Calibration Efforts at the Indiana University School of Dentistry-Department of Periodontics and Allied Dental Programs

- Vanchit John, DDS, MSD
- Chairman, Department of Periodontics and Allied Dental Programs
- Indiana University School of Dentistry
- Indianapolis, IN 46202

Indiana University School of Dentistry

Department of Periodontics and Allied Dental Programs

- Periodontics- Pre-Doctoral and Graduate

- Dental Hygiene

- Dental Assisting- School Based and Distance Learning

The School/Department

• The Division of Pre-Doctoral Periodontics- 104 Dental Student per year

• International Student-20-25 per year

• Graduate Periodontics-12-14 Residents

• Dental Hygiene- 80 Students total. Reducing class size

• Dental Assisting-20 Students total

• Distance Learning Program- 12-14 Students total

Full Time Faculty

- Vanchit John- Chairman
- Steven Blanchard- Graduate Program Director
- Daniel Shin- Pre-Doctoral Director
- Elizabeth Ramos- Clinical Assistant Professor
- Sivaraman Prakasam- Clinical Assistant Professor, primarily involved with research
- Carol Walters- Clinical Assistant Professor- 80% appointment

Information Being Presented

• The process that has been put in place at the Indiana University School of Dentistry

• The need to establish a consensus for any plan to work

• Clinical Calibration is both a short term and a long term goal

• The importance of being consistent and persistent

Introduction

- Literature shows that there are inconsistencies in agreement and high variability in clinical decision making among dental faculty.
  - Bader and Shugars 1993, 1995, Baelum and Lopez 2003, Cosyn and De Bruyn 2007
- "Disagreements [among clinicians] may be due to differing degrees of diagnostic thoroughness or strongly held personal opinions about appropriate treatment"
- In medicine, Berner and Graber (2008) report that the rate of diagnostic error may range from 5-15%.

Background

- At Indiana University School of Dentistry (IUSD), anecdotally it appeared that variations existed in terms of periodontal diagnosis in the comprehensive care clinic.

- To remedy this, the Department of Periodontics and Allied Dental Programs, at IUSD has been running "consensus training sessions"/ "calibration sessions" and workshops which began in 2003.

The Planning Process

- First started our calibration efforts in 2003

- Worked together as a Department

- Challenges of doing this with a large group

The First Workshop

- January 3rd 2003
- Scope- Ambitious
- Topics Discussed- Healthy Periodontium, Gingivitis, Dental Prophylaxis, Periodontitis, Diagnostic Techniques, Radiographs, Instrument set-ups used in clinics

The First Workshop-Expected Outcomes

- The expected outcomes were:
- Develop a consistent mode of teaching our students what they were expected to know about periodontics and dental hygiene
- Develop a consensus document

The First Workshop- Outcomes

- The first time such an undertaking was attempted
- It raised the awareness amongst our faculty about common themes and concerns regarding everyday clinical information and the teaching of the various procedures
- It was a very useful dialogue for all concerned

The First Workshop-Outcomes

- While we developed a more consistent mode of teaching we did not come up with a "consensus document" based on the workshop

The First Workshop- Outcomes

- We recognized that we had made a good start
- We recognized the need to make this an on-going process
- We recognized the need to design a more comprehensive charting form
- We followed this with Part-2 in June 2003

The Second Workshop

- June 2003
- Scope- More focused
- *Major Goal*- To design and agree on a user friendly and comprehensive periodontal charting form that could be used in the pre-doctoral program, graduate program and the dental hygiene program

The Second Workshop

- **Other Goals-** Revisit terminology, e.g., prophylaxis, debridement, root planing
- Brief discussion on clinical grading

The Second Workshop-Major Outcome

- We successfully designed and agreed upon a comprehensive and user friendly charting form

INDIANA UNIVERSITY SCHOOL OF DENTISTRY
Existing Conditions

The Third Calibration Workshop

- Agenda Items:
  1. Further discussion of the new periodontal charting form
  2. ***Criteria for clinical grading- Major Focus Area***
  3. Discuss the Pilot Program with hygiene and the pre-doctoral clinics

The Third Calibration Workshop

- Discussion of Competency Cases
- Open discussion of topics relevant to our curriculum
- Suggestions for future workshops

The Next Step Was to Include the Comprehensive Care Clinic Directors

The Next Step- Including Comprehensive Care Directors

Treatment Planning:

For each case, please complete the following items in the order you believe treatment should be administered.

If there are differences in "how it's done at IUSD" please make comments

Case:

Diagnosis:

Comments

For the sake of this discussion,

Phase 1 will be considered Non-Surgical Periodontal Therapy. This phase can include direct restorations if they are needed.

