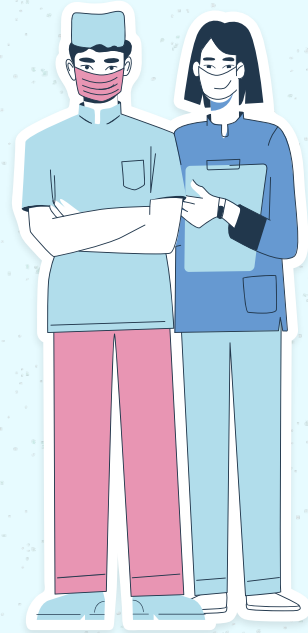


Seeing Beyond the Surface: The Role of CBCT in Endodontic Precision and Education

Jihun Han, Taylor Lam, DDS 2025



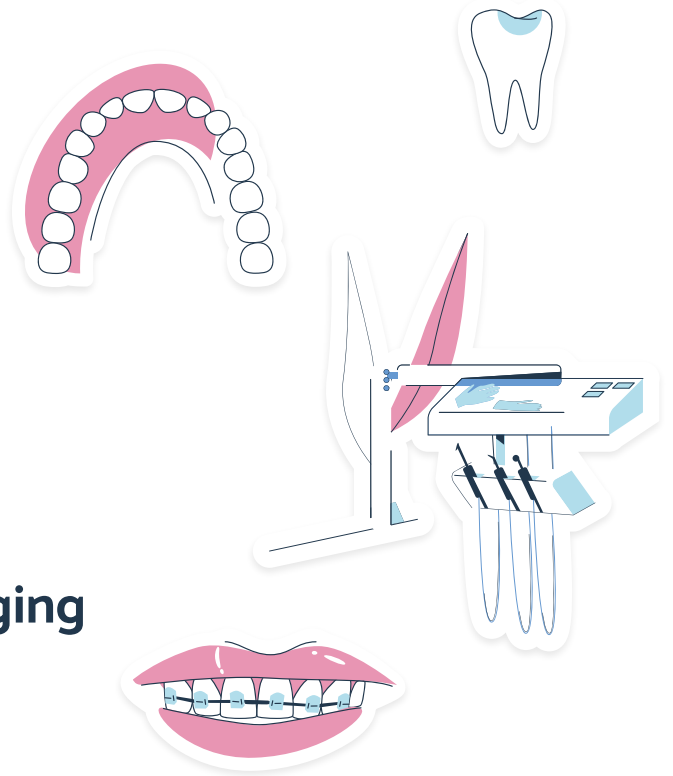
Overview and Objectives



The Role of CBCT in Improving Endodontic Diagnosis and Treatment



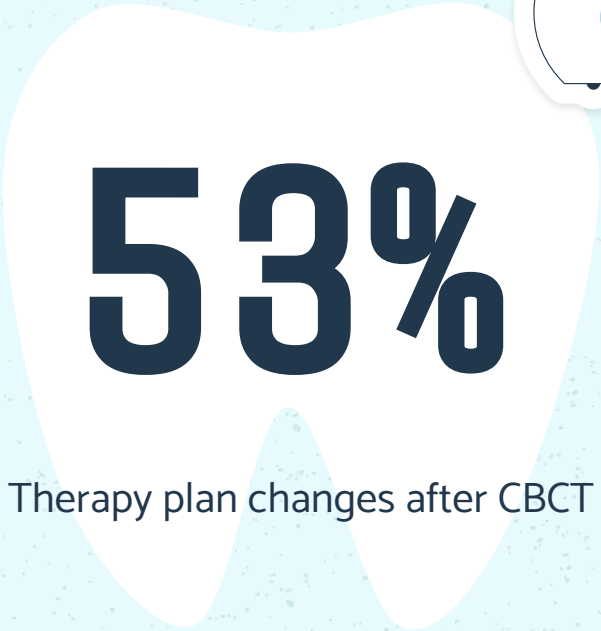
Reflect on the clinical and educational significance of managing technically challenging cases as a dental student



WHY USE CBCT?

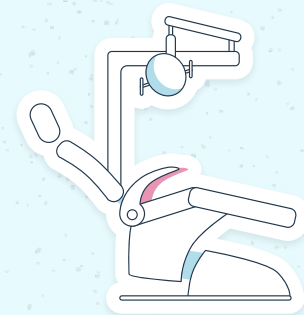
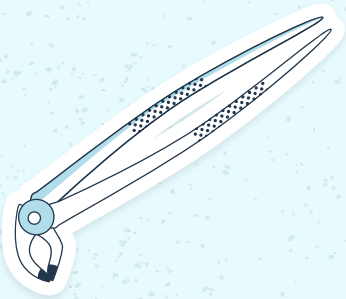
- Advantageous and in some instances essential to take a CBCT scan before any endodontic surgery
- CBCT scans reveal:
 - Extra anatomy
 - Relationships of structures
 - Traumatic fractures
 - Missed canals
 - Resorptions
 - Instrumentation-related issues such as perforations
 - Help during treatment complications.
- Not necessary for all, but helpful



