Evidence Based Dentistry: From Classroom To Clinic

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Cheryl Straub-Morarend, DDS
Presentation Objective

• To describe a 4 year, pre-doctoral, interdepartmental, EBD curriculum from didactic fundamentals to comprehensive patient care.
Learning Outcomes

• Identify fundamental EBD concepts, and strategies to teach EBD concepts to both students and clinical faculty
• Identify strategies to transition didactic EBD concepts to student clinical experiences
• Develop opportunities for students to practice EBD in a comprehensive care setting
Organization

- Didactic instruction
- Transitional instruction
- Clinical application
- Student comments
- Summary
- Audience Brainstorm
Background

- PBL
- Research
Background

• Developed and designed pragmatic EBD continuing education programs for dental teams in the private sector
Background

• Courses
  – ADA/Forsyth Course on EBD
  – ADA Evidence Reviewer Workshop
DIDACTIC PHASE
Didactic Instruction

• Objective
  – To define evidence based dentistry
  – To communicate the need to practice EBD
  – To teach the fundamentals of EBD such that students can practice EBD
  – To develop skills of lifelong learning and professionalism

• Rationale
  – By equipping students with the tools & resources to practice EBD, the process will be automatic in clinic
Didactic Instruction

• Fundamental knowledge
  – 5 Step EBD process
  – PICO format
  – Finding primary & appropriate secondary sources
  – Study design
  – Research manuscripts
    • Manuscript critique
    • Critical appraisal tools
  – Critical summaries
    • Appraisal
  – Clinical recommendations
    • Appraisal
Didactic Instruction

• Fundamental behaviors
  – Lifelong learning
    • Independent on-line activities
      – Time management
      – Different learning styles
  – Professionalism
    • Editorial & commentary readings
  – Critical thinking skill development
    • Structured reflections
Didactic Instruction

• Mechanism
  – Problem Based Learning
  – Elements
  – Readings
  – Critical Thinking Reflections
Problem Based Learning

• Objectives
  – To introduce EBD & critical thinking concepts
  – To introduce the scientific literature
  – To engage in collaborative & professional discussion with peers

• Educational methods
  – Lectures: content knowledge & review
  – Small group sessions
  – Written resource assignments & learning reports
    • Critique lay & scientific sources
    • Assimilate information in written report
  – Tests
    • Individual
    • Group
Problem Based Learning

• Timing
  – D1 year: Sep, Nov, Apr, June

• Interdepartmental facilitators
  – Disseminate EBD content knowledge to faculty
  – Communicates student knowledge to faculty
Elements

• Objective
  – To introduce/reinforce fundamental EBD concepts
  – To provide resources/tutorials for EBD process

• Educational method
  – Online

• Timing
  – D2 year

• Student expectations
  – Complete activity & submit documentation on ICON
Element Assignment

Example

• Module 1 – Elements of EBD #2
  – Design review
    • *Objective: to review designs, including their advantages and disadvantages*
    • Center for Evidence Based Medicine (CEBM)
    • Activity – record your responses to the following and submit on ICON:
      – Select a research manuscript, either new or previously read.
        » Identify the manuscript.
      – Identify the research design for this manuscript.
        » What is the design?
        » How did you arrive at your answer?
        » Outline the advantages and limitations of this design.
      – Identify 2 other designs that could have been used to address the research question.
        » List the two designs.
        » Outline the advantages and limitations of the proposed designs.
Readings

• Objectives
  – To support rationale for EBD
  – To introduce professionalism

• Educational method
  – Online

• Timing
  – D2/D3 years

• Student expectations
  – Summarize and respond to assigned reading
Module 2 – Reading #3


- [http://jada.ada.org/content/140/3/272.full.pdf+html](http://jada.ada.org/content/140/3/272.full.pdf+html)
- **Objective:** To explain the purpose of ADA’s critical summaries.

Summarize content in your own words (1 paragraph minimum).

Respond to the article using one of the following formats (1 paragraph minimum). Identify which format you are using.

- Describe your reaction to the content and explore/explain why you had your reaction.
- Challenge the content.
- Make connections between the content and other readings/lectures/common knowledge.

Submit summaries and responses on ICON
Critical Thinking Reflections

• Objective
  – To develop a structured critical thinking process
    – Based on Paul & Elder’s* model
      • Identify multiple perspectives (i.e., assumptions, biases, points of view, data)

• Educational method
  – Online

• Timing
  – D2/D3 years

• Student expectations
  – Evaluate situation from multiple perspectives
  – Anonymous!

