Case Based Education in Pre-Clinical Endodontics

ADEA Endodontic Section
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Pre-clinical Endodontics

- Late spring/summer of D-2 year
- 80 students
- 5 full-time faculty
- 3 adjunct faculty
- 4 2nd-year endodontic residents
How do we teach?

- Laboratory sessions
  - Fundamental techniques
  - Extracted teeth
  - Tooth models
  - Steps within procedures

- Didactic sessions
  - Lectures
  - Seminars
  - Diagnosis exercise clinical simulation
  - Patient case simulations
Diagnosis Exercise

- Diagnosis Exercise Clinical Simulation
  - Subjective information
    - Chief complaint
  - Objective information
    - Pulp testing
    - Percussion/palpation
    - Swelling/sinus tract
    - Caries
    - Dental findings
  - Radiographic information
    - Dental findings
    - Apical findings
Diagnosis Exercise

- Full class seminar
- 10 simulations
- Students have information ahead of time
- Review terminology
- Review possible diagnosis categories
  - Pulpal
  - Periapical
  - Radiographic
- Audience response system
Audience Response System
Turning Point Clicker
Audience Response System
Multiple Choice Responses

What is the pulpal diagnosis?

• A. Normal
• B. Reversible
• C. Irreversible
• D. Necrotic
What is the periapical diagnosis?

- A. Normal
- B. Symptomatic apical periodontitis
- C. Asymptomatic apical periodontitis
- D. Acute apical abscess
- E. Chronic apical abscess
- F. Condensing osteitis
Diagnosis Exercise

- Students determine a diagnosis
  - Pulpal diagnosis
  - Periapical diagnosis
- Entire class answers with ARS
- Individual student responses
- Comparative with classmates
- Defend or explain diagnosis
Diagnosis Exercise: Pulpal Diagnosis

Graph showing categories of pulp diagnoses:
- Normal
- Reversible
- Irreversible
- Necrotic

1st Qtr
Diagnosis Exercise
Pulpal Diagnosis

1st Qtr

Normal
Reversible
Irreversible
Necrotic
Diagnosis Exercise
Pulpal Diagnosis

1st Qtr

- Normal
- Reversible
- Irreversible
- Necrotic
Diagnosis Exercise

- Identify well-understood concepts
- Identify areas of confusion
- Identify areas needing review and reinforcement
- Practice with terminology
- Prepares for additional Case Based Education
- Prepares for clinical situations
Diagnosis Exercise: Example #1

- Symptomatic
- Tender to percussion
- Patient has localized vestibular swelling
- Pulp tests negative
- Periapex: 5mm radiolucency

- ? Pulpal diagnosis
- ? Periapical diagnosis
Diagnosis Exercise: Example #1

Pulpal Diagnosis

1st Qtr

- Normal
- Reversible
- Irreversible
- Necrotic
Diagnosis Exercise: Example #1
Periapical Diagnosis

1st Qtr

- Normal
- Symptomatic Apical Periodontitis
- Asymptomatic Apical Periodontitis
- Acute Apical Abscess
- Chronic Apical Abscess
- Condensing Osteitis
Diagnosis Exercise: Example #2

- Asymptomatic
- Extensive caries
- Pulp tests positive with short responses
- Periapex – normal

? Additional tests or treatments needed
  - Caries removal – no pulp exposure

? Pulpal diagnosis
? Periapical diagnosis
Diagnosis Exercise: Example #2
Pulpal Diagnosis

- Normal
- Reversible
- Irreversible
- Necrotic
Diagnosis Exercise: Example #2
Periapical Diagnosis

- Normal
- Symptomatic Apical Periodontitis
- Asymptomatic Apical Periodontitis
- Acute Apical Abscess
- Chronic Apical Abscess
- Condensing Osteitis

1st Qtr
Diagnosis Exercise: Example #3

- Asymptomatic
- Slight swelling of the buccal attached gingiva adjacent to a mandibular molar
- Deep (10mm) probing defect into the buccal furcation with purulence from the sulcus
- Not tender to percussion
- Pulp tests negative
- Furcal and apical radiolucency

- ? Pulpal diagnosis
- ? Periapical diagnosis
Diagnosis Exercise: Example #3

Pulpal Diagnosis

Graph showing the distribution of pulp diagnoses in the 1st quarter.