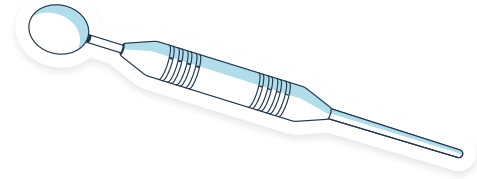


53%

Therapy plan changes after CBCT



Presentation Roadmap



01

CBCT & MB2

02

CBCT & IA Canal



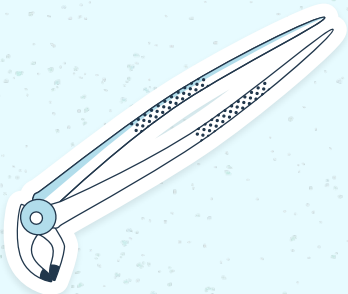
03

CBCT & Unusual
Anatomy

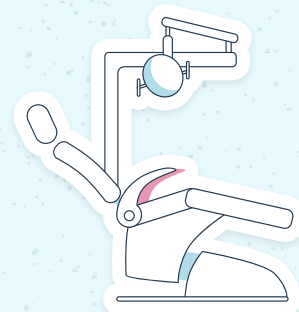
04

Additional case
examples
demonstrating the
application of these
techniques





CBCT FOR MB2



CBCT & MB2

CBCT imaging significantly improves the ability to locate MB2 canals and may be particularly beneficial in complex cases.

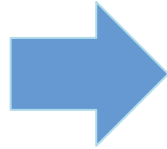
- **Out of 886 teeth:**
 - **MB2 canals were found in 55.8% of cases**
 - **CBCT contributed to the detection of 11.7% of MB2 canals**
 - **CBCT imaging significantly increased MB2 detection rates**



