Moving beyond the Correct Answer: Exploring Innovative Uses and Types of Competency Assessments in Contrasting Educational Programs

2/27/2010
1:30- 3:30 PM
Gaylord National, Washington, DC
National Harbor 10
Participants

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New York University College of Dentistry

Discussant: Hillary L Broder PhD, MEd
Professor Cariology and Comprehensive Care
New York University College of Dentistry
Objectives

• Describe methods and uses of assessments
• Explain how assessments direct instructional targets
• Describe challenges
• Describe other uses of assessments and how they can be used in research
Symposium Structure

1. Individual Programs: Competency Assessments
2. Other Uses of Assessments
3. A Psychologist’s Perspective
4. Discussion
Hello From Your Friends in Texas!

Clarence Bryk DDS, MS
Director of Predoctoral Orthodontic Education
University of Texas Health Science Center at San Antonio

The University of Texas Health Science Center at San Antonio
The Heart of San Antonio
The Mission Trail
Winter in San Antonio
Required Orthodontic Courses

- ORTH 6077: Growth and Development,
  22 hours, 100 students
- ORTH 6075 Sophomore Orthodontic Lectures,
  24 hours, 100 students
- ORTH 7073: Junior Orthodontic Lectures and Case Analysis
  19 hours, 110 students
Electives

- SELC 7097: Pre-clinical Orthodontic Techniques
  20 hours, 60 students
- SELC 7109: Graduate Clinic Rotation
  16 hours, 6 - 8 students
- SELC 8060: Graduate Clinic Rotation
  40 hours, 4 - 8 students
- SELC 8099: Orthodontic Literature Review
  10 hours, 10 students
- National and local 1 or 2 week externship
  6 - 8 per year
Clinic Experience

• Anterior Clear Aligner Treatment, 10-15 cases per year
• Minor Fixed Appliance Cases, 5-10 cases per year
Education Objectives ( Present )

• Recognize and manage malocclusion in the adult and child.
• Develop critical reading skills in the pursuit of the best evidence available now and in the future.
• Provide a sound information base while avoiding “information overload.”
Outcome Assessment

• Information Acquisition: Conventional testing.

• Recognition and Management: Case based analysis.

• Critical Reading Skills: Critically appraised topics (CATS).
Case Based Outcome Assessment

- Six new cases each year.
- 110 students, 9 evaluators, 9 seminar rooms all discussing the same case.
- All students, in pairs, get to present a case; the rest of the class must be prepared to answer questions concerning the patient.
- The faculty and students receive the case electronically one week in advance.
Assessment Continued

• Faculty calibration is held one hour prior to the start of the student led seminars.

• Faculty evaluation of the presenters is both objective (60%) and subjective (40%); other students in the seminar are graded on their ability to answer questions prepared by the faculty, asked by the presenters.

• Active learning is the key
Faculty Calibration
Getting It Right
The Presenters
Following the Case
Future Objective

• Integrate orthodontic treatment into the daily practice of general dentistry, or how can orthodontics help solve restorative and periodontal problems?

• Transition phase is now being implemented by educating faculty and local practitioners on what can be accomplished working together.
Innovations at UTHSCSA

• All text books, course manuals and most power point lectures are available electronically 24/7.

• All case based materials are digitized including study models.

• Interactive computer educational programs developed by Proffit and Britton are used extensively in our basic information acquisition courses.
Innovations continued

• Graduate program residents attend case based analysis seminars for two years before they become faculty evaluators in their third year of training
Challenges

• Meeting the expectations of the students.
• Providing more clinical experiences for our undergraduates.
• “The students are ready to learn, but not willing to be taught.”----WSC
• Budget cuts.
Opportunities

• The time is right.
• The esthetic demands of patients require us to shift emphasis from some traditional dental school training to emphasize interdisciplinary treatment of patients with orthodontics as an equal partner.
• “Success is the ability to go from one failure to another with no loss of enthusiasm.”---- WSC
Moving Beyond the Correct Answer:
Exploring Innovative Uses and Types of Competency Assessments in Contrasting Educational Programs

2010 ADEA SYMPOSIUM

Sandra Fastlicht DDS, MSc
Clinical Associate Professor
Division of Orthodontics
Department of Oral Health Sciences
ORTHODONTICS
DMD Program
Years 3 & 4

- Public institution
- Patients 7-11 y.o.
- Single arch treatment
- Active Tx phase: 9 months
- 55 students per class
- 3 full-time faculty
- 16 part-time faculty
Purpose

“ASSESSMENT DRIVES LEARNING”

• Communicates to students what is important
• Motivates students to study
• Identifies deficiencies
• Confirms competency
• Contributes to promotions decisions
• Identifies needed course/curriculum improvement
Case-Based Assessment using:

WebCT/Vista: Web server designed to support online assessment
Dolphin: Analysis of diagnostic records/cephalometric tracing & analysis
OrthoCAD: Analysis of diagnostic casts/arch length and Bolton analyses
WebCT/Vista
Case-based online assessment

• Multiple choice, short & long answer questions
• Scheduled to open/close automatically
• View high-quality images & radiographs
• Medical & dental history provided
• Clinical examination findings added
• Sequence: findings → diagnosis → treatment plan
### Measurements

**Davina Milton, ID: 71498**

Female Other, b. 5/23/1999 (age 10)

**Timepoint:** Initial

**Analysis:** New UEC

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*Digitized Lateral Cephalometric Analysis*
WebCT/Vista

Diagnosis

Questionnaire
Medical & Dental History
(provided)

Clinical Examination
(important findings not in
records are provided)

Analysis of
Diagnostic Records

Data Base

Problem List =
Diagnosis
Treatment Planning

1. Diagnosis
2. Prioritized Problem List
3. Treatment Options
4. Treatment Plan
5. Justify Treatment Plan
Patient is 10 yrs 8 months old, female, in the mixed dentition. Medical History: Patient is healthy with no contraindications to treatment. Dental history: Upper dental midline is coincident to the facial midline. Patient school. Chief Complaint: Her parents are concerned about her "under-bite".

1. (Points: 1.0)
   Classification of malocclusion (use models)
   Molar relationship right side:
   - a. Class I
   - b. Class II
   - c. Class III
   - d. Can not be determined

Question Status:
- Unanswered
- Answer not saved
- Answered
Patient is 10 yrs 8 months old, female, in the mixed dentition.
Medical History: Patient is healthy with no contraindications to treatment.
Dental History: Upper dental midline is coincident to the facial midline. Patient has good oral hygiene and is eager to get braces just like her friends at school.
Chief Complaint: Her parents are concerned about her "under-bite".

5. (Points: 1.0)
   Overall Angle classification of malocclusion (use models)

   a. Class I
   b. Class II Div 1
   c. Class II Div 1 subdivision right
   d. Class II Div 1 subdivision left
   e. Class II Div 2
   f. Class II Div 2 subdivision right
   g. Class II Div 2 subdivision left
   h. Class III
   i. Class III subdivision right
   j. Class III subdivision left
   k. Pseudo Class III

Save and View Next  Next Question
ZOOM IN radiographs
ZOOM IN on casts
Classification of malocclusion (use models)
Canine relationship right side

- a. Class I
- b. Class II
- c. Class III
- d. Can not be determined

Save and View Next  Next Question
Regardless of whether you feel this case should be treated by a general practitioner or a specialist, what appliances would you use to correct the malocclusion? (Phase 1 only)
(1 or more answers)

- a. Functional Appliance
- b. Rapid Maxillary Expander (RME)
- c. Removable Maxillary Expander
- d. Cervical Headgear
- e. High-Pull Headgear
- f. Combi Headgear
- g. Asymmetric headgear
- h. Reverse headgear/protraction face mask
- i. Lingual Holding Arch
- j. Maxillary 2 X 4 FEA
- k. Mandibular 2 X 4 FEA
- l. Maxillary 2 X 6 FEA
- m. Mandibular 2 X 6 FEA
- n. Full Maxillary FEA
- o. Full Mandibular FEA
- p. Trans Palatal Arch (TPA)
- q. Maxillary Removable Appliance with "z" springs
- r. Mandibular Removable Appliance with "z" springs
- s. Lip Bumper
- t. Maxillary Fixed or Removable Tongue Crib
- u. Mandibular Removable Appliance with distalizing screws
- v. Anterior Maxillary Bite-Plane
- w. Posterior Mandibular Bite-Plane
Patient is 10 yrs 8 months old, female. Medical History: Patient is healthy with no medical concerns. Dental History: Upper dental midline is straight. Chief Complaint: Her parents are concerned about her oral hygiene and wants to improve it. Patient has good oral hygiene and is eager to get braces just like her friends at school.

46. (Points: 10.0)
Based on your selection in the preceding question, justify your answer:

Text Box Long Answer
Advantages

• Build a database of cases and questions
• Assessment can be re-used by changing the case
• Scheduled to open/close automatically
• For long responses, typing easier than writing
• No messy student handwriting to decipher
• Graded automatically

continued…
Advantages

• View high-quality exam images/radiographs
• Exam questions can contain video clips
• Vista automatically generates reports & statistics
• Computer + internet = exam access + grading
• Overall cost reduction
• Improved logistics
Challenges

- Need computer + internet access for each student
- Technological support is critical
- IT problems: from disruption to rescheduling
- Automatic grading is not foolproof
- Potential for “online cheating”
Research Potential

- Statistical and graphical summaries of results
- Complete item analysis
- Overall performance
- Time spent per question
- Overall time spent on the exam
- Class average
Classification of malocclusion (use models)

Molar relationship right side:

- a. Class I
- b. Class II
- c. Class III
- d. Can not be determined

### Response Summary

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Innovations

- Online case-based assessment
- Use of digital diagnostic records
- Simulates diagnosis and treatment planning
Vision

WebCT/Vista OSCE online assessment

- Integrated with other disciplines/basic sciences
- High quality images, including 3D cone beam
- Video clips added to independent questions
- Questions randomized for each student
- Each question timed differently
- Questions can be re-used by changing the case
Thank You
Predoctoral Orthodontics
At NYU College of Dentistry

Mitchell Lipp, DDS
Clinical Assistant Professor
Director of Predoctoral Courses in Clinical Orthodontics
Coordinator of Curriculum for Undergraduate Orthodontics
New York University College of Dentistry
• Goals/Vision
• Overview of Curriculum
• Competency Assessments
• Challenges
• Other Uses of Assessments
Goal (2000):

- To develop an orthodontic curriculum and educational program that would meet the needs of a general dentist and be perceived as useful and relevant by students (and the College)
Features of the NYUCD Predoc Ortho Program

- Competency-based
- Accountable
  - Competency Assessments
  - Evaluator reliability
  - Affective Assessments (Student Course Evaluations)
- Opportunities for interested students
  - Elective
    - Clinical: Limited Orthodontics (Invisalign)
    - Service/Research: Predoctoral Orthodontic Taskforce
  - Selective
    - D4 Honors Program
- Collaborations
  - Esthetics and Orthodontics
  - GP and Orthodontic faculty
  - Predoctoral students and Orthodontic residents
Predoctoral Orthodontics: Curriculum

D1 Growth and Development Lectures (7)

D2 Diagnosis Lectures (20)
D2 Invisalign Simulation Lab (15)

D3 Treatment Lectures (20)
D3 Orthodontic Seminars (12)

D4 EBD Applications (9)

D3-D4 Invisalign Clinics
Our Core Competency

• The student will be able to manage patients with malocclusion and/or skeletal problems (MMSP)
Circa 1998 working on the first competency-based course at NYUCD
Assessments: The key to competency-based education

Create a companion piece that is content specific and directs teachers and students to reaching instructional targets.

Identify key enabling knowledge, subskills, and develop evaluative criteria essential for mastering the assessment.

Design an instructional module that facilitates attainment and demonstration of competence.

Construct an assessment that represents a relevant clinical situation and requires the student to employ (1) key enabling knowledge, (2) subskills, and (3) evaluative criteria.

Identify the ultimate outcome(s) being assessed.
Ultimate Outcomes

• Counsel patients concerning malocclusion and/or skeletal problems
• Consult with specialists

  – Elicit orthodontic/esthetic concerns of the patient
  – Recognize malocclusions and skeletal problems
    • Assess the severity of the condition
  – Integrate Orthodontics in treatment planning
Assessments: Inferences

- Purpose? Aptitude, Achievement, Attitude, Competence
- Type: Selected or constructed response, technical skills/procedures/products
- Grading: Measurement, Rubric, Reliability, Accuracy
- Stakes: Consequences
Age – 11yrs 6 mos
Chief Concern - “I need braces because my teeth stick out”
Past Medical History - Sickle Cell Anemia. No History of Any Crises.
Past Dental History - Routine Dental Visits at NYU Pediatric Clinic
Other Findings - Lip Biting, Nocturnal Thumb Sucking, Bruxing
ORTHODONTICS: Competency Evaluation Form

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<th>Faculty Name</th>
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Orthodontics (25E, 27A, 21C.vi)

The evaluation criteria itemized below generally describe what is acceptable. For each instance where a listed criterion is not met satisfactorily (i.e., where a critical error occurs), please darken the square preceding the corresponding heading. Then darken one or more circles below the square (where present) to indicate which point(s) in the procedure (a,b,c,...) the critical error has occurred.

☐ 1. Accurately Elicit and Record Orthodontic Concerns

☐ 2. Accurately Recognize and Record Dental/Occlusal Problems

O a. Tooth malposition associated with dental or periodontal pathology or dysfunction
O b. Tooth malposition adjacent to an extraction site that would affect optimal prosthesodontic treatment
O c. Tooth malposition related to supra eruption [hyperocclusion]
O d. Tooth malposition related to trauma
O e. Impacted teeth
O f. Developing teeth that are in poor positions and are likely to be impacted
O g. Missing teeth
O h. Supernumerary teeth
O i. Disturbances of dental development and eruption
O j. Disturbances of tooth eruption: Over retention of primary teeth, premature loss of primary teeth
O k. Ankylosed teeth
O l. Tooth malposition related to function [#5]

☐ 3. Accurately Recognize and Record Occlusal Conditions that are Risk Factors for Oral Diseases/Dysfunction

O a. Overbite [100%]
O b. Overjet [Severe]
O c. Open bite
O d. Dental Crowding [Severe]
O e. Dental Spacing [Severe]
O f. Occlusal Interferences resulting in Mandibular functional shifts

