Clinical Application of High-Resolution CBCT in Endodontics—Time to Change Strategy!

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Clinical Applications of CBCT

- Implant Planning
- TMJ/TMD
- Impacted Teeth
- Orthodontic Studies
- Oral-Nasal Airways
- Surgical Planning
- Pathology / Trauma
- Endodontics
Clinical Applications of CBCT in Endodontics

1. Evaluation of anatomy and complex morphology
2. Differential diagnosis
3. Intraoperative
4. Dental-alveolar trauma
5. Resorption
6. Pre-surgical case planning
7. Dental implant case planning
8. Assessment of endo outcomes
9. Non Surgical Root Canal Retreatments?
• **Brynolf 1970** - An accurate diagnosis was obtained 74% time w/ one PA and 90% accuracy with 3 radiographs.

• **Bender and Seltzer 1961 and 1982**— Avg 7% MBL (mineral bone loss) & at least 12.5% CBL (cortical bone loss); lesion must penetrate endosteum.
Endodontic therapy should be planned and performed according to the specific goals of the treatment.
For root canal retreatments, understanding the etiology of the disease or failure is critical to obtain a positive outcome.
Predictor of outcome was preoperative root-filling length!

- inadequate 84% healed
- adequate 68% healed

What does this tell us?

Why Transition to 3D?

You cannot “fix a problem” if you do not know what and where is located!
CBCT provides us with a more accurate preoperative diagnosis and treatment strategy. Thus, increasing the outcome of the therapy and avoiding further complications.
Detection of periapical pathology using intraoral radiography and cone beam computed tomography - a clinical study.

- Two hundred and seventy-three paired roots were assessed with both radiological systems,
- Periapical lesions were present in 55 (20%) and absent in 218 (80%) roots assessed with periapical radiographs.
- When the same 273 sets of roots were assessed with CBCT, lesions were present in 130 (48%) and absent in 143 (52%) roots.
- Seventy-five additional roots were detected with CBCT.
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This presentation will demonstrate:

1. Acquisition of CBCT
2. Interpretation of the data
3. Clinical application for non-surgical root canal retreatment procedures
Two examples
Anomalies: Additional roots/missed canals
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Anomalies: Additional roots/missed canals

45 year-old female presented with chronic pain in the maxillary left. Teeth #13, 14 and 15 were endodontically treated by an endodontist more than 2 years ago. Pain is mild to moderate.
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Our Patient today: TB

• RCT done more than 5 years ago.
• CC: “I feel pain and discomfort every time I chew on this tooth”
• Clinical exam:
  – No extraoral findings
  – Positive to percussion
  – Positive to biting
  – Negative to palpation, both apical to 30 and TMD
  – Perio B333, L323
Brynolf claimed that with 3 PAs we can achieve 90% accuracy!

What about 5 PA radiographs from different angles?

Any lesion? Perhaps we need a 3D imaging system!
So far so good!
Diagnosis

• Previously Endo Treated
• Symptomatic Periradicular Periodontitis (related to DB and DL roots)
• Periapical radiolucencies on both distal roots
  – DL: 4.7mm (H); 5.0mm (W); 2.3mm (D)
  – DB: 1.4mm (H); 2.7mm (W); 3.1mm (D)
• Severe buccal dilaceration of the DB root

Notes: MB: 19.5mm, ML: 20.5mm, DB: 18.5-19mm, DL: 17mm
Treatment Aims

• Remove the root canal filling (Thermafil), particularly from DB and DL (with lesions).
• Bypass the existing ledge on the DL root.
• Achieve favorable environment for healing by controlling the intracanal infection.
• Provide a good seal and prevent future contamination.
Treatment Outcome

✓ Three thermafil carriers were completely removed and patency achieved.
✓ The apical portion of the fourth MB carrier was not completely removed using passive procedures with minimal risk. Since no pathology was diagnosed on that root, no invasive treatment was indicated.
✓ The ledge on the DL root was successfully bypassed and sealed.
✓ The intracanal infection was controlled by using 80mL of NaOCl + 20mL of EDTA, delivered via ANP and PUI.
✓ All root canals were sealed, a coronal barrier placed and the crown restored with a composite core/build-up.
✓ Prognosis is favorable 😊
For root canal retreatments, understanding the etiology of the disease or failure is critical to obtain a positive outcome.
Go Purple. Be Gold.

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“Impossible only means that you haven’t worked hard enough to find the solution yet”
Nestor