INFECTION ON #14 APEX OF MB – IMPORTANT TO CLEAN MB1 & MB2



INFECTION ON #14 APEX OF MB – IMPORTANT TO CLEAN MB1 & MB2



RCT #14

Working Length

- Palatal canal: 23 mm from B cusp tip
- DB canal: 21 mm from B cusp tip



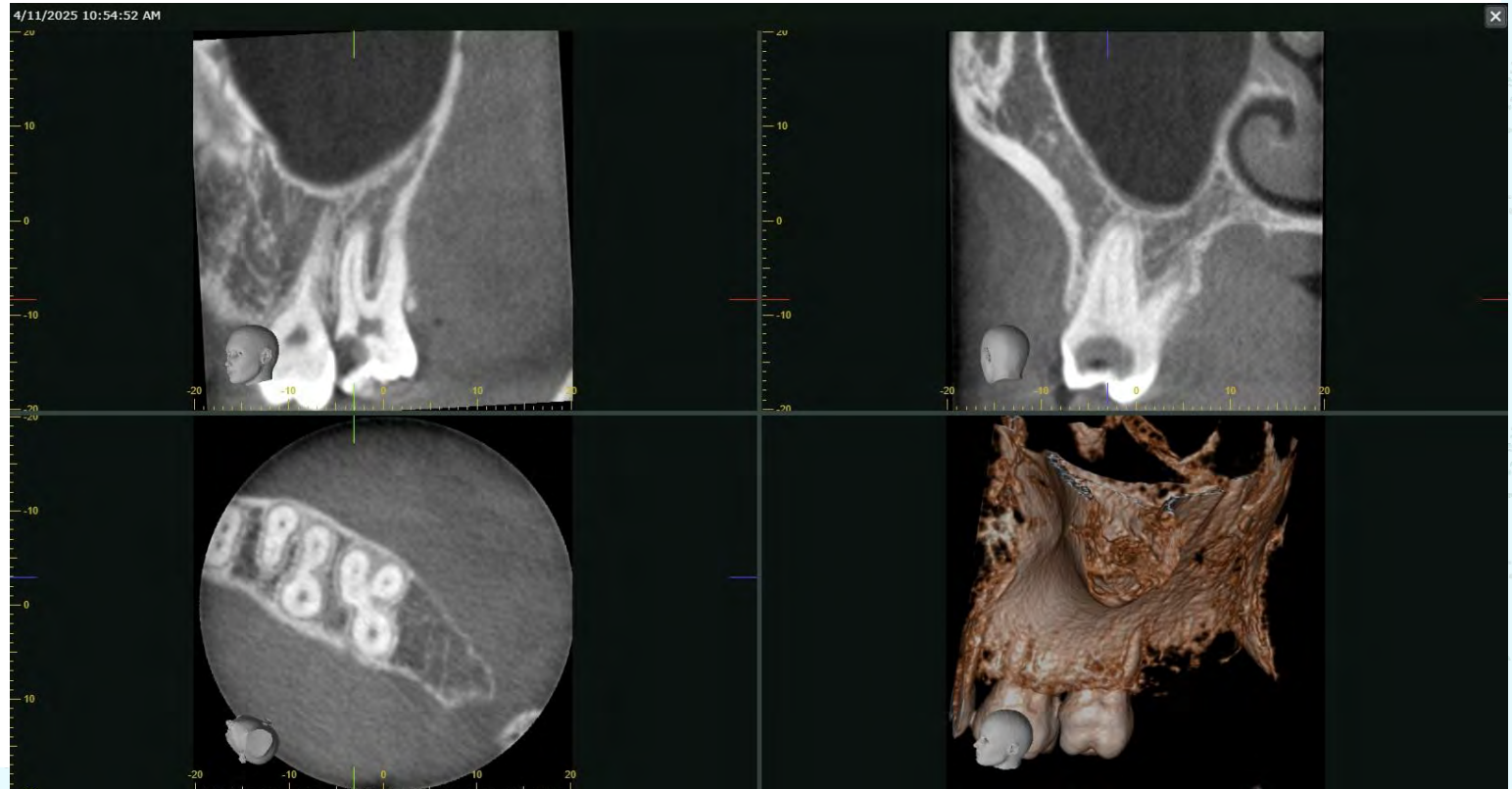
RCT #14

Working Length

- MB canal: 20.5 mm from B cusp tip
- MB2 canal: 16.5 mm from B cusp tip



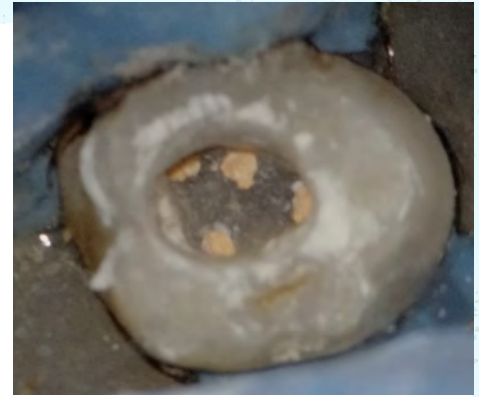
CBCT FOR TOOTH #15



RCT #15

Working Length

- P, MB1, MB2 canals: 18.5 mm from Occlusal plane
- DB canal: 18 mm from Occlusal plane