☐ 4. Accurately Recognize and Record Skeletal Conditions that are Risk Factors for Oral Diseases/Dysfunction

O a. Sagittal Plane [Class II, Class III]
O b. Transverse Plane [Asymmetry]
O c. Vertical Plane [Lower Facial height]
O d. Skeletal Open Bite [Hyperdivergent]
O e. Skeletal Deep Bite [Hypodivergent]

☐ 5. Accurately Recognize and Record Functional Conditions that are Risk Factors for Oral Diseases/Dysfunction

O a. Labial incompetence
O b. Oral Habits
O c. Abnormal swallow
O d. Abnormal breathing
O e. Bruxism
O f. Clenching

☐ 6. Accurately Record an Appropriate Problem List and Treatment Objectives

☐ 7. Accurately Record an Appropriate Sequential Treatment Plan

FACULTY EVALUATION: Count total number of shaded boxes (not circles) and write number in box below:

☐ Total No. Critical Errors

Faculty Signature

_________________________________
ASSESSMENT:
Management of Malocclusion and Skeletal Problems

• The student will construct (1) a problem list, (2) a matching list of treatment objectives, and (3) a treatment plan

• Assessments are graded based on the evaluative criteria

• The student must demonstrate NO critical errors to demonstrate competence

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<th>Treatment Objectives</th>
<th>Treatment Plan</th>
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Clinical Simulation Assessment

- Constructed response
- Objective grading criteria
- “Anonymous”
- Controlled conditions
- Fewer confounding variables
Assessments have helped...

- Direct instructional targets
- Monitor student achievement
- Monitor instructional effectiveness
- Recognize deficiencies
- Credential competence
Setting and Reaching Targets

ORTHODONTICS: Competency Evaluation Form

Student Name (Print)  
Patient Name/Care #  
Faculty Name  

<table>
<thead>
<tr>
<th>Student #</th>
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<th>Faculty #</th>
<th>Date (MM/DD/YY)</th>
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</thead>
<tbody>
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</table>

Orthodontics (25E, 27A, 21C,ii)  

The evaluation criteria listed below generally describe what is acceptable. For each instance where a listed criterion is not met satisfactorily (i.e., where a critical error occurs), please darken the square preceding the corresponding heading. Then darken one or more circles below the square (where present) to indicate at which point(s) in the procedure (a,b,c,...) the critical error has occurred.

☐ 1. Accurately Elicit and Record Orthodontic Concerns

☐ 2. Accurately Recognize and Record Dental/Occclusal Problems
   - a. Tooth malposition associated with dental or periodontal pathology or dysfunction
   - b. Tooth malposition adjacent to an extraction site that would affect optimal prosthodontic treatment
   - c. Tooth malposition related to supra eruption [hyperocclusion]
   - d. Tooth malposition related to trauma
   - e. Impacted teeth
   - f. Developing teeth that are in poor positions and are likely to be impacted
   - g. Missing teeth
   - h. Supernumerary teeth
   - i. Disturbances of dental development and eruption
   - j. Disturbances of tooth eruption: Over retention of primary teeth, premature loss of primary teeth
   - k. Akylosed teeth
   - l. Tooth malposition related to function [#5]

☐ 3. Accurately Recognize and Record Occlusal Conditions that are Risk Factors for Oral Diseases/Dysfunction
   - a. Overbite [100%]
   - b. Overjet [Severe]
   - c. Open bite
   - d. Dental Crowding [Severe]
   - e. Dental Spacing [Severe]
   - f. Occlusal interferences resulting in mandibular functional shifts

☐ 4. Accurately Recognize and Record Skeletal Conditions that are Risk Factors for Oral Diseases/Dysfunction
   - a. Sagittal Plane [Class II, Class III]
   - b. Transverse Plane [Asymmetry]
   - c. Vertical Plane [Lower Facial height]
   - d. Skeletal Open Bite [Hyperdivergent]
   - e. Skeletal Deep Bite [Hyypodivergent]

☐ 5. Accurately Recognize and Record Functional Conditions that are Risk Factors for Oral Diseases/Dysfunction
   - a. Labial incompetence
   - b. Oral Habits
   - c. Abnormal swallow
   - d. Abnormal breathing
   - e. Bruxism
   - f. Clenching

☐ 6. Accurately Record an Appropriate Problem List and Treatment Objectives

☐ 7. Accurately Record an Appropriate Sequential Treatment Plan

FACULTY EVALUATION: Count total number of shaded boxes (not circles) and write number in box below:

☐ Total No. Critical Errors

Faculty Signature
Challenges

- Minimal Competence and credentialing
- Teaching to the test
- Patients
- Instructional Effectiveness
- Generational Factors
- Student perceptions
Other Uses of Assessments

