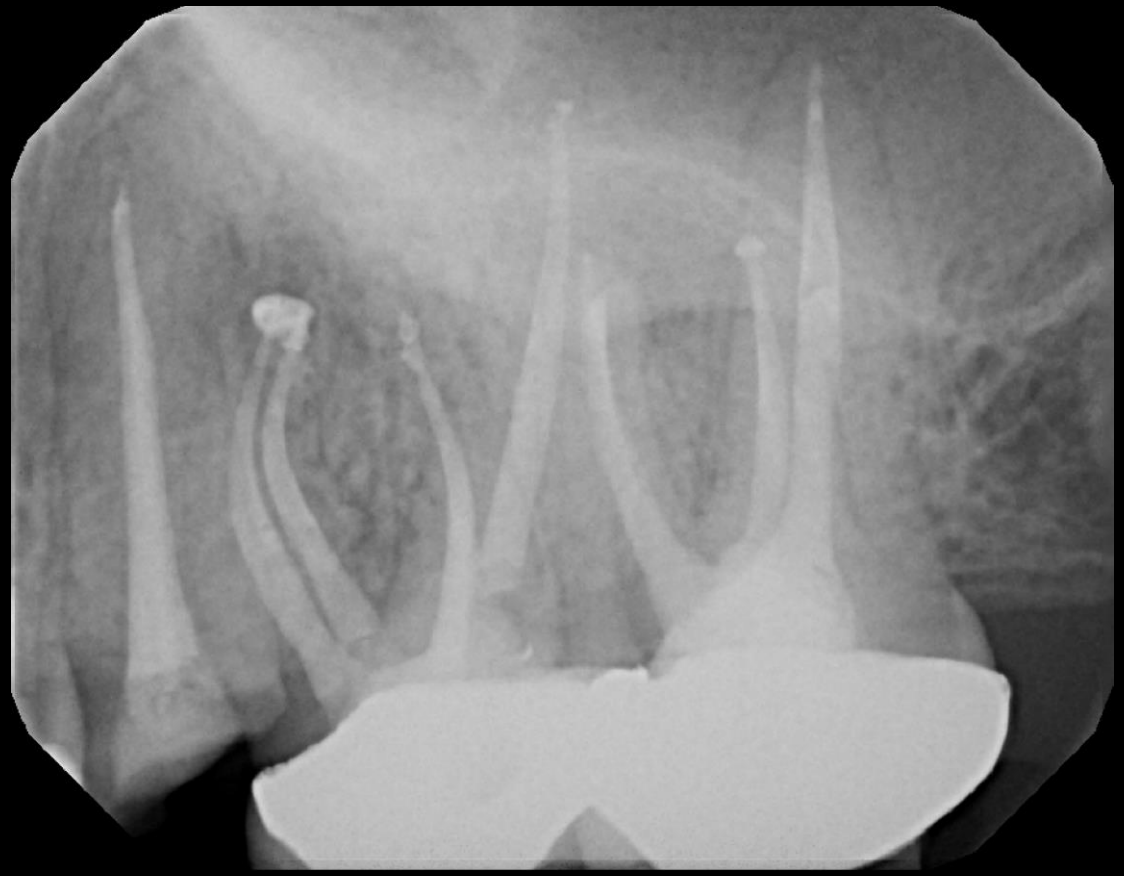
Master cone fit in #14 and #15

#14

#15

PA radiographs of #14 and #15 were taken to confirm the fit of gutta percha master cones.

Post-op of #14 and #15



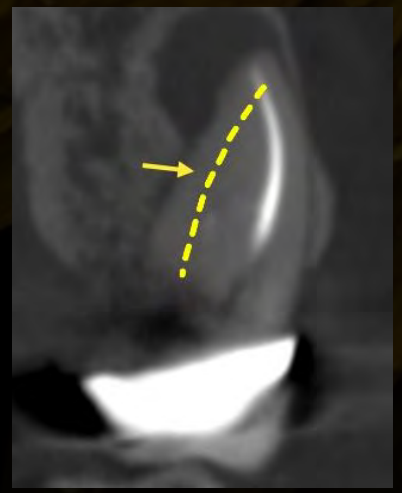
- Obturation was completed via warm vertical compaction with AH Plus
- Access cavities were restored with dual-cure resin

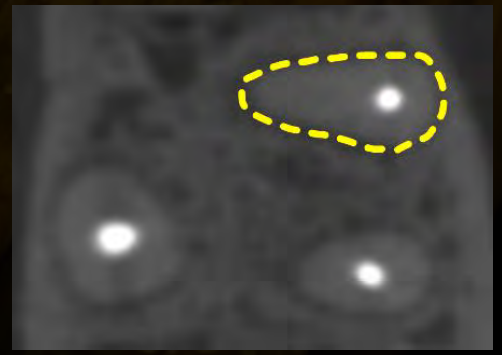
Discussion

- Clinicians should be aware of the challenges that may accompany a re-treatment
  - Previously treated teeth may contain various root canal fillings including Thermafil carriers, silver points, or pastes such as Russian Red and N2
  - These cases may also present with existing iatrogenic errors such as fractured instruments, ledges, perforations, blockages, and transportations
    - Canal anatomy that has not been respected has been shown to be associated with a lower prognosis (*Gorni & Gagliani*)
  - Presence of periodontal disease has also been shown to decrease prognosis 2- to 3-fold (*Janssen*)

Discussion (cont'd)

