

Consortium of Operative Dentistry Educators

(CODE)



REGIONAL REPORTS FOR FALL 2003

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Consortium of Operative Dentistry Educators (CODE)

Forward - Larry D. Haisch, D.D.S.
National Director

On February 27, 2003, CODE held a National/International informal meeting during the annual meeting of the Academy of Operative Dentistry in Chicago with a signed attendance of 56. Thank you to the Academy of Operative Dentistry for providing the time slot and space for the meeting. Additional thanks to Drs. Kevin Frazier, William Gray, and Poonam Jain for their assistance.

CODE has scheduled a meeting for **Thursday, February 19, 2004 from 4:15 - 6:00 P.M., Chancellor Room, Fairmont Hotel, Chicago Illinois**. I am happy to announce that Dr. Ivar Mjor will present a program entitled "**Microleakage and Recurrent Caries**" at the meeting with time for questions and discussion. Time will allow for other CODE business as well. Please mark your calendars and plan on attending the meeting of AOD and CODE.

I had the privilege to attend the Region VI meeting hosted by Dr. Paul Blaser and the University of Florida. A great meeting with good discussion and sharing of information.

The members of CODE continue to spread the word about CODE and work to provide input to Licensure Boards on Restorative Dentistry in several ways - especially as Board members. All CODE Regions are to continue to encourage/invite members of the Licensure examining boards to attend the Fall Regional meetings. Do not forget to invite our colleagues in the Armed and Public Health Services to our meetings - both Regional and National.

Support of CODE by payment from the schools for annual dues is excellent, although not without follow-up efforts by the National office. The same can be said for the collection of the Fall Regional Reports.

The web site (<http://netserv.unmc.edu/code/codeFrame/html>) continues to be the location of "all you wish to know and then some" for CODE. The menu now contains a posting of current available positions. Please access this site and utilize for posting per the directions. Thanks to Dr. William Johnson (UNMC-COD) for continuing to be the webmaster and doing timely updates and enhancements. **NOTE:** Update your schools' directory via the active "*Please help update*" link in the main menu.

Effective January 1, 2004, CODE will stand for *Consortium of Operative Dentistry Educators*. This change was approved by the attendees at the Fall 2003 Regional CODE meetings.

I would like to thank all the Directors and the meeting hosts (Drs. Edmond Hewlett, Gary Hildebrandt, Melvin Hirsh, Courtney Lamb, Richard Lichtenthal and Paul Blaser), the Operative Section of ADEA and, especially, the general membership for helping to make CODE what it is and what it accomplishes.

ORIGINS OF C.O.D.E (Consortium of Operative Dental Educators)

Project ACORDE (A Consortium of Restorative Dentistry Education)

The date usually cited as the starting point for the development of Project ACORDE is 1966. That year, in Miami, the Operative Dentistry Section of the AADS formed a committee charged to plan for the cooperative development of teaching dental materials.

In July of 1971, the Dental Health Center, San Francisco, invited faculty from 14 dental schools to explore the feasibility of reaching consensus of a series of operative dental procedures. The outcome of the meeting suggested that it was feasible to achieve broad-based agreement on basic procedures: task analyses could be developed in which consensus could be reached on essential details of methods and instrumentation. The Project ACORDE committee was charged with the responsibility for coordinating curriculum development efforts on a national level in November of that year. Prominent in this project development were Bill Ferguson, David Grainger and Bob Wolcott.

The Broad Goals and Functions of this committee were:

1. To gain agreement among all participating dental schools on the teaching of operative dentistry functions and gain acceptance by all schools.
2. To produce materials which can be universally accepted and utilized for teaching dental students and expanded function auxiliaries.

During 1974, a 15 module package entitled Restoration of Cavities with Amalgam and Tooth-colored Materials was presented.

The preparation package entitled Cavity Preparations for Amalgam and Tooth-colored Materials became available for distribution in March of 1976.

Project ACORDE was found to have produced three major benefits for dental education:

1. It opened new channels of communication among dental educators.
2. It suggested uniform standards of quality for the performance of restorative skills.
3. It produced numerous lesson materials which were useful both for teaching students and as models of developers of other lessons.

The benefit that was most frequently cited by dental school faculty was communication. The primary example of the communication begun by Project ACORDE which has lasted well beyond the initial project is CODE (Consortium of Operative Dentistry Educators). CODE has as its goal the continuation of meetings for the purpose of information exchange among teachers of operative dentistry. Regional CODE meetings are held annually with minutes of each session recorded and sent to a national director for distribution. This system is a direct spin-off of Project ACORDE.

The first annual session of CODE was held in 1974/75.

The Early Years (1974-1977)

As founding father of the concept, Robert B. Wolcott of UCLA assumed the role of national coordinator and appointed Frank J. Miranda of the University of Oklahoma as national secretary. A common agenda to be provided to all six regions was established at this time. The first regional meetings were held in the winter of 1974. During the first three years of operations each region devised a system of rotation such that a different school hosted the regional meeting each year, providing a greater degree of motivation and bringing schools closer together in a spirit of fellowship and unity. Each region submitted suggestions for future agendas, thereby insuring a continued discussion of interesting and relevant topics. A collection of tests (test bank) was started in early 1976 which consisted of submitted written examination questions on specified topics that were compiled and redistributed to all schools.

The Transition Years (1977-1980)

The first indication that the future of CODE was in jeopardy came in 1977, the first year that a national report could not be compiled and distributed. As the result of the efforts of a committee chaired by Dr. Wolcott, the original concept was renewed in 1980. Its leadership had been transformed from the structure of a national coordinator and secretary to a standing subcommittee under the auspices and direction of the Section of Operative Dentistry of the AADS.

The Reaffirmation Years (1997 - 1998)

During the 1997 meetings of both the Operative Dentistry Section Executive Council and the Business meeting of the Section, interest was expressed about reorganizing CODE and aligning it more closely with the Section. During the following year, fact finding and discussions occurred to formulate a reorganization plan. The plan was submitted for public comment at the 1998 meeting of the Operative Dentistry Section Executive Council and the Business meeting of the Section. At the conclusion of the business meeting the reorganization plan was approved and implemented.

2004

CODE will once again stand for *Consortium of Operative Dentistry Educators* as ratified at the Fall 2003 Regional CODE meetings.

The Future of CODE

The official sponsorship by the Section of Operative Dentistry of ADEA (formerly ADDS) and the revised administrative structure of CODE are both designed to insure its continuance as a viable group. The original concepts, ideas and hopes for CODE remain unchanged and undiminished. Its philosophy continues to be based on the concept of dental educators talking with each other, working together, cooperating and standardizing, when applicable, their teaching efforts and generally socializing in ways to foster communication. There is every reason to believe that organizations such as CODE, and those developed in other fields of dentistry, will continue to crumble the barriers of provincialism and provide the profession with a fellowship that is truly national in scope.

National Coordinators/Directors

1974 - 1982	Robert B. Walcott (UCLA)
1982 - 1986	Thomas A Garmen (Georgia)
1986 - 1989	Frank Miranda (Oklahoma)
1989 - 1998	Marc Gale (Florida)
1998 - to present	Larry Haisch (Nebraska)

ORGANIZATION OPERATION

The Section of Operative Dentistry of the American Dental Education Association has “oversight” responsibility for sustaining and managing CODE.

- The national director will be appointed by the executive council for a three-year term, renewable not to exceed two consecutive terms.
- The director will be selected from a list of one or more individuals nominated by the CODE Advisory Committee after input from the regions.
- The director will perform the functions and duties as set forth by the council.
- The director will be a voting member of the council who will be expected to attend regional CODE meetings and the annual meeting of the council and section.

A CODE Advisory Committee will assist the national director with his/her duties.

- A CODE Advisory Committee will consist of one member (regional director) from each of the six regions plus 1 or 2 at-large members.
- Each regional director is selected by their region. The at-large member(s) may be selected by the national director and/or the executive council.
- The terms are three years, renewable, not to exceed two consecutive terms.
- The national director serves as chair of the Advisory Committee.

The annual CODE Regional meetings will serve as the interim meeting of the section. Some section business may be conducted at each CODE Regional meeting as part of the National agenda.

Regional Directors:

- Will be a member of ADEA and the section of Operative Dentistry
- Will oversee the conduct and operation of CODE in their respective region while working in concert with the national director
- Will have communication media capabilities including e-mail with the capability of transmitting attachments
- Will Attend the region’s meeting
- Ensure that meeting dates, host person and school are identified for the following year
- Do follow-up assist on dues “non-payment” by schools
- Ensure that reports of regional meetings are submitted **within 30 days** of meeting conclusion to the national director
- Ensure that individual school rosters (operative based) are current for the region
- Identify a contact person at each school
- Assist in determining the national agenda
- Other, as required

CODE ADVISORY COMMITTEE

(Revised 12-22-03)

	<u>Region</u>	<u>Regional Director</u>	<u>Phone / E-Mail</u>	<u>Term</u> (term - 3yrs)
I	Pacific	Dr. Edmond R Hewlett UCLA Los Angeles, CA	310-825-7097 eddyhedent@ucla.edu	2003-2005
II	Midwest	Dr. R. Scott Shaddy Creighton University Omaha, NE	402-280-5226 shaddy@creighton.edu	2003-2005
III	South Midwest	Dr. Alan H. Ripps LSU New Orleans, LA	540-619-8548 aripps@lsuhsc.edu	2004-2006
IV	Great Lakes	Dr. William Gray UWO London, Ontario, Canada	519-661-2111 william.gray@fmd.uwo.ca	2004-2006
V	Northeast	Dr. Richard Lichtenthal Columbia University New York, NY	212-305-9898 rml1@columbia.edu	2002-2004
VI	South	Dr. Kevin Frazier MCG Augusta, GA	706-721-2881 kfrazier@mail.mcg.edu	2002-2004
II	At-Large	Dr. Poonam Jain SIU Alton, IL	618-474-7073 pjain@siu.edu	2002-2004
II	National Director	Dr. Larry D. Haisch National Director UNMC-COD Lincoln, NE	402-472-1290 lhaisch@unmc.edu	2002-2004
II	Web Master	Dr. Bill W. Johnson UNMC-COD Lincoln, NE	402-472-9406 wwjohnson@unmc.edu	

Regions and Schools

<p><u>Region I (Pacific) -11</u></p> <ul style="list-style-type: none"> ✓ Alberta - Canada Arizona T British Columbia - Canada ✓ Loma Linda Nevada T Oregon ✓ Pacific ✓ UCLA ✓ UCSF ✓ USC ✓ Washington 	<p><u>Region II (Midwest) - 10</u></p> <ul style="list-style-type: none"> ✓ Colorado ✓ Creighton ✓ Iowa ✓ Manitoba - Canada ✓ Marquette ✓ Minnesota ✓ UMKC ✓ Nebraska ✓ Saskatchewan - Canada ✓ Southern Illinois
<p><u>Region III (South Midwest) - 7</u></p> <ul style="list-style-type: none"> ✓ Baylor ✓ Louisiana State ✓ Mississippi ✓ Oklahoma ✓ Tennessee ✓ UTHSC - San Antonio ✓ UTHSC - Houston 	<p><u>Region IV (Great Lakes) - 10</u></p> <ul style="list-style-type: none"> ✓ Case Western ✓ Detroit Mercy ✓ Illinois ✓ Indiana ✓ Michigan ✓ Ohio State Pittsburg ✓ SUNY - Buffalo ✓ West Virginia ✓ Western Ontario - Canada
<p><u>Region V (Northeast) - 18</u></p> <ul style="list-style-type: none"> ✓ Boston ✓ Columbia ✓ Connecticut ✓ Dalhousie - Canada ✓ Harvard ✓ Howard ✓ Laval - Canada ✓ Maryland ✓ McGill - Canada Montreal - Canada New Jersey ✓ NYU ✓ Pennsylvania ✓ SUNY - Stony Brook ✓ Temple ✓ Toronto - Canada ✓ Tufts ✓ US Naval Dental School 	<p><u>(South) - 11</u></p> <ul style="list-style-type: none"> ✓ Alabama ✓ Florida ✓ Georgia ✓ Kentucky ✓ Louisville ✓ Meharry ✓ North Carolina ✓ Nova Southeastern ✓ Puerto Rico ✓ South Carolina ✓ Virginia
<p>✓ = Paid Member as of December 31, 2003</p>	<p>67 schools (10 Canada, 57 United States)</p>

The National Agenda for 2003 was established after review of the reports of the 2002 Fall Regional meetings and National CODE Meetings.

Thank you to the Regional CODE Directors and membership for making recommendations to establish the National Agenda.

Each Region is encouraged to also have a Regional Agenda.

Each school attending the Regional Meetings are to bring their responses to the National Agenda in writing.

Continue to invite your colleagues, who are Dental Licensure Board examiners and your Military and Public Health Service colleagues who head/instruct in dental education programs, to your Regional meetings.

It is strongly suggested that each Region select next year's meeting site, date or tentative date at the close of your Fall Regional CODE meeting if possible.

This information is published in the Annual National Agenda Final Report.

Early notification may permit additional participation from other member schools in your Region.

The Regional meeting reports are to be submitted to the national Director in **publishable format** as an attachment to e-mail.

The required format and sequence will be:

1. **CODE Regional Meeting Report Form****
2. **Summary of responses to the National Agenda.**
3. **Individual school responses to the National Agenda**
4. **The Regional Agenda summary and responses.**
5. **CODE Regional Attendees Form****

** (Copies may be obtained from the Web site:

<http://netserv.unmc.edu/code/codeFrame.html>).

Mail a hard copy of the report to the National Director. Both electronic and hard copy versions are to be submitted **within thirty (30) days** of the conclusion of the meeting.

2003 NATIONAL CODE AGENDA

(Please include a summary of the Regional Responses to the National Agenda questions, before listing individual Regional Responses).

(Please cite the evidence were applicable)

- I. **KaVo PREPassistant** - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

How long has your school been using this system?

How and where is it being used (i.e. pre-clinic operative/ fixed/ other)?

What are the strengths and weaknesses of this system?

What are your recommendations/ summative evaluation of this system?

Are devices which provide immediate quantitative feedback the way of future preclinical education? Please explain.

- II. **KaVO Diagnodent**/other detection devices:

Are your utilizing current technology based caries detection methods/systems in student clinics?

Which systems are you using and how frequently are you using them?

What are your opinions as to sensitivity/specificity?

Do you have knowledge of other technologies in development but not yet released? Please describe/explain these systems.

III. **CAD/CAM - CEREC 3:**

Are you currently utilizing this system for student clinics and how frequently are you using it?

What is your evaluation as to accuracy/marginal fit?

Is the system utilized in your Graduate Program and Faculty Practice?

What is your opinion as to the overall clinical acceptability of the restorations produced from student clinics?

What are the strengths and weaknesses of this system?

IV. **Educational Philosophies:**

What is your educational philosophy as to learning preps first on the bench and then to the simulation mannequin vs. going immediately to the simulation mannequin?

What is the value of quantity and repetition requirements before evaluation for competency?

Does competency replace the need for quantitative repetition?

In addition to the restoring of ivory teeth in the preclinic courses, how are natural teeth being utilized (if your school uses them)?

Are you utilizing simulators/DentSim for teaching operative dentistry? Describe how you are utilizing these educational aids and their effectiveness.

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

Describe how your school relates biomedical scenarios to pre-clinic operative dentistry?

Have community out-reach programs impacted our educational goals? Please describe.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

Which of these programs is the most effective?

What are the strengths and weaknesses of this system?

- V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise.
Do you agree with this name change? If not, please explain.

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Regional CODE Agenda

(Please include a summary of the Regional Responses to the agenda questions, before listing individual Regional Responses).

National CODE Meeting

The meeting will be held **Thursday, February 27, 2003 from 4:15 pm to 6:00 pm** in the State Room at the Fairmont Hotel in Chicago, Illinois. This is in conjunction with the annual meeting of the Academy of Operative Dentistry. Please submit 1-2 items for consideration for the 'agenda' of the National Meeting. Suggestions as to how to make this brief meeting productive and efficient are needed.

Suggestions for CODE.

What can the organization do to improve its effectiveness?

What is suggested to improve the Web site?

<http://netserv.unmc.edu/code/codeFrame.html>

Other suggestions?

REMINDERS:

National Directory of Operative Educators:

Please have each school update the following information for the National Directory of Operative Educators:

School name and mailing address

Individual names: (full time), phone #, fax #, e-mail address of faculty who teach operative dentistry. (This could be individuals in a comp care program, etc. if there is no defined operative section of department.)

Include this information with the Regional Report in an electronic file transmitted via e-mail plus the mailing of a hard copy to the National Office of CODE.

All update information will be forwarded to the Webmaster for inclusion on the Web site:

<http://netserv.unmc.edu/code/codeFrame.html> .

Larry D. Haisch, D.D.S.
National Director, C.O.D.E.
UNMC College of Dentistry
40th & Holdrege Streets
Lincoln, Ne 68583-0750

E-mail: lhaisch@unmc.edu
Office: 402-472-1290
Fax: 402-472-5290

CODE REGIONAL MEETING REPORT FORM

REGION: _____

LOCATION AND DATE OF MEETING: _____

CHAIRPERSON:

Name: _____

Phone #: _____

Address: _____

Fax #: _____

E-mail : _____

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: _____

Phone #: _____

Address: _____

Fax #: _____

E-mail : _____

Date: _____

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

CODE REGIONAL MEETING REPORT FORM

REGION: I (Pacific)

LOCATION AND DATE OF MEETING:

UCLA School of Dentistry

Los Angeles, CA

October 16-17, 2003

CHAIRPERSON:

Name: Edmond R. Hewlett D.D.S.

Phone #: (310) 825-7097

Address: UCLA School of Dentistry

Fax #: (310) 825-2436

10833 Le Conte Avenue, Box 951668

E-mail: eddyh@dent.ucla.edu

Los Angeles, CA 9009-1668

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

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LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Richard Kahn, D.D.S.

Phone #: 213-740-8084

Address: USC School of Dentistry

Fax #: 213-740-6778

925 West 34th Street

E-mail : rkahn@usc.edu

Los Angeles, CA 90089-0641

Date: TBA

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION I
SUMMARY RESPONSES TO NATIONAL AGENDA**

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

No Region I school has or is using the system, but some individuals have had hands-on exposure to it. Discussion reflected a general sense that cost and technique sensitivity render it not particularly compelling at this time. Specific issues include need to use only KaVo teeth, 5-minute turnaround time for each prep evaluation, counter-intuitive software, and the potential for error if tooth is not precisely positioned in jig. On the other hand, its potential for use to develop 3-D images for multimedia teaching presentations was thought to be noteworthy, and devices such as this are the way of the future **IF** they can truly eliminate subjectivity in examination grading. A representative from a state dental licensing board was intrigued with this possibility. All agreed, however, that this device, at this point in time, will not replace the human eye.

II. KaVO Diagnodent/other detection devices:

One Region I school is using a Diagnodent in student clinics on a very limited basis, and another will begin in the near future. Visual methods are most common for diagnosis of pit and fissure caries, with the “explorer stick” generally recognized as having poor sensitivity and specificity. Caries dyes are commonly used during cavity preparations. There was also a general concern over misinterpretation or misuse of the Diagnodent device leading to overtreatment.

III. CAD/CAM - CEREC 3:

Most schools report little or no experience with CEREC, especially in student clinics. Most also reflect very little among faculty in incorporating CEREC into the predoctoral curriculum due to concerns over precision of fit, cost, and time required for faculty and/or students to become proficient with its use.

IV. Educational Philosophies:

Most Region I schools utilize at least some degree of benchtop learning, with the notable exception of UBC, where clinical simulation is utilized exclusively. Repetition was unanimously endorsed as being essential to develop competency. Natural teeth are being used to varying degrees at all schools except UBC, and their use is generally diminishing. Schools using simulators cite their effectiveness, very positive feedback from students as to quality of the learning experience, and easier transition into clinic. However, those not using simulators tend not to view the transition to clinic as a major hurdle for the students.

Effect of community outreach programs on students' education is uniformly regarded as positive and of significant value.

Regarding "biomedical scenarios", most schools are incorporating case-based and/or simulated clinic cases into their preclinical operative curricula.

Two schools currently utilize a formal, fee-for-service caries risk assessment protocol in their student clinics. Respondents were unanimous in the opinion that the medical model of reimbursement for diagnostic tests and services must be adopted in order for such protocols to enjoy widespread use. Other schools not using formal protocols at this time generally report movement toward adopting one, and changing views among faculty toward less invasive/non-invasive treatment of early lesions.

- V.** Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be known by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise.
Do you agree with this name change? If not, please explain.

All agreed.

**2003 NATIONAL CODE AGENDA
REGION 1 RESPONSES**

(Please cite the evidence were applicable)

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

UBC: Not familiar with the system

LLU: We are not using this system, with no current plans to implement.

OHSU: Not at this time.

UCLA: No

USCF: No

USC: No

UW: No

How long has your school been using this system?

All attending schools had no response

How and where is it being used (i.e. preclinic operative/ fixed/ other)?

All attending schools had no response

What are the strengths and weaknesses of this system?

UBC: No response

LLU: No response

OHSU: No response

UCLA: No response

USCF: No response

USC: No response

UW: Cost: \$61,538.40

What are your recommendations/ summative evaluation of this system?

All attending schools had no response

Are devices which provide immediate quantitative feedback the way of future preclinical education? Please explain.

UBC: No response

LLU: No response

OHSU: Further educational research is needed to evaluate the efficacy of these devices vs. traditional teaching methods.

UCLA: We have perceived a need for greater objectivity in preclinical performance evaluation for many years. We have addressed this issue with traditional strategies, i.e. calibration to improve inter-rater reliability and clearly defined criteria for specific performance levels (grades). That said, devices providing immediate feedback, along with more sophisticated simulation modalities, is the way of the future.

USCF: No response

USC: No response

UW: No response

II. KaVO Diagnodent/other detection devices:

Are your utilizing current technology based caries detection methods/systems in student clinics?

UBC: No caries detection devices in use at the present in the clinics.

LLU: Not currently using any technology-based caries detection system. We are using magnification with air-dried teeth, x-rays, transillumination, and, occasionally, caries dye indicator. Explorers are used in detecting defective restorations, but not used routinely in diagnosing pit and fissure defects.

OHSU: Not at this time. We would like to obtain one such device for research purposes, and then utilize it in the clinic as we see fit.

UCLA: Caries detector dyes primarily, however, one Diagnodent unit is occasionally being used by a few select faculty.

- USCF:** Diagnodent is available through select faculty members, but the faculty at large has not received training with the Diagnodent. DIFOTI is available, but there does not appear to be much interest in using it.
- USC:** We are not using the KaVO Diagnodent. We do use caries detector dye by Ultradent.
- UW:** Not now, but we are planning to introduce them in the future. We already have the Diagnodent in the department.

Which systems are you using and how frequently are you using them?

- UBC:** No response
- LLU:** None
- OHSU:** No response
- UCLA:** N/A
- USCF:** The above systems are used infrequently at present, but plans are in the works to have in-service training for faculty on use of the Diagnodent.
- USC:** Ultradent Caries Detector. We use it infrequently depending on the particular faculty person.
- UW:** N/A

What are your opinions as to sensitivity/specificity?

- UBC:** It is felt the Diagnodent is very sensitive, but may lead to overtreatment, especially mechanically.
- LLU:** Current technological instruments have low specificity leading to possible overtreatment. These might be useful for longitudinal studies where a baseline has been established and caries progression is monitored.
- OHSU:** The potential for overtreatment seems to be present. Proper treatment planning and case selection need to be emphasized concurrent with its diagnostic use. One disadvantage may be that a point source is used necessitating that proper angulation be used to obtain an accurate image.
- UCLA:** Our opinions are obviously not based on firsthand experience in our clinics, but the literature appears to reflect a need for better sensitivity and specificity with newer caries detection devices.
Also, we have significant concerns over the potential use of early caries

detection devices to justify invasive restorative treatment on incipient lesions rather than as tools to identify the need for and monitor progress of *nonsurgical* interventions. The development of these devices is an exciting technological advance in caries management, but there is clearly a need to educate clinicians in the appropriate and ethical interpretation of their findings.

USCF: Fairly accurate at indicating the presence of caries approaching or into dentin, but not accurate at indicating the depth of the caries in dentin.

USC: It can be a wonderful adjunct, however, if one does not have experience with it, you can get false positives and remove excessive tooth structure.

UW: Diagnodent has been shown to have high sensitivity and low specificity. It is also technique sensitive.

Do you have knowledge of other technologies in development but not yet released? Please describe/explain these systems.

UBC: No response

LLU: No response

OHSU: QLF, 3M Clinpro diagnostic alginate (lactate sensitive).

UCLA: Optical coherence tomography (OCT - produces images of carious lesions using reflected laser light (no ionizing radiation!). 3-D imaging is possible. Qualitative and quantitative dimensional data. Ongoing NIH-funded research by Daniel Fried at UCSF.

Development of monoclonal antibodies for cariogenic bacteria - potential for use in fast, accurate, and inexpensive salivary analysis to determine quantities of bacteria present. Ongoing research by Wenyuan Shi at UCLA.

USCF: Optical coherence tomography (OCT - a non-invasive technology that would allow the dentist to see through enamel and dentin using a light source rather than ionizing radiation). It detects reflections of near-infrared light and permits imaging deep within tissues. It could give 2- and 3-dimensional images of early caries in occlusal surfaces for early detection. Because it is non-invasive, clinicians could follow the progression of early lesions over time with frequent scans.

USC: No response

UW: DOFITI: digital imaging fluorescent transillumination. QLF : quantitative light fluorescence. There is ongoing research in this area with the UW Pediatric Dentistry Department.

III. CAD/CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

- UBC:** Not currently in use. Due to the amount of training required to use CEREC, it would not be appropriate for the undergraduate program. It is felt one person would be required to manage the product and train students on its use.
- LLU:** Not currently using this system for student clinics. There is no interest on the faculty's part in teaching that at the moment, as there are problems with marginal fit and fracturing.
- OHSU:** Not at this time. We would like to obtain a CEREC 2 for trail purposes.
- UCLA:** Not using in student clinics at this time. The CEREC 2, 3, and In-Lab devices are used in C.E and postgraduate training programs in esthetic dentistry. We do have past experience with CEREC I in the student clinic. At the height of its use, we did no more than 5 restorations per week on student cases. Only two faculty were experienced enough with the system to use it with students, and it required an inordinate amount of instructor time.
- USCF:** No.
- USC:** We are not using it in our clinic. We have had the opportunity to have one and, after evaluations of others, it was decided that the accuracy did not meet our standards.
- UW:** We are not using this system. We do have an Empress machine that is used by the Prosthodontic graduate program and the experience has been good.

What is your evaluation as to accuracy/marginal fit?

- UBC:** No response.
- LLU:** CAD/CAM crowns, in our experience, are clinically "good enough" but not to the clinical standards of the metal ceramic crowns. A further problem is the inability to build in internal coloration to give the crown depth and vitality.
- OHSU:** The newer systems seem to produce a better fit than previous models with fewer resultant fractures.
- UCLA:** Acceptable margin adaptation can be attained if ALL parameters of prep design/image capture/restoration design are met, BUT the learning curve is steep and broad.

USCF: No response.

USC: No response.

UW: N/A

Is the system utilized in your Graduate Program and Faculty Practice?

UBC: No response.

LLU: It is not utilized in the graduate program or by the faculty practitioners, except in prior clinical studies.

OHSU: Not at this time.

UCLA: Graduate program - yes. C.E. courses and “residencies” only, but not in the formal postdoctoral residency programs.
Faculty practice - no. Past experience with CEREC 1 and 2 in Faculty Practice, but the two faculty who used it most often have left the university.

USCF: No response.

USC: No response.

UW: No.

What is your opinion as to the overall clinical acceptability of the restorations produced from student clinics?

UBC: The product being produced by the CEREC 3 is clinically acceptable. HOWEVER, there have been no long-term clinical trials and therefore no scientific evidence based material from which to teach.

LLU: No response.

OHSU: No response.

UCLA: Acceptable, but typically only after significant assistance from an experienced instructor with preparation finishing, followed by ALL hands-on use of the CEREC unit by that instructor. Trial-and-error (milling > 1 restoration to get an acceptable one) was not uncommon with CEREC 1.

USCF: No response.

USC: No response.

UW: In the pre-clinic we have included adhesive indirect restoration cementation exercises with composite resin inlays and veneers. We plan to introduce these types of restorations more extensively in the clinic in the future. As of now, they are only done under very strict supervision and case selection.

What are the strengths and weaknesses of this system?

UBC: Strengths:
-holds promise for future development
-would be good training device in a graduate program

Weaknesses:
-there is aggressive tooth reduction (2mm circumferentially)
-not user friendly at this point (steep learning curve)
-preparation demands exacting line of draw
-still very expensive to purchase

LLU: CAD/CAM crowns, in our experience, are clinically “good enough” but not to the clinical standards of the metal ceramic crowns. A further problem is the inability to build in internal coloration to give the crown depth and vitality.

OHSU: No response.

UCLA: Strengths:
-Excellent physical properties of ceramic
-Potential for single-appointment treatment with an indirect restoration

Weaknesses:
-Significant learning curve
-No intrinsic characterization possible
-High initial cost
-Need high production to make CEREC ownership profitable

USCF: No response.

USC: No response.

UW: N/A

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to the simulation mannequin vs. going immediately to the simulation mannequin?

- UBC:** We believe in **full clinical simulation** from the initial time a handpiece is picked up. The students at UBC do not actually pick up a handpiece until June of second year and by mid October, third year, 75% of the class have passed all requirements to begin patient care on Class I, II (amalgam/composite), III and V.
- LLU:** D1 students are first introduced to Operative Dentistry with the Learn-A-Prep which is performed on the bench. They then proceed to a mounted Mirror Exercise plate to get a feel for working with a mirror. All their operative preparations are performed on a mounted manikin head. Students seem to have an easier transition with this format as they get comfortable first with the high-speed handpiece, and then the mirror, before proceeding to preparing teeth in a manikin.
- OHSU:** We feel that benchtop preparation offers inherent advantages for incremental learning. It allows a student to focus on basic concepts and rudimentary technical skills and dexterity without the added variables involved with indirect vision and good ergonomic posture. Simply put, beginning on the benchtop is an attempt to avoid “information overload” for the beginning student. The transition from benchtop to indirect vision does not appear to be more than a fleeting challenge for most students.
- UCLA:** Initial orientation to the handpiece, as well as the first four tooth preparation exercises in the preclinical fixed prosthodontics curriculum, are conducted on the benchtop. The long -standing philosophy has been to first allow students to learn and accomplish the fundamental features of fixed preparations before adding the challenge of simulated patient position. All subsequent fixed projects, and all preclinical operative dentistry projects are conducted with the typodont/manikin assembly in the patient position.
- USCF:** We do not present a united front on this issue. Some faculty feel that students should learn from the start with the dentofrom mounted, while others feel students should learn on the benchtop first before working with mounted dentofoms.
- USC:** We have students doing procedures both on the bench and in the simulator. I personally believe that most students can learn better habits and obtain the necessary skills by doing all of the procedures from the beginning in the simulator. However, there are some students whom we have observed can develop the concepts and skills better by doing the procedures on the bench as eliminate the difficulty of access and vision. Most of these students can then make the transitions to the simulator and eventually the patient without a great deal of difficulty.

UW: We minimize the number of benchtop exercises. Students start using the mannequins as soon as they start making cavity preparations and emphasis is given not only to the quality of the preparation but also to the working position.

What is the value of quantity and repetition requirements before evaluation for competency?

UBC: Invaluable as a learning tool. We institute 2 hour practice sessions from 5:00 – 7:00 PM Mon – Thurs for the third years which are monitored by the top of the fourth year class.

LLU: We feel that repetition and a certain amount of quantity is valuable in reaching a level of quality that is evidence of competence. Some students are able to achieve this level with minimal repetitions, while a few will require extended hours outside of scheduled lab time to achieve an acceptable level.

OHSU: The WREB commented and we agreed that we have seen a drop in quality of our students' work when requirements were dropped and a competency-based system was adopted.

Repetition requirements provide multiple learning opportunities for the student (1) to practice his/her technical skill, and (2) to provide multiple clinical experiences unique to each patient.

However, practice does not make perfect; perfect practice makes perfect. Therefore, diligent evaluation and feedback by the clinical faculty must consistently occur

UCLA: Repetition is essential for skill acquisition and retention. Students are thus compelled to attain a minimum level of experience before being eligible for competency evaluation.

USCF: There is much value in repetition before evaluating competency, but a comprehensive care mode does not lend itself to a requirement system. Faculty have concerns about the clinical experience of the students.

USC: We believe strongly in repetition. Therefore I believe that all students need extensive clinical experience to become competent. Competency testing without experience is not a reliable way to determine if an individual is ready to work in an unsupervised situation.

UW: Competency: involves quality of the restoration and speed to complete the preparation in a timely manner.
The highest possible standard in quality is facilitated by repetition.

Does competency replace the need for quantitative repetition?

- UBC:** We feel competency and quantitative repetition go hand-in-hand.
- LLU:** No. Clinically, students are required to perform a certain minimum number of a given procedure prior to attempting a competency for that procedure. If the student's group mentor feels the student is not ready for the test, then the student will be required to do more than the minimum required. Should a student fail a competency exam, he/she will have to do a certain number of remediation preparations on a manikin before attempting another competency.
- OHSU:** Assessment for competency is not reflective in a singular event. Competency is best assessed through repetitive events; consistent performance over time is a true assessment of competency
- UCLA:** No. We believe that repetition is essential for skill acquisition and retention.
- USCF:** It depends on how the competency is measured. Clearly, a single pass/fail test of competency does not accurately measure it. While a competency exam may be passed, the degree of difficulty of the case is also important. An easy case does not measure competency as well as a more difficult case.
- USC:** Absolutely not!
- UW:** No. We look for consistent competency by quantitative repetition and experience.
By using natural teeth in addition to dentoform teeth, students are exposed to a variety of simulated clinical situations. This variation helps develop confidence in the students.

In addition to the restoring of ivory teeth in the pre-clinic courses, how are natural teeth being utilized (if your school uses them)?

- UBC:** We do not use natural teeth.
- LLU:**
- When studying tooth morphology
 - In operative preclinical:
 - caries removal and use of caries dye indicator
 - bonding exercise
 - pin placement and amalgam cusp replacement
 - post/core fabrication and buildup
 - Endo preclinical course
 - Restorative study club:
 - minimal board-type preps
 - partial coverage crown preps
 - simulated fixed partial preps

- OHSU:** Traditionally, we have used natural teeth more frequently than Ivorine teeth in our pre-clinical courses. More recently, Ivorine teeth are being utilized more frequently when a student is first learning to perform a specific preparation. The use of natural teeth increases the closer a student is to his/her clinical experience.
For example, during the first term of the three-term pre-clinical operative dentistry course a student may learn and practice tooth preparation on Ivorine teeth. During the third term, however, the student will practice entirely on extracted teeth having to address caries detection and removal, cusp overlay, enameloplasty of deep grooves or steep cuspal anatomy, etc.
- UCLA:** Preclinical fixed prosthodontics: Natural teeth are used for one posterior FPD project and one ceramic onlay project. All other projects utilize ivorine teeth. Preclinical operative dentistry: Approximately 15 natural teeth are utilized over the course of the curriculum (sealants, Class I, II, and IV composites, diastema closure, root caries restorations, caries detection/excavation, bases and liners, complex amalgam restorations with pin retention). Most introductory preparation exercises and all practical examinations utilize ivorine teeth.
- USCF:** Natural teeth are used much less in the preclinical courses, but when bonding procedures are done natural teeth are a necessity. Natural teeth are also used to demonstrate the clinical appearance of caries and its progression.
- USC:** Extracted teeth are used in Endo and there are a few exercises in Operative to help students become familiar with enamel, dentin and caries. We do give senior simulation exams for amalgam restorations on extracted teeth.
- UW:** The students make the same cavity preparations first in dentoform teeth and then in natural teeth that have been mounted onto the dentoform so that they can articulate them and still work on the mannequins. The use of natural teeth provides them with variation in preparation design. Tactile feedback and caries management experience.

**Are you utilizing simulators/DentSim for teaching operative dentistry?
Describe how you are utilizing these educational aids and their effectiveness.**

- UBC:** Yes, simulators. Regarding simulators in general, we feel they are invaluable in the teaching of clinical simulation.
- LLU:** Not using DentSim. Still utilizing the “head-on-a-stick” simulator with Columbia heads. These are used pre-clinically in Operative I and clinically on dental chairs during the D2 clinic orientation. Also, students utilize these manikins during restorative study club or when a patient cancels their clinic appointment. Students seem to transition from this manikin set-up to a clinical situation without too much difficulty.

OHSU: This is our second year using simulators. The first term of the three-term pre-clinical operative dentistry course is done on bench top. The following two terms utilize simulators. The students learn and practice proper posture, mirror skills, placement of the rubber dam, and tooth preparation with water and suction for two terms prior to their first clinical experience. Effectiveness will be evaluated via survey of the clinical instructors and students. We are very interested to know if other schools have developed evaluation methods.

UCLA: We have just completed a major renovation of our preclinical laboratory and now have simulators available. Most of the lab remains equipped with “head-on-a-stick” manikin setups, with the plan of approximately half the class rotating through the simulator lab at certain times in the preclinical curriculum. We have had no experience with our new simulators as yet. To date, the manikin setup has been used to teach operator ergonomics and use of the mirror for restorative procedures. Students have traditionally found the transition to live patients with water spray and suction use somewhat challenging, but they tend to adapt quickly. We plan to now incorporate the simulators for introduction to and retraining in a more realistic environment.

USCF: Yes. Currently, simulators are used in preclinical activities in small group rotations just prior to the students starting their clinical activities. A variety of operative and crown and bridge modules are completed. Students find these activities very useful.

USC: No.

UW: No.

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

UBC: No response.

LLU: Students appear to transition smoothly with this current format (head-on-a-stick). It has not reduced the number of faculty needed as students are assigned to clinic groups under the supervision of attending primary and secondary group mentors.

OHSU: We have not altered the timeline of when students enter the patient clinics.

UCLA: Yet to be seen for us.