• Instructor/Grader Training
• Affective Assessments (Course Evaluations)
• Research
Course Competencies

• Diagnosis:
  – Recognize conditions that would benefit from Invisalign treatment (NYUCD Predoc Criteria)

• Treatment Planning
  (If case selection criteria met)
  – Complete a prescription and diagnosis form
  – Review ClinCheck and construct at least one modification request
D2 Invisalign Course Assessments

- Based on clinical simulation records
  - Prescription and Diagnostic Form Assessment (PDFA)

- Based on ClinCheck
  - ClinCheck Modification Form Assessment (CMFA)

- Assessments are graded based on the evaluative criteria

- NO critical errors to pass
Instructor Training

• Approximately 60 instructor/graders for 360 students

• Instructor/grader types
  – 1\textsuperscript{st} and 2\textsuperscript{nd} year orthodontic residents (PG1 & PG2)
  – International orthodontic residents (Int)
  – Orthodontic faculty (Ortho)
  – General dentistry faculty (GP)

• Instructor training
  – Standardization
  – Calibration : Grader accuracy and reliability
Traditional Pretest/Post-test Design

Pretest (A)

Post-test (B)
Instructor/Grader Training 2007-2008

Grader training assessments (Pretests and Post-tests) are graded relative to a GOLD STANDARD (answer key)

Introduction
• Presentation of clinical simulation case
• Review of the evaluative/grading criteria

Pretest
• Grade 15 PDFA's and CMFA's
• The first 10 cases constitute the pre-test grade

Training Session
• Remaining 5 cases from pre-test are discussed to reinforce grading criteria
• Grading criteria is reviewed and grading questions are answered

Post-test
• Grade 10 new PDFA's and CMFA's
Instructor/Grader Training 2007-2008

Grader training assessments (Pretests and Post-tests) are graded relative to a GOLD STANDARD (answer key)

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- Grade 10 new PDFA's and CMFA's
2007-2008 Results

PDFA

CMFA
Questions

• Was the post-test easier than the pre-test?

• Could the increase in grader performance be due to the reactive effect of testing?

• Does the training session have any value?
Was the post-test easier than the pre-test?

Development of Equivalent Tests

X,Y: 10 PDFAs followed by CMFAs with identical mistakes (or no mistakes) in the same order with different handwriting and names

A,B: Coin toss, changed composition of PDFAs/CMFAs

- Test B was shuffled
- 2 different exams, constructed without bias, with identical mistakes or no mistakes in random order
- An answer key was made for both versions
Comparison during the study

Were tests of equivalent difficulty?

½ of each type (Int, PG1, PG2, etc)

Split design
Was the post-test easier than the pre-test?

**Equivalence of Test Version A vs Version B**

- Two sample t-test with equal variances
- No statistically significant difference between test versions for the PDFA ($p=0.123$) or the CMFA ($p=0.926$).

<table>
<thead>
<tr>
<th>Test Version</th>
<th>Sample size</th>
<th>Mean</th>
<th>Std. error</th>
<th>Std. dev.</th>
<th>95% C.I. (lower bound)</th>
<th>95% C.I. (upper bound)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version A – PDFA</td>
<td>27</td>
<td>74.815</td>
<td>2.942</td>
<td>15.285</td>
<td>68.768</td>
<td>80.861</td>
<td>$p = 0.123$</td>
</tr>
<tr>
<td>Version B – PDFA</td>
<td>26</td>
<td>81.538</td>
<td>3.123</td>
<td>15.923</td>
<td>75.107</td>
<td>87.97</td>
<td>$p = 0.926$</td>
</tr>
<tr>
<td>Version A – CMFA</td>
<td>27</td>
<td>70.741</td>
<td>3.695</td>
<td>19.201</td>
<td>63.145</td>
<td>78.336</td>
<td></td>
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<tr>
<td>Version B - CMFA</td>
<td>26</td>
<td>71.154</td>
<td>3.523</td>
<td>17.962</td>
<td>63.899</td>
<td>78.409</td>
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</tbody>
</table>
Both instructor groups attended:

<table>
<thead>
<tr>
<th>Training session (Intervention)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibrate for accurate and reliable grading</td>
<td></td>
</tr>
</tbody>
</table>
Does the training session have any value?

Study Design

Instructors/Graders (ALL)

Intervention (Training Session)

Control (Information Session)

Pretest / Post-test

Pretest / Post-test
Does the training session have any value?

Training Session

Introduction
• Presentation of clinical simulation case
• Review of evaluative/grading criteria

Pretest
• Grade 15 PDFAs and CMFAs
  • First 10 constitute the pre-test

Training Session
• Last 5 assessments are discussed to direct application of the grading criteria

Post-test
• Grade 10 new PDFAs and CMFAs
Does the training session have any value?