Phase 2 will be considered Surgical Treatment.

Phase 3 will be considered periodontal maintenance therapy. This phase can include in-direct restorations if they are needed.

Phase I Treatment	Location/ personnel to complete treatment	Phase II Treatment	Location/ personnel to complete treatment	Phase III Treatment	Location/ personnel to complete treatment
1.	1.	1.	1.	1.	1.
2	2.	2.	2.	2.	2.
3	3.	3.	3.	3.	3.
4	4.	4	4.	4.	4.

Other Ideas-On the Clinic Floor Calibration

- Try and work in pairs
- Or, make a diagnosis and formulate a treatment plan and then find another faculty member do the same and then compare notes
- Get the student involved in the discussion
- Depends on Clinic 'busyness'
- Needs constant reminding

Where we are now

- In 2010, we began meeting as the Periodontics Division twice a month
- Now we meet once a month
- Spread out the sessions to include every day of the week
- This allowed most if not all the part-time faculty to attend the sessions

The Process

- The schedule for the year is established early
- Cases from the comprehensive care clinics or graduate clinics are prepared for presentation using a standardized format
- The cases are/were sent out ahead of time for review
- A case writing sheet is/was sent out and asked to be turned in prior to the session
- Approximately 50 minutes for discussion
- A summary message is/was sent out following the session

Patient Profile

- Pt :KG
- 56/F; African American
- Ht: 5' 10"
- Wt: 160lbs
- No family history of periodontitis
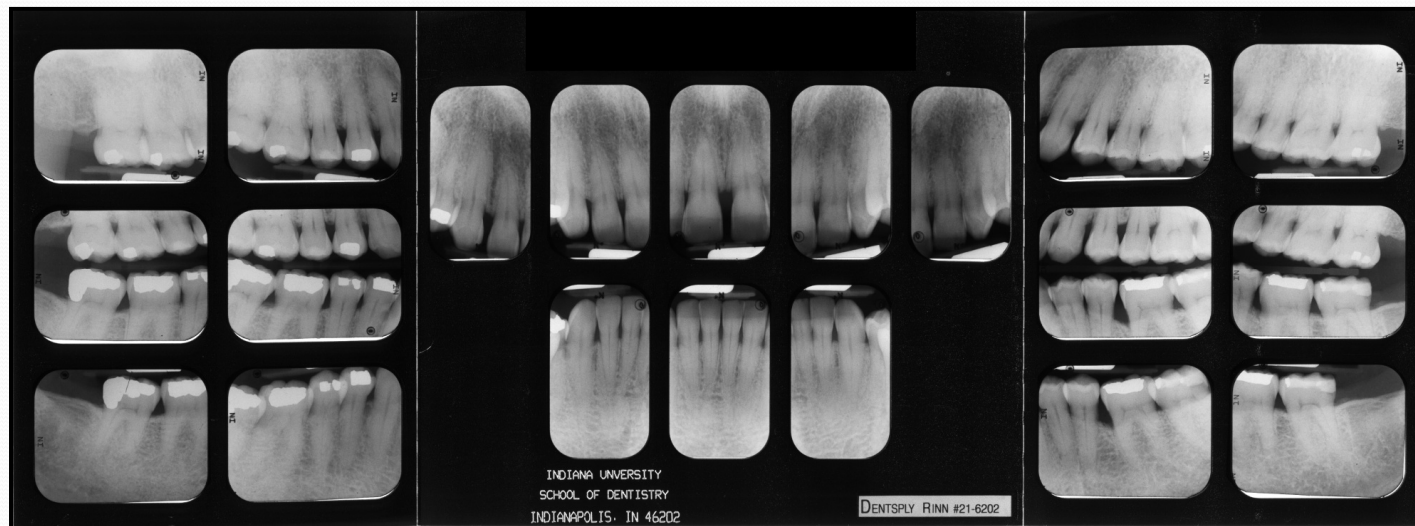- Plaque score 59%
- Bleeding score 3%

Medical History

- Hypertension – Maxide
- Osteoarthritis –Iodine occasionaly
- Anemic on and off depending on her diet
- Use CPAP
- Benign heart murmur
- BP 130/80mmhg
- Pulse – 60bpm