USCF: The labs have helped with the transition to the clinics, but have not reduced the numbers of faculty needed in the clinics.

USC: No response.

UW: No.

Describe how your school relates biomedical scenarios to preclinic operative dentistry?

UBC: Students are given written case studies to complete which include working on medically compromised patients as part of the didactic portion. In addition, in the PBL curriculum, the students are fully integrated with the medical students and thus have extensive medical didactic training.

LLU: In Operative II and Introduction to Castings, the class is divided into groups and given various simulated patient situations with pictures and x-rays. The group, under faculty observation, develops a treatment procedure and performs said procedure on the typodont.

OHSU: Students are exposed to comprehensive treatment planning through lecture, text and interactive CD-Rom during their pre-clinical training. Specifically in Operative Dentistry, in the third term of pre-clinical operative dentistry, students mount an entire mouth (maxilla and mandible) of extracted teeth, treatment plan, and then treat the case. We are currently evaluating the use of pre- and post-operative radiographs in the pre-clinical setting. Accompanying lectures incorporate comprehensive treatment planning themes during the third term.

UCLA: Currently not using case-based or simulated case approach in preclinical operative dentistry, opting for the more traditional approach of emphasis on technique and material science. Cases are used in the treatment planning courses, and planning is underway to revise preclinical operative to incorporate simulated clinical cases.

USCF: The school will be embarking on a new, integrated curriculum next year. The biomedical sciences will be introduced early on with case presentations and small group sessions with input from many disciplines.

USC: All students in our PBL curriculum have cases that describe clinical situations and they do research, self study and group study and interaction to learn the didactic concepts.

UW: We use clinical cases as basis for preclinical education.

Have community out-reach programs impacted our educational goals? Please describe.

UBC: No response.

- LLU:** This has been positively received by the students. For a number of students, it might be the first experience to do procedures not readily available in the school. Students are blocked to spend time at one of our community clinics during their Junior and Senior years. Students also participate in summer mission trips to countries such as Fiji, Micronesia, South America, Asia, and East European countries. These experiences have increased the students' sensitivity and focus to the needs of the underserved. It also presents the opportunity to treat patients not normally seen at the school e.g. drug addicts or patients not able to afford "plan A".
- OHSU:** The community dentistry curriculum does include an extramural rotation. Students are exposed to treating a demographic group that differs from the dental school clinics. However, unlike in the dental school clinics, dental care in this extramural setting is episodic in nature instead of being comprehensive and preventative. In addition, student work is evaluated for "clinically acceptable" levels rather than the "ideal" for which we strive in the dental school clinics. Nonetheless, the feedback from the students is that the extramural rotation is a valuable experience that supplements what is learned in the dental school clinic.
- UCLA:** Community outreach, both assigned extramural rotations and voluntary experiences, have had decidedly positive effects on our students' education. Students typically return from these experiences with increased confidence in their clinical skills and improved speed. They also value highly both the exposure to patient populations with limited access to care and the opportunity to care for these patients.
- USCF:** Community out-reach programs have had a very positive impact on our students. In addition to going to schools and presenting oral health education and participating in school fluoride programs, the students have put together a clinic for homeless people. They have solicited companies and faculty for supplies and have volunteer faculty mentors for this no-cost clinic.
- USC:** Our community outreach programs are a wonderful experience for our students. However, many of the faculty are concerned that the standards and criteria used at these venues are different than those used within the school. This is probable due to the poor calibration of the faculty supervising the outreach program.
- UW:** The students have a required rotation in pediatric dentistry where they go to Eastern Washington to provide dental service for disparity groups. They do this for 2-3 weeks during summer breaks. Students benefit from this experience because they provide comprehensive care and community service. Very good reports have been received from the students regarding this program.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

- UBC:** UBC has designed a medical protocol for the treatment of dental caries. Patients are classified as P1, P2, P3 or P4 (low caries risk P1, high caries risk P4) and a package is designed and sold to them to treat their specific disease. For example, a high caries risk patient (P4) would be counseled on nutrition, treated aggressively with Duraflor and have chlorhexidine rinse and home fluoride programs prescribed and monitored. In addition, oral hygiene instruction would be provided throughout the treatment regime.
- LLU:** There is a paradigm shift occurring in the treatment of the minimal (E1, E2) lesion from a surgical approach to a medical model of treatment utilizing nutrition and habits assessment and counseling, oral hygiene instruction, use of xylitol, chlorhexidine, home and professionally applied fluoride. This paradigm shift, however, is affecting the students' experiences in restoring the "ideal" minimal lesion in preparing for the state and regional boards. **Most or all of the board lesions selected could and should be treated medically, rather than surgically.**
- OHSU:** There is a general trend toward acceptance of research-based non-surgical preventive measures among the faculty and clinicians. Clinic protocol will be reflective as these topics are presented in the pre-clinical curriculum and through further discussion with the clinical faculty. Currently, we stock fluoride varnish in our clinic. Other items under current consideration are xylitol gum and mints and chlorhexidine rinse as part of a caries prevention protocol.
- UCLA:** We are currently developing a formal caries risk assessment program for our student clinics, modeling it after the program in use at UCSF.
- USCF:** UCSF introduced caries risk assessment in its preclinical education several years ago. Just last year a caries risk assessment program was instituted in our clinics. Patients are offered a package that includes risk assessment, diet analysis and counseling, fluoride (Prevident), bacterial testing, and antibacterial rinse (Periogard) sufficient for one year. A description of the philosophy can be read in the February and March 2003 issues of the California Dental Association Journal (vol. 31, No. 2 & 3) or can be found online at the website of the California Dental Association Foundation (www.cdafoundation.org/news.htm).
- USC:** We do not have a protocol for caries risk assessment.
- UW:** The first course in the Operative Dentistry series is mainly a Cariology lecture course. Caries risk assessment and emphasis on preventive therapy protocols will be introduced into the clinic with a more contemporary approach.

Which of these programs is the most effective?

- UBC:** This program (described above) is **VERY EFFECTIVE**. We service mainly low-income patients who buy into this treatment (even though it is not covered by their dental insurance).
- LLU:** No response.
- OHSU:** No response.
- UCLA:** N/A
- USCF:** We do not yet have any long term data for use in our clinics.
- USC:** No response.
- UW:** We do not have the clinical experience so far.

What are the strengths and weaknesses of this system?

- UBC:** No response.
- LLU:** No response.
- OHSU:** As always, the emphasis on comprehensive treatment planning and case selection is imperative. The use of adjunctive agents (fluoride varnish, xylytol products or chlorhexidine rinse) are not to be implemented independent of rigorous oral hygiene and diet instruction.
- UCLA:** N/A
- USCF:** The main weaknesses with these types of programs are maintaining patient compliance and diligence by the faculty and students to see that the programs are properly followed.
- USC:** No response.
- UW:** Strength: the educational goal of prevention, conservation, patient's benefit.
Weakness: reimbursement, credits (points, rewards).

- V. **Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise.**

Do you agree with this name change? If not, please explain.

Majority agreed with change. Additional comments below:

OHSU: "Consortium" refers to combined financial institutions working toward a common end.

"Coalition" is an alliance (although often temporary)

"Conference" refers to either a meeting or discussion, or to an association (such as an athletic conference). The latter term seems to apply most appropriately.

UW: Consortium: refers to a loose association

Confederation: close alliance

III. **Regional CODE Agenda**

The 2004 Region I meeting will be hosted by USC, date TBA.

IV. **National CODE Meeting**

V. **Suggestions for CODE**

What can the organization do to improve its effectiveness?

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

Other suggestions?

Suggested topics for next year's National C.O.D.E. agenda:

CODE Region I Attendees Form

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
Edmond Hewlett	UCLA	310-825-7097	310-825-2536	eddyh@dent.ucla.edu
Gabriela Ibarra	UW	206-542-5948		gibarra@u.washington.edu
Geri Kern	OHSU	503-494-8943		kern@oshu.edu
Ralph Leung	USC	213-740-1530	213-740-6778	rleung@usc.edu
Lance Rucker	UBC	604-433-6071	604-822-3562	lrucker@interchange.ubc.ca
Dan Tan	LLU	909-558-4640	909-558-0253	datan@sd.llu.edu
Karen Gardner	UBC		604-822-3562	drkg@interchange.ubc.ca
Janet Bauer	UCLA	310-825-6987	310-825-2536	jbauer@dent.ucla.edu
Richard Stevenson	UCLA	310-794-4387	310-825-2536	rga@dent.ucla.edu
Richard Kahn	USC	213-740-8084	213-740-6778	rkahn@usc.edu
Calvin Lau	USC	213-740-1525	213-740-6778	cslau@usc.edu
Arthur Schultz	California Dental Board	310-545-4509		artlinda@verizon.net
Ariane Terlet	California Dental Board	510-548-4084		aterlet@aol.com

CODE REGIONAL MEETING REPORT FORM

REGION: II (Midwest)

LOCATION AND DATE OF MEETING:

University of Minnesota School of Dentistry Minneapolis, MN

September 22 -23, 2003

CHAIRPERSON:

Name: Gary Hildebrandt

Phone #: (612) 625-8486

Address: 8-450 Moos Tower

Fax #: (612) 625-7440

515 Delaware Street SE

E-mail: Gary.H.Hildebrandt-1@t.c.umn.edu

Minneapolis, MN 55455

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

1. Compare requirements for graduation
2. Compare clinical evaluation forms and procedures: What is evaluated and graded? What data is recorded and placed in a database?
3. Compare practical and competency exam experiences: What competencies/practicals do you have?
4. Compare faculty calibration and in-service efforts, both clinical and preclinical.
5. What is Evidence-Based dentistry and what value is given to clinical experience by this philosophy?
6. Preventive Resin Restorations make use of sealants as a part of the restoration. Since sealants have a fairly short lifespan, are we committing ourselves to a lifetime of close observation of these restorations?
7. Use of flowable composites or glass ionomers under composites?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Mark Belcher

Phone #: (618) 474-7056

Address: Southern Illinois University
School of Dental Medicine

Fax #: (618) 474-7150

2800 College Avenue

E-mail: mbelche@siue.edu

Alton, IL 62002-4700

Date: Sept 20, 21, 2004

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION II
SUMMARY RESPONSES TO NATIONAL AGENDA**

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

No participating school used the KaVo PREPassistant. Few were even familiar with the system. This did not prevent a vigorous discussion. Concerns were voiced about embracing new technology because it is trendy rather than because it solves a problem or helps fulfill some educational goal. We should not be concerned about developing technology for technology's sake. Just because the current teaching style has been used for a considerable span of time does not imply that the techniques are antiquated and no longer effective.

The KaVo PREPassistant is attractive because of the promise of making the evaluation of student work more objective, however, objective feedback is not all that a student needs. There is value to empathy and encouragement as well. If the KaVo PREPassistant is effective, it is still not a substitute for instructor interaction and feedback.

New technologies also tend to be expensive and the benefits must be weighed against the costs of these new systems.

II. KaVO Diagnodent/other caries detection devices:

The literature contained a few clinical studies which validated the ability of this system to diagnose pit and fissure and cervical enamel caries lesions. It may prove to be a welcome addition to our unreliable skills in diagnosing early pit and fissure caries lesions.

A few schools have used KaVo Diagnodent on a limited basis. The device was expensive and there was concern that the widespread use of it could lead to over-diagnosing and overtreatment. It was suggested that KaVo Diagnodent be used **after** caries risk was established via caries risk assessment. If caries risk status was low, there would be little reason to perform this test.

III. CAD\CAM - CEREC 3:

All participating schools represented had at least one CEREC unit, although they were generally earlier versions and they were often underutilized. Experience with these units was limited, with the exception of the Universities of Iowa and Minnesota. The University of Iowa had experience placing many of these restorations and felt confident they were reasonably durable. The University of Minnesota possessed several units and was offering an elective course to junior and senior undergraduate dental students, including a pre-clinical and a clinical component. Both schools felt the technology involved a significant learning curve for the faculty and suspected the systems were going to become more prevalent in the future. Because the units were very expensive, most had acquired their units by donation rather than direct purchase. There were mixed reviews on the restoration.

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to a mounted dentoform or simulation system vs. going immediately to a mounted dentoform or simulation system?

There were a variety of philosophies regarding dentoform positioning. Some had a full semester of work on the benchtop before switching to the clinical position (bench mount or clinical simulation unit). Others had a few introductory exercises on the benchtop before switching to the clinical position, and still others started right out in the clinical position.

What is the value of quantity and repetition requirements before evaluation for competency?

Most participating schools had Comprehensive Care-type clinic arrangements and student performance was monitored. Requirements for graduation often involved successfully passing competency exams, which require a certain number of similar performed restorations for eligibility. The University of Iowa differed by having a clerkship system. Requirements were tracked behind the scenes and requirement levels fluctuated according to a sliding-scale based on student performance. Some schools also had an attendance requirement in clinic.

Have community out-reach programs impacted your student's education, either positively or negatively? Please describe.

All participating schools were involved in some form of Community Outreach - whether in the form of a mission to a developing country, rotation through an extramural clinic, or participation in local externships (private practice experience). Operative treatment completed in these extramural settings was generally not credited towards intramural clinical grades or requirements, although two schools gave time credit. All schools valued the outreach program as one that built student confidence. Concerns were expressed regarding the continuity of care with short rotation intervals, distance of travel for married students with children, and calibration of supervisors in extramural settings.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

Caries Management:

All participating schools agreed on the value of caries risk assessment and efforts to control the disease over and above providing restorative services, however, risk assessment methods varied. Some schools used "score cards" with weighted formulas for computing level of overall risk. Other schools used "checklists" of potential risk indicators. Impediment to teaching this involves clinic instructors who have practiced in a previous era when caries was more ubiquitous and risk assessment less necessary.

**2003 NATIONAL CODE AGENDA
REGION II RESPONSES**

(Please cite the evidence were applicable)

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

COLO: No.

CRE: No.

IOWA: No.

MARQ: Do not have at Marquette University.

MINN: No.

UNMC: No.

SIU: No, we are currently not using this system and are not familiar with it.

UMKC: No.

How long has your school been using this system?

Not applicable due to system not being utilized at region schools.

How and where is it being used (i.e. pre-clinic operative/ fixed/ other)?

Not applicable due to system not being utilized at region schools.

What are the strengths and weaknesses of this system?

Not applicable due to system not being utilized at region schools.

What are your recommendations/ summative evaluation of this system?

Not applicable due to system not being utilized at region schools.

Are devices which provide immediate quantitative feedback the way of future pre-clinical education? Please explain.

COLO: In some capacity all of these technologies will enhance the learning of dental students. It is important to remember that teeth are treated based on principles and not on rigid criteria. This technology must be careful to not put students' thinking back in the "box".

CRE: No response.

IOWA: They have application for initial standardized preparation. Not effective in transition to detect specific preparation and restoration. Due to the expense, this evolution will be slow. No substitute for 1 on 1 faculty feedback.

MARQ: Do not have at Marquette School of Dentistry.

MINN: No response.

UNMC: Probably, but it is doubtful that they can or should replace feedback from an experienced faculty member.

SIU: No, we are currently not using this system and are not familiar with it.

UMKC: No response.

III. KaVO Diagnodent/ other caries detection devices:

Are your utilizing current technology based caries detection methods/systems in student clinics? Which systems are you using and how frequently are you using them?

COLO: No.

CRE: No.

IOWA: Rarely. Diagnodent

MARQ: Yes, we are using the Diagnodent and Seek.

MINN: Yes (limited). Diagnodent.

UNMC: Yes, on a limited basis. Diagnodent is available in our clinic. Utilization has been low, probably due to faculty not suggesting their use.

SIU: We have one Diagnodent unit which I obtained as a grant from KaVo, in our clinic. We use it at least once a week.

UMKC: No response.

What are your opinions as to sensitivity/specificity?

COLO: We have to be very careful of the false positives. More harm can be done by wrongly preparing a tooth.

CRE: No response.

IOWA: Higher sensitivity compared to other methods of caries detection. Useful adjunct.

MARQ: Not real accurate, good for the real novice, a lot of false positives.

MINN: We have not generated scientific data regarding the sensitivity and specificity. Students are asked to evaluate the technology in an Operative Dentistry evidence base course. Their feedback is positive.
There are more than twenty publications regarding the sensitivity and specificity of Diagnodent. Most of these studies are in vitro and few are clinical. What can be concluded from these studies is that Diagnodent is a viable diagnostic tool for dental caries. It is a welcome addition to the present methods, mainly visual and tactile, which have shown consistently poor sensitivity and specificity.

UNMC: We have completed a laboratory research project where we “mapped” carious proximal surfaces of human teeth. It was found when the surfaces were repeatedly “mapped”, the results were reproducible for each trial. It is possible to fool the Diagnodent unit when restorative materials are present and should be used with caution if restorations are present.

SIU: The Diagnodent appears to have high sensitivity but low specificity. It does not often yield false negatives often but false positives are prevalent, especially when staining is present in grooves. It appears to read all stained areas as decayed.

UMKC: No response.

**Do you have knowledge of other technologies in development but not yet released?
Please describe/explain these systems.**

COLO: No response.

CRE: No response.

IOWA: No response.

MARQ: No knowledge of other systems.

MINN: No response.

UNMC: No.

SIU: We are unaware of any other technology developed to diagnose decay.

UMKC: No response.

III. CAD\CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

COLO: No.

CRE: No.

IOWA: Yes, on a limited basis now in the Junior and Grad Operative Clinic, however, we are purchasing the CEREC 3D and it should be more widely used

MARQ: We have 2 units, still experimenting with usage.

MINN: Yes, there is an elective course taught by the division of Operative Dentistry (6 students). Students at the end of the course do a clinical case.

UNMC: No.

SIU: We are currently not using CAD/CAM CEREC technology in our student clinics. We have an old CEREC 2 unit recently donated by an area clinician. We have not used it in our clinics yet.

UMKC: No.

What is your evaluation as to accuracy/marginal fit?

COLO: No response.

CRE: Depends upon the operator (of the software).

IOWA: Below average but clinically acceptable with cementation for Cerec 2. Improved with the CEREC 3D

MARQ: Marginal fit is poor.

MINN: We have not generated scientific data regarding the fit. The data in the literature is extensive and show that the fit within the parameters of bonded restoration is clinically acceptable.

UNMC: No response.

SIU: No response.

UMKC: No response.

Is the system utilized in your Graduate Program and Faculty Practice?

COLO: No, however, we tried this system several times and just were not satisfied that this was the way to go at the time.

CRE: No response.

IOWA: Yes, infrequently due to learning curve and inferior performance of CEREC 2.

MARQ: Utilized in the Graduate Studies.

MINN: We do not have a Graduate Program, but it is used in Faculty Practice (limited).

UNMC: No.

SIU: No response.

UMKC: No response.

What is your opinion as to the overall clinical acceptability of these restorations produced from student clinics?

COLO: No response.

CRE: Not applicable.

IOWA: Acceptable, but usually more of a demo from faculty. Student does prep with input and faculty finishes, takes optical impression and designs restoration.

MARQ: At this point not clinically acceptable.

MINN: I think this technology adds a new dimension to our restorative techniques. The criteria for acceptability should be the same as any restorative procedure. Good case selection and precise preparation. In case of CEREC there are other skills such as accurate digital impression and the ability to manipulate the software.

Bonding the restoration is the same as bonding any partial porcelain. Students should be able to use this technology and produce clinically acceptable restorations.

UNMC: Not applicable.

SIU: No response.

UMKC: No response.

What are the strengths and weaknesses of this system?

COLO: No response.

CRE: Shade variance at incisal and gingival is not practical because it is cut from a block ingot of one shade.
More natural tooth structure can be maintained for posterior teeth, because inlays and onlays are usually the restorations of choice for this system, rather than full coverage.

IOWA: Strengths are one appointment, bonded restoration, conservative option and student interest.
Weaknesses include cost of system, learning curve, previously not as good a fit as lab processed.

MARQ: Strengths - turn around time.
Weaknesses – fit and color.

MINN: Strength: Evidence based data on clinical performance
Chairside
Esthetic
Conservative
Quality of the restorative material
Weakness: Cost
Learning curve
Constant upgrades
Faculty training

UNMC: Not applicable

SIU: No response

UMKC: No response

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to a mounted dentoform or simulation system vs. going immediately to a mounted dentoform or simulation system?

COLO: Pre-clinic is preparation for clinic. All of the conditions that a student will experience in the clinic should be replicated in the pre-clinic (to the extent possible) from the first day. Give students credit; they are a lot smarter and more talented than we may think. What good does it do to have students develop bad habits from the first day? Our simulation clinic requires students to dress, behave, and perform as if they are in clinic. The only bench preparation is 1 hour of practice with the high-speed handpiece cutting on a Learn-A-Prep II.

CRE: We prefer starting on the bench (freshman year), then going to a combination of benchtop and bench-mount (rod and typodont) or mannequin during the sophomore year.

IOWA: Simulation clinic is superior on every level, however, it is more challenging to students

MARQ: We utilize a mounted dentoform in a simulation system.

MINN: With the exception of three introductory preparations cut on double life-size plaster teeth, we start immediately with bench mounted dentoforms (typodont on a post). We wish students to develop skills from the very beginning in clinically applicable orientation. Otherwise a period of "untraining" or "deprogramming" is required when you switch from benchtop to bench mount.

UNMC: In our program we have the students work tabletop most of the first semester of pre-clinical Operative education. When they begin doing anterior restorations, the dentoform is then mounted. In the second semester Operative course, all work is completed on a mounted dentoform. We feel it is appropriate for the students to adjust to the new techniques and materials before adding the additional burden of using a mirror.

SIU: An additional learning curve is required if the student first learns to cut preps on the bench and then moves on to the mounted dentoform or simulation system. It might be better to have the students cut directly in chair position, although that is not what we do, in our pre-clinical courses.

UMKC: We use the Learn-A-Prep on the bench first, then we go to the lower arch the first semester and the upper arch the second semester.

What is the value of quantity and repetition requirements before evaluation for competency?

COLO: Repetition is good only if corrections are made along the way. It does a student no good to practice 10 Class II preps, all done wrong, without support along the way. Principles are what should be taught not strict criteria or preparation forms. What is the proper shape for a Class III composite preparation or any composite preparation, for that matter?

- CRE:** Quantity and repetition are highly valued before competency (just ask any coach on any level).
- IOWA:** Repetition is necessary to become competent but it must be based upon quality. Competency is reached at different level of experiences for each student. It is important that students practice procedures with faculty feedback before taking competency exams, to gain experience in clinical procedure and understand the evaluation process.
- MARQ:** Quantitative repetition until acceptable.
- MINN:** Repetition is essential to development of hand-eye coordination and improving motor skills. Like learning to ride a bike, lectures and demonstrations are of limited value. There is no substitute for personal experience.
- UNMC:** Repetition is necessary for a person to learn a new motor skill. Additionally, it is necessary for a person to see the variation in clinical situations. Without that opportunity a person cannot learn clinical judgement, which is so necessary to becoming a practitioner.
- SIU:** I strongly feel quantity and repetition are essential before competency evaluations. Even though students may be able to perform satisfactorily on a competency exam, it does not necessarily mean they have mastered the technique. Different variables presented by different situations in different patients' mouths need to be dealt with to achieve true competency. A single, carefully selected case does not demonstrate competency.
- UMKC:** How can you be competent if you don't practice a number of times? It is very valuable.

Does competency replace the need for quantitative repetition?

- COLO:** Of course it does! Students should be competent before graduation. How could you graduate a student who has done 50 Class II restorations, all of them with critical skill errors? Why would you force a student who has done 20 perfect Class II restorations to treat 30 more of the same? Advance that student to something better.
- CRE:** No, competency does not replace the need for quantity. An operator's competency is bound to improve with repeated case exposures/experiences.
- IOWA:** No, but there is variation in amount of experience needed by students to attain competency
- MARQ:** Competency does not replace the need for quantitative repetition.
- MINN:** No. As soon as a child learns to stay up on a two wheel bike he is wobbly and prone to accidents. After repeated practice he will become steady and proficient. The question here is when is the best time to test for competency?
A certain minimal level of repetition is necessary. The timing of competency testing could be tied in to each student's level of development, however, logistically, it is easier for the instructors and course director to test a preset point when historically most students are ready for testing.

UNMC: No.

SIU: In my opinion, competency does not replace quantitative repetition, the other name for which is "experience".

UMKC: Sometimes. If they do not have enough experience, they might have just been lucky on the first or second competency try.

In addition to the restoring of ivorine teeth in the pre-clinic courses, how are natural teeth being utilized (if your school uses them)?

COLO: Not used in restorative dentistry. Only endodontics uses natural teeth.

CRE: Daily lab exercises in freshman and sophomore courses use natural teeth.

IOWA: Caries identification and removal and bonding procedures (D2).

MARQ: Natural teeth are utilized to teach the bonding procedures with amalgam and resin.

MINN: Natural teeth are used in a few limited exercises. This is done for these reasons: (1) to give the student an opportunity to do "caries removal", (2) to note the difference between the ivorine and dental tissues in terms of cutting and finishing restorations, and (3) to do root surface restorations - a task not easily simulated on the dentoform. These exercises are generally accomplished by mounting individual teeth in a small amount of plaster and holding the specimen in whatever orientation is most comfortable.

UNMC: Natural teeth are being used in the second semester, D-2 Operative course when the students are learning amalgam bonding techniques.

SIU: Natural teeth are mounted in stone and decay is excavated, preparations cut and restored with glass ionomer, composite resin and amalgam.

UMKC: We don't use them in the lab. We use the simulated caries teeth for the last exercise before they go to the clinic.

Are your utilizing simulators/DentSim for teaching operative dentistry?

COLO: Yes. We have a simulation clinic. We have one DentSim.

CRE: No.

IOWA: No. DentSim or standardized prep system such as Prep Check. Use simulators/dentoforms in Sim Clinic

MARQ: We utilize ADEC simulators. There are no educational aids associated with these simulators.

MINN: No.

UNMC: We are not utilizing DentSim style simulators. In our pre-clinical labs we use dentoforms on a mounting rod. In addition, there are a few exercises where a Chrome Head with a dentoform is installed on a patient chair in our clinic.

SIU: No, DentSim is currently not being utilized at our school.

UMKC: We bought one and don't use it. Anyone want to buy ours?

Describe how you are utilizing these educational aids and their effectiveness.

COLO: The simulation clinic is used routinely for all restorative dentistry courses. We utilize the system fully. We will be enhancing this facility when we move to our new dental building in less than two years. We only use the DentSim as an adjunctive teaching device. We believe that this device is too rigid in its capabilities to be extensively utilized.

CRE: Not applicable.

IOWA: Sim Clinic; Dental Anatomy; Operative Dentistry preclinical; Esthetic Dentistry Course.

MARQ: No response.

MINN: No response.

UNMC: No response.

SIU: No response.

UMKC: No response.

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

COLO: Yes, students are more prepared for clinic treatment. They start patient care in the middle of the second year and we are pushing that forward even more. Our faculty numbers have diminished due to budget reasons. I am unable to relate change in staffing numbers to the use of technology.

CRE: Not applicable

IOWA: Maybe not earlier but better. Same number of faculty in a better teaching environment. Helps with standardization of faculty and student performance.

MARQ: The simulation laboratories have helped with early transition to the clinics. The faculty numbers really have not changed.

MINN: No response.

UNMC: No, therefore have not had an impact on the number of faculty.

SIU: At our school, students do not perform any clinical operative dentistry until their junior year.

UMKC: No. We still have faculty ratios of 10:1 and we utilize part time faculty. We would rather have faculty contact with students.

Describe how your school relates biomedical scenarios to pre-clinic operative dentistry?

COLO: Every treatment that is rendered in pre-clinic operative dentistry is done according to clinical and radiographic findings. Students are required to understand the clinical conditions and to describe the proposed outline of the preparation. Since we teach composite and amalgam concurrently, students are also required to suggest a restorative material. We are developing a family of patients. One of the family members will provide all of the experiences for operative dentistry, fixed prosthodontics and possibly removable prosthodontics. Another patient will require complete removable prosthodontics. Students will treat the patient according to a list of findings and will develop a treatment plan. All information will be in the form of a virtual patient.

We also use dentoform teeth with existing conditions which need correction. For example we have teeth already prepared for amalgam foundations. Students have to place the retention system and restore. The foundations are then used in fixed prosthodontics for full crown preparations.

CRE: We are kicking off an endeavor called "Interprofessional Education" at Creighton. It consists of Health Science students learning together in different experiences, so as to treat patients in a team approach. So far, these exercises have consisted of grand round panels with small group breakouts.

IOWA: Through our Experiential Learning exercises: Standardized patient cases.

MARQ: Biomedical scenarios are incorporated into the curriculum. We had to change the curriculum totally to accomplish this task.

MINN: (1) The implications of medical conditions on dental treatment are generally the realm of other departments within the school. The effects of general health and other host factors on dental caries is described in the lecture course that accompanies Pre-clinical Operative Dentistry Lab.
(2) The effects of Operative Treatment on patient overall health is not covered in any one module. This is covered more in courses on dental materials and prosthodontics. It is approached in a cursory manner in discussions of field isolation, restorative material selection, and dental morbidity.

UNMC: We are not using case-based education in our courses. Our courses are technique only classes. Information regarding caries and caries prevention are included.

SIU: Very little relationship exists between biomedical scenarios and pre-clinical instruction. Caries risk tests and diet analysis exercises were added to the sophomore curriculum, temporarily, but are not taught any more.

UMKC: For the caries tooth they have to fill out a patient record first. We have a case-based scenario in a course that covers treatment planning.

Have community out-reach programs impacted your student's education, either positively or negatively? Please describe.

COLO: Only positively. We are recognized nationally for the quality of our out-reach program and the experiences it generates. You may be surprised to learn how capable students are if given the challenge.

CRE: We have a couple of community out-reach programs for our dental students. One is locally in Omaha and serves a disadvantaged Latino community. Patients are screened for dental treatment at an off-campus site one week, and the following week are seen at the Creighton dental clinic after hours. All students have the opportunity to work in this program. Students do participate heartily in this activity and always have given positive feedback for exposure into another culture as well as the opportunity to supplement their operative dental experiences. The second program involves travel to the Dominican Republic during the summer between their junior and senior years. The dental students form health teams with other Creighton Health Science students and deliver care to the outlying villagers, under the direction of Healthcare professionals. The maximum number of students that can participate is 12. These students have always greatly appreciated this program and often return as professionals themselves to oversee other students.

IOWA: Positively, extramurals, health fairs, pre-dental student club all help students to connect with community and various environments for health and dental care. Win-win situation

MARQ: No response.

MINN: There is an ongoing debate occurring right now over whether credit should be given for operative treatment carried out in out-reach settings. Some say only work accomplished in intramural clinics should count towards operative graduation requirements so that students can be adequately supervised and judged competent. Others say that students should be allowed to learn anywhere and that competency exams can be used as safeguards. Calibration of extramural (and intramural) faculty is a key issue. Faculty that teach from similar treatment philosophies are less likely to step on each others toes or to create confusion in their student clinicians.

UNMC: In general these programs have a positive impact on our students as they allow the students a more varied view of practice situations. The main concern is whether or not the level of supervision is similar to the dental school environment. Calibration is always a concern when the students are off-site.

SIU: Community out-reach programs mostly focus on prophies, exams and sealants. In those areas, they positively impact students' experiences.

UMKC: Yes, the students like them very much. They receive a great amount of independence and they feel that they are able to self-determine themselves when they go to the clinic. They almost grow into their position as doctor when they return. They also grow in self-confidence.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

COLO: We have a complete vertically integrated program. We teach students that there are two methods for treating a tooth – surgical and non-surgical. They are expected to perform both in the clinic and are given “credit” for both. Students are to formulate treatment plans around the caries risk assessment. There is no such thing as “to observe a suspected lesion.” It must be treated with non-surgical techniques. Students are taught that the dental explorer is a useless instrument for initial diagnosis. They are taught to prepare a tooth based on the problem and not a specific restorative material. Then select the material based on the result of treatment. They are taught that conservative preparation does not necessarily mean “small”.

CRE: Oral hygiene instruction, home fluoride supplements, diet surveys with counseling and management, saliva substitutes (Biotene products)

IOWA: The protocol from our Clinical Guidelines for Clinical Care, the Caries Risk Assessment and the Caries Risk/Activity Treatment Options worksheets follow.

Guidelines for Clinical Care

Department of Operative Dentistry

Proximal Lesions-Surgical Intervention (05-Aug-03)

Diagnosis of proximal lesions is more difficult when the adjacent tooth prevents direct visual examination. While radiographs and transillumination are helpful, the presence or absence of cavitation cannot be judged from a radiograph. For an active carious lesion to become arrested, plaque must be regularly removed from it, and that is impossible with a cavitated lesion. Surgical intervention should not be determined independent of caries risk.

Surgical intervention may be identified if (active lesion indicated):

Lesion present on radiograph or with transillumination (anterior teeth) that was not present on previous radiographs or examination (depth dependent)

Successive, reproducible, serial radiographs indicate progression of lesion(s)

Proximal lesion(s) present on radiograph & high caries risk status

Proximal lesion(s) present on radiographs & presence of persistent gingival inflammation despite the patient's attempts to remove dental plaque with dental floss

Cavitation visible with tooth separation technique

Surgical intervention may not be indicated if (arrested lesions):

Successive, reproducible radiographs show no signs of lesion progression

Patient is assessed as having low caries risk

Decision to monitor or restore is also based on:

No changes in caries risk status of patient (from lower to higher risk)

Patient willingness to comply with recommended preventive measures, recommended recall interval and possible increase in number of serial radiographs

Ability/inability to closely monitor lesions with clinical and radiographic examination intervals dictated by depth of the lesion and caries risk status

Surgical intervention is not indicated for lesions confined to enamel. All lesions beyond the outer 1/3 of dentin should be restored.

CARIES RISK ASSESSMENT worksheet

Name _____

LOW

Chart # _____

HIGH

Date _____

C0180 Initial Caries Risk Assessment

C0181 Caries Risk Re-Assessment
(Completed at recall exam)

Place CRA label on CRT

EVIDENCE OF DISEASE OR PAST DISEASE	Yes/No	NOTES & RECOMMENDED INTERVENTIONS
Active caries lesions		(If YES patient is high risk)
Recent restoration for active caries (within the last year)		
Past dental history i.e., high DMFT (>8)		
White spot lesions		

RISK FACTORS	Yes/No	NOTES & RECOMMENDED INTERVENTIONS
Diet (fermentable carbohydrates)		
Inadequate topical fluoride		
Inadequate oral hygiene		
Xerostomia (check for meds)		
Exposed root surfaces		
Retentive occlusal anatomy		
Teeth erupted with past 2 years		
Challenges to physical/cognitive		
Inadequate systemic fluoride		
Other factors:		

CARIES RISK/ACTIVITY TREATMENT OPTIONS

(check off preventive measures that are recommended and/or prescribed)

LOW RISK (no active caries):

- Brush twice a day with an ADA-approved fluoride toothpaste
- Floss (and use other cleaning aids) as recommended by our office
- Seal susceptible fissures in newly erupted teeth
- Recall 6-12 months (reevaluate caries risk & activity levels)

HIGH RISK (no active caries):

- Brush twice a day with an ADA-approved toothpaste, swish and spit
- Floss (and use other cleaning aids) as recommended by our office
- Seal susceptible fissures
- Discuss risk factors and recommend and record interventions
- PreviDent 500 Plus or fluoride rinse _____
- Topical fluoride (neutral sodium fluoride gel, foam or varnish) at recalls
- Recall 6 months (reevaluate caries risk & activity levels)

LOW ACTIVITY PROTOCOL (1-2 active lesions) HIGH RISK:

- Brush twice a day with an ADA-approved toothpaste, swish and spit
- Floss (and use other cleaning aids) as recommended by our office
- Seal susceptible fissures
- Discuss risk factors and recommend and record interventions
- Diet assessment/modification
- PreviDent 500 Plus or fluoride rinse _____
- Definitive restorations for rehabilitative phase of treatment plan
- Topical fluoride (neutral sodium fluoride gel, foam or varnish) at recalls
- Recall 6 months (reevaluate caries risk & activity levels)

HIGH ACTIVITY PROTOCOL (>3 active lesions) HIGH RISK

- Brush twice a day with an ADA-approved toothpaste, swish and spit
- Floss (and use other cleaning aids) as recommended by our office
- Seal all susceptible fissures
- Discuss risk factors and recommend and record interventions
- Diet assessment/modification
- PreviDent 500 Plus or other R_x fluoride _____
- Restore or temporize existing carious lesions
- Topical fluoride varnish (Duraphat) at each operative visit
- Chlorhexidine rinse when all lesions and fissures are sealed
R_x: Peridex 16 oz. bottle 0.12% BID for 2 weeks, NPO for 30 minutes
- Xylitol (2 pieces immediately after breakfast, lunch and supper for 5 minutes)
- Topical fluoride (neutral sodium fluoride gel, foam or varnish) at recalls
- Salivary counts of mutans streptococci for continued high caries activity
(Not currently available at dental school)
- Recall 3-4 months (reevaluate caries risk & activity levels)
Confirm lowered risk before proceeding with rehabilitative phase of treatment

**ACTIVITY >12 SMOOTH SURFACE LESIONS
CONSIDER FOR RAMPANT CARIES CONTROL PROGRAM (RCCP)**

MARQ: Protocol for caries risk protocol – no radiographic lesions within the last 2-3 dental visits. Non-invasive treatment – smooth surface, recurrent root caries. Fluoride varnish, fluoride rinse.