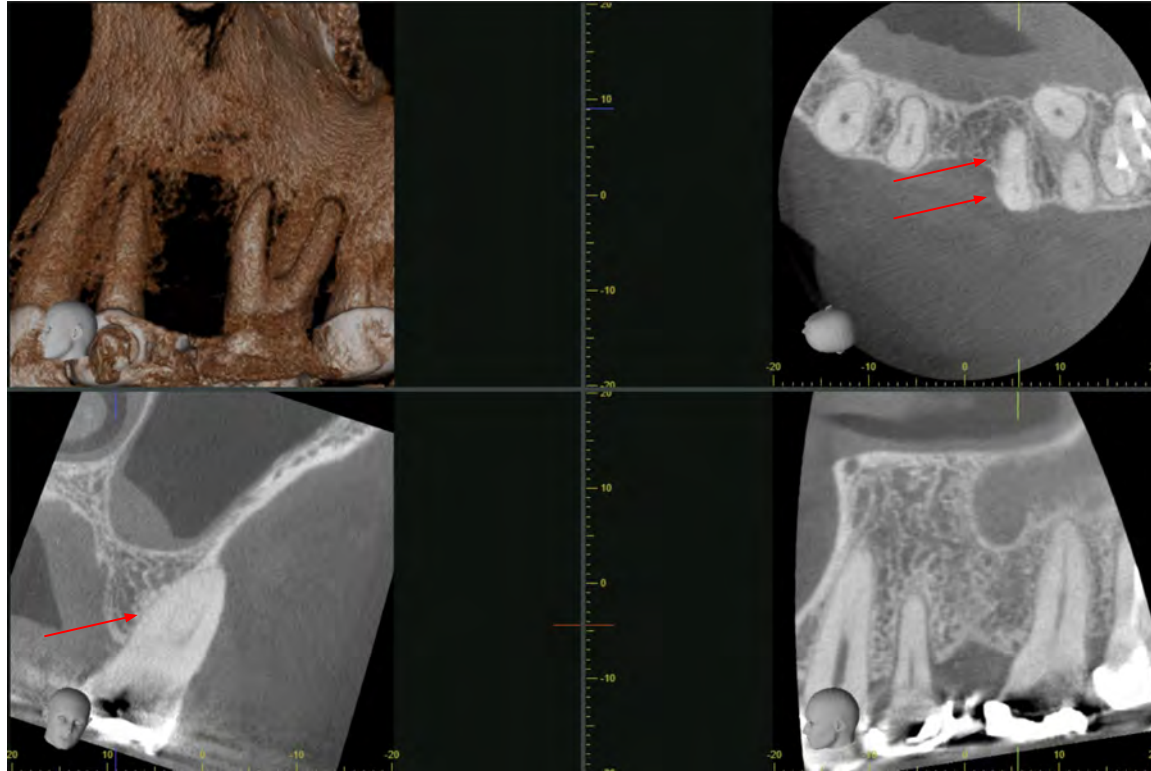




#14 PA



CBCT FOR TOOTH #14



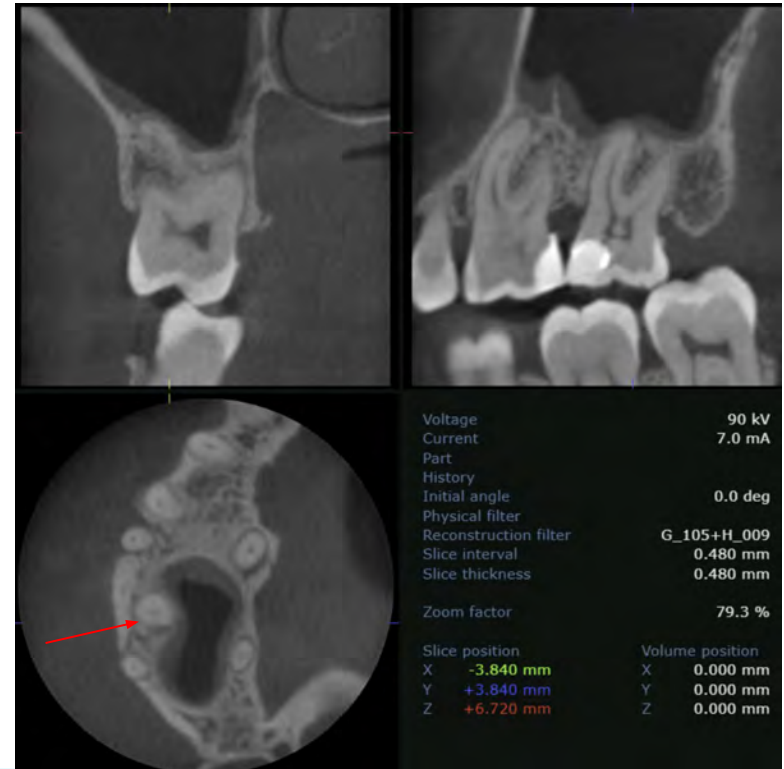
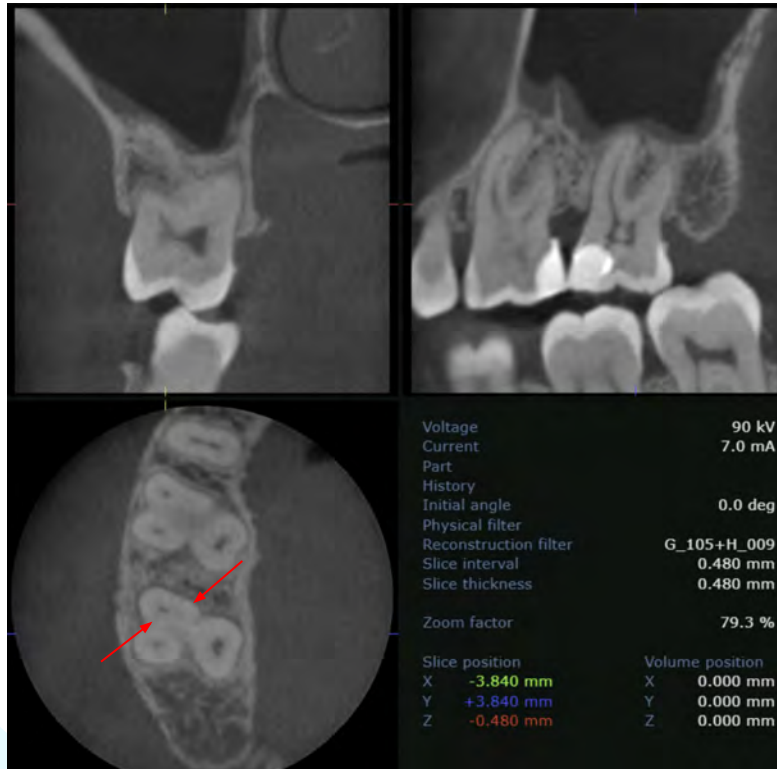
RCT #14

Working length

- MB1 and MB2: 21 mm



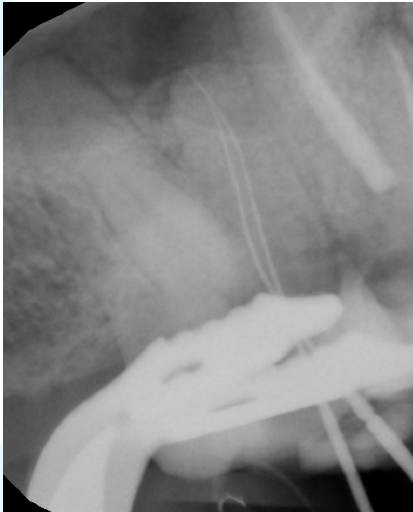
CBCT FOR TOOTH #2



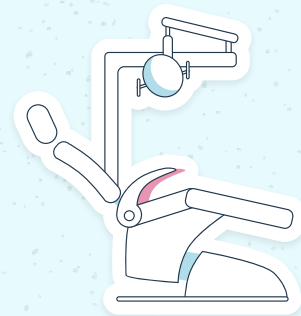
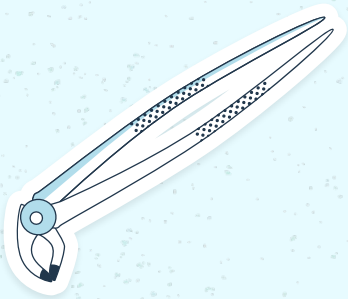
RCT #2

Working length

- MB1 and MB2: 21 mm



CBCT For canal



CBCT & IA canal

CBCT helps visualize the close proximity of the inferior alveolar canal to mandibular molars, reducing the risk of nerve injury