Peri-Apical Radiographs

PA Right

PA Left

Maxillary Charting

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Furcation																
MG INV																
MOBIL																
ATTACH		2 1 1	2 2 2	2 1 3	3 1 3	3 1 2	2 1 2	2 2 1	2 1 1	2 1 2	2 1 2	2 2 2	2 2 2	2 2 2	3 2 3	
REC			1													
PD		2 1 1	2 1 2	2 1 3	3 1 3	3 1 2	2 1 2	2 2 1	2 1 1	2 1 2	2 1 2	2 2 2	2 2 2	2 2 2	3 2 3	
BLEED													B			
PLAQUE		1 1 1	1 1	1 1 1	1 1	1					1	1	1 1	1 1 1	1 1	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PLAQUE		1 1 1	1 1	1 1 1	1							1 1 1	1 1 1	1 1 1	1 1 1	1 1	
BLEED			B		B											
PD		2 2 2	2 2 2	1 1 2	2 2 2	2 2 2	2 2 2	1 1 2	2 1 2	1 1 2	2 1 1	1 1 2	1 1 1	1 1 1	2 2 2	
REC																
ATTACH		2 2 2	2 2 2	1 1 2	2 2 2	2 2 2	2 2 2	1 1 2	2 1 2	1 1 2	2 1 1	1 1 2	1 1 1	1 1 1	2 2 2	
CALC																
Furcation																

Mandibular Charting

		32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Furcation															1		
CALC																	
ATTACH		2 1 2	2 2 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 2	2 1 3	8 3 2	2 2 2	
REC																
PD		2 1 2	2 2 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 2	2 1 3	8 3 2	2 2 2	
BLEED														B		
PLAQUE		1	1 1 1	1 1 1	1 1 1	1 1						1 1	1 1 1 1		

(Lingual / Facial tooth diagrams)

		32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
PLAQUE		1	1	1	1								1 1 1		
BLEED														B		
PD		2 1 2	2 1 2	2 2 2	2 1 2	2 1 2	2 1 2	1 1 1	1 1 1	2 1 1	1 1 2	2 1 1	2 1 4	5 1 2	1 1 2	
REC														1 1	2	
ATTACH		2 1 2	2 1 2	2 2 2	2 1 2	2 1 2	2 1 2	1 1 1	1 1 1	2 1 1	1 1 2	2 1 1	2 1 4	5 2 3	1 3 2	
MOBIL																
MG INV																
Furcation																

Diagnosis

Treatment Plan

- For each case, please complete the following items in the order you believe treatment should be administered.
- **Case 2**:
- **Diagnosis**: Generalized mild chronic periodontitis with a localized muco-gingival defect associated with teeth #24. 25.
-
- **Treatment Plan**:
- 1. Review OHI's and discuss smoking cessation options.
- 2. 4 quads S/RP
- 3. 4-6 wk re-eval
- 4. Discussion of periodontal surgery as treatment option for persistent pocketing and mucogingival surgery to cover root surfaces of 24 and 25 if the patient is complaining of aesthetic or sensitivity concerns.
- 5. Perio Maintenance q 3 months

Research Projects

- Consensus Training: An Effective Tool to Minimize Variations in Periodontal Diagnosis and Treatment Planning Among Dental Faculty and Students. John V, Lee SJ, Prakasam. S, Eckert GJ, Maupome G. *Journal of Dental Education, Volume 77, No 8, 1022-1032, 2013*

- An Assessment of the Calibration of Periodontal Diagnosis and Treatment Planning among Dental Students at Three Dental Schools, Lane. B, Luepke. P, Chaves. E, Maupome. G, Eckert. GJ, Blanchard. S, John V. Accepted for publication in the *Journal of Dental Education*

Purpose

- 1) Measure variations in periodontal diagnosis and treatment planning of pre-doctoral periodontics faculty (who underwent consensus training as part of their departmental calibration), and 2) compare such variations with those of third and fourth year dental students
- Creation of a baseline in which an ongoing effort at improving consensus was tested

Methods

- Study respondents included pre-doctoral periodontics faculty and dental students.
    - Pre-doctoral periodontics faculty group: full- and part-time periodontics faculty and periodontics residents (1st, 2nd, and 3rd years)
    - Dental student group: 3rd and 4th year students

Methods

- Cases included nine patients with the ages of 19 to 81 years old and different degrees of periodontal disease severity ranging from gingivitis to chronic and aggressive periodontitis.

- Nine cases were made available to participants via a project site on a web based survey (Indiana University SharePoint site, Indianapolis, IN).

https://www.sharepoint.iu.edu/sites/Perio_consensus/SitePages/Home.aspx

Methods

Questionnaire

- Participants had to answer a questionnaire with 2 demographic questions and provide a periodontal diagnosis and treatment plan for each case.
- The first question asked about the position/role at IUSD.
- The second question asked about prior clinical experience and was to evaluate if that background can impact the periodontal diagnosis and treatment planning.
- Then the next questions following each case were intended to evaluate the consensus among the respondents' periodontal diagnosis and treatment plan based on a set number of pre-defined procedure names and quadrants.