MINN: Our philosophy: Dental caries is a disease with a subclinical phase. The disease manifests itself clinically with caries lesions. Only the frankly cavitated lesions require invasive treatment. Not all individuals are equally susceptible to dental caries. Caries Risk Assessment helps identify those patients at risk to lesion development and requiring preventive services. Caries Risk Assessment is carried out by evaluating the data gathered in the medical history review, the clinical exam, the radiographic survey, and a few simple questions about fluoride exposure and diet. Fifteen risk indicators are checked for. Forms are available in clinic. Diet analysis usually involves questioning the patient about their normal diet. Generally cariogenic parameters can be readily identified. A 5-day diet history can be used if the culprit is not readily acknowledged. A form is available in clinic. Caries Control measures include diet modification, low-intensity fluorides, Xylitol chewing gum, high-intensity fluorides, and chlorhexidine mouthwash. Adjunctive treatment includes patient education, oral hygiene instruction, recontouring, restorative treatment and pit & fissure sealants. Treatment is tailored to the individual patient based on various parameters of the case and level of caries risk present. We subscribe to the medical infection model of treatment for caries active patients: Treatment is high-intensity, short term, and to a defined endpoint. Students are taught this control strategy in Pre-clinical Operative Dentistry. It is presented to them before they even learn about surgical treatment of caries lesions and it is reinforced during the development of technical skills. It is also reinforced in later Operative lecture courses (D3). The faculty are taught this philosophy in in-service meetings which the Division holds once per semester. Full- and part-time clinical operative faculty, as well as clinical faculty from outside the Division, attend. Current research in the Division is looking at the potential of Xylitol rinse to prevent and arrest dental caries. The plan is to test this strategy in a nursing home population.

UNMC: We have a formal caries risk evaluation form, which was developed by our department chairman. Unfortunately it is not utilized as much as it should be, which is something we as faculty need to change. A plaque control record (O'Leary) is to be performed on all new patients and updated at intervals. Current protocols would include use of topically applied fluoride such as Duraphat and prescription and home-use fluorides. In general, if there are 5 or more active areas of caries, home-use fluoride is encouraged. Additionally, if a patient has rampant caries, the patient is often stabilized with glass-ionomer restorations, followed by more definitive restorations when all of the caries have been initially addressed.

SIU: A lesion limited to enamel is treated conservatively. Preident 5000 Plus is generally prescribed. Topical application of Duraphat varnish is encouraged. Any lesion in dentin is restored.

UMKC: Preident and Peridex intervention for incipient caries and for the control of caries. Diet diary and counseling if necessary. Reinforcement of using fluoride and not eating between meals. Chewing sugarless gum. Sealants and enameloplasty for incipient caries. Restore, if involved into dentin, with as conservative preparation and material as possible.

Which of these programs is the most effective?

COLO: They are equally important and are an integral part of contemporary operative dentistry.

CRE: No response

IOWA: CRA and interventions for each patient and RCCP program provides hope for appropriate management of patients with rampant caries

MARQ: Caries risk management with patient education and sealants is most effective.

MINN: Only one program is described.

UNMC: We have no real data to prove which of our protocol is most effective. Certainly there is sufficient evidence in the literature to support fluoride use. The use of interim glass-ionomer restorations produces the most dramatic change that we can see in our clinic.

SIU: We have not conducted any follow-up studies to see which of these programs may be the most effective in remineralizing/preventing decay.

UMKC: I think Peridex, Preident, and chewing sugarless gum.

What are the strengths and weaknesses of this system?

COLO: Students are quick to learn all things about this concept and are able to provide it. The problem is with faculty acceptance and change. Also, developing a list of non-surgical treatment options that students can use, like we have for surgical treatment, is a must. Finally, patient and insurance acceptance is a problem. Unfortunately, patients still want to get something for their money (a filling) and not a lecture on how to brush their teeth.

CRE: No response.

IOWA: Proper approach to disease control for patients, promotes remineralization and minimally invasive dentistry. Weakness is incorporating it into the collegiate system, follow-up on patients, paradigm shift for both faculty and students is difficult.

MARQ: Strengths – patient education. Weaknesses – patient not following through with oral hygiene, diet, etc.

- MINN:** Attempts have been made to bring all clinical faculty up to date with Caries Risk Assessment, Caries Control (non-invasive) measures, and the threshold for surgical intervention. Many faculty are resistant to change and there is a quiet momentum to the status quo. Former aggressive treatment strategies and ignoring the underlying disease still occurs today. It will be a long struggle to purge outdated ideas from the teaching clinics.
- UNMC:** The greatest weakness would be compliance. We must reinforce utilization with our students and patients. Of course the monitoring of this must be accomplished by the Operative faculty.
- SIU:** No weakness is noted in the above system. The student learns to treat enamel caries conservatively and conserve healthy tooth structure. Respect for tooth structure is emphasized.
- UMKC:** Patient compliance. Student and faculty knowledge base. A priority to shift from surgical model to preventive “medical model.”

V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise. Do you agree with this name change? If not, please explain.

- COLO:** I thought it was the Conference of Operative Dentistry Educators? So, is this a change from “Conference” to “Consortium” or is it for using the full name instead of the acronym (CODE)?
- CRE:** Yes, we agree.
- IOWA:** Agree.
- MARQ:** CODE – Description change. I agree with change.
- MINN:** No. The word *consortium* implies a business relationship developed for some joint venture or goal. *Conference* implies only a meeting to exchange views, create a dialogue, and share opinions. Unless there is a move towards actually accomplishing a shared goal (e.g., developing a consensus or creating a minimum curriculum guide), I feel we are more of a *conference* than a *consortium*.
- UNMC:** No response.
- SIU:** ‘Consortium’ is a good descriptor of our organization and activities.
- UMKC:** No. We have to get used to and explain to others what this is when we talk to them. Leave it as it is.

VI. Regional CODE Agenda

The entire meeting was devoted to the National CODE agenda.

VII. National CODE Meeting

VIII. Suggestions for CODE

(only responding schools listed)

What can the organization do to improve its effectiveness?

COLO: Develop a national action plan for tackling some of these more difficult issues in a consensus developing format.

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

MINN: The forms do not download in a form I can utilize with my Mac (OSX, Microsoft Word X). [*EDITOR NOTE: This problem has been addressed by our Web Master*]

Other suggestions?

Suggested topics for next year's National C.O.D.E. agenda:

1. Compare requirements for graduation.
2. Compare clinical evaluation forms and procedures: What is evaluated and graded? What data is recorded and placed in a database?
3. Compare practical and competency exam experiences: What competencies/practicals do you have?
4. Compare faculty calibration and in-service efforts, both clinical and preclinical.
5. What is Evidence-Based dentistry and what value is given to clinical experience by this philosophy?
6. Preventive Resin Restorations make use of sealants as a part of the restoration. Since sealants have a fairly short lifespan, are we committing ourselves to a lifetime of close observation of these restorations?
7. Use of flowable composites or glass ionomers under composites?

LOCATION AND DATE OF NEXT FEW REGIONAL MEETINGS:

1. There was a discussion surrounding changing the meeting from Monday-Tuesday to Thursday-Friday or Friday-Saturday in an attempt to allow those individuals to attend who cannot because of scheduling conflicts. After weighing the pros and cons of the change it was decided to stay with the present Monday-Tuesday meeting schedule.
2. There was a discussion about how to insert Marquette into the meeting location rotation. The decision was to meet as follows:
 1. SIU
 2. Marquette
 3. Iowa

CODE Region **II** Attendees Form

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
William Johnson	UNMC	(402) 472-9406	(402) 472-5290	wwjohnson@unmc.edu
Larry Haisch	UNMC	(402) 472-1290	(402) 472-5290	lhaisch@unmc.edu
Hugh Murdoch	Marquette	(414) 288-7151	(414) 288-6381	hugh.murdoch@marquette.edu
Denis Higginbotham	Creighton	(402) 280-4586	(402) 280-5094	dhiggin@creighton.edu
R. Scott Shaddy	Creighton	(402) 280-5226	(402) 280-5094	shaddyr@creighton.edu
Poonam Jain	SIU	(618) 474-7056	(618) 474-7150	pjain@siue.edu
Deb Cobb	Ulowa	(319) 335-7214	(319) 335-7267	deborah-cobb@uiowa.edu
Susan McMillen	UMKC	(816) 235-2100		mcmillens@umkc.edu
Tom Larson	UMN	(612) 624-5998	(612) 625-7440	larso004@umn.edu
Craig Phair	UMN	(612) 625-7945	(612) 625-7440	phair001@umn.edu
Ed Ziegler	UMN	(612) 624-6917	(612) 625-7440	zieg1004@umn.edu
Omar Zidan	UMN	(612) 624-0604	(612) 625-7440	zidano@umn.edu
Ignatius Lee	UMN	(612) 624-3240	(612) 625-7440	lleex009@umn.edu
Sillas Duarte	UMN	(612) 624-4284	(612) 625-7440	duart004@umn.edu
Gary Hildebrandt	UMN	(612) 625-5130	(612) 625-7440	Gary.H.Hildebrandt-1@tc.umn.edu

CODE REGIONAL MEETING REPORT FORM

REGION: III - South Midwest

LOCATION AND DATE OF MEETING:

Baylor College of Dentistry - T.A.M.U.S.

Dallas, TX 75246

October 30 - 31, 2003

CHAIRPERSON:

Name: Dr. Christine K. Beninger

Phone #: (214) 828-8211

Address: Baylor T.A.M.U.S.

Fax #: (214) 874-4544

Dept of Restorative Sciences,
3302 Gaston Avenue

E-mail : cbeninger@tambcd.edu

Dallas, TX 75266-0677

Meeting Moderator : Dr. Marvin Hirsh

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

1. Electric handpieces
2. LED curing lights
3. Self-etching bonding systems, even unicem cement
4. Desensitizing agents or techniques
5. Lasers in Operative Dentistry, such as the Biolase Units

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Alan H. Ripps

Phone #: 504-619-8543

Address: Louisiana State University

Fax #: 504-619-8549

1100 Florida Avenue, Box 137

E-mail : aripps@lsuhsc.edu

New Orleans, LA 70119

Date: October ?? , 2004

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION III
SUMMARY RESPONSES TO NATIONAL AGENDA**

No Summary Responses to National Agenda received.

**2003 NATIONAL CODE AGENDA
REGION 3 RESPONSES**

(Please cite the evidence were applicable)

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

LSU: No

MISS: No, we are not.

OKLA: No, we are considering another system.

TENN: Not currently, we are expecting to receive one in the near future for evaluation.

Baylor: No

UTH: No

UTSA: No

How long has your school been using this system?

All schools responded not applicable.

How and where is it being used (i.e. pre-clinic operative/ fixed/ other)?

All schools responded not applicable.

What are the strengths and weaknesses of this system?

LSU: Strengths:

- Does free-up faculty.
- Evaluation is detailed and the student can see the errors visually.

Weaknesses:

- Expense.
- Must use KaVo typodont and teeth.
- Time it takes to scan is too long.
- Time for students to evaluate their work is too long and involved.
- Need extra computers for evaluation if more than one student needs it.

MISS: N/A

OKLA: N/A

TENN: N/A

Baylor: Unable to evaluate since we have no experience with this system.

UTH: N/A

UTSA: N/A

What are your recommendations/ summative evaluation of this system?

LSU: Our recommendation is not to invest in this system until 1) the price comes down, 2) you can utilize other typodont systems, 3) better accuracy of system and 4) a more practical means of providing students feedback becomes available.

UMS: N/A

OU: N/A

TENN: N/A

Baylor: Unable to evaluate since we have no experience with this system.

UTH: N/A

UTSA: N/A

Are devices which provide immediate quantitative feedback the way of future preclinical education? Please explain.

LSU: Probably, but we're not there yet.

MISS: These devices appear to be the way of the future possibly when faculty resources become limited. This is dependent on balancing quantitative/qualitative. Accuracy of both is important of any technology. Must be practical to use. Size, ease of use, time required to calibrate and operate are important to know prior to implementing device.

OKLA: We have no experience with these devices. They might be of some value to the student as a tool to evaluate their practice sessions. Much would depend on the reliability of the instruments to accurately evaluate the preparations.

TENN: At the present time, not completely. We feel that such devices as the KaVo PREPassistant will play a part in pre-clinical education, but will not totally replace faculty members in the traditional sense. The KaVo PREPassistant would be utilized in situations when a student is working independently and wishes immediate feedback. Faculty would be utilized in situations where a student wishes an evaluation and would like feedback on how to improve things that would require human evaluation and feedback. Examples of how better to hold hand instruments and how to correct deviations from ideal in a cavity preparation.

Baylor: These devices may prove to be a valuable adjunct to conventional pre-clinical dental education focusing on hand skills and execution of the principles of tooth preparation and restorations. The advantage for the student is that they could give an immediate, objective, standardized assessment of preparations at times when faculty are not available.

At this time, however, there is no replacement for the type of personal evaluation an instructor can provide. Faculty can assess the quality of a preparation, but also offer suggestions regarding patient and operator positioning to gain access and visibility in the operating field. An instructor can evaluate the way a student uses a rotary or hand instrument and can point out when the instrument is used incorrectly. The instructor may then show the student the correct way to use the instrument and effect changes, or suggest the use of alternate rotary or hand instruments when a student is having difficulty producing an acceptable preparation or restoration. Devices cannot provide this type of discriminating feedback.

UTH: These devices may be used as adjuncts to faculty teaching (used as tools, to blend with faculty guidance).

UTSA: No experience with this system.

II. **KaVO Diagnodent/other detection devices:**

Are your utilizing current technology based caries detection methods/systems in student clinics?

LSU: No

MISS: Yes, in our diagnosis/admissions clinic, but not yet in the operative clinic.

OKLA: No - we do not use the Diagnodent caries detection device, we use visual cues and radiographs. We introduce the students to this type of technology during a "Technology Day" program that invites manufactures of certain products to come and display their products in our clinics.

TENN: Not to the extent that we should.

Baylor: No

UTH: No

UTSA: No

Which systems are you using and how frequently are you using them?

LSU: None, but are familiar with KaVo's.

MISS: The Diagnodent is used conjunction with the clinical exam and radiographic interpretation. If there is a frank cavitation, milky white halo, dark stained shadow or verified radiographic lesion, the Diagnodent is not used. The transilluminating light is used the same way.

OKLA: None - we have visual cues and radiographs.

TENN: We have 2 KaVo Diagnodent units, which are used unfrequently. They get the most use with student summer research projects.

Baylor: We are not using laser-induced fluorescence as provided by Diagnodent or digital imaging fiber-optic transillumination (DIFOTI). We use radiographs and fiber-optic transillumination with visual inspection to assist us in diagnosing caries. (In another related area, we encourage students to use a caries disclosing dye (Cari-D-Tect) as an aid in distinguishing between infected and affected dentin in preparations.)

UTH: Not presently using these systems.

UTSA: No response

What are your opinions as to sensitivity/specificity?

LSU: Compared it to clinicians, tested to show >90%. We recorded 86% accuracy on lesions we detected on extracted teeth and then compared it to sectioned teeth to show actual caries. Better than oral diagnosis faculty but not as good as Dr. Ireland. Sectioned extracted teeth to confirm caries.

MISS: Diagnodent/light confirms clinical suspicion reducing the false negatives. When used in conjunction with sound clinical exam applied criteria, these tests can be accurate. We have not confirmed any false positives.

OKLA: The majority of literature we have reviewed on the Diagnodent caries detection system suggests that it is not significantly better than visual examination. It was often suggested in the conclusions of these studies that Diagnodent should be used as a adjunctive detection method to visual examination. It seems to have a slightly higher sensitivity (detection of carious tooth structure) for detecting caries than visual

cues but has much lower specificity (detection on non-carious tooth structure) for caries detection.

1. Cortes, Ellenwood, Ekstrand – *Caries Research* 37(1):8-16, 2003 Jan-Feb
2. Anttonen, Seppa, Hausen. – *Caries Research* 37(1):17-23, 2003 Jan-Feb.
3. Lussi, Fancescut – *Caries Research* (37(1):2-7, 2003 Jan-Feb
4. Heinrich-Weltzien, et al. – *J. of Dentistry for Children*. 69(2):127-32, 123, 2002 May-Aug
5. Alwas-Danowska, et al. – *Journal of Dentistry* 30(4):129-34, 2002 May
6. Sheehy, et al. – *Caries Research* 35(6):412-6, 2001 Nov-Dec
7. Attrill, Ashley – *British Dental Journal* 190(8):440-3, 2001 Apr
8. Shi, Welander, Anfmar-Mansson – *Caries Research* 34(2):151-8. 2000 Mar-Apr
9. Lussi, et. al. – *Caries Research* 33(4):261-6, 1999 Jul-Aug

TENN: If used properly, the Diagnodent is more sensitive to caries detection and definitive in its diagnosis, when compared to traditional methods (tactile, radiographic, and visual methods). Our experience has been that it does not produce any false positive readings, but it may give some false negatives.

Especially in regards to novice clinicians, a recent study done here showed that quantitative laser fluorescence was a more accurate method of occlusal caries detection and appears to aid the student in making a more confident diagnosis of caries. (“Evaluation of QLF Caries Diagnosis with the Novice Clinician” J.B. Foust, W.G.De Rijk, and D.T. Karaki)

Baylor: Studies by *Lussi et al.* and *Pereira et al.* reported the Diagnodent to have high diagnostic validity and reproducibility. *Shi et al.* concluded in their study that the Diagnodent method was superior to radiography in detecting early occlusal lesions. The Diagnodent is reported to have limitations in that its use is limited to unrestored areas of the occlusal surface; it cannot be used on composites, sealants, or amalgams to detect caries under restorations or at restoration margins. The manufacturer recommends that pits and fissures be cleaned and dried to reduce false positives.

1. Featherstone JDB. *Caries Detection and Prevention with Laser Energy. Dental Clinics of North America Oct 2000;44:955-969*
2. Lussi A, Longbottom C, Braig F, Reich E. *Clinical Performance of the laser fluorescence system DIAGNOdent for detection of occlusal caries. Caries Res 1999;33:299*
3. Lussi A, Inwinkelried S, Pitts N, Longbottom C, Reich E. *Performance and reproducibility of a laser fluorescence system for detection of occlusal caries in vitro. Caries Res 1999;33:261-266*
4. Shi XQ, Welander U, Angmar-Mansson B. *Occlusal caries detection with KaVo DIAGNOdent and radiography: An in vitro comparison. Caries Res 2000;34:151-158*
5. Young DA. *New caries detection technologies and modern caries management: Merging the strategies. General Dentistry July-August 2002;320-331*
6. Featherstone JDB. *Caries Detection and Prevention with Laser Energy. Dental Clinics of North America Oct 2000;44:955-969*
7. Lussi A, Longbottom C, Braig F, Reich E. *Clinical Performance of the laser fluorescence system DIAGNOdent for detection of occlusal caries. Caries Res 1999;33:299*
8. Lussi A, Inwinkelried S, Pitts N, Longbottom C, Reich E. *Performance and reproducibility of a laser fluorescence system for detection of occlusal caries in vitro. Caries Res 1999;33:261-266*
9. Shi XQ, Welander U, Angmar-Mansson B. *Occlusal caries detection with KaVo DIAGNOdent and radiography: An in vitro comparison. Caries Res 2000;34:151-158*
10. Young DA. *New caries detection technologies and modern caries management: Merging the strategies. General Dentistry July-August 2002;320-331*

UTH: N/A

UTSA: The 2001-NIH sponsored systematic review of the literature on caries and diagnostic methods, including laser fluorescence, concluded that “ the available information is insufficient to support generalizable estimates of the sensitivity and specificity of any given application of a diagnostic method (1). A review of recent studies using the

Diagnodent for dentin caries report sensitivity values from 0.80 to 0.94 (2-5). However, the specificity ranged from a high of 1.0 (4) to a low of 37% (a 63% false positive diagnosis for a sound surface) when the visual criteria for instrument usage were reduced from enamel loss to enamel discoloration and the instrument threshold reading reduced to gain 100% sensitivity(6). Two other studies recorded specificity values from 63 – 69% (3,7). The Diagnodent readings do not correlate well with the depth of the dentin carious lesion (2) and it is less suitable for initial enamel caries (7). Several authors concluded that the Diagnodent should be used as an adjunct to visual diagnosis (3,5,7). Another author states that the Diagnodent may be useful to find a “hidden” dentin lesion; but early detection must be used: “for the purpose of intervention, not to justify more drilling and filling”(8).

1. Bader JD, Shugars DA Bonito AJ. *J Public Health Dent* 62:201-13 2002.
2. Ouellet A Hondrum SO Pietz DM *General Dentistry* 50:346-50 2002.
3. Anttonen V, Seppa L, Hausen H. *Caries Research* 37:17-23 2003.
4. Bamzahim M Shi XQ, Angmar-Manson B. *Acta Odontol Scand* 60:360-4 2002.
5. Lussi A et al. *European J Oral Sci* 109:14-9 2001.
6. Pereira AAC et al. *Caries Research* 35:83-89 2001.
7. Heinrich-Wsltzilen R, Weerheigtm KL et al. *J Dent Child* 69:127-32 2002.
8. Featherstone JD. *CDA Journal* 31(2):129-33 2003.

**Do you have knowledge of other technologies in development but not yet released?
Please describe/explain these systems.**

LSU: Yes, another system we’ve evaluated is the DIFOTI unit. This system uses transmitted light that passes through the tooth and is evaluated by a camera/computer for density changes. It does fair for interproximal caries, but is not as accurate as the Diagnodent.

MISS: Infrared light study - see website optics.org September 25, 2003, infrared study at the University of California San Francisco, 1310 NM wavelength.
Also: Ozone for treating caries by KaVo.

OKLA: No

TENN: No

Baylor: We have no knowledge of technologies not discussed in the literature. QLF (Quantitative Laser Fluorescence) is the subject of current research trying to improve on the laser fluorescence technology already available. Another technology of interest is Optical Coherence Tomography (OCT). Featherstone describes OCT as “an imaging technique capable of two-dimensional or three-dimensional images of subsurface tissue”. Laboratory investigations using polarization-sensitive OCT reported detection of carious lesions in enamel. Images showing the extent and severity of the lesion have been produced. The technique shows promise for detecting lesions without ionizing radiation and of hidden lesions in occlusal surfaces.

1. Featherstone JDB. *Caries detection and prevention with laser energy. Dental Clinics of North America Oct 2000;44:955-969*
2. Baumgartner A, Dichtl S, Hitzenberger CK, et al. *Polarization-sensitive optical coherence tomography of dental structures. Caries Res* 34:59-69, 2000

UTH: Not at this time.

UTSA: No.

III. CAD\CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

LSU: We are not yet using it.

MISS: We are currently not using the CEREC 3 in the student clinics. It will be offered as an elective in the future.

OKLA: No

TENN: Clinical: Students may provide CEREC restorations for their patients in our Esthetic Clinic. They work one-on-one with a faculty member on Monday and Thursday afternoon.
Pre-Clinical: Third year dental students are exposed to CEREC technology in our Esthetic Course. There is also a CEREC course offered as an elective in the spring.

Baylor: No

UTH: Not presently using this system.

UTSA: No

What is your evaluation as to accuracy/marginal fit?

LSU: Very, very good.

MISS: N/A

OKLA: N/A

TENN: With experience, we have found the accuracy/marginal fit to be very good. We have scanned dies of completed cases and compared the CEREC restoration to the lab fabricated restorations and have found the fit to be better with the CEREC restoration.

Baylor: Unable to evaluate since we have no experience with this system.

UTH: Based on a demonstration by Sirona, it appears that restorations fabricated within this system remain clinically inferior in terms of accuracy and marginal fit to pressable ceramics, refractory built units, or any cast metal restoration.

UTSA: No response

Is the system utilized in your Graduate Program and Faculty Practice?

LSU: Not yet, but we are working on the possibility of purchasing one or two units.

MISS: It is available in the AEGD/GPR program at this time. The faculty that are part of this program use it as well.

OKLA: No

TENN: No

Baylor: No

UTH: No

UTSA: No

What is your opinion as to the overall clinical acceptability of the restorations produced from student clinics?

LSU: Have not used them clinically.

MISS: We are not yet familiar with the restorations for CEREC 3, however, CEREC 1 and 2 are not esthetically pleasing without the extra step to stain and glaze restoration. These devices do not leave any room for preparation variation. They are very specific, therefore often have marginal discrepancies.

OKLA: N/A

TENN: We have found the overall clinical acceptability to be very good. However, the faculty, not the student, is doing the final touch-up of the preparation, if needed, and scanning and milling the restoration.

Baylor: Unable to evaluate since we have no experience with this system.

UTH: N/A

UTSA: No experience with this system.

What are the strengths and weaknesses of this system?

- LSU:** Strengths: time, cost per restoration, teaching anatomy, contours, occlusion, preparations.
Weaknesses: initial cost, need for additional equipment as glazing ovens, supplies, monthly fee to Patterson.
- MISS:** Time consuming in chair / Expensive piece of equipment especially for student clinics. These also need frequency of use for familiarity and efficiency. For superior esthetics, need to take time to reglaze restoration so esthetics can be compromised. In addition, all the blocks used for the restoration are monochromatic and non-translucent. In a student clinic, this would be time consuming for the faculty covering the clinic and possibly taking time and attention away from other procedures.
- OKLA:** We do not use this system.
- TENN:** Strength: Patient can receive their restoration in one appointment. In most cases, no need for impressions or temporaries.
Weaknesses: 1) expensive, 2) long learning curve, takes time to learn the software and imaging system, however, the new 3D program makes the process user friendly, 3) restorations are monochromatic. This is not a great problem on posterior teeth, but may be one on anteriors. Custom shading must be done.
- Baylor:** Based on discussions with clinicians who have used and are familiar with the CEREC 3 system, the main strength of the system appears to be convenience for the patient in that the restoration can be completed on the same day that it is started. We understand that the CEREC 3 system is also more user friendly than its predecessor. The weaknesses of the system appear to be its cost and the time it takes to initially learn to use the system.
- UTH:** Strengths include the ease of use (once you learn the system), improved physical properties and materials, and improved esthetics (over previous CEREC systems). Weaknesses include the marginal accuracy and fit, the moderate learning curve associated with the operation and nuances of the system, and the perceived need for dedicated faculty and laboratory personnel (in house and/or external) to supervise operation and application of the system.
- UTSA:** Strengths: evidence is accumulating of the clinical efficacy and ability to fabricate long-lasting restorations with CERTAC. We are trying to get the technology for at least an elective/selective course.
Weaknesses: the high costs of the system, maintenance, and rate to technology obsolescence. Possibility of aggressive tooth preparation and/or overtreatment.

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to the simulation mannequin vs. going immediately to the simulation mannequin?

LSU: I feel in the beginning they need to visualize the work required. This can best be done on tabletop. After a short period they can start new tasks on mounted dentofoms.

MISS: Students initially prepare benchtop preparations utilizing Learn-A-Prep. Then we teach straight from the mounted dentoform so they are conditioned to using the overhead light, proper posture, and patient position from the beginning. If a student is having problems visualizing the preparations, we may suggest that they prep some teeth table-top dentoform or tooth-in-hand to gain the feel of the handpiece.

OKLA: We feel like the students should initially learn to utilize the instruments and develop skills on the benchtop to enable them to reproduce the preparations and restorations to an ideal level prior to requiring them to perform their work on a mounted dentoform. Once they have shown the ability to recognize and create preparations and restorations that are ideal, they can then attempt these in a simulated clinical environment.

TENN: We start the students off immediately with both techniques. During the first two operative labs, half the lab time is spent working on the bench with the Learn-A-Prep and the other half is practicing on the DentSim. After that, all work is either on the mounted dentoform or simulation system (DentSim).

Baylor: We teach preparations first on the benchtop and then on a simulation unit. Our pre-clinical operative course begins in the spring semester of the first year. The first year laboratory does not have simulation units. For this reason, we have not started teaching preparations on the mounted typodont in this portion of the course. We do have a few exercises during the course of the semester when the first year students use the second year simulation laboratory to prepare teeth mounted in the simulation unit. We have found that when students learn preparations on the benchtop first, it is easier to assess their understanding of preparation design. It is more difficult if an unsatisfactory preparation of a beginning student prepared on the simulation unit is unacceptable because the student does not understand the concepts involved or rather that he/she is disoriented due to inexperience using indirect vision.

UTH: Initial Operative procedures are performed benchtop to clarify conceptual understanding and to develop foundational hand skills. Students then progress to mounted dentofoms for the remainder of the associated projects.

UTSA: The San Antonio philosophy is to adopt a mounted typodont simulation and, with the sophomore year, make the competency simulation more rigorous. The first and only bench exercise is the Lean-A-Prep, which is the initial exercise for the pre-clinical course. For daily exercises, pre-clinical students may remove the typodont from the

pole to examine/measure their projects. For the freshman pre-clinical course, students may remove the typodont but may **only** use a probe to measure and examine the project. For the sophomore pre-clinical competency exams, students may **not** remove the typodont from the pole.

What is the value of quantity and repetition requirements before evaluation for competency?

- LSU:** They can learn from their mistakes. Most psychomotor skills require repetition or practice with feedback.
- MISS:** We do not have a quantity requirement for the pre-clinical labs. We request them to stay for two full four-hour sessions where instructors are readily available for critique. Students are allowed to practice until the scheduled competency exam and find faculty outside of scheduled pre-clinic time for assistance. We agree that quantity and repetition is of great value especially for clinical guidelines.
- OKLA:** The value of repetition prior to (or after) evaluation for competency is that it exposes the student to more than just the ideal situations. The more procedures the student attempts while in school under the guidance of an instructor, the better they will be prepared for the multitude of variations and problems that occur with the different types of operative procedures.
- TENN:** Students need to acquire psychomotor and judgement skills, which we feel are learned through quantity and repetition.
- Baylor:** There is a great deal of value in quantity and repetition requirements before evaluation for competency. Development of dexterity and muscle memory takes time and repetition for most individuals. The more procedures a student completes, the more clinical variations he/she encounters which prepares the student to competently handle more difficult clinical cases. Repetition also instills confidence in the operator so that he/she is less likely to become unnerved during an evaluation for competency exercise and, therefore, is more likely to demonstrate good clinical judgement and have a successful outcome.
- UTH:** Quantity and repetition are very valuable in Operative hand skill and conceptual development. Competency, increased consistency, and increased confidence arise from repetition.
- UTSA:** In pre-clinical courses, San Antonio encourages practice before the competency exams. Each competency exam is preceded with an identical daily exercise project. However, the only qualification for the competency exam is that all daily exercises must be completed with a passing grade as determined by a number of successful criteria met on the exercise assessment sheet. For clinical skill assessment, students are encouraged to experience as many procedures as practical prior to challenging a skill assessment examination.

Does competency replace the need for quantitative repetition?

- LSU:** NO! Competency must be demonstrated repeatedly also to show competency.
- MISS:** No, repetition is still needed. There are many clinical situations a student may encounter through repetition that better prepares them to handle unforeseen clinical circumstances as well as preparing them and maintaining skills for clinical board examinations. Competency shows they can remove caries and adhere to basic restorative principles usually in a near ideal situation (tooth with minimal caries), however, not all clinical situations are ideal.
- OKLA:** No. The value of repetition prior to (or after) evaluation for competency is that it exposes the student to more than just the ideal situations. The more procedures the student attempts while in school under the guidance of an instructor, the better they will be prepared for the multitude of variations and problems that occur with the different types of operative procedures.
- TENN:** No, competency cannot be attained without practice, which comes from quantitative repetition.
- Baylor:** No. Anyone can be lucky on a given day. With quantitative repetition, it is more likely that the student has developed the level of clinical judgement needed for competency.
- UTH:** No.
- UTSA:** Probably not. However, a well-designed pre-clinical course would progress from simple to complex projects with many and varied projects so that the assessment of a competent skill, such as occlusal cavity preparation or proximal preparation would be assessed many times.

In addition to the restoring of ivorine teeth in the pre-clinic courses, how are natural teeth being utilized (if your school uses them)?

- LSU:** Finishing techniques, you cannot finish restorative materials on ivorine teeth.
- MISS:** They are mounted in dentoforms for the Class II preparations and restorations, Class III composite, Class IV composite, glass ionomer restorations. They are also mounted for gold onlays.
- OKLA:** About one-fourth of our pre-clinical exercises are done on extracted natural teeth. They are used to introduce students to the identification of dentin and enamel, caries removal, bonding techniques, and retentive pin placement.

TENN: Though natural teeth are used in other departments, due to concerns of infection control, natural teeth have not been used in the operative division. We are currently in the process of trying to bring back natural teeth so students can get the “feel” of natural teeth during preparation and decay removal prior to going into the clinic.

Baylor: Because of infection control issues, we rarely use natural teeth in our pre-clinical operative course. We use an extracted anterior tooth for preparation and bonding of Class IV restorations because this exercise would be impossible on an ivorine tooth. We also do a limited number of exercises restoring posterior natural teeth with Class I and Class II composites so that the students gain, at least, limited experience etching and bonding composites to natural tooth structure. We advise students to be selective when choosing extracted teeth for these exercises and to avoid choosing teeth with carious lesions.

UTH: Natural teeth are used for procedures involving sealant placement, conservative composite preparations and restorations, and pin placement.

UTSA: Natural teeth are not used.

Are you utilizing simulators/DentSim for teaching operative dentistry?

LSU: No

MISS: No, but plans are in the works.

OKLA: No

TENN: Yes, DentSim

Baylor: We are not using DentSim, but we are using other clinical simulators. Our simulation unit consists of an ADEC torso and a Kilgore head and typodont. The benchtops and vacuum system in our SIM lab are by Nevin and our media system was designed and installed by Stagefront.

UTH: No, although we have a demonstration unit.

UTSA: No

Describe how you are utilizing these educational aids and their effectiveness.

LSU: I use the software for the CEREC 3 to show some preparations in pre-clinical Operative dentistry. It is nice to take the tooth and be able to rotate it showing the preparation from different angles.

MISS: No, but plans are in the works.

OKLA: N/A

TENN: To help independently working students learn the necessary eye-hand coordination skills for operative dentistry. We also use the DentSim for the fixed prosthodontic and endodontic courses. We have had the DentSim for only 1½ years, therefore, it is too soon to fairly determine the DentSim's effectiveness as it translates to clinical situations.

Baylor: The simulation units are used for pre-clinical exercises in various disciplines including Operative, Fixed Prosthodontics, Removable Prosthodontics, and Periodontics. Our present third year class is the first group of students to have used the simulation lab during the second year. It is our impression that this has made a difference in their level of confidence this year. The students seem more at ease using indirect vision on clinical procedures.

UTH: We are evaluating our demonstration unit in terms of identifying how this equipment can benefit student development overall and how this technology will affect the various types of student learning styles. If it is concluded that this technology can effectively enhance the student's Operative experience, we will look at how best to integrate the system (for maximum effectiveness) into the Operative curriculum.

UTSA: N/A

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

LSU: Many feel that it has helped the transition from pre-clinical to clinical. It has had no impact on faculty numbers.

MISS: We have no basis but hope this would be an adjunctive learning tool.

OKLA: At this time we have no experience with simulation labs. We will be installing ADEC simulators in one year.

TENN: It is too early to tell if the DentSim has helped with an earlier transition to clinic. The first class to utilize the DentSim has just started on the clinic floor.

Baylor: Because we have only had our simulation lab in operation for about 1 year, we have only anecdotal evidence to offer at this time. It does appear that this year's third year class made an earlier and easier transition to clinic. The students appear to be much more comfortable in the clinical setting; they seem to be more at ease using the mirror and more eager to complete multiple procedures as well as more complicated procedures earlier in the third year when compared with previous classes. There has been no impact on our faculty numbers that can be attributable to student exposure to the simulation lab.

UTH: N/A

UTSA: Not applicable to San Antonio.

Describe how your school relate biomedical scenarios to pre-clinic operative dentistry?

LSU: We don't.

MISS: Biomedical scenarios are reviewed in the didactic portion, only, at this time.

OKLA: We do not do this at this time in the operative department courses. These topics are addressed in lectures discussing topics relating to oral diagnosis and treatment planning.

TENN: Biomedical scenarios are used in lectures and the DentSim also presents a case scenario for the preparation the student will be doing.

Baylor: In pre-clinical operative lecture and laboratory, patient case scenarios are occasionally presented. Students are asked to consider the implications that dental treatment may have on their patient's health, for example, the use of epinephrine impregnated cord on a patient with certain heart conditions.
In the second semester of the second year, students take an Introduction to Clinical Practice course in which they perform operative procedures on the SIM patient. Medical and dental histories are given and discussion centers on how treatment is influenced by this information. Other disciplines within our school have introduced patient case scenarios as a part of their curriculum as well.

UTH: Pre-clinical Operative covers various biomedical scenarios as they relate to medical and dental (cariology, periodontal conditions, and overall oral health) patient assessment and treatment. Such scenarios and their relationship to patient health are also covered in various courses throughout the curriculum.

UTSA: Several pre-clinical exercises are introduced with patient scenarios including dental history, caries risk status, and representative radiographs.

Have community out-reach programs impacted your educational goals? Please describe.

LSU: They've been positive. Students report good reception to these programs. Good experiences.

MISS: Our students are encouraged to be involved in community out-reach programs. These certainly have a positive influence on our students. Not only are they serving a large population, but they become aware of underserved areas of Mississippi where they may be of assistance when they graduate. They have recently all been

involved in “Give Kids a Smile Day” where they placed sealants and performed prophylaxis and fluoride treatments on hundreds of school aged children as well as a child-level education forum on dental health. The students are also encouraged to go to the community health fairs and perform oral screening exams and provide literature and information.

OKLA: All of our community out-reach programs are staffed by students on a volunteer basis so that the experience will be different for each student. Those that participate get valuable experience in dealing with patients. This also makes them more aware of the problems facing a segment of our population that cannot afford dental care.

TENN: The University of Tennessee College of Dentistry does not have any mandatory community out-reach programs in its current curriculum. Students, through various organizations, are active in community out-reach programs on a voluntary basis.

Baylor: Community out-reach programs have affected our student’s education in a positive manner. Our fourth year students, in block assignments, participate in a community sealant program where they travel to area schools to provide sealant treatments for the school children. Our students also participate, from time to time, in mission trips to various parts of Mexico to render needed dental treatment. Additionally, they participate in area health fairs performing screening examinations. Having participated in these and other programs, our students feel enriched after providing necessary dental services to underserved populations. They also feel more confident in their abilities as aspiring dentists since they usually perform or assist with more dental procedures in a single day than they ever have before. Again, repetition helps to build competency.

UTH: Community out-reach programs benefit the students and the community. These programs shift focus from requirements, examinations, and school to the very basics of health care. They foster the student’s transition to becoming a true health care professional. Out-reach programs are important in terms of the student’s personal and professional growth and are of great service to an oftentimes disadvantaged population.