*The Foundation for Critical Thinking: www.criticalthinking.org
Critical Thinking Assignment

Example

• Prompts:
  – Describe some interaction between you and one or more parties that occurred away from the dental school during the past week that left you irritated, ticked off and/or wanting to get even.
  – Describe an event that you witnessed during the past week that made you smile.
  – Describe something that was said or occurred in a lecture during the past week that left you unsettled or ticked off.
  – Describe some interaction that included you and a faculty member or patient that left you unsettled, irritated, or depressed during the past week.
  – Describe a situation in clinic where your ethical and/or professional values were challenged.
  – Describe a clinical situation which required patient management skills.
  – Free choice – any event which is bothering you is free game to critique and analyze if such analysis will benefit your thinking skills.
Critical Thinking Reflection Assignment

Example

• Describe selected prompt (i.e., experiences and/or interactions). **1-2 paragraphs**
• Describe your emotional response to the event, and identify what component(s) of the event made you feel this way. **1 paragraph**
• Identify the problem (if any) posed or resulting from the event. **1 paragraph**
• Analyze and critique the event.
  • Outline each individual’s
    – Assumptions.
    – Biases.
    – Point of view.
    – Data/information/evidence base.
  • If the event does not include other people, then
    – Identify circumstantial components within the experience that shaped the event.
    – Identify whether or not such circumstantial components might have been modifiable.
    – Identify how modifying the components could have changed the event.
  • Comment on the similarities and/or differences between players’ assumptions, biases, points of view and information bases.
  • Assume the identity of a different individual – do you see the situation differently? Should you have operated from a different assumption, point of view or information base, would that have led to different action, behavior or communication on your part?
  • Identify a different action, behavior or communication on your part, and describe the implications of that difference for the event outcome.
• Describe whether or not modification of the components which could lead to a changed event is desirable or not.
Teresa A. Marshall

TRANSITIONAL PHASE
Pre-doctoral Clinical Exposure

• Clinical exposure in the D 1 and D 2 years follows a traditional model:
  – Students are introduced to patient care in the clinical environment in the D 1 year.
  – Patient encounters increase as the students progress through the D 2 year.

• Third-year dental students rotate through eight specialty clinics.

• Dental students enter a comprehensive care clinic for their D 4 year of the pre-doctoral program.
Transitional Instruction

• Objective
  – To apply the EBD fundamental concepts to ‘clinical’ scenarios
  – To practice the 5 step EBD process

• Rationale
  – Practicing the 5 step EBD process will help automate the process
  – Critiquing the scientific literature is a process that matures with time

• Mechanism
  – EBD Exercises
EBD Exercises

• Objectives
  – To improve PICO
  – To facilitate searching skills
  – To develop critical appraisal skills

• Educational methods
  – Online

• Timing
  – D2 year: Student identified personal or clinic concerns
  – D3 year: Layered with clinic patient cases

• Student expectations
  – Complete 4 EBD Exercises & submit online
D2 EBD Exercise

Example

• Module 1 – EBD Exercise 1
  – Objective: to practice the 5 steps of EBD, using different sources of information.
    • Assess the patient: describe a puzzling clinical, course content or personal situation (if you are not in clinic)
    • Ask a question: Using the PICO format, construct a question
    • Acquire the evidence:
      – 1 original research article
    • Appraise the evidence using “Research Manuscript Evaluation Criteria” found below and in ICON EBD.
      – Note – Yes/no responses are not acceptable; provide rationale
    • Apply the evidence (conceptually): How would you use this piece of evidence to address your ‘clinical’ situation?