1. Select the statement that best describes your status.

a) I am a full time periodontal faculty member
b) I am a part-time periodontal faculty member
c) I am a 1st year graduate student
d) I am a 2nd year graduate student
e) I am a 3rd year graduate student
f) I am a 3rd year dental student
g) I am a 4th year dental student

2. What is your prior dental experience (for six months or longer)?

a) Dental Assistant
b) Dental Hygienist
c) General Dentist
d) Other Dental Specialty (OMFS, Prosthodontics, Endodontics, Pedodontics, Orthodontics, Radiology, Oral Pathology)
e) None

3. Please select one periodontal diagnosis from the choices provided that would be most applicable for this patient.

a) Gingivitis
b) Generalized mild chronic periodontitis
c) Generalized moderate chronic periodontitis
d) Generalized severe chronic periodontitis
e) Localized mild chronic periodontitis
f) Localized moderate chronic periodontitis
g) Localized severe chronic periodontitis
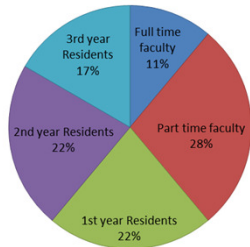h) Generalized aggressive periodontitis
i) Localized aggressive periodontitis

4. Please state the treatment plan that best meets the needs for this patient from the following list of treatment options.

a) Dental prophylaxis
b) 1 quadrant Scaling and root planing
c) 2 quadrant Scaling and root planing
d) 3 quadrant Scaling and root planing
e) 4 quadrant Scaling and root planing
f) Periodontal maintenance
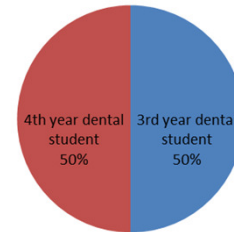g) Locally delivered antimicrobials
h) Systemic antimicrobials

Results

Pre-doctoral periodontics faculty

- Full time faculty 11%
- Part time faculty 28%
- 1st year Residents 22%
- 2nd year Residents 22%
- 3rd year Residents 17%

Dental students

- 4th year dental student 50%
- 3rd year dental student 50%

- As for **prior dental experience**: 1 dental assistant, 1 dental hygienist, 6 general dentists, 7 with other dental specialty, and 23 with no prior dental experience.
- Most of respondents with prior dental experience belonged to the faculty group.

CASE EXAMPLE

Clinical Patient

- 28 year old Caucasian Male
- Blood Pressure- 120/80 mm Hg
- Weight- 170 Pounds
- No medications
- No known allergies
- No family history of periodontal disease
- Overall unremarkable medical history

Anterior Pre-Treatment Clinical Image
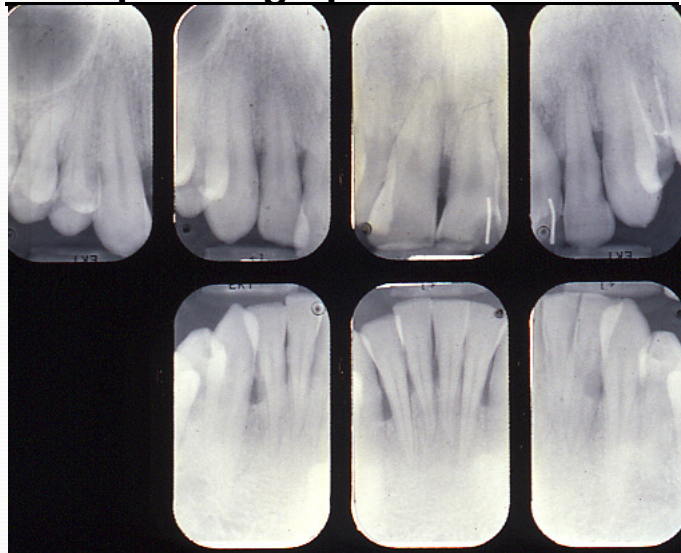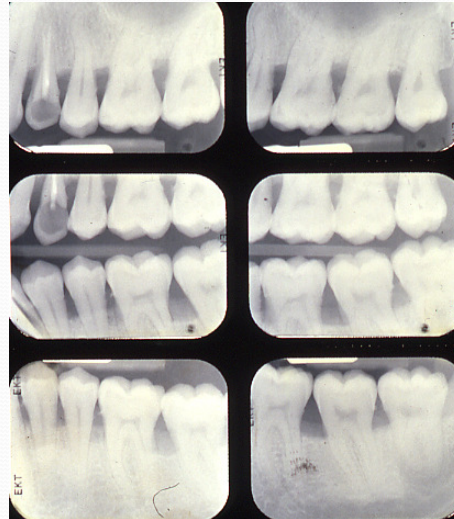
Left Buccal View
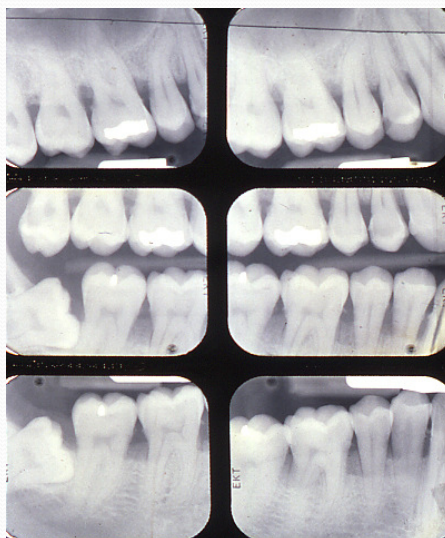
Pre-Op Right Buccal View