UTSA: The only relevant out-reach program at San Antonio is a pre-clinical rotation to local elementary schools to provide oral hygiene instruction and some sealants. The students are generally appreciative to have the chance to interact with the children and assume a professional role.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

LSU: We spend some time teaching caries risk. The freshman class has very little exposure to this but are lectured on it. The sophomore students are required to do a caries risk profile on a patient as one of their requirements. We are going more into caries management than we did in the past. Students can get restoration credit for excavating deep preparations and treating with temporary restorations. We are not

treating our clinic patients with non-invasive treatment of caries. They are lectured on this subject but we do not use it in clinic. It is used for those situations when you're out in the field without proper equipment to treat patients.

MISS: Caries Risk Assessments are completed in our Admissions clinic. Patients are listed as either high risk, moderate, or low caries risk. All patients receive a clinical exam of hard tissues, a radiographic interpretation of decay, and a 24 hour nutritional analysis. For high risk, they are to complete a week-long nutritional analysis diet diary, saliva check, and may require fluoride trays to reduce the progression of disease. All patients will need to go through a Phase 1 treatment for elimination of disease which includes periodontal therapy and caries control until more definitive restorations can be addressed. For those patients that have only minimal interproximal decay we stress that this can be prevented by flossing, and patient education for decreasing the amount of sucrose the teeth are exposed to is imperative.

Instructions for Completing the Caries Risk Assessment

The CRA is used to determine a patient's caries risk category in the development of a prevention plan and, if necessary, a behavior modification plan. The CRA should be completed as part of the initial admissions data gathering appointment.

1. Determine presence or absence of carious lesions. Temporary restorations should be regarded as decay.
2. If no carious lesions are present, skip items 1-3 and complete items 4-7.
3. If carious lesions are present, complete items 1-7. Items with a positive response should be checked, then the weight transferred to the next column. Note that Items 1 and 2 are mutually exclusive.
4. Item 5 may be scored 1 or 2. A score of 1 is assigned if the patient has had no fluoride exposure during childhood, but currently benefits from fluoride use. A score of 2 is assigned if the patient had no fluoride exposure as a child and currently uses no fluoride products. This item should not be checked if there was adequate exposure to fluorides.
5. In completing item 7, use the 24-hour diet diary found in the Prevention and Health Promotion form. Exposure means the number of separate times that sucrose is ingested during the day, not necessarily the number of sucrose-containing foods ingested. Keep in mind that snacks containing sucrose are more cariogenic than foods with sucrose consumed during the course of a meal.
6. Add the weights of items 1-7 to assign the preliminary CRA (pCRA). If pCRA is greater than 6, additional tests may be necessary (items 8 and/or 9).
7. Items 8 and 9 are completed if indicated by the pCRA score or if other factors indicate, e.g., extensive plaque accumulation, multiple incipient carious lesions, contributory medical history, or oral health behavior(s) suggestive of a higher caries risk. We currently do not have kits available for quantifying the mutans streptococci counts.
8. The final CRA (fCRA) is calculated by adding pCRA to the score of items 8 and 9.
9. Check the appropriate box for the fCRA and determine reevaluation schedule.

CARIES RISK ASSESSMENT

Low Risk:

- No presenting caries
- No recent history of caries
- Only simple restorations
- Stable conditions

Actions:

1. Lengthen recall - 6-12 months
2. Discontinue systemic fluoride
3. Evaluate need for sealants
4. Proceed with Phase I and Phase II treatment
5. Reevaluate CRA at 12 months

Radiographic prescription for recall patients

1. Primary/transitional dentition: BWx q12-24 mos.
2. Adolescent permanent (prior to eruption of 3d molars): BWx q18-36 mos.
3. Adult dentate patients: BWx q24-26 mos.

Medium Risk:

- Presents with 1-2 carious lesions
- Several complex restorations (evaluate most recently exposed surface)
- Unstable conditions (medical considerations, pending periodontal tx/sx or ortho)

Actions:

1. 6 mo recall and oral hygiene instructions
2. Recommend home fluoride
3. Sealants
4. Assess and address risk factors (diet, tooth morphology, medical considerations, OH habits)
5. Proceed with Phase I therapy
6. Progress to Phase II therapy once condition is stabilized and a good prognosis is anticipated (at 7-10 day reassessment)
7. Reevaluate CRA at 6 mos.

High Risk:

- Multiple carious lesions
- Many restorations
- Restorations in unusual locations
- Unstable locations

Actions:

1. 3-4 mo recall
2. Office and home fluoride
3. Chlorhexidine rinse
4. Sealants
5. Assess and address risk factors
6. Phase I therapy only until stabilized and oral health behaviors modified
7. Reevaluate CRA at 3 mos.

Radiographic prescription for recall patients

1. Primary/transitional dentition: BWx q6 mos. or until no carious lesions are evident
2. Adolescent permanent: BWx q6-12 mos. or until no carious lesions are evident
3. Adult dentate: BWx q12-18 mos.

OKLA: We evaluate risk factors such as amount of diagnosed caries, caries history, age, home care, fluoride exposure, diet, etc. Based on these factors, we will select the most conservative treatment for the patient ranging from no treatment, supplemental fluoride, sealants, PRR's or more extensive restorations. We are trying to implement a new system for caries risk assessment at this time in our patient work-up. This includes an instrument that attempts to score the patients caries risk numerically and place them in a high, medium or low caries risk category. We use a decision-making flowchart similar to the one printed in the Operative Dentistry textbook written by Summitt, Robbins, and Schawtz. This flowchart is used to help the student in deciding which types of operative treatment are indicated for the patient. (See next page)

CARIES RISK ASSESSMENT- University of Oklahoma College of Dentistry

PATIENT: _____ CHART # _____ DATE: ____ / ____ / ____

Risk Factor	Assessment Criteria		Weighted Points	Assigned Point Value		
1. Number of frank carious lesions (Obviously cavitated lesion or > 1/3 into dentin)	Low	No frank carious lesions	0			
	Mod	Not Applicable	NA			
	High	1 or more frank carious lesions	8			
2. Number of incipient carious lesions	Low	No incipient carious lesions	0			
	Mod.	1 - 2 incipient carious lesions	2			
	High	3 or more incipient carious lesions	4			
3. Number of filled surfaces	Low	No filled surfaces	0			
	Mod.	2 - 4 filled surfaces	1			
	High	5 or more filled surfaces	2			
4. Date of last restorations of a carious lesion	Low	Over 12 months ago	0			
	Mod.	Not Applicable	NA			
	High	Less than 12 months ago	1			
5. Frequency of carbohydrate intake	Low	0 - 3 times a day	0			
	Mod.	4 - 5 times a day	1			
	High	> 5 times a day	2			
6. Exposure to fluoride	Low	Good FL water, toothpaste, supplement	0			
	Mod.	Barely adequate-only one of the above	1			
	High	Inadequate - No fluoride	2			
7. Oral hygiene (plaque index)	Low		0			
	Mod.	Not Applicable	NA			
	High		1			
Optional Evaluations						
8. Mutans Strept Count	Low	Based on test guidelines	0			
	Mod.	Not Applicable	NA			
	High	Based on test guidelines	1			
9. Salivary flow (5 min. unstimulated saliva production)	Low	Unstimulated flow more than 0.2ml.	0			
	Mod.	Not Applicable	NA			
	High	Unstimulated flow less than 0.2ml	1			
Total Score for all factors evaluated						
Low Risk	Low risk assigned if total score = 0 - 3		Moderate Risk	Moderate risk assigned if total score = 4 - 7	High Risk	High risk assigned if total score ≥ 8
Re-evaluate at 12 months		Re-evaluate at 6 months		Re-evaluate at 1 - 6 months		

Date of Caries Risk Re-evaluation ____ / ____ / ____ Date of Optional Lab Tests ____ / ____ / ____

- TENN:** During the screening process, patients of high caries risk are identified. The treatment plans for these patients include nutritional consulting, oral hygiene instructions, and possible fluoride treatment. With proper oral hygiene and fluoride treatment very incipient proximal lesions are observed with the hope of remineralization. Observation of beginning lesions is difficult since patients may not return for evaluations. If required, conservative restorations may be placed such as preventative resin restorations and slot preps.
- Baylor:** We look at patient diet including use of Xyliton gum and the intake and frequency of sweetened and carbonated beverages during the course of the day. We note the number of carious lesions present and their location, caries history, the level of oral hygiene, and fluoride exposure. After taking into account these factors, we treat the patient with the most conservative means as appropriate. This may include fluoride treatment with clinical application of fluoride gel or varnish, use of fluoride rinses as part of the home care regimen, periodical evaluation for evidence of remineralization, application of sealants or PRR's, and the use of other restorative materials as necessary.
- UTH:** Caries risk/caries management/non-invasive treatment options are presented in terms of the importance of appropriate and accurate patient assessment (medical and dental), diet assessment with relevant recommendations, oral hygiene assessment with relevant recommendations, and the initiation of fluoride therapy, if applicable. Stressed also is the importance of accurate and timely patient reevaluation and reassessment, including evaluation of compliance to prior recommendations and/or suggested therapies with subsequent impact on the oral condition.
- UTSA:** The Restorative Department philosophy supports the "medical model" of restorative care. Preventive measures, remineralization, antimicrobials, and caries risk assessment are taught primarily by our Department of Community Dentistry but supported by lectures and in clinic by Operative Dentistry. In clinic, all patients undergo a caries risk assessment as part of the Oral Health Evaluation. Community Dentistry conducts a credentialing program for junior students who, under supervision, work up a preventive plan, dietary analysis, saliva testing, and supervise counseling appointment with three patients at high risk for caries. Operative clinical faculty members are primarily responsible to supervise the diagnosis and placement of sealants and minimal restorations, as well as preventive treatments, including in-office fluoride and fluoride varnish applications. Proximal cavity preparations are performed only when there is clinical evidence of cavitation or radiographic evidence of dentin involvement. Remineralization is a clinical option, with treatment codes and a clinical fee. Occlusally, non-cavitated enamel lesions are to be treated with sealants or, with minimal dentin involvement, preventive restorations.

Which of these programs is the most effective?

- LSU:** Of these three programs, I would feel the most effective one would be the caries management. Excavating larger lesions and controlling the active caries. It is difficult to see changes in patients' caries risk profiles and non-invasive treatment is questionable.
- MISS:** All the programs implemented are effective depending on the patient they are used on. If patients are noncompliant for fluoride trays, we can prescribe a fluoride gel to be used in the evenings.
- OKLA:** Which of what programs is most effective? Not sure what this questions is asking.
- TENN:** Nutritional consulting, oral hygiene instruction.
- Baylor:** Use of sealants and minimally invasive preventative resin restorations seem to be most effective in reducing a patient's need for more invasive and extensive dental procedures later on.
- UTH:** Effectiveness is dependant upon the clinical situation.
- UTSA:** The application of non-invasive treatment of carious lesions has the best success. When the Department of Diagnosis generated the treatment plan, the Operative faculty, at chairside, frequently reversed aggressive charting of cavity preparation for incipient enamel caries. Beginning this year, the Operative faculty has the responsibility for supervising and approving the treatment plan.

What are the strengths and weaknesses of this system?

- LSU:** Strength in the fact that you've removed the caries and/or you give a chance of success for indirect or direct capping procedures. The weakness comes from patient cooperation. Will they change their ways? Will they come back for follow-ups?
- UMS:** In a dental school atmosphere, if someone has rampant caries, we may not be able to address all of them, occasionally, in a timely manner. It is very easy to falsely indicate sodas and how many on a diet diary. Many of our patients are on several medications that cause a decrease in saliva so our approach to maintaining these patients may change.
- OU:** One of the major weaknesses of this program at our school is our inability to get all of the faculty standardized in regard to caries diagnosis and treatment decision-making. Adjusting to some of the newer suggested guidelines for treatment decision-making is difficult for some faculty. Some may still have a tendency to overtreat because of disciplines that have been ingrained over many years of practice. We also have some students who will plan a treatment that is not appropriate for the patient, based on the history and diagnostic information available.

This is usually because they do not take all the factors for caries risk assessment and treatment planning into account (i.e. treatment planning PRR's or sealants for an 80 year-old patient with stains on occlusal fissures).

UT: Strengths: these programs are easily administrated in a dental school setting.
Weaknesses: if a patient has rampant caries, it would be difficult to get the treatment done quickly and efficiently.

Baylor: Our Preventive Dentistry Department uses the decision-making tree as outlined in the *Fundamentals of Operative Dentistry: A Contemporary Approach* text book by Summitt, Robbins and Schartz for teaching the diagnosis, preventive management and treatment strategies to the students. The flow chart approach makes the process easy to learn and follow for the student. This is one of the strengths of the system.

Our weakness is coordinating efforts between our Preventive Dentistry Department and other disciplines in the school and making certain all faculty are calibrated on these matters. This is an area that we are currently working to improve.

UTH: The strength of the system is that designed treatment is patient appropriate (to the clinical situation). Weaknesses may reside within the overall design of the program. Procedures and protocols could turn into time-consuming and cumbersome activities and become an impediment to timely and efficient patient treatment. Subjecting every patient to an extensive evaluation system may be unnecessary and somewhat counterproductive.

UTSA: The medical model, individualized care according to caries risk status, and remineralization have good research evidence and high-profile advocates for support. However, a sizable number of clinical faculty members, including those primarily responsible for clinical operations, have not been receptive to the evidence and, therefore, tend to minimize the practical aspects of preventive services compared to the production aspects of dentistry. Both continued training and an improved system for reimbursement for such service (credits and income) is important. The California Dental Association is actively dedicating resources to publicize, statewide, the benefits and application of the medical model (CDA Journal, Feb-March 2003). The CDA is providing journal articles and caries risk assessment forms with instructions and suggested treatment options as guides for dental clinicians. Perhaps the California commitment will elevate the awareness and importance of the medical model and prevention for the profession and dental educators in other parts of the country.

V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise. Do you agree with this name change? If not, please explain.

LSU: Yes

UMS: The name change seems appropriate.

OU: Either name seems acceptable.

UT: Yes

Baylor: Either name seems to be acceptable.

UTH: Yes

UTHSA: Why does it matter?

IV. Regional CODE Agenda

(Please report on responses from all participants).

1. How is daily work graded or evaluated in your pre-clinical operative laboratory course?

LSU: In the past, one instructor graded a project using A, B, C, D, or F. These were converted to percent values and this would constitute 10% of their final grade. This year we are not grading their daily work, but marking it as acceptable/needs improvement. If not acceptable, they must repeat it until acceptable.

UMS: **Evaluation forms** with criteria listed for exercises that are graded. Check-off sheet for daily exercises that are not graded, but required to pass the course. Graded exercises use critique sheet and restorations grade.

OU: The following is a synopsis of the system used to evaluate daily work in pre-clinical operative laboratory course. Samples of grading forms are included. Each segment of the procedure is evaluated based on the criteria provided in the pre-clinical manual. Each segment is assigned one of the following evaluations:

Ideal - this portion of the procedure was completed to the ideal standards for that procedure as described in the Pre-clinical manual.

Minor Errors - errors were detected that are slightly less than the ideal standards for that procedure as described in the Pre-clinical manual. These errors will not have a major impact on the success or longevity of the restoration.

Major Errors - errors were detected that are obviously less than the ideal standards for that procedure as described in the Pre-clinical manual. These errors will not cause the restoration to fail but may reduce its longevity or the patient's satisfaction with the restoration. The occurrence of multiple major errors will result in a restoration that is unacceptable and will need to be replaced.

Critical Errors - errors were detected that will certainly cause the predicted longevity of the restoration to be unacceptable or place the patient's future oral health at risk. These restorations must be replaced with a restoration that meets acceptable standards.

Assignment of a Numerical Grade

The faculty will review the evaluations of the individual segments for the procedure and assign an overall grade for the procedure based on the following general guidelines:

- 90 - 100** The procedure was completed with only minor errors detected. The resulting restoration is excellent.
- 80 or 85** The procedure was completed with a major error along with some minor errors that still allow it to be a very acceptable restoration.
- 70 or 75** The procedure was completed with a combination of major errors and minor errors that allow it to be only minimally clinically acceptable.
- 60** The procedure was completed with many major errors that might cause the early failure of the restoration. It may need to be replaced.
- 50** A critical error or several severe errors were detected requiring the restoration to be replaced.

Overall	F	C	B	A
Grade	50-69	70-79	80-89	90-100

An example of the Preclinical I Grade Form on Preparation, Insertion and Finish/Polish of the restoration is on the next page.

Insert preclinical I grade form

The second portion of the grade is the Daily Conduct and Productivity Report (see next page)

Throughout the laboratory period, an instructor observes the students' performance as related to more subjective areas that go beyond the scope of their technical performance on the procedure. Evaluations may be assigned at any time during the laboratory session. Most of the time, however, these daily evaluations will be assigned close to the end of the session.

Good = 100

This grade will be assigned if the student has no check marks in the evaluation criteria listed on the lower portion of the daily evaluation sheet.

Needs Improvement = 75

This grade will be assigned if only one or two check marks are recorded in the evaluation criteria listed on the lower portion of the daily evaluation sheet and none of the deficient areas were deemed to be critical by the instructor.

Unacceptable = 50

This grade will be assigned if several check marks are recorded in the evaluation criteria list on the lower portion of the daily evaluation sheet, or one or more of the deficiencies noted are deemed critical by the instructor.

This system is designed to simplify the evaluation of the daily grade to the point that the student has either met the criteria or not. If all criteria are met, they will receive a score of 100 (Equivalent to an A grade). If they have not met all of the criteria, they will be informed of which areas need improvement by the checked criteria area. They will receive a score of 75 (Equivalent of a C grade or minimally acceptable performance) if they have only one or two minor deficiencies. They will receive a score of 50 (Equivalent of an F grade) if they have many deficiencies, or one that is deemed a critical deficiency by their instructor.

Department of Operative Dentistry
DAILY CONDUCT AND PRODUCTIVITY REPORT

Name _____

Date _____ Project # _____

Good	100	
Needs Improvement	75	
Unacceptable	50	

Poor organization of work area, instruments, records

Inadequate preparation for today's procedure
(Lack of knowledge concerning procedure)

Unprofessional attitude

Lack of or improper use of gloves, masks or eyewear

Poor use of clinic/preclinic time

Absent from clinic/preclinic session

Failure to clean work area

Struggling with basic concepts or handskills

Other: _____

The following is a description of some common examples of possible areas of deficiency observed on the evaluation of the daily conduct and productivity report:

-Organization

- Misplacement or loss of grade forms
- Failure to secure signatures at necessary check steps
- Disorganized work areas
- Incomplete armamentaria
- Failure to bring course syllabus to class
- Dull hand instruments

-Inadequate preparation for procedure

- Gross violation of procedural steps and principles
- Shows lack of knowledge concerning daily procedure

-Professional manner

- Failure to secure Permission to Proceed
- Behavior that reflects a lack of concern for classmates
- Inability to accept constructive criticism
- Cynical or unprofessional attitude
 - Inattentive during lecture or laboratory session

-Lack of or improper use of gloves, masks or eyewear

- Improper attire
- No safety glasses
- Not wearing gloves or mask

-Poor use of laboratory time

- Leaving laboratory early before projects are completed
- Non-productive use of time

-Absent from laboratory session

-Failure to clean work area following lab session

-Struggling with basic concepts or skills

- Multiple projects past due date
- Consistently exhibits problems with poor hand-skills

● Other

The list above is by no means exclusive and other reasons for a poor evaluation may present themselves. In that event, the instructor should note the reason for the poor evaluation in the comment box.

UT: Students may do pre-clinical procedures in either the more traditional KaVo (manikin) lab or in the DentSim lab. On the KaVo side, daily work is evaluated by the faculty. The computer gives feedback, evaluates and scores the work (based on 100) on the DentSim side.

Baylor: This year, we have begun using the Quality Assessment (QA) form for pre-clinical operative. (See Figure 1.) This is the same form that is used in our third and fourth year programs to give dental students feedback on the procedures they perform in the clinic. Areas needing improvement are checked and initialed on the form by the attending faculty member and these points are elaborated on as necessary in the

lower right hand corner of the form.

Complimentary comments are also made in this corner of the form, but the QA boxes are no longer checked for this feedback and the comments are no longer logged on the computer. Procedural problem areas are more easily targeted and addressed this way. The students receive a copy of the QA form when the procedure is completed so that they have immediate feedback. The logged comments are collected for each student so that the student and his/her group leader can see, at a glance, the student's strengths and deficiencies. (See Figure 2) Additionally, QA comments can be logged according to the instructor giving them. This is a valuable tool for faculty self-evaluation of the amount of feedback given to students. (See Figure 3).

The fourth year program has been working with this system for more than a year and has found this to be a valuable learning tool for the students. We have implemented the use of this form in the third year program just this year therefore it is too soon to evaluate its use and come to any conclusions.

Insert Figure 1

Insert Figure 2

Insert Figure 3

UTH: Daily work is evaluated in one of two ways (depending on the project): 1) faculty initializes a successfully completed project without an assigned grade or 2) faculty initializes a successfully completed project and includes a grade (from 0 to 5).

UTSA: Daily work is evaluated on a satisfactory/unsatisfactory basis. All projects must have been completed to a satisfactory level by the end of the course for the student to pass the course. The laboratory grade is determined by a series of timed skill assessment examinations.

2. How is daily work weighted when determining the grade in this course?

LSU: In the past this work counted 10% of their final grade. We used a low percentage because the average daily grades were so inflated we didn't count them heavily in the course. Because of this, their daily work will not figure into their final grade except they must complete each project to a certain level.

MISS: Daily work is 33%, 33% practical exams, 33% written exams of overall grade in pre-clinical courses.

OKLA:	Practical Examinations	50%
	Written Examinations	35%
	Laboratory Projects	10%
	Daily Evaluations	5%

TENN: Daily work accounts for 20% of the grade.

Baylor: All daily work must be completed at a clinically acceptable level in order for the student to pass the pre-clinical operative laboratory course. Assuming the daily work has met this standard, the final course grade is determined by the arithmetic average of five of the six practical examinations given during the course of the semester. (The lowest practical grade is dropped when calculating this average).

UTH: Operative has two grading component, a *didactic grade* (30% of the course grade) and a *laboratory grade* (70% of the course grade). The 70% laboratory grade is based on 15 practical examinations (50% of the course grade) and on daily grading (20% of the course grade).

UTSA: A very small grade bonus is awarded to students who complete their laboratory projects by the due date and who evaluate their work. Other than that, daily work does not influence the grade received in the course.

3. How is daily work graded or evaluated in clinical operative?

LSU: Again their daily grades were inflated, with a class average of 96. The students work with one instructor in each clinical session. The finished preparation or restoration is given a grade of A, B, C, D, or F which converts to a percentage grade. When a student calls an instructor over, that instructor usually offers instruction to improve the work. When finally completed, the instructor usually gives the grade.

MISS: Preparation grade with permission to extend for decay, pulp capping check, followed by restoration grade and 24-hour check on polish. Grades are 50% restoration and 50% preparation unless one section is a failure, then the entire grade given is a failing grade. Failure grades are those below 70 and are graded with unacceptable criteria checked on grade sheet. All procedures require rubber dam unless indicated by instructor.

OKLA: The Operative Department uses a descriptive scale which describes clinical performance in terms of its deviation from the perceived "average" within the dental community. The descriptive evaluation scale is as follows:

- **T**otal **E**xceptional **Q**ualities (**TEQ**) = 100%
Textbook quality procedure
- **M**any **E**xceptional **Q**ualities (**MEQ**) = 90%
Very good procedure
Above average within the dental profession
- **C**linically **A**ceptable (**CA**) = 80%
Good procedure
Average within the dental profession
- **M**arginal (**M**) = 70%
Procedure may or may not succeed
Below average within the dental community
- **F**ailing (**F**) = 0% - 50%
Procedure will not succeed

Clinical Operative Dentistry grading scale is as follows:

- A** – 86% and above
- B** – 83% - 85%
- C** – 78% - 82%
- D** – 70% - 77%
- F** – 69% and below

TENN: Students are given a comprehensive daily grade. This grade reflects all aspects of the student's performance in the clinic. Part of the grade is comprised of how the actual procedure was done. Other factors that may affect the student's grade may include their professionalism, their dress and demeanor, following infection control and clinic protocol, case presentation and preparation for the task at hand.

Baylor: Daily work in third year clinical operative is evaluated with the QA form in much the same way as described in question 1. Areas needing improvement are checked and initialed on the form by the attending faculty member and these points are elaborated on, as necessary, in the lower right hand corner of the form. Complimentary comments are also made in this corner of the form. The students receive a copy of the QA form when the procedure is completed so that they have immediate feedback. The logged comments are collected for each student so that the student and his/her group leader can see, at a glance, the areas where the student needs improvement.

UTH: Operative clinical grading for actual procedures is based upon the following scale and criteria:

- 5 - Excellence with virtually no faculty input
- 4 - Very good final result and/or limited faculty input
- 3 - Clinically acceptable and/or moderate faculty input
- 2 - Clinically acceptable with considerable faculty input (due to the student's non-preparedness)
- 1 - Clinically unacceptable

Clinical Operative also includes a professionalism component using the same grading scale. This component includes the student's knowledge and preparedness for the procedure(s), their infection control compliance and management, their overall record keeping, and various behavioral principles (professional conduct, concern for patient's safety, communication skills, clinic attire, overall handling of the patient and the clinical situation).

UTSA: Daily work receives a satisfactory/unsatisfactory grade.

4. How is daily work weighted when determining the grade for clinical operative?

LSU: The active grade for daily clinical work counts for 20% of their final grade. The clinical operative grade consists of daily clinical work, competency grades and a didactic grade.

MISS: All grades add up to total points in a certain area such as Class II amalgams. 2600 Class II points needed to take a Class II competency exam the senior year. Final semester grade is then 80% daily operative grades and 20% for Competency exam grades.

OKLA: Daily clinical work accounts for 30% of the total semester grade for clinical Operative Dentistry. Semester grade for clinical Operative Dentistry course is weighted as follows:

- Clinical Proficiency Examinations 60%
- Daily Clinical Work 30%
- Clinical Judgement 10%

TENN: Since the daily grade reflects all aspects of the student's performance in the clinic, the average of their daily grades is the grade received for clinical operative. (Clinical examinations to determine competency are pass/fail and are required to graduate. They are not used in the determination of their grade.)

Baylor: The final grade for third year clinical operative is the arithmetic average of four clinical progress examinations given during the course of the year. All daily work, termed "essential clinical experiences", must be completed by the end of the spring semester to avoid grade penalties. A shortage of miscellaneous restoration procedures is handled as follows: A shortage of 1-5 restorations will result in a loss of one grade level for the year. A shortage of 6-10 restorations will result in a loss of two grade levels for the year. Any shortage of specific essential experiences will result in an automatic Failure.

UTH: Daily work comprises 20% of the total (Junior) clinical Operative grade. Other components of this grade include the following:

- 25% Third Year Clinical Competency [amalgam preparation/restoration (5%), Class III composite (5%), Class II direct composite (5%), cast gold or indirect composite inlay or onlay(10%)]
- 20% Productivity
- 15% Bench exam on a dentoform (amalgam Class II preparation/restoration, cast gold inlay or onlay preparation/restoration)
- 10% Clinical judgement
- 10% Operative written examination

UTSA: Each operative procedure receives points based on its difficulty. The number of points the student accumulates determines the grade that they receive up to the maximum grade for which they are eligible. The maximum grade for which they are eligible is determined by their performance on timed skill assessments.

5. What review or other preparation is given to your students with respect to Operative Dentistry to ready them for Part II of the National Board Examination?

LSU: Students must attend a mandatory Board Review course in all disciplines. Students must achieve a passing score of 80% prior to receiving the Dean's authorization to sit for Part II of the National Board Examination. We try to use questions from the didactic portion of our clinical operative course. We do not have any contact with the students in their senior year.

MISS: During lecture, references are made to what has been asked on National Boards on released exams, or what seems to have been emphasized in previous years. In addition, there is a thorough review of the operative section. Students also purchase Dental Decks.

OKLA: None of our department specifically for the exam.
The students do take a Mock National Board Part II Exam that is prepared by

Southern Illinois University. This exam has been fairly accurate in identifying areas where the students are the weakest. They can then, hopefully, emphasize those areas in their preparations for the actual examination.

TENN: There is an elective review course presented by the faculty for interested students. Review material is provided on Blackboard and the ASDA provides copies of releases examinations for students.

Baylor: A review of Operative Dentistry handout is given to the fourth year students. In the past, 1 -2 hours for review had been allotted in the curriculum.

UTH: National Board Examination Review (Part II) is centered upon numerous case-based exercises (including overall case evaluation, diagnosis, and treatment planning). In addition, the students participate in an afternoon Operative (fundamental) review session. Written examinations cover the case-based exercises as well as the Operative review.

UTSA: We do not currently provide our students with additional preparation for Part II of the National Boards.

6. Within the last two years, has anyone from your department or school gone to Chicago to review current Operative questions?

LSU: Yes. Dr. Burgess has seen them in the past and has furnished many areas of concern that he found from the boards. When visiting these sessions, you are not allowed to bring paper, etc. to record questions. You can only take with you what you remember.

MISS: No, we have sent people from restorative twice in the past 10 years.

OKLA: Dr. Thomas Coury went to Chicago this past summer to review the exams.

TENN: No response

Baylor: No, but we are planning to send someone to review questions in summer 2004.

UTH: Yes.

UTSA: Yes, Dr. Little Star went.

7. If so, could we collaborate and share information on these questions?

LSU: I suppose so.

MISS: Sounds like a good idea to us.

OKLA: Yes.

TENN: No response.

Baylor: We will be happy to share when we have something to contribute. Let's visit this question again late next summer or early fall.

UTH: Yes, as confidentially as the review allows.

UTSA: Suggest a method.

8. How are direct pulp capping procedures done in your clinic? What are your considerations in determining when a direct pulp capping procedure is indicated?

LSU: The Direct Pulp Capping protocol completed in our student clinical involve the following:

A. Diagnosis

1. Exposure is small, 2mm or less
2. Proper rubber dam isolation is verified; no blood or saliva contamination
3. Bleeding from the exposure is stopped; application of 5.25% of Sodium Hypochlorite on a sterile cotton pellet for 10-30 seconds
4. No sign of suppuration and necrotic pulp tissue

B. Treatment

1. After homeostasis is established, Dycal is placed gently without pressure over the exposure
2. Cavity preparation is completed if incomplete
3. The cavity preparation is based with Vitrebond, the surrounding dentin is and Vitrebond is etched with phosphoric acid. Scotchbond Multi-purpose
4. Complete the restoration with amalgam, composite, or glass ionomer (Fuji IX)
5. Re-evaluate in 4 to 8 months. If the tooth is asymptomatic and tooth was originally treatment planned for an indirect restoration, proceed with the indirect restoration without disturbing the pulp cap

We try to do indirect pulp capping before direct pulp capping. The success is higher in indirect procedures. If an exposure is present we consider several factors: size, type of discharge or bleeding, age, health of patient, planned treatment for the tooth.

MISS: With rubber dam isolation, sterile water irrigation and use cotton pellet to dry and apply Life (CaOH), the cover with glass ionomer.

With an exposure, we determine whether this is mechanical or carious. If mechanical, we place direct pulp cap and indicate that root canal therapy may be

indicated but we hope for reparative dentin formation. With carious, we appoint in endo clinic. For an exposure <0.5mm and hemorrhage **easily** controlled, dry with cotton pellet followed by Life (CaOH) , then covered with GC liner, then final restoration. Student will follow this restoration to make sure patients remains asymptomatic. For an area of > 0.5mm and hemorrhage **not easily** controlled, we recommend temporary IRM restorations and evaluate for endodontics ASAP.

OKLA: Direct pulp capping procedure:

Effective isolation of tooth (rubber dam)

Remove caries

Place a very thin layer of calcium hydroxide limited to the exposed area only

Place a resin modified glass ionomer base over the calcium hydroxide

Total etch procedure with All-bond 2

Restore with appropriate material to effect the best seal possible

The considerations for a direct pulp cap are:

Tooth vitality

Size of exposure – limited to pinpoint exposures

Preoperative condition of tooth

No spontaneous pain

No prolonged pain after initiating stimulus is removed

No periapical pathology

Age of patient

Younger patients are given better prognosis

Tooth will not serve as an abutment for fixed or removable partial denture

TENN: Direct pulp capping procedure:

Cleanse area with cavity cleaner (chlorhexidine gluconate – Consepsis (Ultradent) (as available)

Cover exposure with calcium hydroxide (Dycal)

Cover area with glass ionomer liner (Vitrebond)

Considerations:

Prior to the restorative procedure which may involve the pulp, a thorough evaluation of the tooth's pulpal health must be done. A current radiograph of the tooth must be evaluated for any evidence of periradicular pathology. Tests must be done to determine the tooth's vitality. The patient must not have a history of spontaneous pain with the tooth in question. The tooth must not show signs of an irreversible pulpitis (lingering pain with stimulus). Rubber dam must be used during the procedure. If there is a pulp exposure, the exposure hopefully is small and the bleeding is easily controlled.

Baylor: When a direct pulp cap is indicated, Ca(OH)₂ is applied over the exposure site and covered with resin modified glass ionomer. The dentinal tubules are then sealed with bonding agent or the final restoration is bonded to place if appropriate. A direct pulp cap may be placed if the tooth is properly isolated with a rubber dam (i.e. no contamination with saliva has occurred). Additionally, the tooth must be vital and asymptomatic pre-operatively (no radiographic evidence of periradicular lesion of endodontic origin and upon pre-operative testing with heat and cold, no lingering

sensation remains when the stimulus is removed), the exposure must be small (<0.5mm in diameter) and hemorrhage from the exposure site must be easily controlled. A well-sealed restoration that prevents further bacterial contamination is imperative.

UTH: Clinical examination & assessment:

- the tooth must be vital and have no history of spontaneous pain
- pain elicited during pulp testing with a hot or cold stimulus should not linger once the stimulus is removed
- a periapical radiograph should show no evidence of a periradicular lesion of endodontic origin
- bacteria must be excluded from the site by the permanent restoration

Direct pulp capping - very small carious exposure (< 0.5 mm) **or** a small mechanical pulpal exposure

- the tooth is asymptomatic and there is no radiographic evidence of pathology
- the surgical site is clean and well isolated (no possibility of contamination of the exposed site ≡ no leakage of saliva or blood)
- all caries are removed
- hemorrhage from the exposure site is controlled
- If the restorative material is amalgam, calcium hydroxide is placed over the exposure site, overlaid with either IRM or a RMGI (resin-modified glass-ionomer).
- If the restorative material is composite, calcium hydroxide is placed over the exposure site and either restored at that point or the calcium hydroxide is placed and overlaid with RMGI and then restored.

UTSA: See Student Protocols for Indirect and Direct Pulp Capping Procedures (as follows)

STUDENT PROTOCOLS FOR INDIRECT AND DIRECT PULP CAPPING PROCEDURES

INDIRECT PULP CAP

INTRODUCTION - When there is a very deep carious lesion in a vital permanent or primary tooth, an indirect pulp cap (IPC) should be considered. Indirect pulp capping is a procedure designed to prevent pulp exposure by removing soft, wet carious dentin but leaving a thin layer of dry (fibrous) demineralized dentin, which, if removed, would expose the dental pulp. A bacteriostatic or bactericidal dressing or liner is then placed over the demineralized dentin to reduce the permeability of the dentinal tubules to noxious stimuli. The pulp must be vital and healthy. It must have the ability to remineralize the demineralized dentin and to form sclerotic and reparative dentin. Given the choice, **an indirect pulp cap is greatly preferred to a direct pulp cap. There simply are no advantages to exposing a pulp which has the ability to protect itself.**

DIAGNOSIS - The pre-operative status of the pulp and periradicular tissues should be carefully evaluated. The tooth should be considered a good candidate for an IPC only if the following conditions exist:

- a. There is no history of spontaneous pulpal pain.
- b. There is no history of pain that lingers after the tooth has returned to mouth temperature following the application of a hot or cold stimulus.
- c. Pain elicited during pulp testing with a hot or cold stimulus does not linger after the tooth returns to mouth temperature.
- d. A periapical radiograph shows no evidence of a periradicular lesion of endodontic origin.
- e. Pulpal response to thermal or electrical tests is within normal limits.

TREATMENT PLANNING

An IPC will be accomplished at the restoration appointment if the tooth is to receive a direct restoration (bonded amalgam, composite, or ionomer); the restoration will be placed over the IPC. If the tooth is to receive an indirect restoration, the supervising faculty member, in consultation with the student, will make a determination as to the amount of time that should elapse prior to definitive restoration, usually 4 to 8 months. If an amalgam buildup is indicated, it should be performed at the time of the IPC, time permitting, and it should be bonded. Prior to definitive restoration, normal vitality must be determined. Supervising faculty in consultation with the student may determine that an endodontic procedure is indicated instead of an IPC.

TREATMENT:

Indirect Pulp Capping Procedure:

- a. Isolation - After anesthesia, isolate the tooth with a rubber dam.
- b. Preparation - Prepare the tooth for a final restoration leaving demineralized dentin only in the area immediately adjacent to the pulp. Use a caries indicator stain if necessary to assure complete carious dentin removal (other than that immediately adjacent to the pulp). After this is accomplished, use a spoon excavator or a large round bur in a low speed handpiece, revolving at a very low speed. Use very gentle, featherweight strokes over the area of the demineralized dentin to remove only the wet (soft, amorphous) carious dentin. Leave the dry, fibrous, demineralized dentin that gives some moderate resistance to gentle scraping with a spoon. In other words, leave the last deep layer of demineralized dentin which, if removed, would likely expose the pulp.
- c. Lining - Place a calcium hydroxide liner (Dycal or Life) over the demineralized dentin. Additional cavity sealing is indicated, so a bonded restoration, using a dental bonding system such as Amalgambond Plus or Scotchbond Multipurpose, should be placed. If, in the judgment of the instructor and student, additional protection of the liner is indicated, a stronger material such as an ionomer base (Fuji II LC, Vitrebond), may be placed over the calcium hydroxide liner prior to application of the bonding material.

d. Restoration:

- 1) Direct restorations – **All direct restorations should be bonded** (bonded amalgam, composite, ionomer), and the tooth should be restored with the definitive restoration immediately after the IPC procedure. If time does not allow for placement of a final restoration at the first appointment, an ionomer (Fuji II LC, Ketac Silver) or IRM temporary restoration should be placed and the patient reappointed for the final restoration as soon as possible. The liner placed during the indirect pulp capping procedure should not be disturbed during the subsequent restoration process.
- 2) Indirect restorations - For indirect restorations (cast metal restorations, ceramic onlays or crowns), place a definitive buildup if time allows (bonded amalgam, composite, ionomer) at the appointment in which the IPC was performed. Delay the final restoration for a period of months, usually 4 - 8 months. Prior to proceeding with definitive restoration, assure normal vitality of the pulp and absence of an apical lesion (periapical radiograph).