• Module 5 – EBD Exercise 4
  • Acquire the evidence:
    – 1 original research article
    – 1 ADA Critical Summary OR 1 ADA Clinical recommendation
Sandra Guzman-Armstrong
Cheryl Straub-Morarend

CLINICAL PHASE
Sandra Guzman-Armstrong

CLINICAL PHASE
CLERKSHIP ROTATION SETTING
EJB Clinical Application

• Objective
  – To integrate EBD within clinic activities
  – To practice the 5 step EBD process

• Rationale
  – Clinic faculty and patient preferences facilitate the integration of:
    • Scientific evidence
    • Clinician experience
    • Patient preferences
  – Practicing the 5 step EBD process will help automate the process
  – Critiquing the scientific literature is a process that matures with time

• Mechanism
  – EBD Exercises completed on patient cases within 4 Clerkships
  – EBD content is included as part of student case presentations
CLERKSHIP ROTATION

OPERATIVE DENTISTRY
Dr. Sandra Guzman-Armstrong

PEDIATRICS
Dr. Tad Mabry

PERIODONTICS
Dr. Steve Clark

ENDODONTICS
Dr. Bruce Justman

Team Based Learning – EBD
Dr. T Marshall

Case Presentations – EBD
Dr. T Marshall
Team Based Learning-Evidence Based Dentistry (TBL-EBD) concept is integrated systematically into their group case presentations.

- Slide template provided to students to facilitate group presentations.
Key Elements

• Teams (4-5 students)
  – Accountability
    • Individual
    • Group

• Feedback
  – Frequent
  – Timely

• Assignments
  – Promote learning
  – Promote team development
Day 1

1 case presented by faculty

- Develop 1 PICO per group
  - 4-5 different PICOs
- Identify best resources to address PICO
  - 1 resource per team member
  - Consider quality, strength of evidence

EBD & Team Based Learning Case # 4

- 19 y/o
- Female
- Referred for treatment of moderate/severe fluorosis with white and brown discoloration
- No active caries lesions
- Chief Complain: Esthetic concerns
Day 2

• Group presentations (8-10 minutes)
  – Title slide
  – Ask: PICO
  – Acquire: 1/student
  – Appraise: 1/student
  – Apply: group consensus
    • Group Application
    • Group Treatment
    • Group Reflection
    • Group Summary
Esthetic Sequelae of Ceramic vs. Composite Veneers

Matt Black
Nicole Major
Meggin Passey
Erin Rubach
Othan Sullij

October 23, 2013

Ask

- In patients with moderate to severe fluorosis, what is the benefit of using direct resin composite vs. porcelain veneers to improve esthetics?

Acquire

- Pub Med
  - Key words: Direct resin vs. veneers and treatment of fluorosis

- ADA Systematic Reviews
  - Key words: Veneers

- Source citations
  - Primary articles
    - Center for Evidence Based Medicine-Oxford: RCT Critical Appraisal Sheet
    - Quality-Randomized Clinical Trial: modified split-mouth design
    - Strength-First trial of its kind to compare materials of different nature in same patient
    - Dr. Marshall’s Research Manuscript Evaluation
    - Quality- Compared direct resin, indirect resin, and porcelain veneers based on patient satisfaction (1 month, 1 year, 2 years)
    - However, lacks certain details in methodology as far as the clinical placement and the types of question in the questionnaire
    - Strength- Cohort study (relatively strong but not as good as RCT or systematic review)

Appraise
Nicole’s Key Results


Orhan’s Key Results


Matt’s Key Results


Erin’s Key Results

- Randomized clinical trial
  - Objective: To evaluate clinical performance of laminate veneers made of particulate filled composite or ceramic in a split mouth design
  - Central incisors and symmetric other teeth received same type of restoration: 10 patients with 46 indirect laminate veneers
  - Randomization based on paired teeth and material chosen by coin flip
  - Veneers were re-evaluated every 6 months for chips, caries, debonding, fracture, and post-operative complaints
  - Conclusion: There were no statistically significant differences in survival rates between indirect resin composite and ceramic laminate veneers.
  - However, the composite veneers demonstrated a higher frequency of surface quality change which may require more maintenance over time.

Meggin’s Key Results

  - Randomized clinical trial
    - Objective: To evaluate clinical performance of laminate veneers made of particulate filled composite or ceramic in a split mouth design
    - Central incisors and symmetric other teeth received same type of restoration: 10 patients with 46 indirect laminate veneers
    - Randomization based on paired teeth and material chosen by coin flip
    - Veneers were re-evaluated every 6 months for chips, caries, debonding, fracture, and post-operative complaints
    - Conclusion: There were no statistically significant differences in survival rates between indirect resin composite and ceramic laminate veneers.
    - However, the composite veneers demonstrated a higher frequency of surface quality change which may require more maintenance over time.
Overall Results

- Difficult to separate longevity from esthetics when comparing outcomes.
- Not enough data to support recommendation of one type of veneer over the other.
- Long-term (~2 yrs) success of indirect composite veneers was poor.
- At 2 year recall pts were more satisfied with porcelain veneers.
- Indirect resin composite veneers require more maintenance than ceramic veneers.