Pre-Op Right Palatal View

Pre-Op Radiographs-Anterior View

Left Posterior Quadrants

Right Posterior Quadrants

AMERICAN BOARD OF PERIODONTOLOGY
CASE REPORT RECORD

Candidate Name: Dr. Vanchit John
Patient's Number:

Case Report No: 1
Age 28 Sex M Race C

Stage of Therapy: (Pre-treatment)   Re-evaluation   Post treatment   Date of exam: 10-19-1992
(CIRCLE ONE)

CAL & BOP
PD & Plaque
CEJ – GM

Mobility Scale:
Used: Miller

FACIAL

LINGUAL

CEJ - GM
PD & Plaque
CAL & BOP

1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16

RIGHT —— LEFT

32   31   30   29   28   27   26   25   24   23   22   21   20   19   18   17

CAL & BOP
PD & Plaque
CEJ - GM

FACIAL

Furcation Grade
System Used:
Glickman

LINGUAL

CEJ - GM
PD & Plaque
CAL & BOP

REVISED 199
c AMERICAN BOARD OF PERIODONTOLOGY
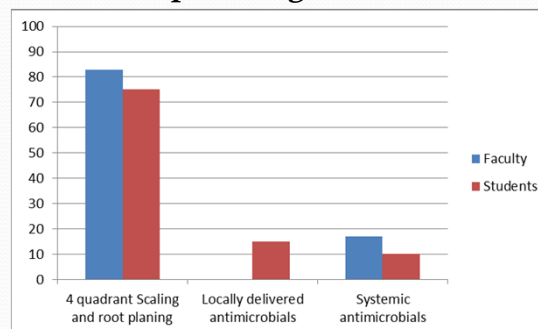
Results

Case 3

Diagnosis

Treatment planning
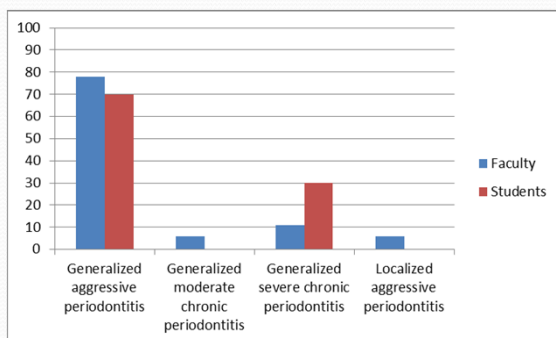
78% faculty and 70% dental students indicated the diagnosis as generalized aggressive periodontitis. 11% faculty and 30% dental students selected generalized severe chronic periodontitis

83% faculty and 75% dental students responded 4 quadrant scaling root planing and some picked the use of systemic antimicrobials (17% faculty and 10% dental students) for treatment.
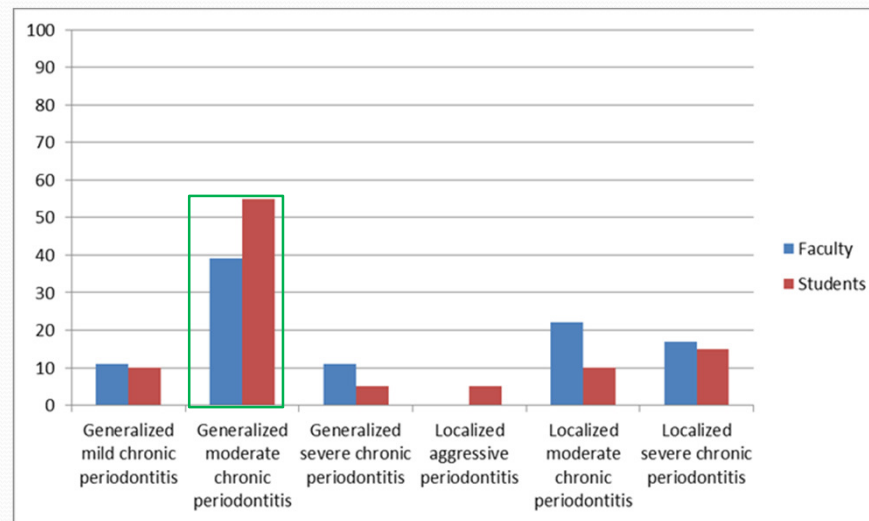
Discussion

- Third year dental students had the lowest agreement in diagnosis, but they were not significantly lower than the faculty.