PRECAUTIONS DURING TREATMENT

- a. Assure no carious or demineralized dentin is left in the area of the DEJ.
- b. Avoid being aggressive in carious dentin removal in the area of the pulp in order to prevent accidental pulp exposure.
- c. For direct restorations or substructures (build-ups) for crowns or FPD retainers, bond the restoration to reduce initial leakage.
- d. If a temporary restoration has been previously placed over an indirect pulp cap and the tooth is reentered for a restorative procedure, do not remove the indirect pulp capping material.

DIRECT PULP CAP

INTRODUCTION - The need for a direct pulp cap should be avoided by using an indirect pulp cap when the carious lesion is deep in a normally vital tooth. A direct pulp capping procedure may be indicated in the management of a mechanical exposure when the exposure is small, trauma to the pulp is minimal, and the history and preoperative evaluation indicate that the pulp is healthy. A mechanical exposure which occurs at the cervical level (such as in a Class 5 preparation) may not be suitable for direct pulp capping; pulp tissue coronal to the exposure could have its blood supply compromised by hemorrhage or inflammation caused by the exposure.

DIAGNOSIS - Diagnostic considerations for the direct pulp cap include those listed above for an indirect pulp cap plus the following:

- a. The exposure is small.
- b. Rubber dam isolation is complete, and there is no contamination with blood or saliva.
- c. Any bleeding from the exposure can be easily stopped.
- d. There is no sign of suppuration or necrotic pulp tissue.

TREATMENT:

Direct Pulp Capping Procedure:

- a. After hemostasis, immediately place calcium hydroxide (Dycal or Life) over the exposure. Be gentle and avoid pressure.
- b. Complete the cavity preparation.
- c. Etch and use an appropriate dental bonding system.
- d. Complete the restoration with amalgam, composite, or ionomer.
- e. Reevaluate in 4 - 8 months. If the pulp is normally vital, the tooth is asymptotic, and an indirect restoration is in the treatment plan, proceed with that restoration without disturbing the pulp cap.

This protocol was developed by the Departments of Restorative Dentistry and Endodontics, and was coordinated with the Departments of Dental Diagnostic Science, General Dentistry, Pediatric Dentistry, and Prosthodontics, UTHSCSA Dental School, February 1991; revised October 1995, October 1999, July 2001, and March 2003.

VII. National CODE Meeting

VIII. Suggestions for CODE.

(only responding schools printed)

What can the organization do to improve its effectiveness?

The organization seems to be serving its purpose.

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

No responses

Other suggestions?

No responses

VIX. Suggested topics for next year's National C.O.D.E. agenda:

1. Electric handpieces
2. LED curing lights
3. Self-etching bonding systems, even unicem cement
4. Desensitizing agents or techniques
5. Lasers in Operative Dentistry, such as the Biolase Units

CODE Region III Attendees Form

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
Terry Fruits	OUHSC	405-271-5735	405-271-3423	terry-fruits@ouhsc.edu
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Jerry Nicholson	UTSA	210-567-3690	210-567-6354	Nicholson@uthsca.edu
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Scott Phillips	UMS	601-984-6030	601-984-6039	smphillips@sod.umsmed.edu
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James Fitchie	UMS	601-984-6030	601-984-6039	jfitchie@sod.umsmed.edu
Karen Troendle	UTSA		210-567-6354	
Robert Gherardi	WREB (Western Regional Examining Board)			rgherardi2@comcast.net

CODE REGIONAL MEETING REPORT FORM

REGION: IV (Great Lakes)

LOCATION AND DATE OF MEETING:

University of Illinois, College of Dentistry

Chicago, Illinois

October 16 - 17, 2003

CHAIRPERSON:

Name: Dr. Courtney C. Lamb

Phone #: (312) 413-2836

Address: University of Illinois College of Dentistry

Fax #: (312) 996-3535

801 S Paulina Street

E-mail: clamb@uic.edu

Chicago, IL 60612-7211

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

1. The use of F vs. E speed x-ray film - With the use of higher speed x-ray film, dental decay is becoming more difficult to see on radiographs. Discuss your school's use of film and the rationale for doing so.
2. Some faculty of dental schools would like to see the use of some form of electronic patient record with the patient's photo as well as pre-treatment intra-oral photographs included in the record. Does your school use an electronic patient record, and if so, are these items included?
3. What type of radiographic record does your school use - conventional radiograph or digital? Both? If digital x-rays are used, what are the legalities involved and how do you deal with them?
4. Many times it is difficult to obtain suitable patients for student treatment. They seem to be either too easy or too difficult. The teeth either have incipient dental caries or are grossly decayed. Does your school have difficulties in acquiring suitable patients/conditions for students? If so, how do you deal with this problem?
5. After teeth have been endodontically treated by your dental students, what is your policy on the restoration of the tooth? How soon is it restored after the obturation? What is the preferred type of restorations (full crown, onlay, amalgam, composite, etc)?
6. Board examiners tend to want to see traditional tooth preparations and restorations. However, there is a decrease in the number of teeth requiring these types of preparations and the increase in smaller lesions requiring more conservative treatment. Is this a problem at your school or for your students doing Board Examinations? If this is a problem, has there been any attempt to discuss the problem with Board Examiners?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Mary Ellen McLean

Phone #: (734) 615-8353

Address: University of Michigan

Fax #: (734) 936-1597

School of Dentistry

E-mail : memclean@umich.edu

Ann Arbor, Michigan

Date: October 14 -15, 2004

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION IV
SUMMARY RESPONSES TO NATIONAL AGENDA**

No Summary Responses to National Agenda received.

**2003 NATIONAL CODE AGENDA
REGION IV RESPONSES**

(Please cite the evidence were applicable)

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

IU: No

OSU: No

SUNYB: No. Would have had faculty training/demo last June - representative had an MI the day the demo was to take place. Machine was on our loading dock.

MICH: No

UIC: No

UDM: No

WVU: No

UWO: No

CWRU: We have 1 unit - donated by KaVo for 1 year - we spent the summer of 2003 assessing the system.

How long has your school been using this system?

Since only CWRU is the only school using this system, the response is less than a year.

How and where is it being used (i.e. pre-clinic operative/ fixed/ other)?

IU: N/A

OSU: N/A

SUNYB: N/A

MICH: N/A

UIC: We have looked at it and currently do not have plans to include it in our pre-patient care facility renovation.

UDM: N/A

WVU: N/A

UWO: N/A

CWRU: Research - 3 dental students assessed the accuracy of the system for scanning the following: intracoronals (Class I, II, and V), extracoronals (PFM, FGC), restorations (amalgams, composite, provisional, wax patterns, gold castings).

What are the strengths and weaknesses of this system?

IU: Don't know. We haven't used it.

OSU: We feel that having an objective evaluation mechanism for preparations would be enormously useful. We were pleased to view the system in Chicago during a visit to KaVo. At that time, we determined that the speed of evaluation and the number of students in a course would preclude use in our courses. The software (interface) was still in flux. We would like to be able to put in parameters for an acceptable preparation (including bounds on over/under preparations for different areas, and then have the machine provide feedback about the specific evaluation.

SUNYB: N/A

MICH: Unable to comment

UIC: N/A

UDM: N/A

WVU: N/A

UWO: N/A

CWRU: Strengths - the unit very accurately scans extracoronals, and some restorations. The accuracy is within .05mm and 1°. Weaknesses - the units do not scan intracoronals - 3-D images exhibit ghosting and artifacts, especially as preparations become deeper. In addition Class V preps (we believe based on the way the light hits the surfaces) do not scan well at all; restorations with shiny surfaces do not scan - again we believe this is due to the light being reflected off the surface. Time - the time it takes to scan the tooth and rebuild the 3-D image is extensive. Feedback - presently there is a screen image per section - no easy way to send the data to a spreadsheet. It would be better if a single page evaluation could be formatted - so students and faculty could easily review the prep/restoration, and for a method of sending information to a spreadsheet. Also the 3-D image describes how close you are to the standard point/line/angle. It would be helpful if one could ascertain the actual distance from the tooth to the prep, then one could determine how much reduction there actually was.

What are your recommendations/ summative evaluation of this system?

IU: Not enough information to comment.

OSU: Though this is a great idea, we are not ready to use it in our pre-clinic.

SUNYB: No response

MICH: N/A

UIC: N/A

UDM: N/A

WVU: N/A

UWO: N/A

CWRU: Eventually this type of system will make objective grading/evaluation the standard. We are looking forward to seeing some improvements in the system - once the "bugs" are worked out - it will be a fabulous tool for self-evaluation as well as faculty evaluations.

Are devices which provide immediate quantitative feedback the way of future pre-clinical education? Please explain.

IU: Immediate quantitative feedback I think is very important. This type of feedback is often used in sports training. Feedback that is accurate and immediate is documented in other types of manual skill training. There is no reason to think that it would not also work in the acquisition of fine motor skills, such as in dentistry.

OSU: Yes. We are very interested in having technology such as this in the future. Allowing unsupervised objective and quantitative feedback without faculty intervention would allow and encourage additional practice with the ability to focus on areas of improvement. However, it is not a substitute for faculty evaluation during the learning process. There are some "habits" that students start with that may not be recognized by these devices.

SUNYB: No. Would have had faculty training/demo last June - representative had an MI the day the demo was to take place. Machine was on our loading dock.

MICH: Unable to comment. No experience with these systems.

UIC: No response

- UDM:** There may be a place for systems such as PREPAssistant or DentSim, but options for learning experiences/simulations need to be expanded significantly. Also, if systems were able to simulate disease or a defect in the context of a case, their benefit would be greatly enhanced. Teaching students to make preps with narrowly defined parameters and no context (like making “widgets”) is of limited value in preparing them for modern dental practice. Other issues include limited practical benefits based on the high cost of these systems, the amount of space the unit takes, and the large (not realistic) size of the handpiece (in the case of DentSim). A major benefit is the ability to have an excellent level of calibration.
- WVU:** No response
- UWO:** I am not sure at this point. The immediate feedback devices that I have seen have not impressed me. At UWO we still rely heavily on row instructors giving feedback. I feel there is more valuable information transferred by this method, although, I have to admit that the calibration of faculty is a problem.
- CWRU:** Yes - 2 reasons: (1) faculty shortage (need to utilize system which will help students learn how to self-assess - fewer faculty available), and (2) student expectations (based on available technology in other fields). Students expect dental education to keep pace with other health professions.
The type of information to the students needs to be carefully assessed. How tight are the parameters of acceptance (within 0.05mm, 0.15mm, 0.3mm, 1⁰, 2⁰, etc), and what is clinically acceptable?
For example, we are also using DentSim system (DenX) - originally the information was given in a negative approach - points deducted- (i.e. you started at 100 and points were deducted as you made critical errors), they are modifying the system to have points added (start at zero). We have found that for the first projects the most important feature is the feedback (cross-sectional, depth, etc) without points, and students work until they are satisfied with their preps with no grade visible.
See additional comment under question IV re: DentSim simulators.
In addition it is very critical to use DentSim and other technology which assists in quantitative information. We are using the DentSim system for learning the requisite hand skills, not necessarily to reproduce the “ideal” prep. We try to stress the prep design is dependent upon the following : amount and location of decay, as well as the type of restorative material that will be used.

II. KaVO Diagnodent/other detection devices:

Are you utilizing current technology based caries detection methods/systems in student clinics?

IU: Not using in clinics, but is being used as research tools at the present time in Cariology. Practitioners may be using it for the wrong reason; using it to treat early carious lesions. Lawsuits pending. Students are exposed via a cariology class.

OSU: No

SUNYB: Yes

MICH: No

UIC: We are not using the Diagnodent - but have several clinical research projects in mind that may include the use of this technology for identification of early carious lesions.

UDM: No

WVU: No

UWO: Not at this point. UWO has just (October 1, 2003) acquired a Diagnodent unit. We are about to introduce early caries detection methods, however, the questions is "How early do we have to diagnose dental caries?" The general feeling among my colleagues is that the conventional method of mirror, explorer, and radiographs has done the job in the past. Do we have to identify the moment of conception as it relates to dental caries? We will not treat restoratively until there is a cavitated lesion.

CWRU: The first year class participates in a two-week sealant program. At this time, the students go to Cleveland public schools and place sealant on newly erupted first molars. There has been an attempt to use the KaVo Diagnodent at this time, but it has been rarely used because it takes too long to calibrate. A representative of the company is to come to the school to eliminate this problem. The school is very eager to use the system in the sealant program.

Which systems are you using and how frequently are you using them?

IU: Diagnodent and Quantitative Fluorescence. Used primarily in research at our school.

OSU: N/A

SUNYB: Ultradent Sable Seek (greenish-black), FD & C dyes, eg. glycol base. Infrequent use. No formal control over it.

MICH: N/A

UIC: No response

UDM: No response

WVU: N/A

UWO: N/A

CWRU: About 20% of the time. Junior students use Seek (liquid) on prepared teeth to detect caries. We try to get the students to rely on transillumination, x-ray, and explorers.

What are your opinions as to sensitivity/specificity?

IU: Research indicates high sensitivity and specificity.

OSU: No better at this time than a thorough examination using current instruments. We have been addressing how we teach caries - etiology, diagnosis and management - within our curriculum. Last September we had a faculty retreat presented by some of our faculty summarizing current diagnosis and treatment concepts. It would be a wonderful research tool, however. We have a web site that may be of interest that allows people to view an occlusal of a premolar, determine caries presence/absence and view a section of the same tooth to see their accuracy. The site has two access points:

<http://www.dent.ohio-state.edu/d533/caries/>

<http://www.dent.ohio-state.edu/d632/caries/>

At least one of these sites should continue to be available in the future.

SUNYB: False positive and false negatives obtained.

MICH: N/A

UIC: N/A

UDM: N/A

WVU: N/A

UWO: N/A

CWRU: We have found Seek to be beneficial to students just starting in the clinic, but wean them off using Seek as soon as they become more proficient in caries detection.

**Do you have knowledge of other technologies in development but not yet released?
Please describe/explain these systems.**

IU: Not aware of any other systems at this time.

OSU: We are not working in this area at OSU.

SUNYB: No

MICH: No

UIC: No response

UDM: No

WVU: No response

UWO: No

CWRU: No

III. CAD\CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

IU: We have a CEREC 2 machine with CEREC 3 software. We are using in Grad Prosthodontics clinic, but when CEREC 3-D was developed, interest in CEREC 3 started waning. We are in the process of procuring a CEREC 3-D machine with plans of eventually using it in our undergraduate student clinics. Will not have until after January of 2004.

OSU: Currently used as a elective lab-only course.

SUNYB: We have image capturing capability but send out for milling. Not for student clinics.

MICH: Yes, infrequently. Only in selected case, usually with D4 (senior) dental students who have a particular interest in technique and an appropriate patient who also elects this option for treatment.
(Point of contact and source for responses to these questions: Dr. Dennis Fasbinder, Clinical Professor/AEGD Director. Dr. Fasbinder also conducts regional hands-on training for Sirona for private practitioners who purchase CEREC systems and has authored several articles and research studies on CEREC restorations.)

UIC: Not currently used

UDM: No

WVU: No

UWO: Not at present, however, the school is awaiting delivery of a CEREC 3 unit. One faculty member has already taken an introductory course for CEREC 2 and the Basic Training Session (2 days) for CEREC 3.

CWRU: At the present time, our third year students are given a two-hour lecture in the fall semester on the use of the CAD/CAM - CEREC 3. Our future goal is to obtain the equipment for clinical use.

What is your evaluation as to accuracy/marginal fit?

IU: Marginal fit and accuracy of the CEREC 3D machine is excellent. The CEREC 2 machine had adequate margins, but software is not as user friendly and fit and margins do not seem to be quite as good as CEREC 3D.

OSU: The current model is much improved over previous models.

SUNYB: Steep learning curve. Marginal fit still not very good even in hands of skilled operator.

MICH: Excellent. As good as any laboratory fabricated restoration.

UIC: N/A

UDM: N/A

WVU: N/A

UWO: From our limited experience, the fit appears to be as good as a lab processed resin or ceramic unit.

CWRU: N/A

Is the system utilized in your Graduate Program and Faculty Practice?

IU: Currently being used in Grad Prosthodontics.

OSU: No

SUNYB: Grad - yes, limited. Faculty Practice - No

MICH: Yes. It is routinely used in the AEGD and graduate operative dentistry residencies. In the faculty practice, there are a few doctors who use it routinely.

UIC: N/A

UDM: No

WVU: No

UWO: We have no graduate program. When obtained, the unit will be used in the faculty practice by anyone who takes the necessary training. Undergraduate students in their final year will be given the opportunity to use this technology once they have met their other requirements for graduation.

CWRU: N/A

What is your opinion as to the overall clinical acceptability of the restorations produced from student clinics?

IU: With grad students, the clinical acceptability is good. Have not used with undergraduate students.

OSU: We don't use enough to evaluate.

SUNYB: Not used in student clinics. No data.

MICH: As good as indirect restorations fabricated by conventional methods given equal faculty assistance and input. Unless a student is performing a procedure for a competency exam, it is commonplace for faculty to provide some hands-on assistance, such as touching-up a preparation or assisting with an impression, during conventional crown and bridge procedures. A usual scenario for CEREC procedures is that the faculty may touch-up the final preparations details, will capture the picture of the prep (if the student is new to the technique, however, students who do multiple restorations pick up on this step quickly), and will design the restoration on the computer while quizzing the student regarding anatomical and occlusion-related details. Students generally perform the cementation procedures independently.

UIC: N/A

UDM: N/A

WVU: N/A

UWO: No experience as yet.

CWRU: N/A

What are the strengths and weaknesses of this system?

IU: CEREC 3: software is cumbersome. Substantial learning curve.
CEREC 3D: software very intuitive. A virtual waxing program.

OSU: Getting good anatomy, and finish and polish are weak areas, but not really significant. Being able to use any material is a positive. The machine is great for onlays, but we currently do not do enough to justify the cost of the machine in our clinics.

SUNYB: Strength - eliminates lab fees, no impression, no provisional.
Weakness - lugging unit around. Getting enough faculty trained and competent with unit.

MICH: One appoint procedure:

Strengths:

- Eliminates need for impressions, provisional restorations and lab work.
- No laboratory fees or wait-time while the restoration is being fabricated at a lab.
- Improvements in software allow continual improvement in restoration quality. New 3D software allows for planning of occlusion prior to fabrication.
- Good for reinforcing dental anatomy and occlusion concepts. The operator must design the location of proximal and occlusal contacts, ideal embrasure form, etc.
- Elimination of lab fees results in a low cost per restoration, approximately \$25.00. This allows a dental school to charge a relatively low fee for a bonded ceramic restoration. This opens up this treatment option to patients who might otherwise not be able to afford it and increases potential clinical experience of dental students with bonded ceramic procedures.
- High initial cost may be a deterrent for private practices, but dental schools can purchase CEREC systems directly through Sirona for approximately \$35,000 (a significant price reduction).
- Equipment maintenance is not an issue.
- Training resources (such as CD) are available from the Sirona company to help faculty put together and develop educational materials.

Weaknesses:

- Initial learning curve with a new technique. Can be daunting if not computer savvy.
- Logistics of moving the machine from clinic to clinic or cubicle to cubicle. Scheduling and planning so that the machine is not double-booked.
- Must have location for milling unit.
- Primary roadblock is having faculty who are skilled enough with the system that they are comfortable teaching it. Would need a cadre of skilled faculty if the system were to be used for other than occasional use (at Michigan, two faculty members do the majority of the teaching).
- High initial cost for private office to purchase.
- As with any bonded ceramic restoration, case selection is critical and will limit where it can successfully be used. Camera cannot read subgingival margins and tooth must be able to be isolated with rubber dam.

UIC: N/A

UDM: Strengths include exposure of students to cutting edge technology that they may see in practice and the ability to fabricate crowns quickly, without the need for a dental laboratory. Weaknesses include high cost, technique sensitivity, and concerns regarding the quality of restorative margins. Also, given the already crowded curriculum, is this technology “nice to know” or “need to know”?

WVU: N/A

UWO: Cannot comment due to lack of experience with CEREC 3.

CWRU: N/A

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to the simulation mannequin vs. going immediately to the simulation mannequin?

IU: We generally have them prepare the first ones on the bench. They are not graded, only the ones on the dentoform are graded. We haven't tried the other method so I really can't speculate on which method is better.

OSU: Learn-A-Prep is used as a bench experience for students to learn to handle the handpiece and appreciate size/precision of our preparations.

SUNYB: 1st year Learn-A-Prep on desktop, 2nd year #30 occlusals on desktop, all others mounted, patient positioning, operator positioning, finger rests, mirror position all stressed (last 8-10 years).

MICH: In both the 1st and 2nd years pre-clinical courses, when learning a new preparation design (either in operative or fixed prosthodontics), students cut the first one (or first several in some instances) on the benchtop before cutting the prep with their typodonts mounted. The reasons given by the course directors for this practice are as follows:

- The first hurdle is to ensure that students learn and understand the details of the preparation design first and can reproduce the preparation without other complicating factors making it more challenging. If a student does not understand the reasons for the design or cannot recognize errors in the preparation on the benchtop, they will not be able to do it once it is mounted.
- By performing the procedure on the benchtop, it makes it easier for the faculty to give feedback initially and ensure that the student is seeing what the faculty is seeing.
- Once the student conceptually masters the preparation and has gained confidence that they can reproduce the prep, then they mount the typodont and learn to do the procedure with the additional challenges of limited access intraorally and indirect vision.

UIC: Our philosophy is to have students begin learning preparations in a mounted simulated position without benchtop (not clinically relevant) practice. Rather than using simulators, we have designated one clinic currently for simulation exercises. Students have an opportunity to complete some of their work in this environment with dentechs mounted on dental chairs/units that are identical to those in the clinic group practices. Some pre-clinical exercises are actually completed in the group practice clinics at the same time that routine patient care is also occurring in the majority of the units. The thought is that this is the best way to provide a "seamless transition" to the clinical setting.

UDM: Learning on the bench first has the advantage of good access and visualization. Learning on the manikin/simulator first has the advantage of learning to do the procedure the way it will be done for patients, in proper patient/operator position. Beginning students may find it more difficult to coordinate positioning, use of the mouth mirror, proper finger rest, etc. in a simulation system and may become frustrated. However, when working on the benchtop, these important issues are not

addressed or are left to the student to do whatever works. The transfer of clinical patient care is greater when learning is done in a context that most closely simulates the actual practice environment. Starting on the benchtop allows better visualization, but does nothing to lead to development of many of the skills needed for actual clinical practice and may, in fact, lead to development of behaviors that are not constructive and will need to be unlearned. Issues of access and visualization can be mitigated by having samples of correct preparations and incorrect preparations available for students to study during learning. Some of the faculty at UDM advocate benchtop procedures before learning in a simulation environment because they believe that students can better see what they are doing.

WVU: We use 2x plastic teeth for the first look at Class II amalgam and inlay preps on the benchtop. We feel that this allows the student to visually examine the principles of the prep prior to the mannequin.

UWO: At Western, we start the 1st year Operative Dentistry students off using our simulation set-up. There is no “out of mouth” preparation done prior to working on dentoform teeth mounted in a phantom head.

CWRU: We have just renovated the CWRU 2nd floor pre-clinical area - to include a Simulation Clinic (NOTE: it is not referred to as a “lab”) and a DentSim Clinic (10 units). The Simulation Clinic consists of a multimedia station and 72 KaVo simulators. All work is done on the simulators, students gown and glove as though they were in the clinic. Our expectation is that this will improve the transition into the clinic. The “immersion” method is being used in the 1st year. The D1 students start prepping class (lab) time. Instruction is predominately limited to information provided from the multimedia information with the DentSim unit. During the 2nd semester of the 1st year, students will participate in a formal Pre-clinic Fixed Pros course in which they will continue preparing crown preps. (This Fixed/Crown Prep course was introduced last year - we feel it is very successful - based on student and faculty evaluations of course and preps.) Presently, Operative instruction occurs in the 2nd year. This should change in the near future. We plan on moving portions of the 2nd year Operative course into the 1st year (fall 2004). To test the changes, we sought volunteers for a Pilot Program (summer 2003) - 10 rising D2 students participated in an Op Course - which was given in half the ordinary time. These students will now go into clinic, 1 afternoon per week, and work with an assigned D4 student, 1st semester as EFDA’s (placing restorations) and 2nd semester (prepping and restoring teeth).

There are 3 phases to the clinical component of the Pilot Program:

- Phase 1 - D2 assist D4 for 4 sessions (log of experiences),
- Phase 2 - Placement of restorations prior to restoring in clinic. D2 learns which procedure is scheduled, must be on typodont, prep and restoring in clinic. D2 learns which procedure is scheduled, must be on typodont, prep and restore tooth, submit to restorative faculty for evaluation
- Phase 3 - Prep in clinic, similar “in time learning”, prior to executing the procedures in the clinic. The D2 will prep and restore on typodont and submit for evaluation (use of technological advancements such as the PREP assistant and DentSim would be appropriate).

What is the value of quantity and repetition requirements before evaluation for competency?

- IU:** The best value is to make sure they have done enough so they are not setting themselves up for failure on the competency. The minimum number of “required” procedures will vary from student to student. One-time demonstration of competency does not necessarily indicate competency. Competencies should also be repeated, even if they are demonstrated once, in my opinion.
- OSU:** Repetition without feedback and assessment (reflection) is not efficient and may not necessarily improve performance. It may, in fact, reinforce bad habits leading to continued poor performance.
- SUNYB:** They are an integral part of the learning process especially at the introductory level of learning restorative dentistry. This is the only way a student learns handling properties of various restorative materials, and the skills necessary for the effective use of instrumentation. In clinic, they have to do a minimum number of procedures before taking a competency exam.
- MICH:** Competency means being able to predictably perform a procedure at a satisfactory level, not just on one occasion which may just reflect luck, not competently, but consistently.
- Students are required to repeat a given restorative procedure a number of times before being tested in the pre-clinical setting, and then should perform the procedure multiple times clinically before taking a competency examination. By repetition, the following advantages can be gained:
- Students gain confidence in their ability and overcome fear of performing the procedure for either an examination or on a patient.
 - Students can identify areas in which they need improvement or are having difficulty and can work on these areas prior to a competency exam. Students having difficulty can be identified ahead of time and intervention can be done in the way of additional faculty help or tutoring prior to testing.
 - Practice makes perfect. Even skilled individuals should strive for continual improvement.
 - Faculty can assess, to some degree, whether a student has basic skills necessary for a procedure by observing daily work where students perform a procedure repeatedly. This allows the faculty some insight as to whether successful or unsuccessful performance on an examination is an accurate reflection of a student’s usual work, or an anomaly.
 - By observing students’ daily work and their ability to reproduce what we have taught, repetition allows faculty to assess the effectiveness of their teaching. If confusion or misinformation exists among the students as to the correct method of performing a procedure, perhaps we did not explain it well and should go over it again prior to students being tested.

Successful completion of competency examinations are only part of the graduation requirements. Eligibility for graduation is based on quantitative measures, overall quality of the students’ work on a daily basis (including patient management), and performance on independent competency test cases. In addition to competency exams, other requirements include a passing faculty evaluation in all clinic disciplines (oral medicine, oral surgery, operative, orthodontics, endodontics,

periodontics, and prosthodontics) which takes into account student performance on a daily basis. Students must complete a minimum of 650 CEU's (Clinical Experience Units) during D4 and 360 CEU's during D3 years. They must complete treatment on 15 comprehensive care patients and complete 6 endodontic cases of which 2 must be molars.

- UIC:** Our philosophy is to have students begin learning preparations in a mounted simulated position without benchtop (not clinically relevant) practice. Rather than using simulators, we have designated one clinic currently for simulation exercises. Students have an opportunity to complete some of their work in this environment with dentechs mounted on dental chairs/units that are identical to those in the clinic group practices. Some pre-clinical exercises are actually completed in the group practice clinics at the same time that routine patient care is also occurring in the majority of the units. The thought is that this is the best way to provide a “seamless transition” to the clinical setting.
- UDM:** Most educators agree that procedures must be learned and practiced before students can be tested for competency. Repetition is one factor in skill acquisition. The loop of information, practice, and feedback must be utilized and repeated for students to learn psychomotor skills. Every student will require a different number of repetitions to achieve competency. Experience and investigation help determine how many “repetitions” of this loop most students will need, although there will be extremes at either end of the spectrum. It is important to note that repetition without feedback is of little value. Students need to evaluate their performance against a standard (criteria) and then need to compare their evaluation to that of an expert (faculty). This is where learning takes place. Corrections can be made and performance improved over time. Without feedback, repetition may perpetuate errors. As an aside, daily practice and feedback (e.g. simulation or clinical) that are ungraded allow students to make mistakes and learn from them without the risk and pressure of achieving a grade.
- WVU:** We use the term “competency” to relate to larger achievement of the students to practice general dentistry. We are using “minimal thresholds”, aka “requirements”, prior to challenging our operative “Performance Assessments”. We are currently changing how we determine competency through performance assessment.
- UWO:** We feel that students must develop their skill level by numerous repetitions of the procedures being taught, however, there is no requirement for a student to do a specific number of preparations and restorations. This applies to both the pre-clinical and clinical areas. Certainly in the pre-clinical labs, students do as many preparations and restorations as they feel are necessary to pass practical exams. They are allowed “after hours” time in the Simulation Clinic to improve their performance and prepare their assignments.
- CWRU:** Presently the minimum quantity and numbers are faculty-determined in 1st and 2nd year, while in the 3rd and 4th year it is more student-determined, when they feel they are ready (within certain time limits). The amount of repetition needed is dependent on the student, some need more repetition than others. Unfortunately, most schools follow the “herd” approach, all students work on the same project during the same time period. The faster students are not able to advance any faster than the masses.

Does competency replace the need for quantitative repetition?

- IU:** Not in my book; not if that is what they are going to be doing the rest of their work productive lives.
- OSU:** No!
- SUNYB:** No. Much in restorative dentistry is learned only through repetition and exposure to variation. Occasionally a student might be competent almost right away.
- MICH:** No, for the reasons outlined in the previous question.
- UIC:** No, there must be repetition, but there is not a defined number of repeated experiences that would assure development of competency for any skill and in each student.
- UDM:** No.
- WVU:** Depends on one's definition of competencies.
- UWO:** Yes, in all courses and all years. Due to pressure from Accreditation reviews, we have now eliminated number requirements and evaluate only competency. In the pre-clinical years, competency is still evaluated through practical exams. In the patient treatment clinics, we do not have "competency exams", but instead evaluate the daily work of the students and make a notation on their evaluation card as to whether or not the instructor feels the work they did that session is at the competent level. Organized dentistry in Canada has agreed a new graduate should have certain minimal competencies (46 of them). We teach and evaluate those Global Competencies.
- CWRU:** Not necessarily, sometimes clinicians need to hone their skills especially if some time has elapsed since they last practiced that skill.

In addition to the restoring of ivorine teeth in the pre-clinic courses, how are natural teeth being utilized (if your school uses them)?

- IU:** Used for bonding, to obtain the "feel" of cutting dentin and enamel, to obtain experience in caries removal, to learn dental anatomy, and to perform endodontic procedures.
- OSU:** Natural teeth are used in the first quarter D1 course (Dent 430) to teach and reinforce the anatomy of the tooth, etching, bonding and sealants, and they are also used in the dental anatomy (Dent 417) course as examples of each of the teeth for identification practice. In the second year, during the esthetic restorations course (Dent 538), an extracted tooth is used for an initial proximal restoration, leading to a larger multi-surface restoration and finally an onlay (if the tooth lasts that long).

SUNYB: We use extracted teeth on a limited basis for the resin portion of course. Extracted teeth, difficult to acquire, are essentially limited to 3rd molars. Proper storage, variation, and dessication present problems in their use, however, very difficult to effectively teach etching and bonding techniques on other than extracted teeth. We do a large Class V on maxillary molar.

MICH: Natural teeth are used a significant amount in pre-clinic courses. Students are not required to supply their own extracted, but rather the dental school has a “tooth bank” which is run by the pre-clinic administrator. Extracted teeth are obtained from university clinics and outreach clinics as well as private dentists (many of whom are UM alumni). The administrator sends empty jars with tooth storage liquid in them to offices who participate along with a prepaid self-addressed shipping label. When the jar is full, it can be shipped back to the dental school at no charge to the dentist. When a jar is received from a dental office, a new, empty jar is sent back again. Work-study students are employed to sort the teeth which are then used for teaching, research, etc.

In pre-clinic courses, natural teeth are used when teaching the following areas:

- Caries removal
 - Students perform caries excavation on moderately to grossly carious extracted teeth (mounted in stone) to aid in learning the following skills:
 - Provide experience in cutting on natural teeth so they are aware of the differences between plastic and natural teeth when they move to the clinic.
 - Appreciate the varying appearances of dentin within the same tooth and among different teeth with regard to normal dentin, sclerotic dentin, and stain.
 - Appreciate the varying appearances of caries within the same tooth and among different teeth with regard to color, texture, and hardness.
 - Recognize the difference between caries which must be removed and healthy tooth structure which may be left in place during preparation.
 - Removal of an appropriate amount of enamel for convenience form and external outline form relative to the size of the carious lesion. (provides a more realistic experience of what students should expect to face in clinic rather than just cutting ideal preps on plastic teeth).
 - Establish a caries-free DEJ during caries excavation.
 - Recognize unsupported enamel and experience fracture of fragile tooth structure.
 - Reinforce dental anatomy concepts of location and depth of pulp chamber.
- Liners and Temporary Restorations
 - Teeth which have been used for caries removal are then used for teaching the mixing and placement of liners (calcium hydroxide and glass ionomer liners) and varnish in deep cavity preparations, as well as the mixing and placing of IRM in a large preparation as a temporary restoration.
- Sealants and Preventive Resin Restorations
 - Students perform tooth preparation (when indicated) as well as cleansing, etching, bonding, placing and finishing restorative material on extracted teeth (mounted in stone) with deep pits/fissures or incipient fissure caries to aid in learning the following skills:

- Additional experience of preparing natural teeth (for PRR's) rather than just plastic teeth.
- Appreciation of varying appearances and depth of occlusal anatomy.
- Observation of "frosty" appearances of properly etched enamel.
- Better simulation of proper bonding techniques.
- Better simulation of shade matching and ability to identify flash on a natural tooth.
- Better simulation for true hardness of tooth structure when finishing composite resins (easier to damage plastic teeth when finishing).
- Class II Preparations
 - Students cut their first Class II amalgam prep on an extracted tooth mounted in stone with an adjacent tooth touching. This allows students to appreciate penetrating enamel, locating the DEJ, and placing preparation depths at 0.5mm inside the DEJ.
- Endodontics (some use)
 - Use of natural teeth is decreasing as suitable teeth are harder to find and plastic tooth manufacturing companies have made improvements in teeth fabricated for endodontic teaching procedures.
- Post and Cores
 - The pre-clinical crown and bridge course uses some "recycled" endodontically, treated teeth which were mounted and used the year before for teaching pre-clinical endo. These are used the next year for teaching preparation and fabrication of post and cores.

UIC: Natural teeth are used in Endodontic pre-clinical courses and also in limited pre-clinical restorative exercises. We have exercises that involve excavating decay from carious teeth, application of bonding principles and use of various adhesive systems, and limited exercises that allow students to experience differences between enamel and dentin during tooth preparation.

UDM: Caries removal exercise, sealant, preventive resin restoration, endodontics

WVU: We mount natural teeth in our Kilgore dentoforms for 5-6 uses in our pre-clinic operative courses.

UWO: No. Due to the difficulty in obtaining suitable natural teeth, we have not used any in the operative dentistry or crown and bridge areas for 10 years. Endodontics still has students find their own natural teeth (from family dentists, etc.) for most of their exercises.

CWRU: Natural teeth are being used in pre-clinical operative courses. They mount about 6-8 teeth into their typodonts during their 2nd year. The use of natural teeth has been very positively received by students. Students understand "being in dentin" when using natural teeth. They can feel the different preparations, can see dentin and enamel and can better practice placing the finishing for composites, etc.

Are you utilizing simulators/DentSim for teaching operative dentistry?

IU: Most schools have or are getting simulators.

OSU: No

SUNYB: 3 ADEC units

MICH: Not currently, but a simulation lab is under construction which should be ready for use in January 2004. We will be upgrading from typodonts on bench mounts to 110 simulated dental unit work stations with manikin heads, water, suction, new audiovisual system, and computer access. There will be no “electronic” feedback system such as DentSim.

UIC: No, we are not using DentSim. This technology may be used in a limited manner in the future. We have a laboratory with traditional simulators that is currently used in the International Dentists Program and for continuing education courses.

UDM: Yes

WVU: No

UWO: No, not any computerized ones. We have what we refer to as a “simulation unit”. It consists of Frasco teeth mounted in a phantom head and attached to a thorax. There is a dental unit attached to all this (overhead light, high speed fiber optic handpiece, slow speed handpiece, air-water syringe, and a regular operator’s stool).

CWRU: Yes, as previously stated, we have 10 units. They are being used in conjunction with the simulation clinic. Using 70 simulators KaVo for D1 +D2 (gowns, masks, etc.), fiber optics, water spray, etc.

Describe how you are utilizing these educational aids and their effectiveness.

IU: Not using. Do not have any.