- Normal
- Reversible
- Irreversible
- Necrotic
Diagnosis Exercise: Example #3
Periapical Diagnosis

1st Qtr

- Normal
- Symptomatic Apical Periodontitis
- Asymptomatic Apical Periodontitis
- Acute Apical Abscess
- Chronic Apical Abscess
- Condensing Osteitis
Patient Case Simulations

- Small group seminars (8 students)
- 9 simulations
- Students have presenting clinical information
- Additional information presented during seminar
  - Clinical photos if indicated
  - Pre-op diagnostic radiographs
  - Objective testing results
  - Results from additional tests or procedures
Patient Case Simulations

Series of questions

- Simulate clinical setting
- Information gathering
- Information interpreting and filtering
- Decide what testing is indicated
  - Familiarizes the students with the different tests and when they are appropriate
- Any additional information that would be helpful
Patient Case Simulations

- Students identify what they see
  - Clinical photos
  - Radiographs
    - Normal anatomic structures
    - Radiographic changes
    - Terminology and interpretation
  - Potential etiologies for chief complaint
  - Develop a differential diagnosis
Patient Case Simulations

- Provide the information they wanted
  - Pulp testing
  - Periapical testing
  - Additional radiographs
  - Additional procedures or tests

- Familiarizes the students with the different tests and when they are appropriate
Patient Case Simulations

- Diagnosis
  - Pulpal
  - Periapical

- Additional considerations
  - Anatomy
  - Calcification
  - Adjacent teeth

- Treatment plan
  - Endodontic
    - Emergency
    - Definitive
  - Periodontic/restorative
Patient Case Simulations

- Medical history implications
- Prognosis
- Results or follow-up from their treatment decisions
Patient Case Simulations
Example #1

- 32 year old male in no distress
- New pt. requesting complete exam
- No significant medical findings
- Soft tissues examination
  - Extraoral normal
  - Intraoral normal
- Hard tissue exam
  - Multiple restorations
  - Caries
  - Incisal wear
- Order a full mouth radiographic series
Patient Case Simulations
Example #1
Patient Case Simulations
Example #1
Patient Case Simulations
Example #1

- Which teeth (write the numbers) might have significant pulpal and/or periapical pathosis and require additional testing?

- What are the radiographic findings that are significant for each of these teeth?
  - Root length of #8 vs. #9
  - Length of clinical crown – incisal edges
  - Discuss pulp testing
  - Discuss what organisms you would expect to see histologically

- What objective test(s) is (are) indicated for each tooth?
  - Thermal, electric, percussion, palpation, probing, mobility
### Patient Case Simulations

#### Example #1

<table>
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<th>Tooth #</th>
<th>CO2</th>
<th>EPT</th>
<th>Percussion</th>
<th>Palpation</th>
<th>Probing</th>
<th>Mobility</th>
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</table>
Patient Case Simulations
Example #1

What is the pulpal and periapical diagnosis for each suspect tooth?
Patient Case Simulations
Example #2

- 56 year old male in moderate distress
- Long term patient but seeks treatment only when specific problem occurs
- “One of my back teeth is sore to chew on”
- Gum tissue started to swell few days ago
- Type II Diabetic managed by medication & diet
- No other medical conditions
- Soft tissue examination
  - Extraoral normal
  - Intraoral swelling between #14 & #15
Patient Case Simulations
Example #2
Patient Case Simulations
Example #2
Patient Case Simulations
Example #2

- Is this an emergency?
- What other subjective information is needed?
- What objective tests are necessary?
- What is the radiographic interpretation?
- What is the diagnosis?
- Does Edward’s medical status impact the treatment plan?
- What is the treatment plan?
Patient Case Simulations
Example #2

- **Diagnosis:**
  - Periodontal abscess #14
  - Normal pulp
  - Normal periapex

- Illustrates assumption that all patients presenting with pain and swelling are of endodontic in origin.
Incorporating Case Based Learning

- Sophomore Pre-Clinical Endodontics
- Junior Endodontic Clinic
- Junior Endodontic Seminar
- Graduate Endodontic Residents
Incorporating Case Based Learning

- Emphasis, Review and Reinforcement
  - Information gathering
  - Medical and Dental history
  - Radiographic interpretation
  - Diagnosis
  - Etiology
  - Treatment options
  - Critical assessment of treatment
  - Prognosis