- Pre-doctoral periodontics faculty, also including residents, showed the lowest agreement in treatment planning.

- No conclusion could be drawn from previous dental experience in this study.

Case 2

Generalized Mild with Localized Severe Chronic Periodontitis

Discussion
Treatment planning

- Most of the respondents varied on the number of quadrants of scaling and root planing that they would choose for each case.

- If combining all the treatment plans of scaling and root planing into one group rather than based on the number of quadrants, potentially less variation may be observed.

Limitations

- Answer choices were limited rather than open ended questions
- Can only select one response for each case in terms of both diagnosis and treatment planning
- Small sample cohort available for the study

Conclusions

- We can speculate from this, the effect of consensus training among pre-doctoral periodontal educators may help decrease the variation of periodontal diagnosis and treatment planning among themselves as well translate into better agreement to dental students.
- We can conclude that despite the consensus training significant variations involving diagnosis of extent and severity exists as well variation in extent and choice of treatment planning exists.
- **This may imply there is a need for frequent consensus training sessions emphasizing treatment planning among faculty with diverse training and experiences.**

Future studies…

- To see what the faculty group favor as their first line in treatment planning for different periodontal diagnosis

- Further development in methods of consensus training to particularly minimize the variation in diagnosis and treatment planning

- Periodontal decision making in dental students when developing a diagnosis as well as treatment planning

- Data from our study will be used to further refine our ongoing consensus training at IUSD

Limitations to Lee et al. Study

- Constricted diagnosis and treatment choices
  - For example treatment options were divided into number of quadrants
- Small student sample size
  - Total of 20 dental students
- Students took survey on their own laptop computers
- Periodontal charting was not standardized

Purpose

The purpose of this study was to evaluate the level of calibration of 3rd and 4th year dental students on periodontal diagnosis and treatment planning across three dental schools (IUSD, MUSoD, and WVUSD).

The responses of students (across years, and across schools) were contrasted against gold standards for diagnoses and treatment plans relevant to standardized periodontal cases.

Additionally, we determined if a dental students' class rank and GPA were associated with superior ability to make a correct diagnosis and treatment plan.
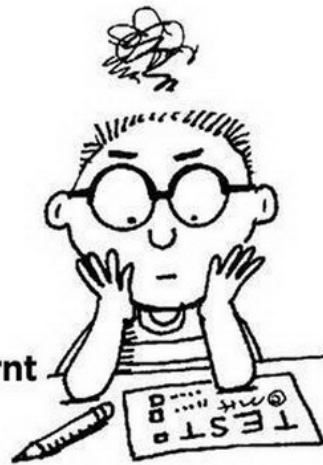
Materials and Methods

We invited third and fourth year dental students from IUSD, MUSoD, and WVUSD to participate in the study via email

Materials and Methods

- A total of 20 third year dentals students and 20 fourth year dental students were included in the study at each institution. If more than 20 students in either year in training had volunteered to participate, the first 20 to volunteer were included.

- Participation in the study was voluntary and the participants could withdraw at any time.

Materials and Methods

- Students were asked to view 11 case vignettes and answer two multiple choice questions to select the proper diagnosis and treatment plan for each case.

Materials and Methods

- The students' class rank and GPA were contrasted with their answers on the survey; this information remained confidential

Materials and Methods: Questionnaire

1. Select the statement that best describes your status.

A. I am a 3rd year dental student

B. I am a 4th year dental student

2. What is your prior dental experience (for six months or longer)?

A. Dental Assistant

B. Dental Hygienist

C. Foreign Trained Dentist

D. None

3. Please select one periodontal diagnosis from the choices provided that would be most applicable for this patient.

A. Gingivitis

B. Localized moderate chronic periodontitis

C. Generalized mild chronic periodontitis

D. Generalized moderate chronic periodontitis

E. Generalized severe chronic periodontitis

F. Localized aggressive periodontitis

G. Generalized aggressive periodontitis

H. Periodontitis as a manifestation of systemic disease

I. Acute necrotizing ulcerative gingivitis

J. Necrotizing ulcerative periodontitis

3a.   **(Optional) Additional diagnoses.**

4. *Please select the treatment plan that best meets the needs for this patient from the following list of treatment options*.
A. Dental prophylaxis
B. Scaling and root planing
C. Periodontal maintenance
D. Locally delivered antimicrobials
E. Systemic antimicrobials
F. Combination of SRP+ antimicrobials (systemic)