Application

- Treatment plan:
  - Present both options and let patient decide since there’s not one clear recommendation.
  - Inform patient of pros/cons of options (cost, longevity, maintenance, etc.).
- Considerations:
  - Study populations were generalized to our patient.
  - While it is feasible for a student clinician to provide the patient with anterior rehabilitation to treat moderate fluorosis, we would recommend that an experienced clinician perform the procedure since its success is highly technique sensitive.
  - Benefits (improving patient’s appearance/self esteem, decreasing caries risk, etc.) of treating moderate fluorosis can outweigh the risks (failure, cost, etc.).

Reflection

- What We Learned:
  - Better research needs to be done in this area.
  - There are a lot of options for esthetic restorations.
  - Veneers seem to be best option for treatment of severe fluorosis.
- What we’d do next time:
  - Try to be more specific to treating fluorosis with anterior esthetic restorations in our search for sources.

Summary

- Any last thoughts?
  - There are many options for treating fluorosis and not one clear solution.
EBD Daily Clinical Application

ADA Center for Evidence-Based Dentistry™

Systematic Reviews  Clinical Recommendations  Resources  Suggest Clinical Ideas  Tutorials  For the Patient

Home > Clinical Recommendations

ADA Clinical Recommendations

Developed under the sponsorship of the ADA Council on Scientific Affairs and the ADA Center for Evidence-Based Dentistry, clinical recommendations are useful tools that can be used by practitioners in conjunction with their clinical judgment and their patients’ needs and preferences to make evidence-based treatment decisions.

ADA Clinical Recommendations do not constitute standards of care but instead are a useful tool that can be applied in making evidence-based treatment decisions. The following links provide information on the process used to develop evidence-based clinical recommendations.

ADA Clinical Practice Guidelines Handbook
Criteria for Disseminating Evidence-Based Guidelines Developed by External Agencies
Topical Fluoride - UPDATED November 2013
Topical fluoride for caries prevention: Full report of the updated clinical recommendations and supporting systematic review
Executive Summary: Topical fluoride for caries prevention: Executive summary of the updated clinical recommendations and supporting systematic review
Chairside Guide: Topical Fluoride
American Dental Association and American Academy of Orthopaedic Surgeons (AAOS): Co-developed evidence-based guideline on the Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures:
Full Guidance: Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures
Executive Summary: Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures
Chairside Guide: Shared Decision-Making Tool: An aid to help balance clinical information and treatment options with patient preferences
Non-Fluoride Caries Preventive Agents
ADA Systematic Review and Clinical Recommendations for Non-Fluoride Caries Preventive Agents
Executive Summary: Nonfluoride caries preventive agents: Executive summary of evidence-based clinical recommendations
Chairside Guide: Chairside Guide
Fluoride Supplements
Evidence-Based Clinical Recommendations on the Prescription of Dietary Fluoride Supplements for Caries Prevention
Reconstituting Infant Formula
Evidence-Based Clinical Recommendations Regarding Fluoride Intake From Reconstituted Infant Formula and Enamel Fluorosis
EBD Daily Clinical Application
EBD Clinical Assessment

Integration of Evidence-Based Dentistry

- Asking Answerable Questions
- Searching for best evidence
- Critically appraising evidence
- Applying evidence/Making a decision
- Evaluating the outcome/your performance

Axilum Grading Forms

<table>
<thead>
<tr>
<th>Question</th>
<th>Scheme</th>
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<tbody>
<tr>
<td>OPER - Operative Learning Guide</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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<td>Learning Guide/Thought Process</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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<td>Isolation</td>
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<td>Caries Removal</td>
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<td>Internal Form</td>
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<td>Finish/retention bevel</td>
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<th>Tooth Restoration</th>
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<td>Margin and Surface Finish</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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<tr>
<td>Anatomy, contour and shade</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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<tr>
<td>Occlusion</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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<tr>
<td>Proximal Contacts and embrasures</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
</tr>
<tr>
<td>Adjacent teeth, tissue and restoration</td>
<td>SMN - Surpassed/Met/Needs Improvement</td>
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Clerkship Presentations

