Periapical Microsurgery: The Effect of Root Dentinal Defects on Short- and Long-term Outcome

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**Year**: 2015  
**Journal**: JOE

**Aim**
- To evaluate the healing response of roots with & without dentinal defects following apicoectomy at the 1 & 3-year follow-up time points

**Materials & Methods**
- 150 teeth treated with endodontic microsurgery were included in this prospective study.
  
  **Exclusion**
  a. Teeth with severe periodontal mobility (class II or greater), furcation involvement, or localized probing defect greater than 5 mm.
  b. Teeth with any form of perforations
  
  - All procedures were performed using the standard micro-surgical techniques:
    1. Anesthesia + flap reflection
    2. Bone window was prepared and granulation tissue was removed, if present
    3. The apical 3mm were resected, roots stained with methylene blue and inspected with microscope + transillumination
    4. Root end preparation with ultrasonics
    5. Re-inspection of the root with microscope & transillumination for any dentinal defects
    6. Roots were retro-filled with MTA or super EBA followed by suture placement
  
  - Roots were divided into 2 groups according to presence/absence of dentinal defects:
    - **Dentinal defects group**: lines that appeared to disrupt the integrity of the dentin on the external or internal root surface (63 roots)
    - **Intact group**: dentin devoid of any lines or cracks on the external/internal root surface (87 roots)
  
  - In this study none of the dentinal defect were visualized with methylene blue.
  
  - Patients were followed up at 1 & 3 yrs and assessed as;
    - **Healed**: Absence of clinical signs & symptoms with radiographic evidence of complete healing
    - **Not healed**: any abnormal clinical signs and/or radiographic evidence
  
  - Statistical analysis was performed to determine factors affecting treatment outcome.

**Results**
- At 1 year, the success rate was:
  - **Dentinal defect group**: 29.8%
  - **Intact group**: 94.8%
- Presence of dentinal defect significantly influenced the clinical outcome of apical microsurgery at the 1 & 3-year follow-up.
  
  - At 3 years, the success rate was:
    - **Dentinal defect group**: 31.5%
    - **Intact group**: 97.3%

**Conclusion**
- Dentineal defects significantly decrease the outcome of teeth undergoing apical surgery.
- Transillumination with a microscopic LED light should be incorporated as part of apical surgeries to systematically determine the integrity of root apices during apical surgery.

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