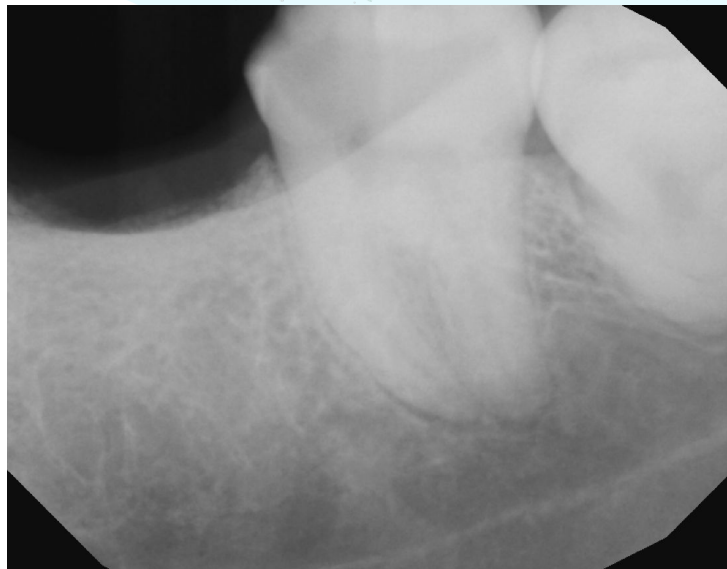
- **High incidence of Direct Communication between IA canal and mandibular molars**
 - **60% in mandibular second molars**
 - **38% in mandibular first molars**



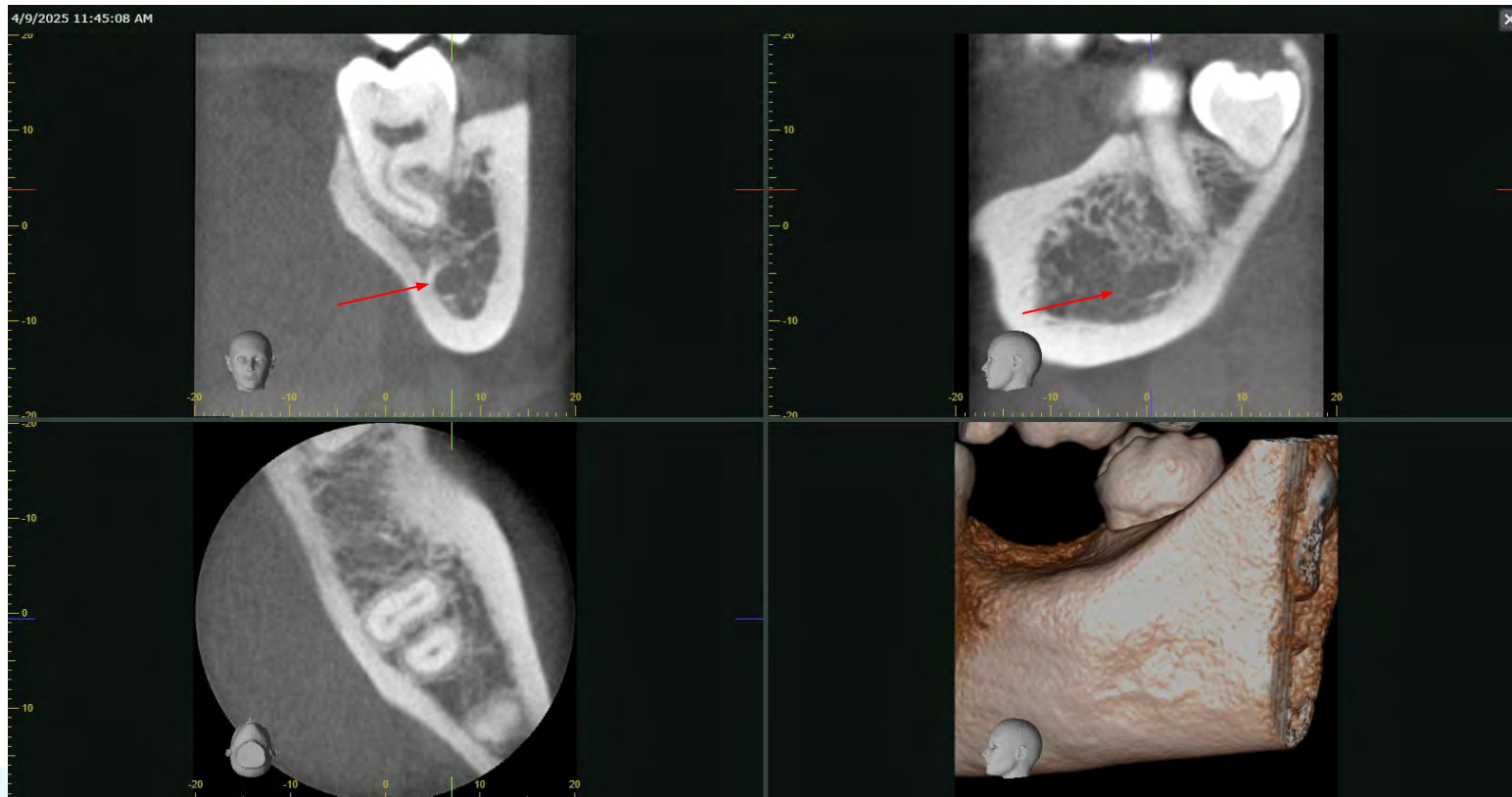


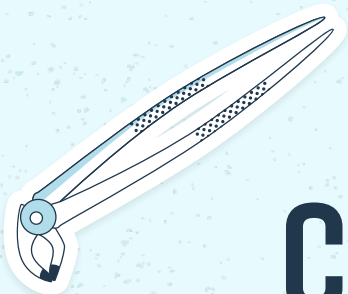
#18 PA

“The IA canal may be located directly beneath the apex of tooth #18– let’s take CBCT to confirm.”