*Endodontic - Pediatric – Periodontic Rotations*

- EBD content is integrated systematically into ongoing case presentations

- Slide template provided to students to facilitate *individual* presentations
Case Presentation
Ask & Acquire

• PICO question
  – PICO components readily identifiable

• Source
  – Original manuscript
  – Critical summary or clinical recommendation
    • If available
Appraise

• Identify level/quality of evidence
• Relevant results
  – Summarize with significance
Apply

• Relevance to patient?
  – Generalizability of study population
  – Feasibility of treatment/protocol for student clinician
  – Relative potential benefit vs. harm
  – Impact on patient care
D3 EBD Exercise
- Submitted on ICON as part of EBD Curriculum -

• 5 Step EBD Exercise Format
  – **Assess** the patient: describe your clerkship patient, including patient goals.
  – **Ask** a question: Using the PICO format, construct a question.
  – **Acquire** the best available evidence: Identify 1 original research manuscript and 1 other source that address your PICO question. The second source could be a critical summary, a clinical recommendation, or another original research manuscript.
  – **Appraise** the evidence: Appraise each source using one the following formats:
    • Original research articles
      – A critical appraisal summary
      – Marshall’s D3 Research Manuscript Evaluation Criteria
    • Critical summaries (i.e., ADA, Evidence Based Dentistry, Journal of EBD)
      – Marshall’s D3 Critical Summary Evaluation Criteria
    • Clinical recommendation (i.e., ADA EBD site)
      – Richards & Clarkson Rapid Guideline Assessment
  – **Apply** the evidence (conceptually): How would you use this piece of evidence to address your ‘clinical’ situation given your experience and the patient’s goals?
  – **Reflect:**
D3 EBD Example

Introduction and History
- 73 year old Caucasian female
- Chief complaint: "My implants are broken."
- Medical history:
  - Penicillin allergy
  - Cricopharyngeal hypertrophy
  - Arthritis
  - Previous use of Fosamax (Oral bisphosphonate)
- Medications:
  - Ibuprofen, Lovastatin, Omeprazole
- This was the first time the patient was seen by the periodontist.

Clinical Assessment
- Minimal inflammation
- No known history of periodontal disease
- 4 existing implants – placed from 2006 to 2007
  - Bone level implants with screw-retained restorations
- Screws fractured in the implants replacing #4 & 5
- 9mm probing depth identified on #4 buccal

Justin Anderson 1/31/14
Treatment of Peri-Implant Dehiscence Defect

Probing defect

Original date of radiograph: 12/10/13

Flap for access
Etiologic and Risk Factors

- This did not appear to be a primary peri-implant infection.
- There is no sign of gross infection or mobility, and the implant appears to be osseointegrated
  - No obvious radiolucency
  - No mobility (mobile implants have a hopeless prognosis²)
  - Only mild gingival inflammation and overall good oral hygiene
- Primary etiology (possibilities):
  - Occlusal trauma¹
  - Inaccurate implant placement¹
- Secondary (local) factors:
  - 9mm probing depth allows bacterial introduction into the site
- Systemic factors:
  - Non-contributory

Diagnoses

- Periodontal diagnosis:
- Radiographic diagnosis:
  - Generalized slight horizontal bone loss (diagnosis made from CMS in 2006)
- Clinical diagnosis:
  - Could not make current clinical diagnosis due to lack of current probing depths and radiographs

Treatment Plan

- Systemic phase – N/A
- Acute/emergency phase – N/A
- Disease control phase/prevention – N/A
- Rehabilitation phase
  - Removal of fractured internal abutment screws
  - Bone grafting with guided tissue regeneration
- Maintenance/monitoring/prevention
  - Recall appointments to monitor success of bone graft

Collagen (resorbable) membrane in place

Completed graft

Primary closure achieved with 4-0 vicryl sutures

Courtesy of Mr. Justin Anderson (D3) and Dr. Gustavo Avila-Ortiz
D3 EBD Example

EBD: PICO Question

- For a patient with a peri-implant dehiscence defect, is guided tissue bone regeneration more effective at improving implant success than other grafting techniques?