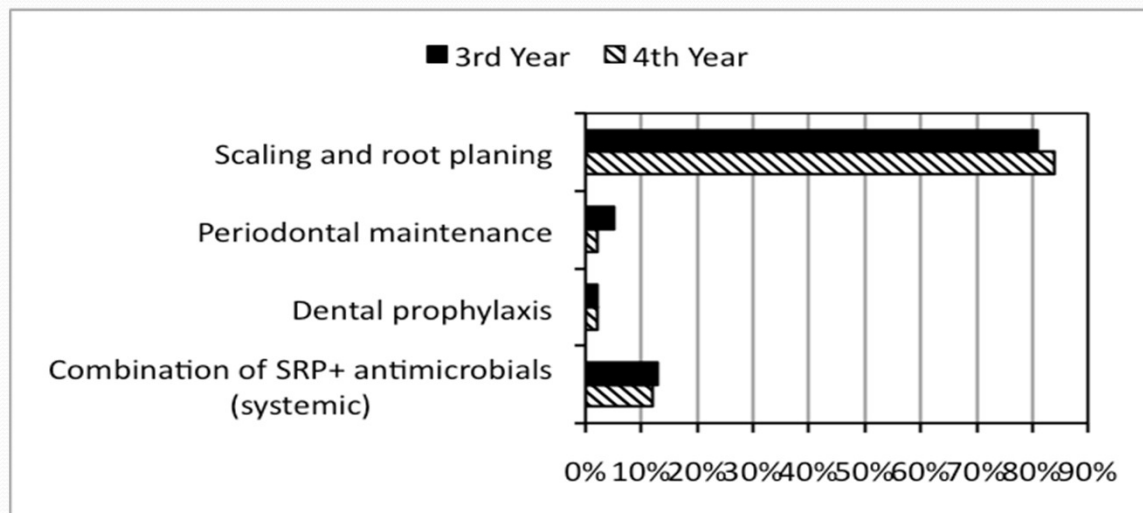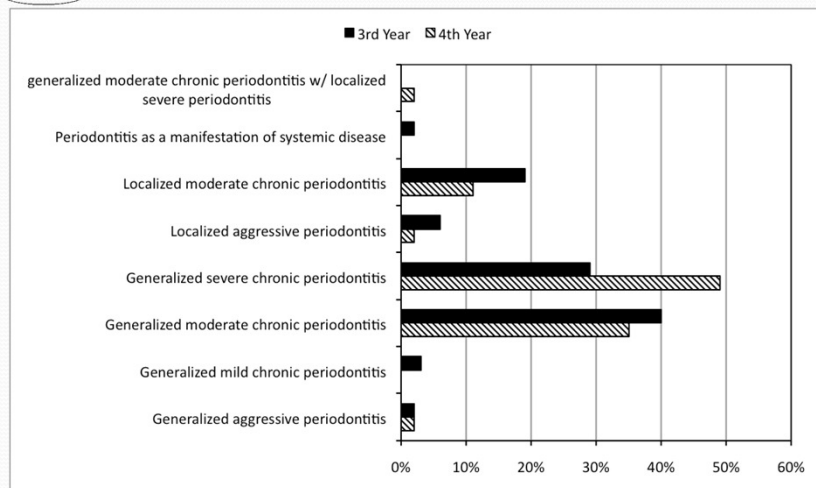*4a.*   **(Optional) Additional treatment options.**

Case 1 Diagnosis and Treatment Plan

Diagnosis: Generalized Moderate with localized severe chronic periodontitis
Treatment: Initial Tx, SC/RP. Reevaluation and assessment for surgical therapy especially around #19. Periodontal Maintenance every 3 months

