Diagnosis and Treatment: Cracked Tooth and Vertical Root Fracture

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“Cracked Tooth Syndrome”
Cameron '76

Cracked Tooth “Syndrome”

- **Syndrome**, n. [Gr. *syndromê*, a running together; syn, together.]
  - 1. In medicine, a number of symptoms occurring together and characterizing a specific disease.

Presentation will vary:

- Pulpal diagnosis
- Type of crack
- Extent of crack
- Periodontal status
Implications

• Avenue for bacterial ingress
  – Pulpal pathosis
  – Periodontal pathosis
  – Failed RCT
• Structural Compromise

Treatment related to:

• Pulpal diagnosis
• Type of crack
• Extent of crack
• Periodontal status

Classification of Cracks

Craze lines

Vertical root fracture

Diagnostic Steps

• Subjective history
• Objective exam/testing

Subjective History

Watch for...

• Inconclusive diagnosis
• Occlusal adjustments
• Pinpoint sensitive area
• Specific biting incident
• Previous cracked teeth
• Crack-inducing habits

Clinical exam

• Hard tissue
  – Restoration Removal
  – Staining
  – Transillumination
  – Radiographs
  – Surgical assessment
**Restoration removal**

**Transillumination**

**Light Wand**

**Radiography**

- Cracks rarely evident
- Patterns of bone loss
  - Vertical defect
  - Bone loss in furcation

**Hard tissue**

- Staining

- Surgical assessment
- **Soft tissue**
  - Periodontal probing
  - Sinus tracts

- **Bite tests**

**Craze Lines**

- Crown/enamel
- Variable direction
- Asymptomatic
- No Treatment
- Prognosis Favorable

**Fractured Cusp**

**Etiology**

- Loss or lack of dentin support/traumatic blow
- Wide and/or deep class II restoration or caries
- Cusp support is primarily from the marginal ridges
  - Reeh and Messer ’89

**Fractured Cusp Characteristics**

- Pain to bite/release
- Inconclusive radiographs
- Restoration removal to aid in visualization
Treatment of Fractured Cusps

- Removed affected cusp
- Restore tooth
- Prognosis favorable

Cracked Tooth

Incidence

- Frequency unknown but increasing
- Md 2nd molars > Md 1st molars > Max premolars
- Class I = Class II restored
- Non-restored = restored

Treatment depends on...

- Pulpal diagnosis
- Extent of crack

Etiology

- Habits
  - Bruxing
  - Clenching
    - “Continuous loading (e.g. clenching) is potentially more damaging than cyclic loading.”
  - Chewing ice, hard candy, corn nuts, etc.
  - Lingual barbell
    - DiAngelis, 1997

Treatment

- Pulpal diagnosis
- Extent of crack

RCT Cuspal coverage EXT
Treatment

RCT Cuspal coverage EXT

Prognosis

Cracked tooth after NSRCT and crown

Three years later

R/O Split Tooth

Split Tooth

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**Split Tooth Characteristics**
- Separated segments
- Tenderness mastication
- Perio abscess
- Furcal radiolucency

**Treatment of Split Teeth**
- Usually extraction
- Occasionally:
  - Treat endodontically
  - Remove smaller segment
  - Restore larger segment

**Possible treatment of split tooth**

**Prevention**
- Cracked Teeth
  - Change patient’s habits
  - Restore to protect occlusion
- Split tooth
  - Restore cracked tooth with cuspal coverage
  - Protect weakened tooth structure

**Vertical Root Fracture**

**Etiology**
- Excessive internal load
  - Excessive spreader or post cementation force
  - Taper
- Propagated by occlusal load
**Diagnosis**

- On average, 10 years after RCT
- May mimic periodontal disease or failed RCT
- Restorative history
- Pain not diagnostic

**Clinical Features**

- Sinus tracts
- H/O swelling
- Narrow wall probings

**Radiographic Appearance**

- Normal 21%
- Apical only 21%
- Apical, lateral and crestal 45%
- Crestal only 10%
- Apical and crestal 3%

**Surgical Findings**

- Granulomatous filled “punched out” bony defect
- VRF confirmed 50% on flap reflection

**Treatment**

- Root resection
- Hemisection
- Extraction

Thank you for your attention. Questions?