OSU: We are using the “typodont-on-a-stick” with cheeks and skull. All students are required to wear masks, gloves and eye protection during operative courses. Additionally, faculty try to help the students when they observe incorrect posture for the procedure. We also reinforce these techniques with weekly clinic sessions.

SUNYB: We are pushing proper patient and operator positioning and making it a part of the grading process. All competencies and practicals require appropriate positing of patient (typodont). Operator and patient positioning are graded as part of every competency. Gloves, eye wear, mask, magnification, scrubs are all required.

MICH: N/A

UIC: No response

- UDM:** Yes, we are using ADEC simulators in a simulation laboratory. We do not use DentSim. The simulation lab is used for teaching all pre-clinical restorative courses. Endodontics, periodontics, dental hygiene and orthodontics are also taught in the simulation lab. The simulators are effective at helping students learn procedures using correct patient/operator positioning, high speed handpieces with air/water spray, and high speed suction, etc. Lighting provided by operatory lights is a significant improvement over the traditional lab. The simulation laboratory also has the ability to deliver audiovisual information to each bench. Other disciplines, such as radiology, utilize the simulation lab for its excellent audiovisual capabilities.
- WVU:** N/A
- UWO:** The pre-clinical simulation units are used for all pre-clinical activities which would normally be done in a regular dental operatory during patient treatment. There are no lab type procedures (uses of wax, dental plaster, etc.) allowed in the Simulation Clinic. The Simulation Clinic is used by operative dentistry, endodontics, fixed prosthodontics, and removable prosthodontics. Students must all wear gloves, masks, safety eye wear (or loops). The Simulation Clinic is also used extensively for “hands-on” continuing education courses. In a few words, this facility is very effective. After six years of use, we would do exactly the same thing that we did if we had to do it all over again. Students coming out of the pre-clinical restorative programs are well-prepared to enter the patient treatment clinics.
- CWRU:** The D1 students, the first month of class, start prepping Class I preparations on tooth #19 on the DentSim, within 2 months they are executing crown preps. All this is done 1-2 hours per week on a rotation basis mostly during non-scheduled class (lab) time. Instruction is predominately limited to information provided from the multimedia information within the DentSim unit.
The D2 students will use them as part of their operative course. They will prepare the following: a Class I on tooth #19; Class II's on #18, #14, and #20; a Class V on #18. (During their 1st year, they prepared crown preps.)

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

- IU:** Don't know. Haven't had the opportunity to teach with such a lab. My students often suggest that it might help them to have practiced on dentofoms that had cheeks and tongues. I hear this after they have been to clinic the first few times.
- OSU:** We don't have hard data, but discussions with students indicate that use of the mask and reinforcing proper operator/chair position helps in the transition.
- SUNYB:** We start students in clinic 2nd semester 2nd year. Not likely to happen any earlier than this. Emphasis on patient/operator positioning has made this a much smoother process. 2nd year students don't stand out as they once did not knowing what they're doing.
- MICH:** Unable to comment. No experience with these systems.

UIC: No response

UDM: Anecdotally, students appear better prepared primarily in the area of patient/operator positioning, mirror skills, etc. At UDM, students are not entering clinic earlier than they did prior to the opening of our simulation lab (they were already entering early in their second year). Faculty members have increased slightly in simulation courses. This may be more due to improvements in staffing or to more widespread use of criterion referenced evaluation which is more labor intensive. The impact of the simulation lab on both faculty and students has been most positive. It is a much cleaner, brighter, more efficient learning environment. Faculty can teach using multiple media such as lecture, video, PowerPoint, demonstration, and Internet and can easily switch to media that is most effective as needs dictate during the laboratory session. Students can easily see all demonstrations, slides, etc. which can be left on display as they work

WVU: N/A

UWO: Yes, transition to the main clinics has been made much easier for both students and faculty. They are used to working with gloves and masks on and much of the equipment they use in the Simulation Clinic is the same as in the patient treatment clinics. Faculty numbers have remained the same.

CWRU: Too early to tell. The present D3 students had both traditional and just half-a-year of Simulation Clinic (transition year). We are planning on having early transition thought "experiences".

Describe how your school relates biomedical scenarios to pre-clinic operative dentistry?

IU: We have a problem-based curriculum in the first two years. The PBL case-writers have asked for input, but most of the time the operative is remotely related to the basic science principles intended for the case. I have toyed with the ideas of creating "cases" that would relate to the student's dentoforms, so they could feel like the preparations and restorations have some clinical basis. It sounds like a good idea, but I have not had any experience in doing it.

OSU: We are increasing student exposure to the clinic during the first year to provide more direct reinforcement of the basic materials being taught at that time and their relevance to clinic procedures and situations. D1 students start the first quarter with weekly clinic ½ days where they learn the fundamentals of disinfection, recording in the patient record, taking the medical history, recording vital signs and performing head and neck exams on each other. The exercises are designed to coincide with basic science and dental courses teaching the background materials and allow greater relevance to be established. Some laboratory courses have used the Progress Notes portion of the patient record to record the daily "treatment" rendered to their "patient" and teach the outline basics of a proper progress note (we use the PTEN notation in our records).

- SUNYB:** As part of pre-clinical operative program, students make entries to a patient folder. They have to simulate the exam plus treatment planning of 3 patients whose principle need is operative dentistry. They are required to respond to a dental emergency and make appropriate entries. We are working to develop more complete patient profiles that will require students to respond to a patient's medical history as well as a medication regiment. The record is collected and graded on 3 occasions during pre-clinic course.
- MICH:** During both 1st and 2nd year restorative pre-clinical courses, the class is divided into 2 sections, A and B. When section A is in the pre-clinical lab, section B participates in either a clinic-related seminar or actively assists or provides patient care in the student clinic. The schedule is opposite for the other section of the class and every lab session is duplicated. Clinic seminars, particularly for the 1st year students, are case-based discussion sessions which emphasize patient management and biomedical scenarios. They are coordinated with the laboratory schedule to tie-in and relate to what is being taught in the pre-clinical lecture/lab portion of the course. Cases are fictitious or actual patients with medical problems that require attention by the dentist or social histories/background that affect the treatment plan. An example of tying the fictitious seminar patient into the pre-clinical lab curriculum is that when the students are learning caries removal and preparation design in the pre-clinical lab. In clinic seminar they perform a caries risk assessment on a fictitious patient with rampant caries and discuss non-surgical methods of managing the disease as well. They would also discuss how the patient's medical history and medications affect the caries risk.
- While not specifically related to pre-clinic operative dentistry, there has been an emphasis at UM to integrate more biomedical scenarios into all foundation level courses. Starting this year, most basic science courses taught in the 1st and 2nd years of dental school (such as biochemistry, microbiology, etc.) have been incorporated into an Integrated Biomedical Science curriculum. The curriculum is system-based rather than discipline-based, and each module is geared toward relevancy to clinical dentistry.
- UIC:** No response
- UDM:** There is integration of biomedical information in several pre-clinical courses. Cariology and histology are included in the introduction to Operative Dentistry course. Head and neck anatomy pertinent to the TMJ are presented in the Occlusion course. Hydrodynamic Theory of Pulpal Pain is discussed in the Esthetics course.
- WVU:** Caries risk assessment and understanding the disease "caries" in Biochem lab/lecture courses.
- UWO:** We don't.
- CWRU:** No response

Have community out-reach programs impacted your educational goals? Please describe.

IU: Some students consider it a boon, others consider it a bust. It depends on the program and the students' particular experience. Alternative spring break to Haiti.

OSU: Positively. We are one of the recipients of the Robert Wood Johnson grants and are looking hard at providing earlier clinical experience to our students in order to prepare them for potentially less-supervised work in a more production-oriented environment. This is coincident with our past goals of providing earlier clinical experiences to allow smoother transition into the clinical years. Planning for clinic utilization by more classes and managing multiple rotations to multiple sites is likely to be a very difficult task as we try to ensure that they can continue to provide treatment for their patients and attend the final few classes as D4 students. Besides the expected service learning that will occur with the increased programs, we are hoping for increased clinical efficiency by the students when they return and additional experience with the utilization of dental assistants.

SUNYB: Involved in neighborhood clinic years ago.

- 1) Summer trips to Central America.
- 2) Sealant program.
- 3) Hospital based rotations for 3rd and 4th years.
- 4) Cancer screening clinics: very positive feedback from students.

MICH: Yes, very positively. The number of out-reach experiences our students receive has increased over the last several years. Current D4 students complete 4 weeks at out-reach clinics during their senior year. We currently have out-reach clinics located throughout the state of Michigan including Battle Creek, Traverse City, Saginaw, Grand Rapids, Marquette, Muskegon, as well as local community clinics. The Traverse City program treats migrant workers who work in nearby cherry orchards. Other community service programs run at the dental school include a Dental Health Day screening program for adult patients and a Mouth-Guard Day program which provides free athletic mouth-guards to over 100 children at the start of each school year. Out-reach rotations occur in the D4 year with many of them concentrated in the summer before the fall semester of D4 year. Out-reach experiences are an adjunct, not a replacement for clinic experiences received at the dental school. (Students must still complete the same graduation requirements as expected of students previously and receive no "credits" for their time spent on out-reach rotations.) Some advantages of the out-reach program are the following:

- Students enjoy it as both a mental and physical break from the usual dental school routine and surroundings. The practice environment more closely resembles a private office which most find more relaxing and the travel provides a geographical break as well. Most students come back re-energized and enthusiastic.
- Students often are allowed a greater degree of freedom and are able to practice more independently than at the dental school. This allows students to gain confidence in their skills and decision-making abilities.
- Students are exposed to a wider variety of patients, some of whom suffer from very severe disease.

- Students are able to practice and learn 4-handed dentistry while treating adult patients.
- Having some students out of the building frees up cubicle space for other students (such as D2 and D3 students) to receive more scheduled clinic time and obtain more clinical experience.

A few negative aspects are:

- Having students out of the building on out-reach rotations makes it more complicated for faculty teaching didactic courses. Students must make up quizzes and exams, and arrangements must be made for getting information out to students on out-reach, such as on-line courses information, web-sites, chat-rooms, etc..

Recent state budget cuts to adult Medicaid funding may affect some programs.

UIC: We have placed an emphasis on “service learning” and community experiences while planning revision to the curriculum. It is too early to evaluate the impact, positive or negative. The early response from the students has been extremely favorable.

UDM: Community out-reach programs have impacted our student very positively. Students have been exposed to diverse populations and to the needs of the under-served. A significant part of the UDM Mission is service to the community and this is supported by several programs, including community and homeless clinics, an urban hospital-based clinic, numerous community screening activities, including Head Start screening and an international opportunity to provide dental care in Belize.

WVU: Our students normally spend six weeks of their senior year at a rural site. Next year, it becomes 12 weeks. The students receive varied experience in techniques and opportunities. Some receive experiences in CAD/CAM, laser, and air abrasion.

UWO: We, at present, have only two community out-reach programs. One is in cooperation with the University of Toronto. This involves a two-week visit to “Moose Factory” - a small northern community where students treat patients under the supervision of a full-time faculty member from the University of Toronto. The second program is a one day visit to a Regional Health Care Centre with one of our faculty members to treat disabled and long-term care patients. Both have been very positive influences on our students dental and community involvement education. We would like to expand these types of activities.

CWRU: The University is very committed to working with one for the community at large. *“We’ve given students more hands-on opportunities to make a difference, and to find professional inspiration through service learning. This resulted in every child in the Cleveland Municipal School District now receiving dental sealants because every dental student at CWRU is in the schools, serving the community’s oral health needs.”* (From President Hundert’s Global Summary address on the 21st Century Campus, May 1, 2003.)

The Health Smiles-Bright Futures dental sealant program provides more than 2 million dollars in free dental sealants and examinations for Cleveland Municipal School District children by CWRU faculty and dental students and is a collaboration of CWRU, the Cleveland schools and St. Luke’s Foundation of Cleveland.

The CWRU Dental School revised its school curriculum to integrate the sealant program into its educational program. First-year dental students trained for the sealant program by learning the skills needed and applying these techniques to each other during clinical sessions before traveling to the schools. More than 70 CWRU students and faculty will visit 100 Cleveland schools this year.

Lalumandier piloted the sealant program at five Cleveland schools in 2000. Due to the fact that three out of four children examined had dental problems, their teeth could not be sealed. Lalumandier envisioned a school-based program that reached more children and provided a broader range of dental treatment. (CWRU Press, January 22, 2002)

In addition to the above program, CWRU also has a Student Initiated and Student-Run Dominican Republic Program.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

IU: Caries risk assessments are done on all patients and appropriate preventive therapy is initiated. Cavitated lesions are still restored. Initial surface-lesions and radiographic enamel lesions are treated conservatively (fluorides, Prevident, varnishes, etc.). Written attempts in calibration of faculty has been tried. (Reading and subsequent testing of faculty.) Prevention and conservative treatment is more prevalent than it used to be, but we still have a long way to go in this regard. Even though some faculty pass the test, they do not necessarily change their philosophy of treatment.

OSU: We are modifying our current curriculum to get a better handle on caries management. The initial operative courses are being revised so that they address the "treatment of the carious lesion", and, within that framework, we can address diagnosis, early non-surgical management, minimal surgical intervention and the standard preparations. We used to have a caries risk assessment clinic years ago, but that seems to have been lost in our clinic changes. Risk assessment and early management are taught by pediatric dentistry, and mentioned early in the D1 course schedule in restorative courses, however, there is no comprehensive approach that continues into the clinics. Plans are to introduce caries management (risk assessment, early non-surgical intervention and minimal intervention techniques) into the first year curriculum as mentioned above and have that follow into the clinics. We just had an overview given to the faculty at our annual retreat (September 2003) covering the current concepts in caries identification and early management. We hope to continue with in-service training for the current faculty in addition to the protocols and training given to new faculty.

SUNYB: Radiographic series taken, caries in enamel treated with fluoride gel rinse, home care instructions. Problem - patient can get "lost" in school environment. Occlusal caries diagnosis by explorer, stain, color changes (NERB's). Cavitated lesions are restored. Junior students must follow suspect areas and restore in their senior year, if necessary. If you really get a catch with stain, and there are a number of these, preventative resin restorations are placed.

- MICH:** Students are taught to assess caries risk as low, medium, or high on every patient as part of the oral examination and treatment planning process. There is a separate area on the treatment plan form for students to annotate caries risk and risk factors as part of the diagnosis process. There is also an area to document prevention-orientated treatment modalities on the treatment plan. Protocols for assessing caries risk and subsequent caries management are listed in detail on the university website: <http://oralhealth.dent.umich.edu/edprpg.html>. The protocols conform with the Consensus Statements of the NIH Consensus Conference on Caries Diagnosis and Management Throughout Life, March 26-28, 2001.
- In general, the school follows a conservative and minimally invasive philosophy towards the caries management and treatment. Non-surgical management, including diet counseling and modification, oral hygiene instructions, topical fluorides, sealants, and monitoring of incipient carious lesions not yet into the dentin are heavily stressed and routinely employed. Other methods such as bacteriological testing, Xylitol gum, and chlorhexidine rinses are recommended for high risk cases. In situations where non-surgical management is either not feasible or has not been effective and operative intervention is required, the lesion should be managed with the most conservative preparation design possible, preserving healthy tooth structure where possible.
- UIC:** We have placed an emphasis on “service learning” and community experiences while planning revisions to the curriculum. It is too early to evaluate the impact, positive or negative. The early response from the students has been extremely favorable.
- UDM:** We implemented a caries risk assessment and management protocol in May 2003. All patients must be assessed for caries risk. Low, moderate, and high caries risk patients follow specific protocols tailored for their needs. High and moderate caries risk patients do not receive Phase II treatment (definitive prosthodontic care) until they are able to remain caries-free for a period of one year.
- Our patient population has a very high caries rate. Minimally invasive dentistry guidelines are followed and non-invasive treatment of carious lesions is instituted when indicated. This depends on the caries risk status of the patient and other factors such as compliance and medical history.
- Students learn about cariology and caries risk assessment and management beginning in the first semester of their first year. Caries management is emphasized in concert with treatment of caries (i.e. preparations and restorations) throughout the pre-clinical and clinical curricula.
- WVU:** All patients are screened. Those that are determined to be at high risk are evaluated with bacterial tests. Fluoride and chlorhexidine rinses are mainly used for treatment. Caries risk is taken into account during treatment planning. For low risk patients minimal lesions are not always restored.
- UWO:** At present we use only visual and radiographic evidence of caries. We will augment this with the Diagnodent unit in the near future. If radiographically and visually there is no evidence of cavitation, we inform the patient there is a “decalcification” evident and advise them on oral hygiene procedures they should practice to prevent further decalcification. The areas in questions are then followed-up in 12 months (with an x-ray) to see if there is any increase in the size of the lesion. Depending on the

evidence, active treatment in the way of a restoration may be initiated. We do not treat until we are sure the lesion is cavitated. Topical fluorides are used in situations where only decalcification has occurred.

As far as re-mineralization is concerned, we stress this as a method of treatment with incipient lesions (fluoride varnish, OHI, etc.). In deep carious lesions, we stress the use of indirect pulp capping methods (temporary restoration plus wait 3-4 months, etc.).

CWRU: No formal program at this time. Handled by the Preceptor Program. Lectures on caries management for D2 students. Use of fluoride, etc..

Which of these programs is the most effective?

IU: The mandatory risk assessment has been the most effective in getting the faculty on board. Some are still resistant, but it is better than it used to be.

OSU: No response

SUNYB: We have no data.

MICH: Did not understand the question.

UIC: No response

UDM: It is too early to determine the effectiveness of our program.

WVU: Probably the use of chlorhexidine and cavity varnish (Duraflor).

UWO: We only use the one program as noted in the previous question.

CWRU: No response

What are the strengths and weaknesses of this system?

IU: Faculty and student compliance. Even though we have clinical competencies, we still are on a restorative point system (minimum requirements). As long as we have clinical restoration requirements, we are going to have a compliance problem.

OSU: No response

SUNYB: Students can only follow for two years.

MICH: Again, not sure of the question. For any treatment philosophy/modality that provides more individualized consideration of the patient's needs and addresses those needs in a way that both effectively stops the disease while preserving healthy tooth structure is beneficial. This disadvantage of trying to employ this philosophy in a dental school setting is the difficulty of achieving consistency in its application among a large number of faculty.

UIC: No response

UDM: We had no formalized system for caries risk assessment/management prior to this program. This program seems to have been positively received. Awareness has been significantly increased with both students and faculty. More emphasis is placed on treating the patient's disease and not as much on "doing procedures". However, much work needs to be done to enhance the system, now that it is in place and we are getting feedback about its practical application.

WVU: Recall of the patient in a timely manner for retesting salivary bacterial count.

UWO: I believe our present system of treating only identifiable cavitations works well. It is certainly in the best interest of the patient as any restoration placed is going to be replaced a number of times and if the patient can treat themselves through proper oral hygiene procedures non-cavitated lesions need never become cavitated ones needing restoration.

CWRU: No response

V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise. Do you agree with this name change? If not, please explain.

IU: That's fine.

OSU: We have no real problem with the current or proposed name.

SUNYB: Yes

MICH: Yes

UIC: We favor the change to "Consortium".

UDM: The name change is okay. It seems that the full name should appear on many things, as many of the faculty are unsure of even the present name.

WVU: Sounds good to us.

UWO: Yes, we at Western agree.

CWRU: Yes.

III. Regional CODE Agenda

(Please report on responses from all participants)

Should the learning of dental anatomy include some form of 3-dimensional work (waxing/carving, etc.), or is a didactic course alone satisfactory?

- IU:** Dental Anatomy is the first introductory course. Working with wax accomplishes more than just teaching amalgam. Manual skill development, working with a medium that lends itself to shaping and molding easily (reversible). Will work with wax throughout dentistry.
- OSU:** We use a waxing exercise in our dental anatomy (Dent 417) course to teach the students more detail about tooth anatomy. They start with a Class V, then Class IV wax-up and finish waxing with a cusp build-up on a molar. The first exercises coincide with exercises in Dent 430 teaching basic restorative techniques by restoring a Class V and then Class I using composite and amalgam respectively. These waxing techniques are assessed, but not graded, and provide feedback for anatomy and also aid in the creation of contours with later materials that may be less easily modified.
- SUNYB:** A didactic course alone is not satisfactory. 3-dimensional waxing is still done, although not as much as in past years. First-year students observe demonstrations of 3-D waxing, then are required to wax three separate projects.
- MICH:** Our dental anatomy course involves 3D work, but it is a course that also teaches basic occlusion principles. Three years ago, our dental anatomy course was revised to include some waxing exercises that used to be taught in other preclinical restorative courses. The benefits/advantages to this were determined to be:
- Allows an emphasis on functional anatomy and occlusion principles.
 - Provides hands-on experience which students enjoy and which reinforces the didactic concepts taught in lecture.
 - Frees up time in other restorative courses for learning other clinical procedures.
 - Students learn basic waxing techniques which, even if not used for fabrication wax patterns for casting later on, need to be taught so students can perform diagnostic wax-ups for complex restorative cases.
- UIC:** We do not believe that wax carving is absolutely essential for the learning of dental anatomy. We have retained several exercises involving wax carving since we believe that they are useful in helping students learn skills necessary to produce direct restorations that reproduce proper anatomic form and modify indirect restorations to enhance proper anatomic form. We also think that these exercises help students develop eye-hand coordination.
- UDM:** We have had solid success with our didactic anatomy course so we don't see a need for "3-dimensional work" at this time. Some of the departmental faculty believe that learning how to carve teeth may transfer to other skills needed in the practice of dentistry. However, students get a fair amount of experience reproducing tooth anatomy in the subsequent occlusion courses, which include waxing.

WVU: We feel that waxing/carving of teeth in dental anatomy enhances our students dexterity. We begin, in addition to the didactic portion, with our students waxing (additive) to single and multiple surfaces. They then progress to waxing 5 full crown preparations (shoulder PFM preps) to full form and function. Our final waxing exercise involves the use of the Lundeen additive waxing technique (cores, etc.) to wax-up 2 molars and a premolar.

UWO: Yes, UWO feels strongly that some form of 3-dimensional work is necessary. We don't want all their learning (mistakes) to take place in the patient's mouth. It helps to develop hand skills and an awareness of proper dental anatomy.

CWRU: Still do wax-ups.

How to teach caries management/excavation?

IU: Pre-clinically, do excavation on natural teeth. One exercise. Checking in clinic not done. Clinic floor not uniform due to lack of calibration

OSU: We teach caries management/excavation pre-clinically didactically. We have used the Kilgore caries teeth, but this is an exercise in how to modify our "standard" preparations to accommodate increased extension and depth. We currently teach this using the "apprentice method" in the clinic where it is expected that the supervising faculty member will teach the techniques of identification and excavation. We are looking for good pre-clinical teaching methods that can apply clinically.

SUNYB: I feel that incipient lesions are over-treated on our clinic floor. We teach to look for staining accompanied with an explorer "stick" along with shadowing (seeing the carious dentin through the enamel). Some faculty seemingly treat any stained groove. Students are taught to look at the color, consistency, and sound. Some faculty on the clinic floor have students use caries detecting agents - I wish they didn't. I feel that sometimes it stains more than just carious dentin.

MICH: Caries management: Best presented by lectures then reinforced by case-based discussion or clinical experience.
Caries excavation: Concepts are first presented in a lecture and a video. Caries excavation exercises are then performed in the pre-clinical laboratory on extracted teeth. Carious extracted teeth (selected by the faculty) are mounted in stone by the students the week before the exercise. Teeth are kept moist by covering with wet gauze and storing in a Ziploc bag. A faculty demonstration is done on an Elmo Visualizer prior to the exercise to reinforce concepts taught in class and review evaluation criteria. A specific evaluation sheet is used for faculty to evaluate student's work according to stated criteria. Faculty examine the teeth pre-operatively to assess the expected extent of caries. Students use a high-speed handpiece to remove enamel to achieve convenience form/outline form appropriate for the extent of the carious lesion. Students then achieve a caries-free DEJ prior to removing caries from the deeper part of the lesion. Students are instructed to stop before removing all the caries in the deepest part of the lesion (axially or proximally) so that faculty can assess whether or not they can identify caries from healthy tooth

structure. (If this is not done, students might significantly overcut the tooth not knowing when to stop, claiming it was caries.) Students then proceed with complete caries removal. Students are evaluated by faculty on caries removal on 3 assigned teeth and are expected to mount additional teeth and practice on their own prior to a competency exam graded pass/fail by the faculty during which the students perform the above procedure with specific stopping points for faculty evaluation. Much like a board examination, students are instructed to notify their instructor if caries extends beyond what one would normally expect from pre-operative examination. Feedback from faculty and students indicate that this exercise helps students gain an understanding of proper caries removal procedures, and they learn to appreciate and experience variations in types of dentin and caries among teeth. Students are more comfortable and more accurate in removing caries in a clinical situation.

UIC: We have emphasized management of early carious lesions by addressing modifiable patient risk factors and by application of various fluoride and chlorhexidine rinses and varnishes. The teaching of excavation of carious lesions begins in the pre-clinical operative dentistry course, using extracted teeth, spoon excavators, round burs in the low-speed handpiece and Sable Seek (caries disclosing solution-Ultradent). In the clinics, caries excavation is an early performance examination. Skills in recognizing and excavating carious tooth structure are reinforced by close interaction with clinical faculty during patient care appointment. We do not advocate routine use of “caries disclosing” solutions in a clinical setting, since we feel that most of these solutions are not caries specific and may actually lead students to remove excessive tooth structure.

UDM: We use extracted teeth to teach students initial caries removal, first in the simulation lab (during DS1 and DS2 years), then in clinic as part of orientation at the beginning of the DS3 year. Caries management is discussed above in the context of caries risk assessment and management.

WVU: Caries management is provided as a layered course and the basic premise taught is Walter Loesche’s “Specific Plaque Hypothesis” method. Our method of teaching our students how to excavate carious lesions involves the use of carious natural teeth mounted in a manikin (for 1st and 2nd year students) or, initially, mounted in a stone block. This aids in determining carious material removal involving the use of a caries detector dye, tactile sense and, somewhat, color.

UWO: This is an area we are having difficulty with at present. This area is covered in both lectures and on the clinic floor. With more incipient lesions, it is often difficult to decide to treat or not. We tend to be very conservative and when in doubt take a “wait and see” approach.

CWRU: Kilgore teeth with decay. Natural teeth excavations. Juniors use indicator dyes.

How to teach and apply Caries Risk Assessment?

- IU:** Caries risk assessment is taught first in lecture and lab to the students by the cariology department. All clinical faculty were calibrated by an online course and test that had to be passed. Finally, a caries risk assessment is done on all patients as part of the patient record. The students first start by filling out Form A which is a flag form that decides whether the patient is low, moderate or high risk. If moderate to high risk is determined, Form B is filled out and the preventative faculty are called in on the case.
- OSU:** No response
- SUNYB:** First year students get a fair amount on caries risk assessment. The clinical application is where we fall short, in my opinion. This is another example of the disconnect between what is taught in pre-clinic and what occurs in clinic. Very little attention (unfortunately) is paid to caries risk assessment on the clinic floor.
- MICH:** Best presented by lectures then reinforced by case-based discussion or clinical experience. See answer to National Agenda question #IV (pg. 12).
- UIC:** As mentioned previously, teaching risk assessment for carious infections, periodontal disease, and oral cancer begins in the first semester of the D1 year and continues throughout the curriculum. We use electronic patient records (Axiom) and have tabs within the program for risk assessment for the various conditions. We have an early clinical performance examination for caries risk assessment that requires students to identify risk factors and implement appropriate care to address improvement of the patient's oral health. The failure of various regional licensure examinations to recognize that early enamel lesions without cavitation are often ideal candidates for remineralization or very conservative adhesive restorations is perceived as a problem. It is difficult to explain to students that these treatable lesions are the same lesions that they may be required to restore in order to obtain their license to practice.
- UDM:** See reply to previous question.
- WVU:** Caries Risk Assessment is part of every dentulous patient's initial examination. Patients that score moderate or high receive additional steps leading to a modification of patient's caries risk largely through eradication of existing carious lesions and the chemical modification (CHX) of oral flora - all coupled with a surface enhancement of fluoride (fluoride varnishes, topical fluoride application, and/or mouth rinses; Prevident dentifrice.)
- UWO:** We do not really have a program. I am looking forward to hearing ideas from other schools. We definitely need to do more in this area.
- CWRU:** No response

What are the implications of teaching minimal invasive techniques (tunnel preps, remineralization methods, etc.) on the “numbers” of procedures students should do clinically to obtain “competency” given the number of “learning sessions” available?

IU: I don't think this has much of an impact at our school on availability of learning lesions.

OSU: Our clinics, although we have “minimal numbers” for restorative guidelines, function predominately as a patient-based requirement system. Our students currently do not have problems meeting operative requirements (not true, necessarily for the prosthodontic requirements). I don't expect that will change as we proceed to less invasive techniques.

SUNYB: First-year students get a fair amount on caries risk assessment. The clinical application is where we fall short, in my opinion. This is another example of the disconnect between what is taught in pre-clinic and what occurs in clinic. Very little attention (unfortunately) is paid to caries risk assessment on the clinic floor.

MICH: Little impact on clinical experiences.

- Our patient pool is such that many of the patients we see in the student clinics have either rampant caries or recurrent caries where restoration replacement is required. It does not lend itself to performing many conservative restorations, so given the few numbers to start with, not treating these surgically has little impact. Students receive abundant training in cutting “ideal” preparations in pre-clinical exercises. Learning these preparations can be easily simulated in a laboratory setting.
- Many studies have indicated that a majority of restorations placed are replacement restorations. More clinical student experience in this arena merely reflects “real world” dentistry and students *should* obtain significant experience with these clinical scenarios before graduating. This is also a procedure that is more difficult to simulate and teach in a classroom or pre-clinic setting and relies more heavily on the clinic setting for providing adequate experience.
- We must practice what we preach. We cannot teach a minimally invasive philosophy in the classroom, emphasizing non-surgical treatment, and then not practice this in the clinics. This would give a mixed message to the students. If they do not see it practiced in the clinics, they will not take this philosophy into practice later. By doing what is best for the patient (whether it be remineralization or a restoration), this reinforces to students the importance of treating each patient as an individual.

UIC: We discuss tunnel preparations but do not advocate their use by inexperienced clinicians. We teach slot amalgam and slot composite preparations, and find that resin composite is generally the most appropriate restorative material for these minimal lesions. We teach minimally invasive preparations and see these concepts applied on a daily basis in our clinics when the patient's risk for disease is appropriate. We advocate addressing the patient's needs and do not use the clinical setting as an opportunity for students to practice larger preparations when not indicated. We do have a large population of patients with extensive restorative needs and the students do have ample opportunity to restore extensive defects.

UDM: As mentioned before, our patient population has a very high caries rate, so the impact of minimally invasive procedures on total procedures is not significant. We teach students to provide care for patients based on a thorough assessment of their needs and reward them for choosing appropriate treatments. Although we know that a certain amount of practice (or completed procedures) is necessary to achieve competency, we try not to make that our main focus to the detriment of our patients. (Also, we do not do tunnel preparations.)

WVU: We admit to remineralize radiographic lesions that demonstrate enamel penetration up to, and, perhaps very slightly, into the DEJ in patients that are determined to be moderate to low in their caries risk assessment. They are followed in subsequent annual exams. If the lesion progresses in subsequent years, it is restored.

UWO: There is no real implication as our students have to show “competency” in a large numbers of areas so the fact they do a number of “minimally invasive” preparations does not lessen the need to show competency in other types of dental procedures, be they restorative or in other areas. They still do sufficient numbers of less conservative restorations to give them the necessary experience. We do not teach the “tunnel” preparation. We explain what it is but advise against its use due to the difficulty of ensuring total removal of decay and the high risk of damage to the adjacent tooth.

CWRU: Still have to teach for Boards.

IV. National CODE Meeting

V. Suggestions for CODE

(only responding schools listed)

What can the organization do to improve its effectiveness?

IU: Somehow convince non-clinically oriented deans that operative is still a necessary discipline in the education of competent dental practitioners.

UWO: Nothing that we can think of, seems to function well as is.

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

UWO: No, it is fine as it is - well done!

Other suggestions?

Suggested topics for next year's National C.O.D.E. agenda:

1. The use of F vs. E speed x-ray film - With the use of higher speed x-ray film, dental decay is becoming more difficult to see on radiographs. Discuss your school's use of film and the rationale for doing so.
2. Some faculty of dental schools would like to see the use of some form of electronic patient record with the patient's photo as well as pre-treatment intra-oral photographs included in the record. Does your school use an electronic patient record, and if so, are these items included?
3. What type of radiographic record does your school use - conventional radiograph or digital? Both? If digital x-rays are used, what are the legalities involved and how do you deal with them?
4. Many times it is difficult to obtain suitable patients for student treatment. They seem to be either too easy or too difficult. The teeth either have incipient dental caries or are grossly decayed. Does your school have difficulties in acquiring suitable patients/conditions for students? If so, how do you deal with this problem?
5. After teeth have been endodontically treated by your dental students, what is your policy on the restoration of the tooth? How soon is it restored after the obturation? What is the preferred type of restorations (full crown, onlay, amalgam, composite, etc)?
6. Board examiners tend to want to see traditional tooth preparations and restorations. However, there is a decrease in the number of teeth requiring these types of preparations and the increase in smaller lesions requiring more conservative treatment. Is this a problem at your school or for your students doing Board Examinations? If this is a problem, has there been any attempt to discuss the problem with Board Examiners?

CODE Region IV Attendees Form

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
Bob Rashid	OSU	614-292-3071	614-292-9422	rashid.1@osu.edu
Diane Hoelscher	UDM	313-494-6785	313-494-3781	hoelscdc@udmercy.edu
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Larry Abbott	UDM	313-494-6785	313-494-6781	abbottlj@udmercy.edu
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Ilze A. Bekeny	CWRU	216-368-2486	216-386-3204	iab2@po.cwru.edu
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Tim Toepke	UIC	312-996-7540	312-996-3535	toepke@uic.edu
Stephen Campbell	UIC	312-996-2669	312-996-3535	stephend@uic.edu

CODE REGIONAL MEETING REPORT FORM

REGION: V - Northeast

LOCATION AND DATE OF MEETING:

New York University

New York, New York

October 9 - 10, 2003

CHAIRPERSON:

Name: Dr. Richard Lichtenthal

Phone #: 212-305-9898

Address: Columbia University

Fax #: 212-305-8493

603 W 168th Street

E-mail: rml1@columbia.edu

New York, NY 10032

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr, Richard Lichtenthal

Phone #: 212-305-9898

Address: Columbia University

Fax #: 212-305-8493

603 W 168th Street

E-mail : rml1@columbia.edu

New York, NY 10032

Date: **TBA (mid-October)**

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION V
SUMMARY RESPONSES TO NATIONAL AGENDA**

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Consensus was that, yes, devices that provide immediate quantitative feedback are a wave of the future for pre-clinical education as one teaching and evaluation tool among many. It, or some form of it, will be utilized as an adjunct to patient simulation, typodonts, extracted teeth, and instructor feedback (similar feeling about DentSim).

II. KaVO Diagnodent/other detection devices:

Consensus was that devices do not offer much improvement, at the present time, over traditional caries detection methodologies.

III. CAD\CAM - CEREC 3:

The consensus was that these systems are continuing to evolve with CEREC 3D much better than the previous models. Esthetics is not up to laboratory standards yet and marginal fit is not as good as laboratory processed restorations. It was agreed that this technology will continue to improve and is the wave of the future.

IV. Educational Philosophies:

No summary response.

V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise. Do you agree with this name change? If not, please explain.

The group approved, reluctantly, the change in name to Consortium of Operative Dentistry Educators. They felt that there was no valid rationale for change.

**2003 NATIONAL CODE AGENDA
REGION V RESPONSES**

(Please cite the evidence were applicable)

I. **KaVo PREPassistant** - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

Clmb: We do not have this equipment at the present time.

Hwrdr: We do not have this equipment at the present time.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: We do not have this equipment at the present time.

Mary: No response.

Stony: We have had two scanners for one year.

BU: We do not have this equipment at the present time.

Tufts: We do not have this equipment at the present time.

How long has your school been using this system?

Clmb: No response.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: About one year.

BU: No response.

Tufts: No response.

How and where is it being used (i.e. preclinic operative/ fixed/ other)?

Clmb: No response.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: We are not currently using them in the teaching program.

BU: No response.

Tufts: No response.

What are the strengths and weaknesses of this system?

Clmb: No response.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: No response.

BU: No response.

Tufts: No response.

What are your recommendations/ summative evaluation of this system?

Clmb: We are waiting for further development of the equipment.

Hwrd: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: We feel that the system needs more development prior to implementation in our curriculum.

BU: No response.

Tufts: No response.

Are devices which provide immediate quantitative feedback the way of future preclinical education? Please explain.

All attending schools had no response.

II. KaVo Diagnodent/other detection devices:

Are you utilizing current technology based caries detection methods/systems in student clinics?

- Clmb:** We are not currently using the KaVo Diagnodent system.
- Hwrdr:** We are not currently using the Diagnodent or other caries detection devices.
- McGil:** We are not currently using the Diagnodent or other caries detection devices.
- Tmpl:** We are currently utilizing the Diagnodent.
- NYU:** We are utilizing the KaVo Diagnodent clinically.
- NJ:** We are in the process of determining the benefits of such a system.
- Conn:** We are not currently using the Diagnodent or other caries detection devices.
- Mary:** We are currently utilizing the Diagnodent.
- Stony:** We are currently using Diagnodent and DIFOTI for senior students as part of an oral biology caries diagnosis selective rotation.
- BU:** We are not currently using the Diagnodent or other caries detection devices clinically.
- Tufts:** We are not currently using the Diagnodent or other caries detection devices.

Which systems are you using and how frequently are you using them?

- Clmb:** We are currently using the DIFOTI in the pre-doctoral and post-doctoral clinics in conjunction with risk assessment/remineralization exercises as follow up to initial radiographic diagnosis in early and/or incipient caries.
- Hwrdr:** No response
- McGil:** No response.
- Tmpl:** We use the device sporadically in the patient care clinic.
- NYU:** We use the Diagnodent but not on a regular basis.
- NJ:** As stated above, we are trying to determine the benefits of using the Diagnodent in addition to and/or instead of traditional caries detection methodology and trying to develop a protocol for its use.
- Conn:** We utilize Seek caries disclosing solution in the patient care clinics on a sporadic basis.