EBD: Appraise

- Conclusions:
  - Without good RCT studies, the clinical necessity of GBR procedures cannot be demonstrated, although results appear to be favorable.
  - Non-resorbable membrane without bone graft appears as effective as resorbable membranes with graft material.
  - Not enough evidence exists to support covering dehiscences – may not be necessary because it may not improve implant prognosis.
  - GBR results in more bone regeneration than traditional graft, but long-term improvement in implant survival has not been demonstrated.
  - Not enough evidence exists to support a particular type of membrane material or graft material.

EBD: Apply

- No change would be necessary to the treatment.
  - GBR is more successful at regenerating bone than other techniques (such as grafting alone).

- Future treatment:
  - Frequent recalls to assess healing and bone regeneration as well as peri-implant health.
  - Prosthodontic restoration of #4 and 5

Courtesy of Mr. Justin Anderson (D3) and Dr. Gustavo Avila-Ortiz
### Periodontics Case Presentation Evaluation

<table>
<thead>
<tr>
<th>Student</th>
<th>Date</th>
<th>Patient [0-10]</th>
<th>Patient History</th>
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<tr>
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<td>Medical, dental, and social history: Were the medical and dental histories accurately addressed? Did the student understand the dental implications of the medical history and medications?</td>
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<td>Global and radiographic findings: Were preoperative documentation and relevant radiographs presented? Were relevant radiographs outlined and integrated?</td>
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<td>Diagnostics: Were the diagnoses accurate and complete? Were the diagnoses correctly categorized?</td>
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<td>Risk Assessment &amp; Prognosis: Were risk factors and modifiers appropriately identified and discussed? Were the problems prioritized based on severity?</td>
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<td>Treatment Plan: Were appropriate medical and interdisciplinary consultations obtained? Was the treatment plan developed that addressed the diagnosis, etiologies, and risk factors?</td>
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<td>Therapy: Did the student understand the goals and rationale for the selected therapy? Did the student understand the basic technique(s) of the procedure performed?</td>
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<td>Evaluation of Outcomes: Did the student understand the potential complications and limitations of the procedure performed? If surgery was performed, did the student understand postoperative management required?</td>
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<td>Incorporation of Evidence Based Dentistry: Did the student formulate a well-reasoned, evidence-based treatment and/or management plan?</td>
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<td>Presentation Factors: Was the presentation well organized? Was the use of didactic materials effective? Did the student respond accurately to questions in a professional manner?</td>
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<tr>
<td><strong>Comments Points</strong></td>
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<td>(maximum 100)</td>
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### Patient Care Presentation Evaluation

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<th>Student Presenter</th>
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#### Topic

<table>
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<tr>
<th>Category</th>
<th>Grade 1 to 5</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Basics and Delivery</td>
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<td>above and beyond expected level</td>
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<tr>
<td>Quality of Powerpoint and Media</td>
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<td>basics met and presentation acceptable</td>
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<tr>
<td>Evidence Based Dentistry Support</td>
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<td>3 – average</td>
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<tr>
<td>Depth of Knowledge</td>
<td>5 – excellent</td>
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<table>
<thead>
<tr>
<th>Length of Presentation</th>
<th>Final Point Total</th>
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<tr>
<td>Below 30 minutes is a 2 point grade deduction. If time exceeds 15 minutes, it is a 1 point deduction. No deduction if time is 10-15 minutes.</td>
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CLINICAL PHASE
COMPREHENSIVE CARE SETTING
D 4 EBD Objectives

• To reinforce and refine *application* of skills acquired in the D1-D3 years to accomplish an evidence-based practice

• Reinforce EBDM and the use of scientific evidence to support rationale for recommended treatment

• To reinforce critical thinking and independent learning skills
Family Dentistry Students
(N= 76-80)

- The Family Dentistry students have a full-time faculty member who serves as Group Leader for the group.
- The Group Leader is charged with individually mentoring and counseling the dental students.
Department of Family Dentistry

• Clinical supervision: 60% is provided by one-day-per-week adjunct faculty who maintain active general practice in the private sector.