Results

Comparison of responses between schools

- There were statistically significant differences in responses for **diagnosis** between schools for almost all of the cases (Case 1, 3, 4, 6, 7, **8**, and 11)
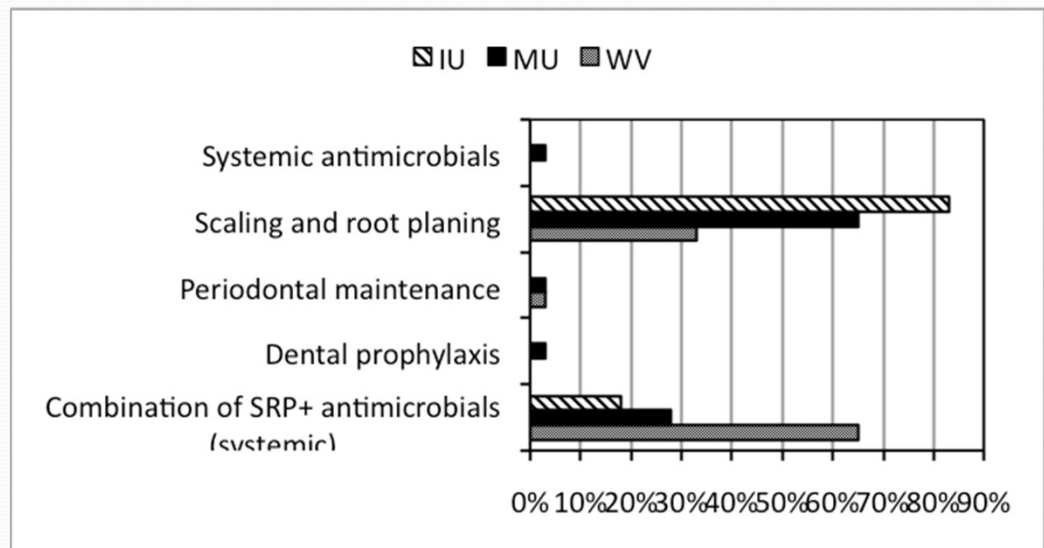
Results

- There were only 3 cases (Case 7, 10, and 11) with statistically significant differences in responses between schools for **treatment selection**.

Case 7 Treatment Plan

Results

Comparison among 3rd and 4th year students within each school

- Kappas for school agreement and for class agreement ranged between 0.32 and 0.51.

- Diagnosis and treatment agreements overall were lower for 3rd year students than for 4th year students.

Values < 0 as indicating no agreement and 0–0.20 as slight, 0.21–0.40 as fair, 0.41–0.60 as moderate, 0.61–0.80 as substantial, and 0.81–1 as almost perfect agreement

Type			Kappa	Standard Error	Confidence Limit
Diagnosis	School Overall		0.34	0.0015	(0.34, 0.34)
Diagnosis	3rd Overall		0.32	0.0028	(0.31, 0.33)
Diagnosis	4th Overall		0.36	0.0031	(0.36, 0.37)
Diagnosis	IU	3rd	0.33	0.0090	(0.32, 0.35)
		4th	0.51	0.0087	(0.50, 0.53)
		Overall	0.42	0.0043	(0.41, 0.42)
Diagnosis	MU	3rd	0.36	0.0090	(0.34, 0.38)
		4th	0.32	0.0091	(0.30, 0.33)
		Overall	0.34	0.0044	(0.33, 0.34)
Diagnosis	WV	3rd	0.32	0.0084	(0.31, 0.34)
		4th	0.37	0.0116	(0.35, 0.40)
		Overall	0.33	0.0048	(0.32, 0.34)
treatment	School Overall		0.39	0.0023	(0.38, 0.39)
treatment	3rd Overall		0.38	0.0045	(0.37, 0.39)
treatment	4th Overall		0.40	0.0050	(0.39, 0.41)
treatment	IU	3rd	0.48	0.0164	(0.45, 0.51)
		4th	0.46	0.0145	(0.43, 0.49)
		Overall	0.46	0.0075	(0.45, 0.47)
treatment	MU	3rd	0.42	0.0140	(0.40, 0.45)
		4th	0.40	0.0141	(0.37, 0.43)
		Overall	0.41	0.0069	(0.40, 0.42)
treatment	WV	3rd	0.38	0.0119	(0.36, 0.40)
		4th	0.37	0.0175	(0.34, 0.41)
		Overall	0.37	0.0070	(0.35, 0.38)

Conclusions

- There should be more emphasis placed on case-based learning in the pre-doctoral curriculum at dental schools. Curriculum reform!

- Implementing consensus-training programs at dental schools is helpful in terms of faculty calibration

- Criticisms of the 1999 classification system- need for reform

- Implementing a risk assessment form into Axium to help students take into account the patients medical and dental presentations and their susceptibility for further disease progression.

Conclusions

- Utilization of dental hygienists on the clinic floor to check prophylaxis and periodontal maintenance patients, so periodontists are able to spend more time with students treatment planning.
- Next research project should include a pre and post questionnaire associated with a pilot training system to determine if it can enhance agreement on periodontal diagnosis and treatment planning.

Acknowledgement

- **Dr. Seung-Jun Lee**
- **Dr. Brittany Lane**