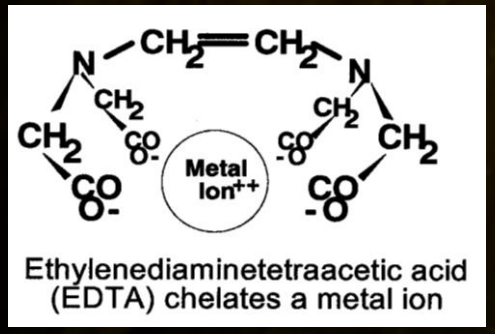
- CBCT scans are more accurate for detection of apical periodontitis, and may help identify any missed canals and associated lesions that were obscured by the superimposition of anatomy on 2-dimensional radiographs (*Estrela, Patel*)
- When the obturation appears off-centered, such as the case here in the coronal and axial slices of the MB root of #14, there is an untreated canal 42% of the time (*Hoen & Pink*)
    - When the tooth is re-accessed, these untreated canals are found 90% of the time





Discussion (cont'd)

- Chloroform was used in both cases to soften gutta percha to allow space for subsequent insertion of K-files and H-files
  - Chloroform has been shown to be safe for the patient, clinician, and staff (*McDonald, Chutich*)
- EDTA and RC prep was used in this case to aid with identifying and instrumenting mineralized MB2 canals
  - EDTA is a chelating agent that aids with instrumentation in narrow or obstructed canals by softening the dentin (*Nygaard-Ostby*)
  - RC prep contains EDTA, urea peroxide (antimicrobial), and glycol (*Heling*)

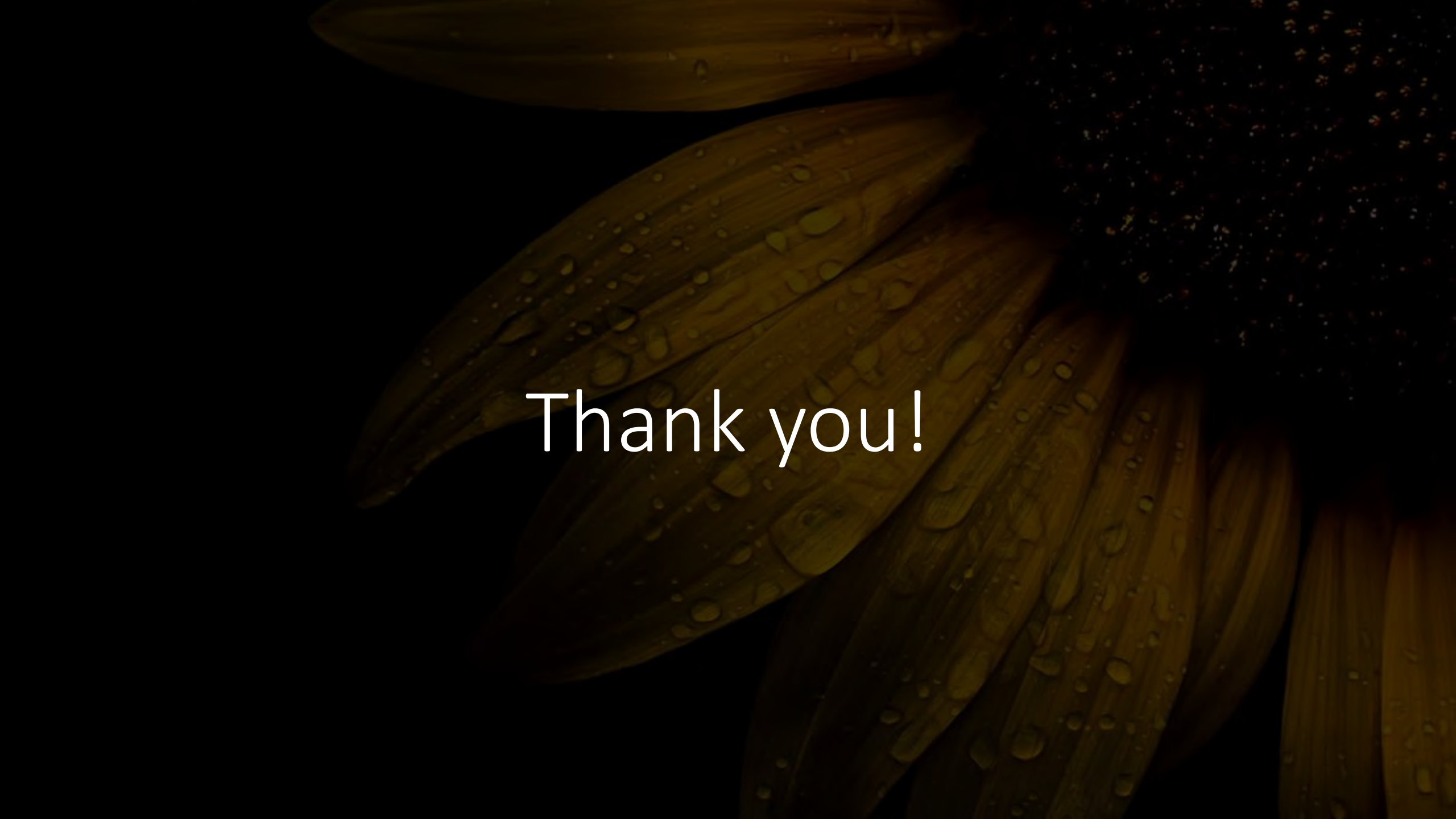


Ethylenediaminetetraacetic acid (EDTA) chelates a metal ion

Discussion (cont'd)

- No technique completely removes all gutta percha and sealer (*Wilcox & Madison*)
  - Thus, using 3D files that have a wider envelope of motion, such as the TruShape files that were used in these cases, may result in greater gutta percha removal

- Both #14 and #15 re-tx cases were accomplished in 2 visits
  - Multiple studies have reported no significant difference in outcome between single versus multiple visits (*Peters & Wesselink, Messer, Molander*)


Thank you!