Mary: We are using the Diagnodent intermittently.

Stony: In addition to the Diagnodent and DIFOTI systems, we are using salivary flow, salivary buffering capacity and microbial analysis.

BU: We are discussing the use of caries detection devices in lectures.

Tufts: No response.

What are your opinions as to sensitivity/specificity?

Clmb: DIFOTI has been found to be reliable for the most part, with a few false positives when used with a placement device.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

Conn: No response.

Mary: No response.

Stony: In our opinion, both Diagnodent and DIFOTI occasionally give false positive findings.

BU: We believe that this technology shows promise.

Tufts: No response.

Do you have knowledge of other technologies in development but not yet released? Please describe/explain these systems.

All attending schools had no response.

III. CAD\CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

Clmb: Currently utilizing system in the pre-doctoral and post-doctoral clinics. Approximately 2-3 cases are done each week.

- Hwrdr:** We are not currently using the CAD/CAM CEREC technology in the student clinics.
- McGil:** We are not currently using the CAD/CAM CEREC technology.
- Tmpl:** We are not currently using the CAD/CAM CEREC technology.
- NYU:** We are currently using the CEREC system in the student clinics to a limited extent.
- NJ:** We are not currently using the CAD/CAM CEREC technology.
- Conn:** We are not currently using the CAD/CAM CEREC technology.
- Mary:** We are not currently using the CAD/CAM CEREC technology.
- Stony:** We are currently using the CEREC 2 system in student clinics daily with year three and year four students and in the post doctoral programs, not however, in faculty practice.
- BU:** We are not currently using the CAD/CAM CEREC technology, however, faculty are evaluating and learning to use the system.
- Tufts:** Using the CEREC system currently in pre-doctoral, post-doctoral and pediatric clinics and do about 25 cases per year.

What is your evaluation as to accuracy/marginal fit?

- Clmb:** Accuracy and marginal fit are acceptable providing preparation is good, image capture and computer design are accurate.
- Hwrdr:** No response.
- McGil:** No response.
- Tmpl:** No response.
- NYU:** No response.
- NJ:** No response.
- Conn:** No response.
- Mary:** No response.
- Stony:** We feel that the esthetics, accuracy and marginal fit are clinically acceptable.
- BU:** Current faculty evaluating the system report that the restorations seem to fit nicely on resin dies but they have not yet evaluated the fit intraorally.
- Tufts:** We feel that the accuracy and marginal fit are adequate but not as good as laboratory processed restorations but better than direct large restorations.

Is the system utilized in your Graduate Program and Faculty Practice?

Clmb: No response.

Hwrdr: The system has been demonstrated and will be introduced to the post-doctoral residents this summer.

McGil: No response.

Tmpl: No response.

NYU: No.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: Graduate, yes; Faculty practice, no.

BU: Currently under faculty evaluation.

Tufts: Graduate and pediatric clinics.

What is your opinion as to the overall clinical acceptability of the restorations produced from student clinics?

Clmb: Esthetics is fair and many restorations have to be stained and baked. Protocols have to be established regarding indications and contraindications, preparation and acceptability of the fit internally marginally, contacts and occlusion.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: We feel that the esthetics, accuracy and marginal fit are clinically acceptable.

BU: No response.

Tufts: We feel that the accuracy and marginal fit are adequate but not as good as laboratory processed restorations but better than direct large restorations.

What are the strengths and weaknesses of this system?

Clmb: Weaknesses of the system involve operator learning curve and occlusal adjustments, polishing and staining requirements as well as the initial cost of the system.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: Strengths: esthetic alternative to amalgam/metal restorations.
Weaknesses: considerable occlusal adjustment and polishing requirements

BU: Strengths: include the decreased time required for completion of the case and the design control being in the hands of the operator.
Weakness: purchase price.

Tufts: Strengths: one visit capability
Weaknesses: inferior esthetics, uneven marginal quality, and a long learning curve.

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to the simulation mannequin vs. going immediately to the simulation mannequin?

Clmb: Begins with benchtop exercises for a short time and then uses mounted dentofoms.

Hwrdr: We have used the mounted dentoform for years and have never found it to be an impediment to learning.

McGil: Pre-clinic lab is started with Learn-A-Prep exercises, then mounted extracted teeth are utilized along with mounted dentofoms.

Tmpl: Students transition to mounted dentoform after a series of benchtop exercises.

- NYU:** Begins with Learn-A-Prep and continues with a mounted dentoform in a new simulation laboratory.
- NJ:** Laboratory exercises begin with blocked, mounted teeth and then continue with a mounted dentoform.
- Conn:** In pre-clinical operative dentistry, students do all preparations on ivory teeth in a dentoform mounted on a post.
- Mary:** Pre-clinic lab begins with Learn-A-Prep and then continues with a mounted dentoform on a manikin.
- Stony:** We prefer learning preparations on a mounted dentoform.
- BU:** Bench preps are not done, students use a mounted dentoform system from day one.
- Tufts:** Benchtop is used for the first preparation after which all preparations and restorations are done on a mounted dentoform in the simulator.

What is the value of quantity and repetition requirements before evaluation for competency?

- Clmb:** A series of laboratory competency examinations are utilized in conjunction with repetition, the quantity of which varies among students to establish Competency
- Hwrdr:** Competency evaluation is tailored to the needs of each student and does not replace the need for repetition in many cases.
- McGil:** Quantitative repetition of acceptable operative dentistry leads to competency evaluation in third and fourth years.
- Tmpl:** Quantity and repetition are considered valuable in progressing toward competency.
- NYU:** Quantitative repetition is important in the formative phase of education before proceeding to competency.
- NJ:** Quantitative repetition is important in achieving competency.
- Conn:** Quantity and repetition are essential for performance quality and requirements are imposed.
- Mary:** Quantitative repetition is utilized in a simulated environment leading to competency evaluation.
- Stony:** We believe that preparation of teeth is a learned motor skill that requires repetition under supervision which leads to competence. However, quantitative repetition is also required to eliminate accidental success.

- BU:** If the formative procedures are accompanied by meaningful teaching than quantity and repetition are valuable.
- Tufts:** Quantity and repetition requirements are valuable before competency evaluation but are difficult to control.

Does competency replace the need for quantitative repetition?

- Clmb:** No response.
- Hwrd:** We feel that quantity is required and necessary to gain competency.
- McGil:** Successful quality preparations and restorations determines clinical competency.
- Tmpl:** Repetition and a series of “skill exams” lead to the determination of competency.
- NYU:** Competency evaluation is an end and does not substitute for repetition.
- NJ:** Competency exam does not replace repetition.
- Conn:** Competency does not replace quantitative repetition. We use the term “Progress Exam” rather than “Competency Exam” because the latter implies “I know it all - I am done.”
- Mary:** Competency evaluation, in of itself, does not replace repetition.
- Stony:** No response.
- BU:** Competency has replaced quantitative repetition at Boston.
- Tufts:** Competency is not a substitute for quantitative repetition.

In addition to the restoring of ivorine teeth in the pre-clinic coures, how are natural teeth being utilized (if your school uses them)?

- Clmb:** Exercises are done on ivorine teeth primarily with caries excavation and cast gold onlay exercises done on extracted teeth (supply limited).
- Hwrd:** Only ivorine teeth are used in pre-clinical operative.
- McGil:** A 160 hour course in caries and composite bonding uses extracted teeth exclusively. Ivorine teeth are utilized in other phases of pre-clinical operative.
- Tmpl:** Exercises are done on ivorine teeth with only limited use of extracted teeth.
- NYU:** Most exercises are done on ivorine teeth with limited use of extracted teeth in operative.

- NJ:** Exercises are done mainly with ivorine teeth; with extracted teeth used occasionally for hand instrument training and bonding exercises.
- Conn:** We use only ivorine teeth mounted in a dentoform.
- Mary:** Most exercises are done on ivorine teeth but extracted teeth are utilized in stone mountings for PRR, sealants and composite bonded restorations.
- Stony:** Preclinical exercises are done on ivorine teeth only, with no natural teeth introduced.
- BU:** All exercises are done on ivorine teeth.
- Tufts:** Ivorine teeth are used mostly but extracted teeth are used for those restorations requiring etching, adhesion and bonding.

**Are you utilizing simulators/DentSim for teaching operative dentistry?
Describe how you are utilizing these educational aids and their effectiveness.**

- Clmb:** DentSim (4) technology is utilized in first and second year with each student assigned to the DentSim lab for a series of required exercises prior to and during the preclinical course in operative dentistry. The series is supervised by faculty and upperclass teaching aids trained in the technology.
- Hwrdr:** We do not currently use DentSim type technology for teaching operative dentistry, but plans are being made for its introduction in the near future.
- McGil:** DentSim technology is not currently used.
- Tmpl:** We have two DentSim units that are used to assist in the pre-clinic to clinic transition.
- NYU:** DentSim technology is not currently in use.
- NJ:** DentSim technology is not currently in use.
- Conn:** We do not currently use DentSim technology in the Operative course. There is a simulation lab with dental chairs and units, but it is utilized by behavioral science to teach infection control.
- Mary:** DentSim technology is not currently in use.
- Stony:** DentSim simulators are utilized with each student assigned to a series of DentSim projects that must be completed. Student mentors supervise each session.
- BU:** DentSim technology was tried and abandoned. Standard simulators with live video presentations have been effective.
- Tufts:** We do not use DentSim technology. Standard simulators are used. They are very useful with almost all exercises being done in this manner.

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

Clmb: Utilization of simulation/DentSim technology has impacted positively on the transition to clinical dentistry and has had little effect on faculty numbers

Hwrdr: No response.

McGil: No response.

Tmpl: These units are helpful but do not make a big difference in the speed of transition nor do they impact faculty numbers.

NYU: Improved and expanded state of the art simulation lab is being evaluated regarding earlier transition to clinic.

NJ: No response.

Conn: No response.

Mary: No response.

Stony: To date, technical simulation has not translated into earlier transition to clinic and they do not relate biomedical scenario to preclinical exercises

BU: Students understand the theory and are reasonably comfortable entering clinic but there has been no effect on timing and/or faculty numbers.

Tufts: It is not know, as yet, whether simulation has helped with earlier transition to the clinic.

Describe how your school relates biomedical scenarios to pre-clinic operative dentistry?

Clmb: Biomedical scenarios are related to preclinical exercises only in problem based written examinations and in the preprogrammed medical histories associated with DentSim.

Hwrdr: No response.

McGil: Biomedical scenarios are introduced in small group treatment planning sessions in pre-clinical operative.

Tmpl: Biomedical scenarios are related to exercises in the pre-clinical operative course.

NYU: Biomedical scenarios are not incorporated into pre-clinical operative lab but are covered in the medical core fo the curriculum.

- NJ:** Biomedical scenarios are utilized in the pre-clinic related to medical histories and treatment planning.
- Conn:** There are lectures on caries development and its relation to cavity preparations, as well as pulp considerations, enamel and dentin structure related to preparations, bonding and adhesion.
- Mary:** Biomedical scenarios are introduced to the pre-clinic in treatment planning sessions.
- Stony:** No response.
- BU:** Each daily procedure is part of a “virtual” patient history and the biomedical information is related to each “appointment.”
- Tufts:** The pre-clinic is taught with a “patient” chart using various medical and situational scenarios to introduce reality.

Have community out-reach programs impacted our educational goals? Please describe.

- Clmb:** Community outreach programs to area hospitals and community clinics have impacted our pre-doctoral students in a variety of ways depending on the individual site, i.e. patient availability, supervision and enthusiasm of the student. It is good for most but not for all.
- Hwrd:** Outreach programs have had a positive effect on students who enjoy interacting with staff and patients outside of school to build up their confidence.
- McGil:** Outreach programs have a positive influence on students who do compulsory rotations in the dental van that serves the community as well as a six week rotation to the hospital clinic.
- Tmpl:** Rotations to outreach programs have had a positive effect on students but calibration of faculty at the sites is difficult.
- NYU:** Outreach programs to the Dominican Republic and the Dental Van are positive experiences for students.
- NJ:** School-related clinics are located in the community and student rotation to them stay in the area. Experience is positive in nature.
- Conn:** Community outreach programs involve migrant farm workers at a shelter, externships to Peru and the “Pipeline Project” to begin this year, as well as pedodontic rotations to children’s hospitals. Impact is unknown.
- Mary:** Outreach programs in the form of rotations to health centers in the State appear to be a positive experience for students.
- Stony:** No response.

BU: Outreach programs have impacted the students positively in their social development and honing their skills.

Tufts: The impact of community outreach programs on the student will vary with the program.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

Clmb: Caries risk/management and non-invasive treatment are taught didactically. Risk assessment/management and remineralization procedures are done only sporadically in the student clinics but have increased in the past two years. Faculty training is proceeding well and as more faculty are on board we expect that the concept should be applied more universally. Minimally invasive operative techniques are used routinely.

Hwrdr: We are currently developing a caries risk program and feel that a non-invasive program is most effective.

McGil: No response.

Tmpl: CRA, CRM and non-invasive treatment of caries is taught didactically and two clinical cases are required.

NYU: CRA, CRM and non-invasive treatment are all taught to competency but are not introduced clinically at the present time.

NJ: CRA, CRM and non-invasive treatment is taught in the third and fourth year and is a competency requirement in Nutrition. There is no clinical application currently in place.

Conn: Every dentate patient is supposed to have a caries risk assessment (CRA) at each stage of treatment. CRA is integrated as part of the operative treatment plan with an established protocol for CRA and caries risk management (CRM). One united program is required.

Mary: CRA, CRM and non-invasive treatment are taught didactically. Forms are in place clinically and a cariologist is on staff but clinical application is difficult to establish.

Stony: Regarding non-invasive treatment of carious lesions, students are taught conservation lesion identification philosophies, caries risk assessment/oral biology. Enamel lesions are not treated with surgical technique which is reserved for lesions at or into dentin.

BU: There are lectures in CRA/CRM and non-invasive treatment but usage clinically varies with the faculty involved.

Tufts: Caries risk assessment/management is accomplished in sporadic cases depending on the enthusiasm of the faculty member supervising. Patients prior caries experience is a most valuable tool.

Which of these programs is the most effective?

Clmb: These systems are most effective when applied in their entirety.

Hwrdr: No response.

McGil: No response.

Tmpl: No response.

NYU: No response.

Conn: No response.

Mary: No response.

Stony: No response.

BU: No response.

Tufts: No response.

What are the strengths and weaknesses of this system?

Clmb: No response.

Hwrdr: No response.

McGil: No response.

Tmpl: We have found that patient follow-up is very difficult.

NYU: No response.

Conn: A 'buy-in' from faculty is weak from other than full-time operative faculty and only lip service is given to it by other than full-time operative faculty.

Mary: No response.

Stony: No response.

BU: No response.

Tufts: No response.

- V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be know by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise.**

Do you agree with this name change? If not, please explain.

The group approved, reluctantly, the change in the name to Consortium of Operative Dentistry Educators. They felt there was no valid rational for change.

=====

Regional CODE Agenda

No Region V Agenda responses received.

National CODE Meeting

Suggestions for CODE.

What can the organization do to improve its effectiveness?

Communications should be sent to all members rather than just individual chairs.

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

- Web site should include all CODE information, principles and agenda answers.
- Web site should include a downloadable application for the Academy of Operative Dentistry.
- Include a "Clinical Technique of the Day" - change every two weeks.
- Web courses
- Video sequences for new techniques on web site.

Other suggestions?

Suggested topics for next year's National C.O.D.E. agenda:

CODE Region V (Northeast)**Attendees Form**

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
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CODE REGIONAL MEETING REPORT FORM

REGION: VI (Southeast)

LOCATION AND DATE OF MEETING:

University of Florida College of Dentistry

Gainesville, FL

October 15 - 17, 2003

CHAIRPERSON:

Name: Dr. Paul Blaser / Dr. Valeria Gordan

Phone #: (352) - 392-4341

Address: University of Florida

Fax #: (352) - 846-1643

1600 SW Archer Road, P O Box 100415

E-mail: pblaser@dentla.ufl.edu

Gainesville, FL

List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

- Guidelines for minimally invasive restorations.
- New principles for cavity preparations
- Evidenced-based instruction or traditional?
- Use of composite as build-ups or for replacing cusps?
- How do we define secondary caries?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Gary Crim

Phone #: 502-852-1303

Address: University of Louisville

Fax #: 502-852-3364

501 S Preston Louisville, KY 40292

E-mail : gcrim01@louisville.edu

Date: Oct. 20-22 (tentative dates)

Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC
College of Dentistry;

40th and Holdrege Streets; Lincoln, NE 68583-0750.

Deadline for return: 30 Days post-meeting

Office: 402 472-1290 Fax: 402 472-5290 E-mail: lhaisch@unmc.edu

Also send the information on a disk and via e-mail with all attachments.

Please indicate the software program and version utilized for your reports.

**2003 NATIONAL CODE AGENDA
REGION VI
SUMMARY RESPONSES TO NATIONAL AGENDA**

The Region VI CODE Meeting took place at the University of Florida College of Dentistry in Gainesville, Florida on October 15-17, 2003. Dr. Paul Blaser and Dr. Valeria Gordan were the co-hosts. Dr. Larry Haisch, National CODE Director, was in attendance along with faculty representatives from seven of our regional schools (eight responses were submitted). In addition, we also had two representatives from the Southern Regional Testing Agency- Dr. Wayne Looney of Arkansas and Dr. Michel Bedell of South Carolina. This was the fourth year in a row that SRTA has had representation at our regional meeting.

I. KaVo PREPassistant - system for measuring and evaluating preparations in dental training.

Although none of our regional schools are currently using the KaVO PREPassistant System, several are investigating this and similar technologies from other companies. There was a general consensus that at this time, any of these systems would only be supplemental to faculty-student interactions for learning psychomotor skills needed for tooth preparations. The use of KaVO Diagnodent and other caries detection devices is variable among our regions' schools. For Diagnodent, the reported low specificity (high false positives) could be offset with better intra-oral visualization. In this scenario, the Diagnodent would be used as a screening device followed by careful visual discrimination for confirmation. The newer QLF device shows promise as a caries diagnostic tool from the initial reports.

II. CAD\CAM - CEREC 3:

Although our experience with CAD/CAM CEREC III is very limited (most have some experience with earlier versions), the machineable ceramics have had moderate success in some of our programs.

The University of Alabama has the most experience with these systems and they have published their results. A summary of their results from earlier versions of the CEREC III System was presented at IADR in 1997- *"It is evident from numerous in vivo and in vitro studies that the bonded ceramic restoration, developed with the CEREC CAD-CAM technique has generated consistently reproducible restorations that have been deemed clinical acceptable for interfacial wear and marginal fidelity, while offering the clinician a technique that is conservative, durable and esthetic."*

All schools agree that these technologies offer some unique advantages but, in the end, it all comes down to accurate margins.

III. Educational Philosophies:

Answers to questions on **"Educational Philosophies"** varies significantly in the region. Regarding starting to learn tooth preparations on the benchtop vs. starting directly in the manikin, our schools were almost evenly divided (5 vs. 3 respectively). The consensus of our regional schools was that quantity and repetition of procedures before competency testing has a definite value, and competency does not replace quantitative repetition.

Natural teeth are still being used for caries removal, base/liner placement, pin placement, sealants, preventive resin restorations, endodontic procedures, and post and core techniques in seven of the eight schools. Only one school does not use natural teeth.

DentSim is not currently being used in any of our region schools but several of our schools do have modern simulator labs using other types of equipment. The impact that this equipment and technology has on our students' transition to clinic is not obvious since the outcomes are difficult to measure.

The incorporation of **Biomedical Scenarios** into pre-clinical operative courses varies from school to school, influenced by the sequence of basic science courses in the curriculum and the time available in the course. Many schools provide simulated patient scenarios with health histories, radiographs and other clinical information. The students are expected to incorporate appropriate modifications into their proposed treatment plans for these imaginary patients using concepts from their basic medical sciences courses.

Every school has **Community Outreach Programs** that take the students away from campus for various times thus causing interruptions in their progress toward graduation and school clinic production decreases. The general consensus is that the experiences are positive for the students although the consistency of instruction/supervision at these off-site areas varies greatly. These programs generally enhance our public image in the communities as well. With increasing time spent away from campus, there is an increasing need to give credit for procedures done in these clinics.

Caries risk/caries management philosophies were presented in varying detail with many using a medical model as the basic framework for their protocols. Although most have well-developed programs, the effectiveness of them is not easily measured

- V. Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be known by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise. Do you agree with this name change? If not, please explain.

The proposed name change back to **Consortium of Operative Dentistry Educators** was unanimously agreed to and the two most common suggestions for CODE were to improve communication with licensing boards and to increase participation by all member schools.

2003 NATIONAL CODE AGENDA
REGION VI RESPONSES
(Please cite the evidence were applicable)

I. **KaVo PREPassistant** - system for measuring and evaluating preparations in dental training.

Is your school using this system ?

No Region VI schools are currently using this system.

How long has your school been using this system?

No Region VI schools are currently using this system.

How and where is it being used (i.e. pre-clinic operative/ fixed/ other)?

No Region VI schools are currently using this system.

What are the strengths and weaknesses of this system?

ULVL: Strengths: Students can receive objective feedback without instructors.

Weaknesses:

- Costs – I believe that they will license 1 system per 15 students. For a class of 80, that would mean purchasing 6.
- Limited information – The system evaluates individual teeth – it cannot evaluate breaking of contacts, damage to adjacent teeth, etc.
- Preference for feedback – Since grading of examinations will still be done by faculty; students will still seek input from the faculty that will be doing the evaluations. This won't eliminate the "lines" of students waiting for an instructor.
- Constructive criticism – The system may tell the student what is wrong but not necessarily how to correct the error.

What are your recommendations/ summative evaluation of this system?

N/A

Are devices which provide immediate quantitative feedback the way of future preclinical education? Please explain.

ULVL: Devices can be used as an adjunct. Current devices don't evaluate all aspects of what constitutes an acceptable preparation.

II. KaVO Diagnodent/other caries detection devices:

Are you utilizing current technology based caries detection methods/systems in student clinics?

- UFL:** Yes. We have Diagnodent units in our Diagnosis and Treatment Planning Clinic and in our Operative Clinic.
- MCG:** No
- UKY:** No
- ULVL:** No devices. We use caries detection dye sometimes.
- Nova:** Not using Diagnodent in the pre-doctoral program. Diagnodent is being used in the Pediatric Post-Graduate clinic.
- MUSC:** No.
- VCU:** In the pre-doctoral GP clinic, very limited use of Diagnodent for only several months. In AEGD, limited use. We, no longer have a unit in pre-doctoral clinic.

Which systems are you using and how frequently are you using them?

- UFL:** They are available for student/faculty use as needed. Not a required diagnostic instrument.
- MCG:** There is one Diagnodent in the building. It is used sparingly in student clinics and slightly more by faculty in their clinic.
- UKY:** N/A
- ULVL:** N/A
- MUSC:** Dyes (sparingly), visual, and tactile detection.
- VCU:** See Above. Caries Indicator Dyes-frequently, but certainly not on every preparation.

What are your opinions as to sensitivity/specificity?

- UFL:** Very reliable in predicting dentinal involvement in pit and fissure caries.
- MCG:** We believe in caries visualization as the primary technique for diagnosis. The sensitivity for caries visualization is ~60% and specificity is ~85%. We do not believe in tactile exploration with explorers. Such method's sensitivity in pits and fissures is only 17%. All other modalities for caries diagnosis are adjunctive.

Diagnodent works well in its limited capacity. It cannot be used around old restorations of any type, including sealants, nor can it be used for interproximal investigation. Sensitivity/specificity unknown.

UKY: N/A

ULVL: For Diagnodent, it has been reported to have high sensitivity (doesn't miss decay), and low specificity (high number of false positives).

1. Anttonen V, Seppa L, Hausen H. *Clinical study of the use of the laser fluorescence device DIAGNOdent for detection of occlusal caries in children. Caries Res (Switzerland), Jan-Feb 2003, 37(1) p17-23*
2. Ouellet A, Hondrum SO, Pietz DM. *Detection of occlusal carious lesions. Gen Dent (United States), Jul-Aug 2002, 50(4) p346-50*

Another study reported that the specificities of visual inspection were higher than those of Diagnodent and the measurements showed a higher association with the enamel part of the caries lesion than with the dentinal part. Due to higher specificity, visual inspection should be preferred to diagnose occlusal lesions in populations with low caries prevalence.

3. Alwas-Danowska HM, Plasschaert AJ, Suliborski S, et al. *Reliability and validity issues of laser fluorescence measurements in occlusal caries diagnosis. J Dent (England), May 2002, 30(4) p129-34*

The correlation between Diagnodent measurements and the actual depth of carious lesions was lower than that of visual inspection. The correlation with the enamel part of the lesion exceeded that of the dentine part. It was concluded that the validity of the Diagnodent was not statistically significantly different from that of visual inspection.

4. Naphausen MT, Riemersma M, Verdonchot EH. *[Diagnosis of occlusal caries lesions using laser fluorescence measurements]. Ned Tijdschr Tandheelkd (Netherlands), Jan 2002, 109(1) p3-7*

The performance of the Diagnodent systems was not statistically significantly better than that achieved using visual examination for non-cavitated teeth. Diagnodent may prove useful as a predictive clinical tool, however with appropriate training, visual examination may offer similar results without the need for additional equipment.

5. Attrill DC, Ashley PF. *Occlusal caries detection in primary teeth: a comparison of DIAGNOdent with conventional methods. Br Dent J (England), Apr 28 2001, 190(8) p440-3*

A study was done to assess the potential of Diagnodent (DD) readings for detecting secondary enamel and dentin carious lesions associated with composite resin restorations in a set of preserved extracted adult teeth. DD readings for dentin caries diagnosis produced better diagnostic results compared to visual readings for the 30 test sites in the study, but these results were not significantly different from the visual evaluations.

6. Boston DW. *Initial in vitro evaluation of DIAGNOdent for detecting secondary carious lesions associated with resin composite restorations. Quintessence Int (England), Feb 2003, 34(2) p109-16*

The Diagnodent offers potential use as one of the screening tests for proximal surface caries detection through sound dentin when the sound dentin between tip and caries is thin.

7. Iwami Y, Shimizu A, Yamamoto H, et al. *In vitro study of caries detection through sound dentin using a laser fluorescence device, DIAGNOdent. Eur J Oral Sci (Denmark), Feb 2003, 111(1) p7-11*

MUSC: Dyes are not totally reliable.

VCU: Although we continue to use diagnostic methods with poor sensitivity/specificity (explorer), improvements in this field have been slow. Sensitivity/Specificity is improved for Diagnodent, yet acceptance and utilization need to improve.

**Do you have knowledge of other technologies in development but not yet released?
Please describe/explain these systems.**

UFL: Quantitative Light Fluorescence has very promising extensive studies (30+ publications).

MCG: We are familiar with other systems (DIFOTI, Logicon Caries Detection, Digital Subtraction) but only have the low-end QLF.

UKY: No

MUSC: No.

VCU: QLF, EC, and DIFOTI.

III. CAD\CAM - CEREC 3:

Are you currently utilizing this system for student clinics and how frequently are you using it?

UAB: CEREC 2 is used for selected cases in the Graduate Prosthodontic Program and with fourth year students in the Comprehensive Care Clinic. Used for approximately, one case per month.

UFL: No.

MCG: No. We are currently using CEREC 2. A lecture and laboratory demo is done with junior students in the Esthetics course.

UKY: Limited exposure with CEREC 2 in pre-clinical only. Supposed to receive a CEREC 3 in August '03.

ULVL: We have 4 of these units. At this time, they have been used in the GPR program, not the undergraduate clinics.

Nova: Not using CAD/CAM-CEREC 3 in the pre-doctoral program. This system is being discussed for a senior elective and for use in the post-graduate program.

MUSC: Yes, limited; approximately 1 case/week.

VCU: No

What is your evaluation as to accuracy/marginal fit?

- UAB:** CEREC 1 produced a restoration with an average marginal gap of 90 -100 micrometers. CEREC 2 and CEREC 3 can generate a restoration consistently with less than 50 micrometers of interfacial gap.
- UFL:** N/A
- MCG:** Not as good as conventional casting but equal to porcelain veneers.
- UKY:** Highly variable.
- ULVL:** I understand that the new CEREC 3D units are more accurate than the older versions.
According to one study, progressive disintegration of the marginal luting cement was seen for CEREC inlays. That might imply some degree of marginal opening.
1. Thordrup M, Isidor F, Horsted-Bindslev P. A 3-year study of inlays milled from machinable ceramic blocks representing 2 different inlay systems. Quintessence Int (England), Dec 1999, 30(12) p829-36
Another study of the CEREC 3 reported relatively good margin quality. When the luting space was set to 30 or 50 micron, the marginal gaps ranged from 53 to 67 microns.
2. Nakamura T, Dei N, Kojima T, et al. Marginal and internal fit of Cerec 3 CAD/CAM all-ceramic crowns. Int J Prosthodont (United States), May-Jun 2003, 16(3) p244-8
- MUSC:** To date, all restorations have been found to be clinically acceptable.

Is the system utilized in your Graduate Program and Faculty Practice?

- UAB:** Yes, for selected cases with an experienced faculty mentor.
- UFL:** N/A
- MCG:** GPR and faculty practice on a limited basis.
- MUSC:** Yes
- UKY:** The system is not utilized in our AEGD program. Has been used in Faculty Practice on a limited basis by a few practitioners.
- ULVL:** Yes, in the GPR program. One faculty member uses it in Faculty Practice.

What is your opinion as to the overall clinical acceptability of these restorations produced from student clinics?

- UFL:** N/A
- UAB:** Based on fifteen years of clinical experience with the CEREC 1, 2, 3 systems and as reported to the IADR in 1997: *"It is evident from numerous in vivo and in vitro*

studies that the bonded ceramic restoration, developed with the CEREC CAD-CAM technique has generated consistently reproducible restorations that have been deemed clinical acceptable for interfacial wear and marginal fidelity, while offering the clinician a technique that is conservative, durable and esthetic.”

MCG: With proper occlusal adjustment, polishing and bonding procedures, the restorations are of acceptable quality.

UKY: Have not been used in student clinics, but based on limited Faculty Practice cases; about 50% acceptable with CEREC 2.

ULVL: N/A

MUSC: All have been successful.

What are the strengths and weaknesses of this system?

UAB: Strengths:

- a. A one appointment, direct, chairside technique
- b. Utilizes bonded ceramic materials, such that the restoration has been documented through long-term clinical evaluation to meet clinically acceptable standards of care

Weaknesses:

- a. There is a learning curve to become proficient with the technique and be able to comfortably integrate this technique into a professional practice
- b. Approval and payment by some third party payment programs may be variable
- c. Requires an experienced clinician to teach the technique and to determine correct case selection

UFL: N/A

MCG: Dental students cannot prep, design, mill, adjust and cement these restorations in one appointment. Viable option when finances and time do not permit other restorations.

UKY: Positive has been the exposure of students to new technology and recognition of its limitations compared with manufacturer's claims. Also gives the students an opportunity to use resin cements. Weaknesses include highly variable results, technique sensitivity, 'messy' with the powdering steps, and prep criteria critical.

ULVL: Strengths: one visit, no temporaries, no impressions, reduced lab fees, lower material costs

Weaknesses: aesthetics, learning curve, preps may need more divergence than usual

MUSC: Strengths: Restoration began and completed in one appointment.

Students are exposed to advanced techniques.

Ability to use Function mode to adjust occlusal contacts.

Weaknesses: Degree of isolation required for an acceptable restoration (impression).

Restorations are not characterized.

IV. Educational Philosophies:

What is your educational philosophy as to learning preps first on the bench and then to a mounted dentoform or simulation system vs. going immediately to a mounted dentoform or simulation system?

- UAB:** All students are required from the beginning of the course to do procedures on the manikin. All competencies are done on the manikin. The manikin consists of a head, plastic lips and cheeks. Students begin handpiece usage on the Learn-A-Prep block.
- UFL:** Bench technique is a good first step for introduction to operative techniques. We use this technique (Learn-A-Prep) in our Introduction to Operative Dentistry I Course in one afternoon. This is their first time to use a handpiece – this is important since they can focus on becoming familiar with using a handpiece and what it is like to cut on ivory teeth. When they have experienced this, they proceed to work in the simulation system on mounted dentoforms.
- MCG:** We do our Learn-A-Prep exercises on the benchtop first for a few sessions. Then we mount the Learn-A-Prep plates into the manikin head for a few sessions until our first practical exam. Afterwards, it's strictly dentoforms mounted in manikin simulators.
- UKY:** We rarely do benchtop exercises first. Our students generally do procedures on dentoforms either on posts in the pre-clinical laboratory or preferably on a post attached to dental chairs in the clinic.
- ULVL:** We have the students go immediately to simulation. They may do benchtop when faculty aren't supervising, but in class the dentoforms are in the manikins.
- Nova:** We have primarily had students learn procedures (preparations, restorations, matrix application, etc. for direct and indirect restorative procedures) on benchtop first, and then transition to a mounted dentoform. This year we have just started having D-1 students learn tooth preparation on the DentSim system. We do not know yet what effect this change in educational philosophy will have upon the student's psychomotor skills and ultimate performance.
- MUSC:** "Walk before you run."
Begin with Learn-A-Prep exercises (bench), then typodont exercises (bench), then natural tooth block exercises (bench), then live natural teeth on patients (clinic). Bench preparations allow the student to visualize and develop all aspects of the internal surface of the preparation. Thus, a concept of how to produce an "ideal" preparation can be formed and used later as the student moves into mounted typodont exercises and ultimately live patients.
- VCU:** We teach benchtop dentistry to freshman as a result of our faculty limitation. Our plans for new simulation labs/DentSim labs will change our operative instruction program.

What is the value of quantity and repetition requirements before evaluation for competency?

- UAB:** Quantity is very important for freshmen and encouraged for optimal performance in clinic and competencies.
- UFL:** We feel it is very valuable and that repetition and practice are important before being evaluated for competency.
- MCG:** We believe in learning through reinforcement and practice. We have created an environment where the students can learn from their own experiences and by repetition without pressure.
- UKY:** Depends on the complexity of the procedure.
- ULVL:** Students need to learn patient head position, finger rest position, visualization of their work, and receive feedback from faculty before evaluation for competency.
- Nova:** We have found that the majority of students benefit from quantity and repetition before competency evaluation.
- MUSC:** Very important! Most students are not prepared to demonstrate competency after only a limited number of operative experiences. Additionally, quantity and repetition requirements allow the student to learn to manage variations in the clinical presentation of restorative needs. (i.e. all Class II's are not necessarily the same, etc.)
- VCU:** Quantity without quality supports the idea of training tooth mechanics, not clinicians. However in clinical skills course (pre-clinical) we have several exercises in which quantity is the goal – just for practice of skills. We try to focus on both at the same time.

Does competency replace the need for quantitative repetition?

- UAB:** No, most students need repetition.
- UFL:** No. Before students are tested for competency they must have done the procedure and if they feel ready for competency testing, then they will be tested. We have several competency requirements each semester, so the students must continue to practice and show competency.
- MCG:** No. Students should have some minimal experience before they attempt a competency examination. We view the competency as a way to test the student's independent problem solving skills. Even after passing a competency examination, the students are not exempted from performing similar procedures. They are encouraged to treat their patient as a whole and follow through with the treatment plan.

UKY: NO!

ULVL: No, not when students are learning hand skills. Some students need less practice and some need more. We do not limit the number of teeth that they can have for practice prior to taking an exam.

Nova: Competency does not replace the need for quantitative repetition.

MUSC: No. Quantitative repetition is a tool to use in developing competency, maintaining competency, and enabling a student to surpass the level of “minimum competency.”
Also, as previously noted, quantitative repetition enables the student to see many different clinical presentations and learn to manage these variations from the “ideal” or “textbook” case.

VCU: NO.

In addition to the restoring of ivorine teeth in the preclinic courses, how are natural teeth being utilized (if your school uses them)?

UAB: Natural teeth are used only for caries removal, Dycal, Vitrabond placement, complex amalgams, and pin placement.

UFL: We only use them for placement of sealants and one afternoon for caries removal and placement of IRM temporaries. Teeth are bulk sterilized prior to working on them.

MCG: We utilize natural teeth mainly for caries removal, base and liner application and bonding exercises including composites and glass ionomers. The students bring in their hoard of natural teeth at certain intervals and then we bulk sterilize them.

UKY: We have tried using natural teeth for a caries recognition exercise but the lack of availability of acceptable, suitable teeth is becoming increasingly difficult. Our students do some endodontic procedures on natural, extracted teeth; however the use of extracted teeth in restorative is extremely limited due to the lack of availability.

ULVL: We don't use natural teeth.

Nova: Natural tooth exercises are included in:
Dental Anatomy (tooth identification, sectioning primarily for root morphology)
Direct Restorative Operative Dentistry (tooth identification, identification of caries lesions, identification of other defects, evaluation of existing restorations, treatment planning, all applicable direct restorative procedures and materials placement.)
Endodontics (radiographic evaluation, access through obturation)
Fixed Prosthodontics- Indirect Restorations (cast post and core, pattern fabrication restoration with prefabricated post and core.
Clinical Remediation
Identification of caries lesions.

MUSC: We use them extensively. Primarily natural teeth mounted in stone blocks.

VCU: Freshmen place sealants on natural teeth, excavate for PPR and dental anatomy exercises.

Are you utilizing simulators/DentSim for teaching operative dentistry?

UAB: No

UFL: No

MCG: Not DentSim.

UKY: No

ULVL: Yes, simulators but not DentSim.

MUSC: No

VCU: Anticipate arrival in near future.

Describe how you are utilizing these educational aids and their effectiveness.

MCG: We are not using Dent/Sim in our clinic. However, we do have a system with ADEC designed manikins using a Frasaco phantom head and torso, Kilgore models and computer-supported audio-visual systems. A retrospective study was presented at ADEA in 2000.