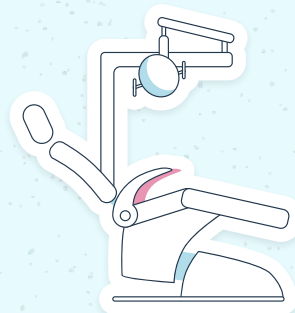


CBCT FOR TOOTH #18





CBCT FOR UNUSUAL ANATOMY



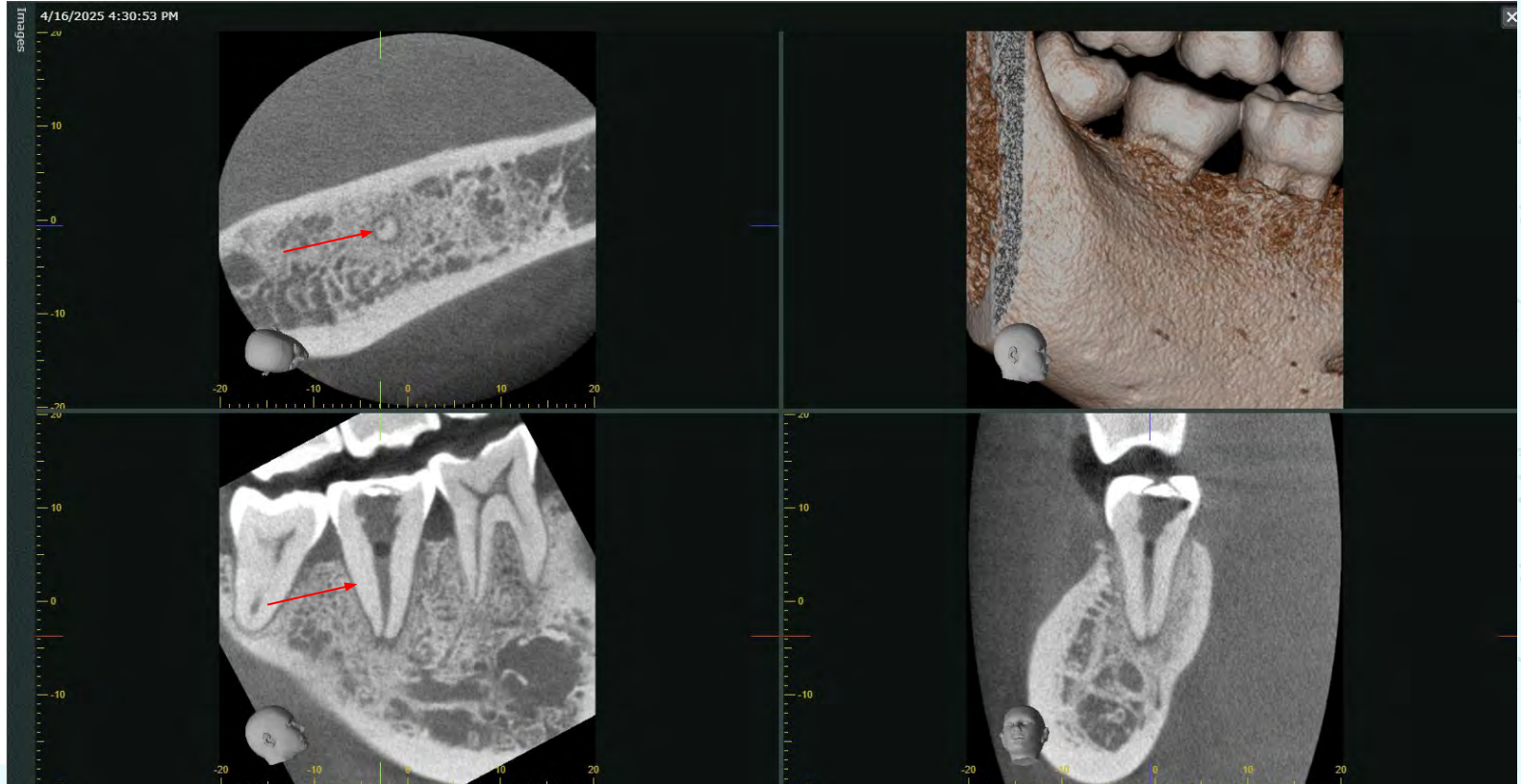


#31 PA

“The anatomy of this tooth seems atypical for a mandibular second molar; is there just a single canal?”