• Faculty are assigned one consistent full day per week to the same core group of students.
Department of Family Dentistry

The Department of Family Dentistry Faculty convene five times throughout the academic year for professional development and calibration activities.
Faculty Development

• Fundamental Knowledge
  – 5 Step EBD process
  – PICO format
  – Advanced search strategies
  – Study design
  – Research manuscripts
    • Manuscript critique
    • Critical appraisal tools
  – Critical summaries
  – Clinical recommendations

• Involvement of Adjunct Faculty in EBD Curricular Instruction
D 4 EBD Curricular Integration
Problem-Based Learning Seminars

Objective
• Assist students in refining critical thinking and independent learning skills while addressing complex treatment planning cases

Mechanism
• Session 1: Informal student presentations with Socratic guidance
• Session 2: Student reports
D 4 EBD Curricular Integration
Decision-Making in Technology Incorporation

Objective

• Reinforce critical thinking through a decision-making process regarding technology incorporation into practice

Mechanism

• Session 1: Team brainstorming/research

• Session 2: Team presentations

Decision-making in technology: Institutional process and student critical thinking exercise. J Holloway, M Spector, D Gratton, D Johnsen
**D 4 EBD Curricular Integration**

**Decision-Making in Technology Incorporation**

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### Evaluating Pulp Vitality

#### EPT-Electric Pulp Testing

- Sensitivity test - approximates pulpal health from sensory
- Electric pulp testing is based on stimuli assessments and comments from the Technology-Oriented
- Health benefit and population? Low
- Tests pulp vitality
- Inexpensive with immediate results
- Adverse reactions are rare
- Cost?
  - $24.99 Dental Pulp Tester Taiwan
  - $18.99 Dental Apex Locator China
  - $99.99 Digital X Pulp Vitality
- Longevity?
  - 3-5 years
- Risk/Complications?
  - Patient discomfort
  - Cost?
  - Cost of endo ice or CO2
- Longevity?
  - 3-5 years
- EPT = cost yields more accurate results
- Access to care impact?
- Cold test can be part: post, tooth, returning to affect
- Implementation: minimal learning curve

#### Cold Test (Endo Ice, CO2)

- Pulp vitality technique
- Cutting into dentine using a high or low speed bur without local anesthetic may give some indication of whether the sensory element of the pulp is still functioning

#### Test Cavity

- Pulp vitality device
- Purpose is to measure pulpal blood flow and provide an accurate diagnosis for endodontically involved teeth
- Technology-oriented device
- Health benefit and population?
  - Used with primary teeth or immature permanent teeth
  - Used with associated patients – operating room
  - Dual application used to measure tooth vitality and eruption
- Risk/Complications?
  - Non-invasive and noxious stimuli
- Cost?
  - $200-1000 (Elay & Henry Schein Dental)
- Longevity?
  - Majority of producers offer 3 year warranty
- Efficacy?
  - Sensitivity: 1.00 (EPT 0.71 & Cold 0.81) Specificity (Gopalan et al. 2007)
  - Access to care impact?
  - More expensive vs. EPT and cold tests
    - Need electricity in form of battery power
    - Implementation
      - Multiple readings needed in order to average results
      - Unique considerations
      - Patient doesn’t need to be conscious
      - Accurate in children with EPT and cold

### Pulse Oximetry

- Pulp vitality device
- Purpose is to measure pulpal blood flow and provide an accurate diagnosis for endodontically involved teeth
- Technology-oriented device
- Health benefit and population?
  - Used with primary teeth or immature permanent teeth
  - Used with associated patients – operating room
  - Dual application used to measure tooth vitality and eruption
- Risk/Complications?
  - Non-invasive and noxious stimuli
- Cost?
  - $200-1000 (Elay & Henry Schein Dental)
  - Dentist must fabricate custom tooth

#### Table

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<thead>
<tr>
<th>Identified Technology</th>
<th>EPT</th>
<th>Cold</th>
<th>Test Cavity</th>
<th>Pulse Oximetry</th>
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**Notes**

91.9 91.6 72.4 82.6
D 4 EBD Curricular Integration
Formal Case Presentation

Objective
• Reinforce critical thinking, independent learning, and the use of scientific evidence to support decision-making in the treatment planning process

Mechanism
• Integrates 5 Step EBD process into a comprehensive case presentation
• Slide template as well as student examples provided to students to guide development of their presentation
• Advanced submission required affording faculty review and assessment of EBD process
D 4 EBD Curricular Integration
Formal Case Presentation

Family Dentistry Case Presentation

Clinical Exam/ Findings

EBD: Ask

- In patients with deep caries, is partial caries excavation as successful as complete caries removal?
D 4 EBD Curricular Integration