**Information (Control) Session**

- **Introduction**
  - Presentation of clinical simulation case
  - Review of evaluative/grading criteria

- **Pretest**
  - Grade 10 PDFAs and CMFAs

- **Information Session**
  - Course goals and objectives, procedures
  - Instructor responsibilities

- **Post-test**
  - Grade 10 new PDFAs and CMFAs
Expectations

Intervention: Training

Pretest

Post-test

Control: Information

Pretest

Post-test
Training group increased, pre to post-test, 78.2% to 89.6% in grading the PDFA and increased 73.2% to 84.6% in grading the CMFA.

Control increased 78.0% to 85.2% in grading the PDFA and increased 68.4% to 69.2% in grading the CMFA.
Does the training session have any value?

**Effectiveness of Training Session**

<table>
<thead>
<tr>
<th>Training vs Control</th>
<th>Sample size</th>
<th>Mean score increase</th>
<th>Std. error</th>
<th>Std. dev.</th>
<th>95% C.I. (lower bound)</th>
<th>95% C.I. (upper bound)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training - PDFA</td>
<td>28</td>
<td>11.429</td>
<td>2.851</td>
<td>15.084</td>
<td>5.580</td>
<td>17.277</td>
<td>0.306</td>
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<tr>
<td>Training - CMFA</td>
<td>28</td>
<td>11.429</td>
<td>3.699</td>
<td>19.572</td>
<td>3.839</td>
<td>19.018</td>
<td>0.035</td>
</tr>
<tr>
<td>Control - CMFA</td>
<td>25</td>
<td>0.800</td>
<td>3.105</td>
<td>15.524</td>
<td>-5.608</td>
<td>7.208</td>
<td></td>
</tr>
</tbody>
</table>

- No significant difference between the groups regarding the increase in performance when grading the PDFAs (p=0.306)
- Significant difference between the groups regarding the increase in performance when grading the CMFAs (p=0.035)
Both Groups after Training

- Two sample t-test to determine if there were any differences in post-test scores between the groups after training.

<table>
<thead>
<tr>
<th>Group A Training vs Group B Control (post-test)</th>
<th>Sample size</th>
<th>Mean score</th>
<th>Std. error</th>
<th>Std. dev.</th>
<th>95% C.I. (lower bound)</th>
<th>95% C.I. (upper bound)</th>
<th>p Value</th>
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</thead>
<tbody>
<tr>
<td>Training - PDFA</td>
<td>28</td>
<td>89.643</td>
<td>2.545</td>
<td>13.467</td>
<td>84.421</td>
<td>94.865</td>
<td>p = 0.908</td>
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<td>Control - PDFA</td>
<td>25</td>
<td>89.200</td>
<td>2.882</td>
<td>14.411</td>
<td>83.251</td>
<td>95.148</td>
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<tr>
<td>Training - CMFA</td>
<td>28</td>
<td>84.643</td>
<td>1.957</td>
<td>10.357</td>
<td>80.627</td>
<td>88.659</td>
<td>p = 0.465</td>
</tr>
<tr>
<td>Control - CMFA</td>
<td>25</td>
<td>82.000</td>
<td>3.109</td>
<td>15.546</td>
<td>75.583</td>
<td>88.417</td>
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</tbody>
</table>

- No significant difference in post-test scores between the AM and PM Training Sessions in the grading of the PDF (p=0.908) or the CMF (p=0.465).
Why did PDFA grader scores improve in both training and control groups?

- PDFA – selected response
- CMFA – constructed response
- Reactive effect of testing
  - Sensitized by the pre-test
  - Control group had the evaluative/grading criteria sheet with them at all times
George J Cisneros DMD, MMSc
Chair, Department of Orthodontics
New York University
College of Dentistry
Affective Assessments (Student Course Evaluations)

- Perceptions
- Attitudes
- Interest
- Confidence

- Must be anonymous and perceived as anonymous
- Look at group data, not individual comments, except when there are large numbers and patterns of similar responses
D4 EBD-Orthodontics

**Goal:** To apply EBD principles to counsel patients regarding orthodontic treatment

**Objectives:** Based on a clinical simulation patient, the student will:

- 1) Develop PICO questions relevant to patient management
- 2) Search
- 3) Appraise
- 4) Consider the best evidence when counseling the patient
D4: EBD-Orthodontics

The patient wants his teeth straightened with Invisalign

– Working in small groups, students focus on one area:
  • TMD
  • Periodontal
  • White spots/discholorations
  • Impacted third molars
  • Suitability for Invisalign treatment
Group Projects:

– Project #1:
  • PICO questions

– Project #2:
  • Search—Sites, key words, citations

– Project #3:
  • Considering relevance and quality, select the best to appraise

– Project #4:
  • Presentation: Review process of discovery and what to tell the patient
Course attributes

• Active learning
• Laptops/internet
• Small groups (360 divided into 20 groups)
• Peer interactions
• Clinical relevance
• Group leaders as facilitators, moderators, coaches, not instructors/graders
• Pass/Fail
• The big Idea: Empowering the student
Mean Scores for Course Evaluation
Questions for Entire Class