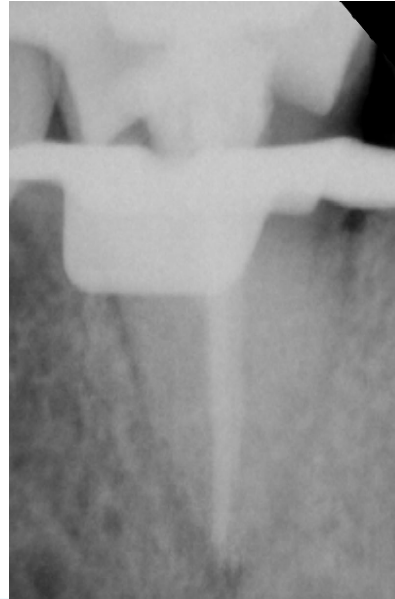
CBCT FOR TOOTH #31



RCT #31

Working Length

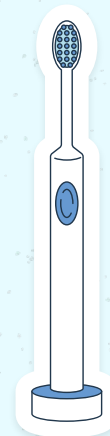
- Central canal: 18 mm from Occlusal plane





#30 PA

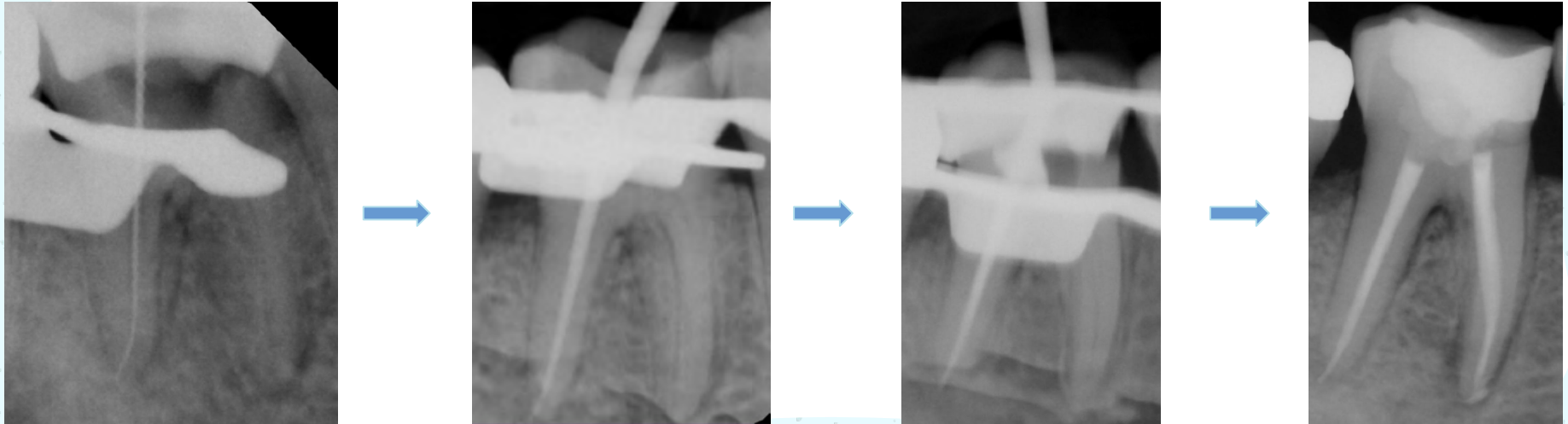
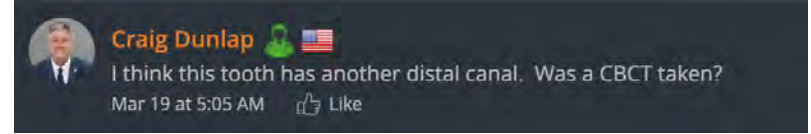
“The distal canal doesn’t look too centered. Did you miss a canal?”