Formal Case Presentation

**EBD: Acquire**

- **2-3 Sources**

**EBD: Appraise**

- **Maltz et al. 2013: RCT**
  - Level of evidence: high, behind systematic reviews
  - Critique using the critical appraisal for therapy worksheet made available by the Center for Evidence Based Medicine at Oxford:

**EBD: Apply**

- **Relevance to patient**
  - Generalizability of study population
  - Feasibility of treatment/protocol for clinician
  - Relative potential benefit vs. harm
  - Impact on patient care
D 4 EBD Curricular Integration
Formal Case Presentation

Treatment Accomplished

- Stepwise Therapy # 2 DB
- Composite Restorations: # 5B, # 7ML, # 8 DLF, #9 DIFL, # 10 MLF
- Amalgam Restorations: # 18 O, # 20 MOD
- Glass Ionomer Restorations: # 19 DBL

Case Prognosis

- Questionable prognosis of #2 due to caries proximity to the pulp and deep subgingival distal margin making stepwise restoration placement less than optimal.
Objective

• Challenge students to reflect on the value of their educational experiences in the comprehensive management of patients and how these experiences contribute to their continued professional growth

Mechanism

• Online submission with supporting documents
D 4 EBD Clinical Integration

• Objective
  – Integrate EBDM in an authentic environment
  – Practice the 5 step EBD process with real-world experiences

Clinic faculty guide the integration of:
  • Scientific evidence
  • Clinician experience
  • Patient preferences
Evolving Role of Faculty

Read and memorize the textbook.

I will tell you what procedure to do, and how to do it, according to what works best in my hands.

Know how to access the latest information.

I will help you discover the answer to your question.

I will collaborate with you to formulate an individual strategy for treating your patient, according to the best available evidence.
D 4 EBD Clinical Integration

- Chairside Access to EB Resources
- Self-Assessment
- Formative & Summative Feedback for Professional Growth
- Patient Education
Sandra Guzman-Armstrong

STUDENT COMMENTS

“Reading an article such as this makes me thankful that our school teaches evidence based dentistry so well”

-UICD Dental student -

“This course is definitely expanding my knowledge of research manuscripts and how to better read and then understand them. I may not always enjoy learning how to more effectively interpret research, but it is also making me a more discerning, educated, and effective professional”

-UICD Dental student -

“I thought this assignment was really useful. I feel like when we do procedures in the Simulation Clinic, we cannot possibly picture ourselves actually doing treatment on a real person. Once we move to the clinic, it is truly amazing how inquisitive people are pertaining to their treatment. I remember looking at this assignment at the beginning of the year and thinking “How am I going to find a clinical question that I can actually apply EBD?” To my surprise, I have actually used EBD several times in the clinic. Once patients hear that you have been doing your research, they know you care, and usually become a little more receptive of treatment. If I had to do this assignment over again, I do not think I would do much different. This is a question that I get all of the time in Endo, it is feels good to finally get some evidence to answer people’s questions.”

-UICD Dental student-
“Before entering dental school, I thought it was routine to always apply a topical fluoride product because it was always needed...but, as we have learned, that is not the case at all. In addition, sometimes patients do need a push in the right direction to better be able to make a beneficial decision for themselves. Therefore, being able to read simple articles such as my original article here will give me the confidence to better present to them the pros and cons of their decision-making, and therefore be better equipped to provide them with the best healthcare I can (which is exactly what we are all here to learn and do in the big picture)”

-UICD Dental student-
## University of Iowa
### EBD & Critical Thinking Curriculum

<table>
<thead>
<tr>
<th>Pre-doctoral Year</th>
<th>Curricular Integration</th>
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<tbody>
<tr>
<td><strong>D 1 Year</strong></td>
<td>Problem Based Learning</td>
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</table>
| **D 2 Year**      | Elements
                  Readings
                  Critical Thinking Reflections
                  EBD Exercises |
| **D 3 Year**      | Readings
                  Critical Thinking Reflections
                  EBD Exercises
                  TBL & Case Presentations |
| **D 4 Year**      | Problem Based Learning
                  Decision-Making in Technology Incorporation
                  Case Presentations
                  Reflective Summaries of Major Care Patients |
AUDIENCE BRAINSTORM
QUESTIONS????
Brainstorm Questions

- What strategies for implementation of EBD are being considered at your institution?
  - Pros
  - Cons
- What alternative strategies might achieve the same outcome?
teresa-marshall@uiowa.edu