Student Grade for the course

Q7 My knowledge and skill in Evidence based dentistry has improved since beginning of course

Q6 Course provides student with valuable experiences in Evidence based dentistry

Q5 My confidence in using an evidence based approach in responding to clinical challenges has increased since beginning this course

Q4 I plan to use an evidence-based approach in clinical practice after dental school

Q3 Group leaders were effective in the course

Q2 There was too much time for the course

Q1 I had sufficient foundation knowledge for this course
Mean Scores for Course Evaluation
Questions Organized by Generational Cohort

Q1 I had sufficient foundation knowledge for this course
Mean Score: 3.5

Q2 There was too much time for the course
Mean Score: 3.2

Q3 Group leaders were effective in the course
Mean Score: 3.8

Q4 I plan to use an evidence-based approach in clinical practice after dental school
Mean Score: 4.1

Q5 My confidence in using an evidence-based approach in responding to clinical challenges has increased since beginning this course
Mean Score: 3.7

Q6 Course provides student with valuable experiences in Evidence based dentistry
Mean Score: 3.6

Q7 My knowledge and skill in Evidence based dentistry has improved since beginning of course
Mean Score: 3.3

Student Grade for the course
Mean Student Score 1=SD - 5=SA
Mean Scores of Course and Instructor Indices by Instructor

Course index
Instructor index

<table>
<thead>
<tr>
<th>Instructor#1</th>
<th>Instructor#2</th>
<th>Instructor#3</th>
<th>Instructor#4</th>
<th>Instructor#5</th>
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</tr>
</tbody>
</table>
Group Leader Effect on Students' Perception of the Course

Student response to Q3: "Group leaders were effective in the course"

- Strongly Agree: 3.29
- Agree: 3.24
- Neutral: 2.67
- Disagree: 2.67
- Strongly Disagree: 1.93
Group Leader Effect on Students' Perception of the Course

Student response to Q3: "Group leaders were effective in the course"
Comparison of Commenting vs. Not Commenting Subjects

![Bar chart showing the comparison between commenting and not commenting subjects. The chart includes categories A, B, C, D, and F, with varying percentages for each category under the two conditions: No Comments entered and Comments entered.](chart.png)
Distribution of Comments by Categories

- Repetition/Redundancy: 38%
- Course Sequence (bad timing of the course): 25%
- Too much time: 18%
- Instructor issues: 5%
- Other: 11%
- Positive Comments: 3%
Acknowledgements

• Predoctoral Orthodontic Taskforce
  – Affective Assessments: Graphs and Data Analysis
    • Kate Danoff
    • Paul Lazari
    • Dennis Pham
  – Grader training study
    • Dr. Rahul Gulati
Reflection
Goal (2000):

- To develop an orthodontic curriculum and educational program that would meet the needs of a general dentist and be perceived as useful and relevant by students (and the College)
Step 1 - Identify the problem
Step 2 - Why, Why, Why
Step 3 - The Solution (?)
Discussant Response

Hillary L Broder PhD, MEd
Professor Cariology and Comprehensive Care
New York University
Assessment: Evidence, Reflections and Experience

Hillary L. Broder, PhD, MEd
Professor
Cariology & Comprehensive Care
NYU College of Dentistry
Purpose

1. Present/reinforce evidence on learning and assessment.
2. Reflect/Discuss specific points from the presentations.
3. Present some of my experience regarding outcomes, competencies and assessment.
What is Assessment?

- *Assessment* refers to all those activities undertaken by faculty/teachers -- and by their students in assessing themselves -- provides information to be used as feedback to modify teaching and learning activities.

- *Becomes formative assessment* when the evidence is actually used to adapt the teaching to meet student needs.

Beliefs about learning affect assessment

- Evidence from contemporary cognitive psychology indicates that all learning requires that the learner think and actively construct evolving mental models.

- Dietel, R.J., Herman, J.L., Knuth, R.A. 1991. *What Does Research Say About Assessment?* North Central Regional Education Laboratory, Oak Brook
Formative assessment includes both feedback and self-monitoring.

Why is self-assessment essential?

1. for progress as a learner:
2. for understanding of selves as learners,
3. for an increasingly complex understanding of tasks and learning goals, and
4. for strategic knowledge of how to go about improving.

What is meaningful learning?

- **Meaningful learning is reflective, constructive, and self-regulated.** ‘We now recognize the importance of knowing not just how to perform, but also when to perform and how to adapt that performance to new situations. Thus, the presence or absence of discrete bits of information—which is typically the focus of traditional multiple-choice tests—is not of primary importance in the assessment of meaningful learning. Rather, what is important is how and whether students organize, structure, and use that information in context to solve complex problems.’