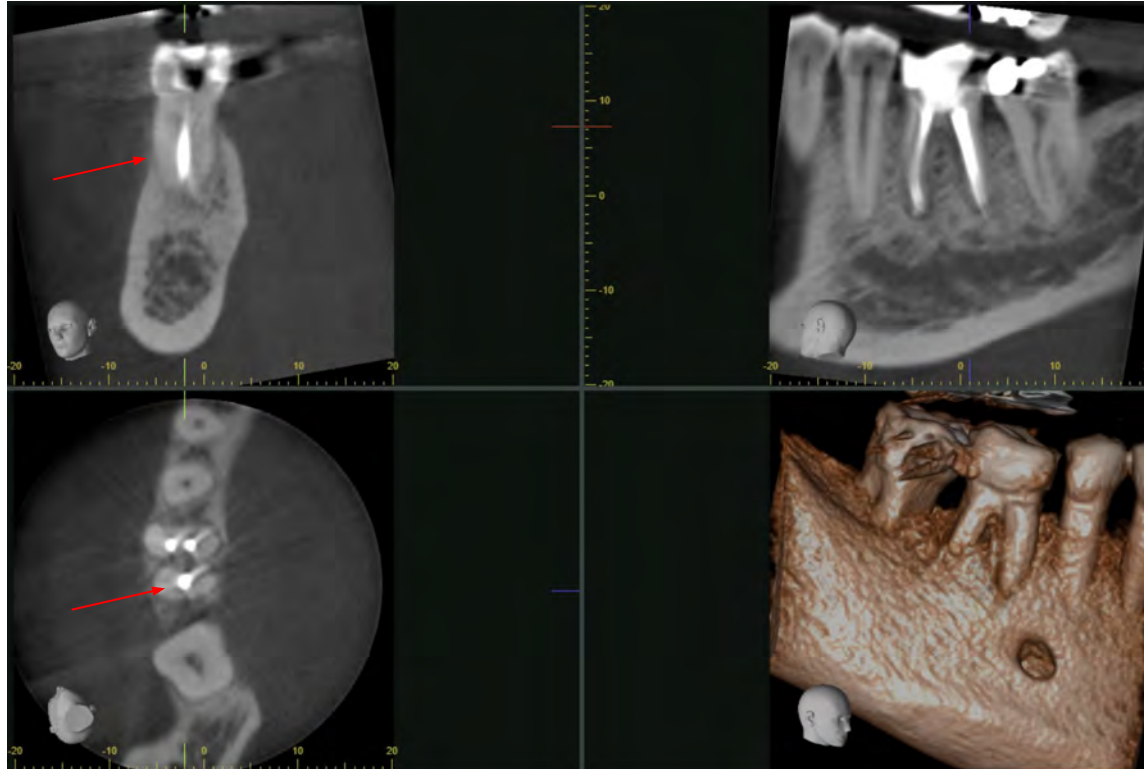
RCT #30

Working length:

- Distal: 17.5 mm from DB cusp tip
- Mesial buccal: 17.5 mm from MB cusp tip
- Mesial lingual: 17 mm from MB cusp tip



CBCT FOR TOOTH #30

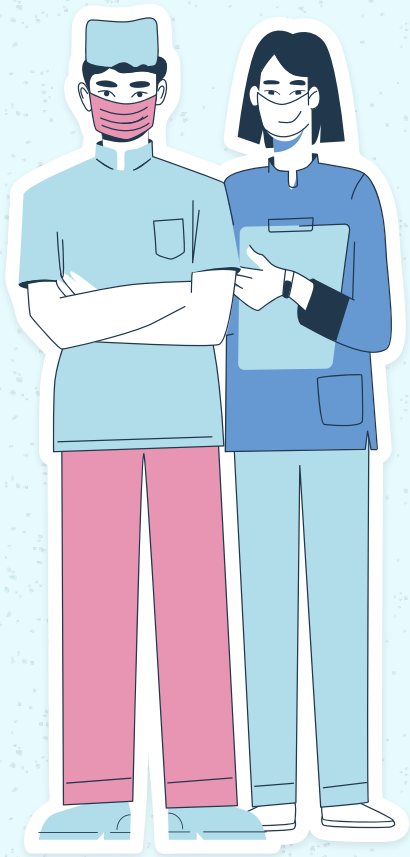


DISCUSSION

- CBCT enhances visualization of complex root anatomy, aiding in accurate diagnosis and treatment planning
- Significantly improves detection of MB2 canals and identification of anatomical anomalies
- Helps assess proximity to critical structures (e.g., IA canal), reducing risk of procedural complications
- Supports minimally invasive endodontics by limiting unnecessary tooth structure removal
- Literature and case results confirm CBCT's clinical value in both primary and retreatment cases

REFLECTION

- Gained deeper appreciation for the diagnostic power of 3D imaging in endodontics
- Improved confidence in managing complex cases with advanced tools like CBCT
- Learned to integrate radiographic interpretation with clinical judgment for more predictable outcomes
- Recognized the importance of staying current with evolving technology to provide optimal patient care
- This experience marked a major step in developing clinical independence and critical thinking



THANK YOU!



y

We would like to give thanks to Dr. Dunlap and Dr. Lai for leading our Endodontic Enrichment Program and serving as our mentors. We would also like to thank all of the Endodontic faculty, residents, and staff for helping us as we continue to tackle more complex cases.

References

American Association of Endodontists. "CBCT: The New Standard of Care?" *American Association of Endodontists*,
<https://www.aae.org/specialty/cbct-new-standard-care/#:~:text=Most%20clinicians%20agree%20that%20it,not%20treating%20such%20dubious%20teeth?>. Accessed 30 Apr. 2025.

Mota de Almeida FJ, Knutsson K, Flygare L. The effect of cone beam CT (CBCT) on therapeutic decision-making in endodontics. *Dentomaxillofac Radiol*. 2014;43(4):20130137. doi:10.1259/dmfr.20130137. Epub 2014 Mar 10. PMID: 24766060; PMCID: PMC4082257.

Stropko, John J. "Canal Morphology of Maxillary Molars: Clinical Observations of Canal Configurations." *Journal of Endodontics*, vol. 25, no. 6, 1999, pp. 446–450. doi:10.1016/S0099-2399(99)80276-3.

Studebaker, Ben, et al. "The Incidence of Second Mesio Buccal Canals Located in Maxillary Molars with the Aid of Cone-beam Computed Tomography." *Journal of Endodontics*, vol. 44, no. 4, 2018, pp. 565–570. doi:10.1016/j.joen.2017.08.026.

OKU Sutro Excellence Day Project Cover Sheet

Project Title

Full name(s) and class year(s) of all project collaborators

Example: Jane Smith, DDS 2022; John Smith, DDS 2022

Project Category

Enter your abstract text here (max 300 words)