- Dietel, R.J., Herman, J.L., Knuth, R.A. 1991. *What Does Research Say About Assessment?* North Central Regional Education Laboratory, Oak Brook
What are the elements of formative assessment?

- The key elements that have emerged from the case studies and related research are:
  1. Establishing a culture that encourages interaction and the use of varied assessment tools
  2. Establishing learning goals, and tracking of individual student progress
  3. Using varied instruction methods to meet diverse student and patient needs
  4. Providing constructive feedback on student performance and adapting instruction to meet identified needs
  5. Involving students’ active learning.
What gains has formative assessment made?

- Formative assessment - the frequent assessments of student progress to identify learning needs and shape teaching - has become a prominent issue in education reform. The achievement gains associated with formative assessment have been described as "among the largest ever reported for educational interventions."

OECD. 2005. *Formative Assessment: Improving Learning*
When the cook tastes the soup, that’s formative; when the guests taste the soup, that’s summative.

Research opportunities

- Demonstrate that students’ improve.
- Look at compliance (adherence) rates.
- Case completes.
- Clinic income
- Patient-oriented outcomes- oral health-related quality of life
- Recognize the subjective aspects of evaluation
  - Are we blinded?
  - Should we be blinded?
  - What about triangulation- should patient’s evaluate the student’s performance?
    - Calibration issue/ subjective evaluation
Quality of Life - outcome
Lookin' for love in all the wrong places.
Research Results

ALL SCHOOLS INCLUDE - COMPETENCY about ADDRESSING PATIENT’S CHIEF COMPLAINT.

Why– is there such a high no show rate?
Patients who dropped out of care

N=188  (78% response rate)

- ‘Treatment took longer than expected’.
- ‘Student was not concerned for my feelings’.

What’s wrong with this picture?
Purpose

To evaluate interpersonal communication skills among third and fourth year dental students during two clinical communications training programs.
Communication in healthcare

Challenging assessment: competency re: chief complaint- patient-oriented care

Patient instructors- lay people actors

Calibrated

Feedback- content, interpersonal skills

Seminar – reflect- evaluate-

I always ask in the later rounds- ‘would you go back to see this doctor?’ - subjective
Rationale for programs to enhance cultural competence

- Health professionals are challenged to provide services to diverse populations.
- Effective treatment planning can benefit from knowledge of cultural differences and sensitivity to the patient’s perspective.
- Improved communication is found to increase patient adherence with treatment.
- Long range health policy goal is to reduce health disparities.
Background

Standardized patient and patient instructor programs to improve interpersonal communication skills of dental and medical students for many years have been reported in the literature (Barrows, 1993; Logan et al, 1999; Stillman, et al, 1990).
Prerequisite for CC1, students completed two didactic modules on communication and interviewing during the spring of their second year.

Prerequisite for CC2, students completed a course titled “Communication in Health Care: Working with Diverse Populations” in the spring of their third year.
The patient instructor (PI) is a lay person trained to simulate a patient’s illness or condition in a standardized fashion.

PI also functions as teacher and evaluator by providing feedback and assessing the student regarding interview content and process.
The Patient Encounters
(4 rounds) -- approx. 3 hours)

1) Chart review then Patient-Doctor interview (15-minute interview)
2) Feedback from the patient’s perspective (10-15 minutes)
3) Course director debriefs the PIs “go back to the stud-doc”- subjective (45 min)
4) Seminar with the group of students (45 min)
5) Course evaluation
Student Evaluation

- Data analyses
  - Data entered into Excel-- % content checklists & ACIR by round
  - Individual and group evaluation by round

- Grading
  - SPSS- commendation- data gathering, interpersonal or both
  - remediation- data gathering, interpersonal or both
  - pass – satisfactory data gathering & interpers.
  - Notified by memo– copied to clinic GPA
  - Must pass to graduate –
  - Competency for accreditation
Participants

143 students from two consecutive dental school classes at one dental school.
### Mean scores for ACIR by round during each of the 2 training sessions

<table>
<thead>
<tr>
<th>ACIR ITEMS</th>
<th>Rd 1</th>
<th>Rd 2</th>
<th>Rd 3</th>
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<td><strong>1. Organization</strong></td>
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<td>CC1</td>
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</table>
Mean (SEM) ACIR score, averaged over 13 questions by session and round.

Significant effect for time of training on students’ performance ($F(3.405)=211.8$, $p<.001$).
The students’ written responses:

- great experience,
- good exercise in both junior and senior year,
- learned a lot,
- stimulating and thought-provoking,
- the simulated interviews are very helpful for real-life clinical situations.

Students recommend scenarios
Conclusions

Patient instructor program is an effective mode of teaching interpersonal communication among dental students.

In-service CE courses for faculty and practitioners is suggested.

Summary

What should be assessed?
Range of skills-competencies

How should assessment be done?
Depends

When/Where should we assess?
Depends

Who?
Depends
Thank You!

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