“Simulation with Pre-clinical Operative Dentistry courses - 3-year retrospective results”, D.C.N. CHAN, K. FRAZIER & F.W. CAUGHMAN. Medical College of Georgia, Augusta, GA 30912-1260

The Department of Oral Rehabilitation at the Medical College of Georgia developed and established a simulation laboratory for occlusion, operative dentistry and prosthodontics pre-clinical courses in Aug 1995. The system employed ADEC designed mannequins using Frasaco phantom head and torso, Kilgore study models and computer-supported audio-visual systems. Other schools have also started similar laboratories. The purpose of this retrospective study was to compare the pre and post-simulation performance in operative dentistry courses (1994-1998), and to share our experiences in simulation teaching. This time period was chosen because of the constancy of instructors. Student/faculty ratio improved from 13:1 to 11:1; the

number of required procedures decreased from 38 to 32. The number of students achieving A performance significantly decreased from 22.7% to 4.5%. The B group increased from 55.7% to 63.4% while the C group increased from 20.2% to 31.1%. Other groups remain essentially the same: D: 0.98% vs. 0.3% F: 0.49% vs. 0.6%. The difficulty in achieving an A performance can be attributed to the more stringent requirement of the simulator. This may translate to better preparation for clinical conditions. The major problems encountered were 1) Student practice time was limited, 2) Laboratory maintenance is expensive, and 3) Development of curriculum and exercises to make full use of the facilities. The new simulation laboratory offers a lot of potential but requires continued funding and upkeep to function properly.

ULVL: All pre-clinic courses are in simulation clinic. Some competency exams for clinic are done in the simulation clinic (orthodontics and RPD). Works well for some clinical competencies because there may not be enough patients presenting with the right conditions.

Nova: NSU recently installed 6 DentSim units. The initial use is for psychomotor training for direct and indirect vision with D-1 students. The current plan is to incorporate use of the DentSim into the courses with corresponding procedures:

- Direct Restorative Dentistry - tooth preparation for amalgam and resin composite restorations,
- Fixed Prosthodontics - tooth preparation for onlays, inlays, full gold crown, PFM crown
- Endodontics - endodontic access preparations
- Pediatric Dentistry - tooth preparation in primary teeth
- Cosmetic Dentistry - tooth preparation for all porcelain crowns; possible future use for veneer preparation.

Have current technological simulation labs helped with earlier transition to clinic and what impact have they made on faculty numbers?

MCG: See above abstract. Our faculty assignment remains the same, with one faculty for 12 students in the pre-clinical lab.

ULVL: Not any earlier as far as transition. Pre-clinic operative occurs in the freshman year. Operative patients are not seen until the summer preceding the Junior year. No impact on faculty numbers in the pre-clinic course. Although the faculty may be in better condition because the simulation clinic is over 100 feet in length!

Nova: It is too soon for us to know the effectiveness as it relates to pre-clinic and clinic.

MUSC: Don't know since we don't use them.

Describe how your school relates biomedical scenarios to preclinic operative dentistry?

UAB: A comprehensive dentistry course taught Spring quarter D2 presents a review of operative procedures, crown & bridge, RPD's, with interpreting a variety of medical histories and implications pertaining to dental treatment. Patient histories and dental profiles are given to the patient and they are asked to interpret, diagnosis, devise a treatment plan and treatment sequence. Pharmacology and physical diagnosis are incorporated into the patient profiles.

UFL: Lectures in pulp and dentinal histology, pathology, and physiology are included in our pre-clinical operative curriculum. These lectures focus on the relationship between caries, restorative procedures and materials, and their effect on the pulp-dentin organ. In addition, the operative department directs a semester long course employing case-based problem solving in restorative diagnosis and treatment planning.

MCG: We give the student a description of a "patient" including their medical and dental history and incorporate simulated clinical and radiographic images so that they can make their own decisions. An example of such an examination is attached.

CL II Maxillary Molar Preparation Examination (Freshmen Operative Course)

Synopsis of Patient History

Age: 35

Gender: Female

Weight: 150 lb

Height: 5'7"

Medical History: The patient denies a history of medical problems

Dental History: The patient reports that she neglected dental care after college because she was very busy with work and family. She has not seen a dentist for six years. She does practice adequate oral hygiene home care. At this time, she desires routine dental care.

Chief Complaint: "My upper molar is sensitive to sweets and hot or cold!"

Oral Examination Findings: Patient has had teeth restored with amalgam. Tooth #3 shows visible carious lesion on the occlusal area (Figure1). Enamel appears to be demineralized at the occlusal central pit area and distal pit area and the underlying dentin is stained. The disto-lingual groove area appears to be sound and coalesced. The groove joining the distal fossa and the central pit area appears to be non-coalesced and is slightly stained. Radiographic examination revealed obvious carious lesion involving the mesial proximal surface and other areas (Figure 2).

Figure 1. Clinical appearance



Figure 2. Radiographic finding (section of tooth at the central pit area)



Treatment planned: You are to remove the caries lesion and prepared #3 to receive an amalgam restoration. Utilize your knowledge of cavity preparation and materials to design a cavity preparation that will adhere to sound operative dentistry principles. All preparations are to be done on the simulator with rubber dam and indirect vision.

UKY: Basic science principles are reinforced where applicable. An example might be anatomical landmarks in local anesthesia procedures or microbiological principles in infection control procedures.

ULVL: This is not done in pre-clinic operative. The students are taking physiology concurrently but have not had OD/OM, pharmacology, or pathology. The preclinic FPD course does incorporate some health histories and resultant altered treatment in the simulation clinic.

Nova: A full semester course in D-1 Cariology is given prior to the D-1 (Spring) Operative Dentistry course. As students proceed to upper level courses in Oral Pathology, Treatment of the Medically Complex Patient, Treatment Planning, topics are gradually built onto the existing knowledge base from pre-clinical operative dentistry. Principles of microbiology, biochemistry, and pathology are incorporated into all aspects of diagnosis, treatments planning, and treatment.

MUSC: Try to correlate lectures to actual treatment.

VCU: Numerous courses include case-based exercises in lectures and labs. Freshman and Sophomore operative final lab examination involve patient scenario.

Have community out-reach programs impacted your student's education, either positively or negatively? Please describe.

UAB: Our senior clinic is a "Comprehensive Care" model. The philosophy of our Comprehensive Care Program (CCP) is to train dental students to provide excellence in comprehensive dental care for their patients in a setting that emulates private practice. Patients are assigned to individual CCP students for diagnosis and treatment planning, periodontal, endodontic, oral surgical, and restorative dental treatment. Senior students spend about 60 % of their clinic time in this program and another 40% time they are rotating to the specialty clinics. Our senior students sign up for the Outreach program on a voluntary basis and the

participation rate is between 20 to 33%. This outreach program is supported by a grant from the Alabama Health Department and it can be a 2-week or a 4-week rotation. When we started the program three years ago, the students participated in a four-week rotation and received credit for one RCT (senior expectation is 5 two-canal RCT), one perio patient (senior expectation is 4 complete patient treatment), and two crown units (senior expectation is 18 crown units), however, students participating in the outreach program now will not receive any credit. The reasons are: (1) as we are moving toward the competency-base curricula, students are evaluated by various clinical competency examinations and it is very difficult to calibrate their performance outside of the school, (2) based on our last three years' experience, 95% of the students who participated in the outreach program did very well in their clinical expectations and did not require any credit adjustment. Students were required to turn in their productivity report, but it was utilized for statistical purposes. Last year eighteen senior students participated in 2 or 4-week outreach rotations and over 1200 procedures were accomplished.

Our students are very positive about the outreach program. As a matter of fact, we have four graduates from the class of 2003 who are practicing in the public service. The down side of the outreach program is that the grant provided by the State Health Department is not adequate to offset the loss of clinical revenue for the school.

UFL: Our students do two one-week rotations at one of many outreach clinics. They also do another at the ACORN clinics, which is a local outreach clinic. Along with these rotations the students are required to perform community service hours, which are non-dental related. All of these community programs have had a very positive impact on our students. While the students help to provide dental care to the underserved population it also teaches them the importance of sacrifice and service to others.

MCG: Currently we have two outreach programs that operative dentistry is involved with. One is at the Richmond County Health Department under the supervision of the Department of Human Resources, Division Of Public Health. The other is at Tri-County Health System, Inc. Warrenton, GA. The Richmond County Health Department program is on an as-need basis. The students are assigned there only if they have unexpected patient cancellations. The public health clinic is only five minutes by car from the Dental School and works well with the current arrangement. The Tri-County Health System, Inc. Warrenton, GA is staffed by three of our faculty and one from the Department of Pediatric Dentistry. It about one hour drive from Augusta. The program is part of the clinical rotation and the students are given credits for their work.

The positive side of the outreach program is that both of these sites have the purpose of providing dental care delivered by pre-doctoral students to an underserved population. It is good public relation for the school and the students have a taste of the real world.

The main negative side is the problem of staffing and working with Public Health Dentists who might have an unrealistic expectations form our pre-doctoral students.

UKY: Positively, our first year students get an early clinical exposure on our sealant van that travels to outlying schools and areas, particularly in Eastern Kentucky. The students also have summer externship opportunities between their 3rd and 4th years. The latter is good from an experience standpoint, but they also often return to

school in the fall having picked up some bad habits and poor techniques from private practice exposures.

- ULVL:** Very positively. Students have an AHEC requirement between the Junior and Senior years when they are placed in general practice or specialty offices. Students are also rotated out to community clinics where they treat underserved populations. They participate in the Kentucky State Fair screening and sealant program for school children that is sponsored by the Universities of Louisville and Kentucky, the Kentucky Dental Association, and P&G. Aside from expanding their contact with different populations, the school could not accommodate all of the students in the clinics at the same time.
- Nova:** Most students who participate in community outreach programs do so as a requirement. Those who are enthusiastic are generally thinking about future training and practice in pediatric dentistry.
- MUSC:** These programs significantly take away from operative clinic time with some positive return, but probably not enough to justify the time spent.
- VCU:** Outreach programs for students have been positive experiences for students. At times the information gained by students may not be similar to our teachings. Additionally, we are experimenting with private-practice and community clinic perceptorships for our senior dental students. Students spend a week or two at one facility to gain clinical experience.

Describe your current philosophies/protocols of caries risk/caries management/non-invasive treatment of carious lesions?

- UAB:** The school does not have an outlined protocol of caries risk assessment, though the dental history of the patient and dietary habits are examined carefully in conjunction with the current dental needs to determine the treatment options and sequence. Management of lesions is addressed in multiple stages and lesions may be treated chemically and/or mechanically. It is imperative that the patient be counseled on oral hygiene needs and given the proper tools and dietary counseling.
- Major strengths: We do not treat lesions that do not need to be surgically removed and there is maximum tooth structure preservation. There is decreased need for RCT interventions with partial excavations. There is time to reassess the patient's hygiene as we progress with treatment.
- Weaknesses: Some patients do not return for recall as planned. The issue of compliance is linked to patient education and because we deal with a group of several care givers (students) we cannot control all portions of the educational process.
- UFL:** Cariogenic profile – All patients:
1. Active caries – no culture required – Assume patient would benefit from medical Tx of plaque to reduce cariogenic potential.
 2. Low caries Hx and no active caries present – no culture required – Assume patient would not benefit from medical Tx of plaque.

- Unknown caries activity, high caries Hx (i.e.) high DMFT, do a culture as part of data collection.

Medical model @ UF:

Phase I Tx Plan:

- OHI, dietary counseling
- Prophy/ Fluoride
- Recommend Act fluoride rinse
- Eliminate retention sites
 - Sealants
 - Refurbish/repair/replace defective existing restorations.
 - Restore cavitated lesions
- Chlorhexadine prescription – rinse at night (instead of Act) for 2 weeks.
- Culture in 2-3 month's to determine efficiency of treatment.

Note: Advantage here: Operative Department controls data collection, treatment plans, treatment, and recall

MCG: We follow the "Medical Model" popularized by Dr. Max Anderson. This model focuses on treating the disease itself, which is a dietary, carbohydrate-modified, infectious, bacterial disease, rather than treating the destructive results of the disease (e.g., dental caries).

Caries Risk Assessment

The first step in using the model is to assess the patient's caries risk and categorize it as low, moderate, or high. Next, a treatment sequence is initiated that eliminates the cause of the infection and restores the diseased areas.

The following table provides criteria for each of these categories.

Low Risk	Moderate Risk	High Risk
No caries in past 3 years	One lesion in past 3 years	2 or more lesions in past 3 years
Adequate restored surfaces	Exposed roots	Large # filled surfaces/exposed roots
Good oral hygiene	Fair oral hygiene	Poor oral hygiene
Regular dental visits	Irregular dental visits	Irregular dental visits
	Incipient lesions	Elevated S. mutans levels
	Orthodontic treatment	Dietary risk factors
		Inadequate salivary flow rate
		Inadequate fluoride exposure

Once the patient's risk status has been determined, treatment can be initiated. For each of the caries-risk categories, a recommended treatment sequence is provided below:

Low-caries-risk patient:

- Office: Annual recall, topical fluoride once per year (optional)*
- Home: Fluoride dentifrice two to three times per day
- *If prophylaxis is accomplished, then topical fluoride is suggested

Moderate-caries-risk patient:

- Office: Semi-annual recall, topical fluoride biannually, sealants, diet modifications
- Home: Fluoride dentifrice two to three times per day, fluoride rinse once per day

High-caries-risk patient:

Treatment goals are to remove nidi of infection from oral ecosystem, and attack the now vulnerable microorganisms using the following protocol:

- Step 1. Restore the existing carious lesions. Place caries-control temporaries. Dietary analysis. OHI.
- Step 2. Apply sealants to unrestored teeth and to ditched/noncarious amalgam margins.
- Step 3. Chlorhexidine rinses for 14 days. Fluoride varnish (Durafluor or Duraphat) or fluoride gel -- three applications over one week.
- Step 4. Xylitol gum (Xylifresh) – two pieces TID for at least five minutes.
- Step 5. OTC fluoride rinses BID. Fluoride dentifrice two to three times per day. Consider fluoride trays.
- Step 6. Recall exam for caries activity, compliance, and salivary tests.
- Step 7. From salivary test results, re-institute antimicrobial therapy if necessary or continue with definitive restorations and strict recall.

UKY: We sadly do not have an active caries risk/management program. Historically, this was previously covered by the departments of oral diagnosis and periodontics. Both departments, particularly oral diagnosis, have experienced drastic reductions of lines in recent years where only basic educational topics are being covered. There has been an interest in revitalizing a caries risk/management program at our school, but it is on an extreme back burner at this point in time.

ULVL: Diet surveys are given to patients. Counseling by students follows, if needed. Oral hygiene instructions and re-evaluations of oral care are part of the treatment plan. Prophys are scheduled during patient treatment based on individual needs. We prescribe various levels of fluoride applications for children and adults depending on their caries activity and the probability of achieving remineralization and/or slowing the caries activity. We are beginning to use fluoride varnishes in the pediatric clinic.

Nova: NSU-CDM does not yet have a systematic Caries Protocol. However, the basic philosophy is to treat tooth structure in a conservative manner: to attempt remineralization under favorable circumstances, utilization of pit and fissure sealants, conservation of tooth structure in tooth preparation for resin composite (removal of diseased tissue only) and for amalgam.

VCU: Medical model of caries control. Caries risk assessment is completed on every patient. Individual risk factors are addressed at Tx planning and reevaluated throughout Tx. Protocol for low, moderate and high risk factors is a continuum of preventive treatments utilizing fluorides in-office and at home (1.1%, 1.23%, 2%, rinses, etc), dietary analysis, fluoride trays, remineralization therapy, xylitol gum, sealants, bacterial testing and use of Chlorhexidene. Caries management is based on the multifactorial model of the caries process. Trying to address patient risk factors as they relate to: Agent, Host, and Environment. General Practice department has addressed another patient concern regarding compliance by selling Rx: 1.1% NaF toothpaste and xylitol gum. Additionally, developed a new reevaluation process in which our clinic software helps generate our risk reevaluation periods: High = 3 months, Moderate = 6 months, and Low = 12 months.

Which of these programs is the most effective?

UFL: Don't understand question

MCG: Since we do not have requirements for caries risk assessment, much depends on the supervising faculty and how the patient is followed up. We do not have formal record of how effective these programs are. Ensure that all teeth targeted for remineralization are documented in the dental record. Inform the patient that you are attempting to remineralize rather than restore the lesions and that success will depend largely on their compliance with your instructions. They need to understand the need for follow-up at the appropriate time so that lesion progression can be monitored. Some lesions may require restoration if remineralization efforts are ineffective. Be sure to document all preventive instructions and treatment rendered.

ULVL: We haven't collected data. I would guess that fluoride applications as well as self-care are the most effective.

Nova: No one approach to prevention, diagnosis, materials science, patient management, treatment planning, treatment evaluation, and psychomotor ability can stand alone.

VCU: Caries risk assessment is an underlying philosophy in our general practice clinic. It is a comprehensive program – not individual entities

What are the strengths and weaknesses of this system?

UFL: Strengths are the treatment of the disease process rather than the results of the disease. It can decrease the number of caries, be cost effective, and prevent pain and discomfort.
Weakness is to get administration, faculty, and students to comply with the program. If faculty aren't consistent and require the students to comply with the program, it is less effective.

MCG: The positive side is certainly the less aggressive treatment of dental decay. However, such a system can only work with a well-organized recall system and also depends on patient compliance.

ULVL: Strengths: recognition of individual differences and tailoring treatment to match needs.
Weaknesses: Patient compliance

VCU: Strengths: Only full-time faculty perform Tx planning. Each member is knowledgeable in the protocols taught to students and readily makes use of protocol recommendations.

- V.** Initially CODE was known as The Consortium of Operative Dentistry Educators. The CODE advisory committee and others have responded to a suggestion that CODE again be known by this more descriptive definition. The consensus was for the change to take place effective January 1, 2004 unless the Regions advise otherwise.
Do you agree with this name change? If not, please explain.

UFL: Yes.

MCG: Yes.

UKY: Yes.

ULVL: Yes.

Nova: The name change (back) to The Consortium of Operative Dentistry Educators is acceptable, if we believe that "Operative Dentistry" is still acceptable terminology.

MUSC: The name change is fine, but not of great importance.

Regional CODE Agenda

(Please report on responses from all participants).

I. Pre-clinical Operative/Restorative Dentistry Courses

1. When is your course scheduled?

UAB: Freshmen Operative: Fall-Winter-Spring, October thru May
Sophomore Operative: 4 weeks spring

UFL: Pre-clinical instruction is divided into 3 courses. Spring semester (January) of freshman year through the end of the fall semester of their sophomore year (December). Students work through the summer.

MCG: In the freshman year, from the middle of the Fall Semester (mid-October) until the end of the Spring Semester (end of April).

UKY: First Year – Fall and Spring

ULVL: First Year - Fall and Spring

Nova: D-1 Fall - DentSim rotations
D-1 Spring - Operative Dentistry Lecture and Lab
D-2 Fall and Spring - Fixed Prosthodontics (Indirect Rest) Lecture and Lab
D-3 Summer - Clinic Prerequisite Review
D-3 Fall - Cosmetic Dentistry Lecture and Lab

MUSC: Sophomore, Fall - Operative I
Sophomore, Spring - Operative II

VCU: Fall and Spring of the Freshman and Sophomore years

2. How many sessions and how many weeks?

UAB: Freshmen: 3 half days (4 hours/day) per week X 22 weeks= 264 hours
Sophomore: 3 half days (3.5 hours/day) X 4 weeks= 42 hours

UFL: Course 5405C 24 half days – 15 weeks
Course 5406 32 half days – 13 weeks
Course 6407C 27 half days – 15 weeks
Total 83 half days – 43 weeks

MCG: Approximately 37 sessions and 22 weeks.
Fall = 7 weeks, once per week.
Spring = 15 weeks, twice per week.

UKY: Preclinical Amalgam Course 24 Sept – 12 May (Generally once a week)
 24 Lectures – 29 Sessions
 Preclinical Composite Course 16 Apr – 21 June (Generally twice a week)
 14 Lectures – 17 Sessions

ULVL: 42 sessions - 21 weeks.

Nova: Operative Dentistry 2 half days per week for 18 weeks
 Fixed Prosthodontics 1 full day per week for 18 weeks, each semester
 Cosmetic Dentistry 1 half day per week for 18 weeks

MUSC: Two half-days for 30 weeks each semester

VCU: D-1- Fall: 1 day x 10 weeks Spring : 2 days x 15 weeks
 D-2- Fall: 1 day x 15 weeks Spring* : 1 day x 15 weeks
 (*Clinical Skills Course- a continuation of D-2 Operative)

3. Provide a copy of your sign-off sheet for daily/routine projects

(EDITORS NOTE: Although all responding schools indicated enclosure of the requested sheets, no sheets were included with received responses)

4. Indicate the percentage of time spent on amalgam vs. composite-

UAB: Time: Amalgam = 65%, Resins = 35%

- Direct Restorations (all on the dentoform in the manikin):
 tooth numbers and surfaces are specified for the students

<u>Amalgam</u>	<u>Resin</u>	
4 occlusal Class I's	2 occlusal Class I's	
3 B or Li Class I pits	1 conventional Class II	
2 Class II slot slot restoration		3 Class II
2 Class V	2 Class V	
6 Class II	4 Class III, 4 CL I	
4 Complex amalgams with pin placement (natural teeth)		
IRM placement x 3 teeth, Dycal and Vitrebond placement (natural teeth)		

- Indirect Restorations:

Preparation for 2 surface resins
 Preparation for 4 surface gold restorations
 Poly vinyl siloxane impressions, casts, pindexed and trimmed
 Fabrication of restorations not covered

UFL: Course 5405C – 8 weeks composite 7 weeks amalgam
 Course 5406 – 23% composite 73% amalgam
 Course 6407C – 6 weeks composite 6 weeks amalgam
 11 half days 11 half days
Composite – 38% Amalgam – 62%

- MCG:** 50:50.
- ULVL:** Amalgam 65%, Composite resin 35%
- Nova:** Amalgam Technique - approx. 60%
Resin Composite Technique - approx. 40%
- MUSC:** 35% amalgam, 45% composite

5. List all of the competency examinations that you require in the pre-clinic course.

- UAB:** Competencies:
 Class I preparation
 Class II preparation
 Class II preparations X 2 plus place and carve amalgam in one of the required preparations
 Class IV preparation and restoration and a Class II resin preparation
- UFL:** Course 5404C:
 1. Prepare Class I amalgam preparation and restore
 2. Class I composite restoration
- Course 5406:
 1. Prepare 2 Class V composite preparations – restore one
 2. Prepare 2 Class III composite preparations – restore one
 3. Prepare 1 Class II amalgam preparation
 4. Prepare 1 Class II amalgam preparation – restore one previously prepared Class I amalgam preparation
 5. Prepare 1 Class II amalgam preparation – restore one previously prepared Class II amalgam preparation with composite
 6. Prepare 1 Class II amalgam preparation – restore one previously prepared Class II amalgam preparation
 7. Prepare 2 Class V composite preparations – restore one
 8. Prepare 2 Class III composite preparations – restore one
 9. Class IV composite restoration
 10. Complex Class II composite restoration replacing a cusp on a molar tooth
 11. Complex Class II amalgam restoration replacing a cusp on a molar tooth
 12. Complex Class II pin-retained amalgam preparation on a molar tooth
 13. Cast gold onlay (MODBL) preparation on a molar tooth

- MCG:** One hour allowed per procedure for the following:
1. Class I Amalgam: #19/30-O, prep only (on benchtop, all others in manikin) and an instrument identification “station” exam 1 minute/station-1 hour @ test.
 2. Class I Amalgam: #30-O Prep (rubber dam) and #5/12-O Rest (prepared tooth).
 3. Class II Amalgam: #19/30- MO Prep (rubber dam) and DO Rest #5/12.
 4. Class II Amalgam Prep: #3/14- MO Prep and Class III Composite Rest #8/9 (dam).
 5. Class IV Composite Restoration: #8/9 (dam) and a PBL station exam 1 hr.
 6. Class II Amalgam Cusp Replacement Rest: #19/30 (prepared tooth with a rubber dam) and Class II Amalgam Prep #3/14 MO.

- UKY:**
- | | |
|------------------|---|
| <u>Amalgam</u> | “Star Chamber” (lab station) Exam (instrument I.D.)
Class II preparation
Class II restoration
Cusp replacement amalgam
Class II preparation |
| <u>Composite</u> | Class III preparation
Class III restoration
Class IV restoration (Practical teeth already prepared)
Class IV restoration (Final exam – students do this twice) |

- ULVL:**
- Competency Exam 1 - Class 3 & 5 Preparations
 - Competency Exam 2 - MO Prep and MO Carving
 - Competency Exam 3 - MO PREPARATION AND MOD CARVING
 - Competency Exam 4 - MO Preparation AND MODL (pin) Carving
 - Final Competency Exam - MO Preparation and DO Resin

- Nova:**
- Class I Amalgam Preparation and Restoration
 - Class II Amalgam Preparation and Restoration
 - Class III Resin Composite Preparation and Class IV Resin Composite Restoration
 - Class II Amalgam Preparation and Class II Resin Composite Restoration

- MUSC:**
- Class II Amalgam Preparation and Restoration
 - Class V Amalgam Preparation and Restoration
 - Class III Composite Preparation
 - Class V Composite Preparation
 - Diastema closure with Direct Composite
 - Direct Composite veneer (optional for extra credit)

- VCU:**
- Learn-A-Prep exercise- Square and Cross shapes (D-1)
 - Class I #13 O (D-1)
 - Class II #14 DOL prep, #3 MO rest (D-1)
 - Class II #4 DO prep, #13 rest (D-2)
 - Class II #19 MOD prep & rest (twice D-1 & D-2)
 - Class II Composite #30 MO prep and rest (D-1)
 - Case-based exam, Critical Thinking: Seal/Comp/Remin. (D-1)
 - Class IV #9 MIFL, #29 DO Composites (D-2)

6. Describe a typical competency exam-

- UAB:** Exams begin at 1:15 and end at 4:30. No self-examination. Students are given option of requesting a second exam tooth for the competency but must relinquish this tooth for the replacement.
Intra-oral simulation for all daily exercises and practical exams. Frasco head with Columbia magnetic dentoform are used.
Grading: The 55-60 dentoforms are randomly divided into 3 groups. We currently have 4 faculty. The 3 module leaders each provide feedback and numerical grades for the dentoforms. The course director then grades each dentoform independently from the 1st grader. The student receives the average of the 2 grades unless there is a large disparity. At that point, the course director decides whether or not to consult the other grader and/or consult with other operative faculty. The student receives a numerical grade with detailed feedback on the exercise. 58-60 students.
Remediation: none for individual practical exams. Remediation is done for the course as a whole the summer following the course.
- UFL:** Amount of time given for each exam may vary and is determined by the course director. Each exam is done on a simulation head. Students have five minutes for self-evaluation and can get extra credit for correct self-evaluation. Instructors are assigned in four pairs (total of eight faculty) and the exam is graded. Following the grading, time is allowed for students to ask questions and receive feedback. Remediation is provided for those who fail the course
- MCG:** All of the exams are done in the simulator head except for the first one (Class I Amalgam prep #30-O). Typically, one hour is allowed per procedure, prep and restoration = 2 hours. The students have 10 minutes for self-evaluation prior to turning their dentoforms in and they can earn extra credit for correctly identifying errors. The procedures are double-graded. Four faculty per grading session. Four to eight dentoforms are used for calibration grading by all four faculty. The hardest and the easiest graders are paired, as are the two moderate graders to make up the two grading teams. The dentoforms are randomly divided into two halves and each team grades half of the class. The pairs of grades are averaged for the student's score. A third grader (course director) may render a grade if a two-grade discrepancy exists from the original two graders when one score is a failure. Remediation is prescribed for failing students that may involve individual discussions with course faculty and extra lab work. Some practicals are repeated until a passing score is obtained.
- UKY:** Students typically have a one-hour lecture followed by a three-hour practical exam. Preparations/restorations are done on dentoforms on a 'stick' attached to actual dental chairs on the clinic floor. Self-evaluation is done and points awarded for accurate self-assessment. All class faculty participate in grading practicals after a calibration session before each session. Remediation is accomplished by the course director as needed.

Nova: Typical Competency Exam -

First exam is benchtop, the rest are mounted in mannequin. This may be reconsidered after more use with the DentSim system

- One preparation, one restoration
- Timed (approx. 2½ - 3 hours)
- Evaluation of matrix where applicable
- Evaluation of rubber dam placement on all mannequin exams
- Students self-evaluate for all exams
- Procedures are graded by faculty, standardized prior to grading, working in pairs, consensus grading, all failures are evaluated by a third grader, then by the course director.
- Remediation is allocated for the middle 2 exams for a maximum passing grade on one attempt. Further attempts must be continued until clinically acceptable, but not for grade change.
- Failure of the course, even after in-course remediation, requires remediation and re-exam (during the summer) in order to determine if the student passes the course or not.

ULVL: Time: normally 2½ hours
Position: all are on simulators
Self-evaluation: required
Grading: same 2 faulty grade everything and the 2 scores are averaged
Remediation: failed exam must be remediated and checked off by one of the graders; does not factor in grade

MUSC:

- Approximately 3.5 hours allowed
- Done on extracted teeth mounted in stone
- Graded by course director
- Students do not do self-evaluation...they are allowed to enter comments on the grade sheet prior to instructor grading
- Remediation done by faculty working with individual student as needed.

VCU: Freshman Pre-clinic- Benchtop, Learn-A-Prep or manikin, 1 – 1½ hours long
Self-evaluation performed - anticipated grade is written
Grading: 2-3 lab faculty using 0, 1, 2, 2.5, 3, 3.5, 4 scale.
All 0 & 4 grades are further examined by all lab faculty (8-10) for consensus
Remediation: additional practice until several are satisfactory, Tutors available.
Practical grade remains unchanged.
Sophomore Pre-clinic.- Manikin on Head/Stick, 1 – 1½ hours with self-evaluation.
Grading: same as above.
Remediation: same as above
Sophomore Clinical Skills- Manikin in clinical setting, 3 hrs.
Mock Board-like self-evaluation,
Graded by 2 faculty, Mock Board type grading
Remediation: 5 satisfactory examples in clinic setting with supervision.

II. Student Clinics for Operative/Restorative patient care

1. Describe your school's warranty policy for direct and indirect restorations done in the student clinics.

- UAB:** The director of clinics gives the faculty permission to deal with each case on an individual level and it is the judgment of the faculty to evaluate the details and recommend a fee or waive the charge. (Director approval needed)
- UFL:** This is determined by the faculty working with the student and can vary from case to case. If the restoration has failed within less than the ideal time frame, the replacement is often done at no charge
- MCG:** All of these situations would be handled on a case-by-case basis. If a restoration fails within a reasonable time period (< 1 year) and the error is apparently due to student technique then a replacement is often done at no charge. Material-related failures may be redone without charge if a new material was used and the outcome was less than expected for the standard issue material in our student clinics (i.e., faculty trying a new composite for some perceived advantage).
- UKY:** Common sense dictates replacement of student placed restorations of all types. According to our Assoc. Dean of Students the 'official' replacement period at no-cost is generally one year, however, many factors come into play and are at the discretion of the faculty to determine an appropriate fee. The College faculty will generally remake any failed board restoration at no charge either accomplished by the faculty or assigned to another student depending on the particular patient factors involved. Due to a shortage of good board patients, assignment of our school patients of record to 'other candidates' would be exceptionally rare. Outside applicants are responsible for their own patients for board examinations.
- ULVL:** We do not have a written policy on length of time that a restoration should be serviceable. If a restoration that has been placed in the student clinics requires replacement and the supervising faculty member believes that it should be done at no charge or a reduced charge, this information is submitted on a Quality Assurance Form to the Associate Dean for Clinical Affairs. This person has the final determination.
- Nova:** Direct restorations – up to one year, with the final determination by the attending faculty.
Indirect restorations -- each case must be evaluated on its own merit, fractured porcelain, missing proximal contact, sensitivity to thermal changes, undetected open margins, with the final determination by the Director of Clinics.
- MUSC:** Warranty is usually about one year, but decided on a case-by-case basis and depends on the reason for replacement.
- VCU:** Case by case basis. Varies with elapsed time, circumstances of re-treatment, student operator.

If there is a no-charge for replacement policy and how long would this usually be?

ULVL: N/A

MUSC: Clinically unacceptable board restorations on patients of record are re-done in the school clinics.

How does your school handle remakes for clinically unacceptable board restorations that your graduates or other candidates do on school patients of record?

UAB: The school is not held responsible for the cost of replacing a clinically unacceptable board restoration. The patient signs a consent form originating from the State Board for treatment. It informs the patient that the student is not a licensed practitioner and the examination is held under test conditions. The patient has the responsibility to meet the cost of additional treatment and to seek further treatment.

UFL: If assigned to a student, the necessary treatment plan adjustments will be made and the student will treat the patient for the appropriate fee.

MCG: There is no guarantee for a free replacement since the restoration was not done under faculty supervision. The only "guarantee" that a school patient of record has is that we will promptly see them and offer to correct an unacceptable restorative result for the appropriate fee depending on who does the corrective work - student, resident, or faculty. Board patients that are not school patients of record can use the dental emergency clinic for simple problems or they have the option of being screened for assignment like all new patients and any defective restorations could be corrected as part of the proper sequence of comprehensive treatment.

ULVL: The same procedure as described in Question #1 is used.

MUSC: We have not had requests to this point; will need to consider options for this situation.

2. Describe your repair vs. replacement philosophy in student clinics for direct and indirect restorations. Provide some guidelines – indications or contraindications for repair vs. replacement. Are there differences between amalgams and composites?

UAB: In very few instances amalgam restorations are repaired. Most times if a problem originates in or adjacent to the amalgam restoration, a decision is made as to whether the restoration is acceptable or needs replacement. Composite repairs are not routinely done unless it is one that was recently done at our clinic (within the last 1 - 1½ year). We should then have the record of treatment and a repair can be attempted.

UFL: Numerous cross-sectional studies have shown that the main reasons for replacement of restorations in general dental practice are:

- Secondary (recurrent) caries
- Fracture of restoration (bulk or margin)
- Discoloration (bulk or margin)
- Fracture of tooth (bulk or margin)

These four reasons for replacement of restorations comprise about 90% of all reasons for replacement of directly placed restorations and usually only one reason is cited as the reason for replacement.

Any localized defect on a restoration should be considered for repair rather than for replacement of the restoration, and many restorations that are scheduled for replacement have localized defects. The most common reason for replacement of restorations in general dental practice is the clinical diagnosis of secondary (recurrent) caries. It is difficult to make a good differential diagnosis between secondary caries and stained cavosurface margins of tooth colored restorations, but both defects are often localized to a part of the cavosurface margin. Similarly, ditched cavosurface margins (= marginal degradation/fracture) on amalgam or tooth colored restorations are often localized. All these marginal defects should be considered for repair, provided less than half the cavosurface margin is involved. The clinical approach is to remove enough of the restorative material to allow a definitive diagnosis to be made, provided the defect does not extend to and spread at the pulpal floor. The affected cavosurface margin should be gently cleaned if a tooth colored restorative material is to be used, and the exploratory prepared cavity is filled. Longevity data on these types of repairs are lacking, but are presently being collected at UFCD. The surface of discolored tooth-colored restorations that have intact cavosurface margins should first be attempted to improve by refurbishing/polishing. A surface stain may be removed to give satisfactory esthetics. If the body of the restorative material is discolored (usually a material defect), all or most of it should be removed and replaced. Localized fracture of tooth structure associated with an otherwise acceptable restoration may also be repaired. Bulk fracture of a large part of the tooth associated with a restoration often calls for a cast restoration, but a cusp fracture may be successfully replaced by a direct restorative material, provided adequate retention can be obtained. However, no longevity data is available on this treatment. Finally, bulk fracture of restorations usually calls for replacement of the restoration, but partial replacement should be considered for those parts of the restorations that are clinically acceptable, provided adequate retention may be obtained.

The main motives for repair and refurbishment of restorations are:

- Saves tooth structure**
- Minimizes preparation trauma/stress on the pulp**
- Reduces cost for the treatment**

MCG: All of these situations are handled on a case-by-case basis as well.

Factors to be taken into consideration include: age of the restoration, age of the patient, source of the existing restoration (school or unknown), patient caries history and risk assessment, reason for failure (mechanical, technical, or biological), tooth sensitivity level (pulpal diagnosis), risk of endangering the pulp by total replacement.

Amalgam vs. Composite- In general, from a technical perspective, it is easier to repair composites with a conservative approach, although the decision to repair or replace an amalgam may be easier.

UKY: Again, common sense dictates replacement, however, if a truly defective restoration were to present, the one-year rule would generally apply. If a restoration is merely stained or suffering minor marginal breakdown, first a refurbishing/repair procedure would be attempted.

ULVL: See attached lecture – Replace or Repair?
(Editors Note: Cited article not included in received responses)

Nova: Repair vs. Replacement:
Resin composite – repair acceptable if repair site is accessible and all other clinical factors are favorable
Amalgam – repair is not done routinely, but may be done on a case-by-case assessment.
Indirect restorations – case-by-case basis, but generally replaced. May be repaired if accessible, if there is a medical contraindication, and/or patient management issues exist.

MUSC: Regarding repair vs. replacement, we consider what is in the best interests of the patient. Repairs are allowed in an otherwise sound restoration if the result is predictable and indicated.
Repair guidelines: Generally defective margins and/or slight localized caries in an otherwise sound restoration in a low caries risk patient. If caries extends into dentin and is judged to be active, replace rather than repair, particularly in a high caries risk patient. If clinically significant loss of function, tissue inflammation, or pulpal pathology resulting from defective restoration, usually replace rather than repair.

VCU: Attempt to identify reason for retreatment so as not to repeat it (caries, material, preparation, occlusion, etc.)

- Direct: recurrent decay= replacement,
- Questionable material choice= replacement,
- Open margin/contact= repair.
- Indirect: only minor repairs are made to crowns, small lingual or facial carious lesions repaired with amalgam/composite.

Guidelines same as warranty policy. No repairs on composite subgingival margins or areas where isolation can not be gained.

Amalgam vs. Composite differences - isolation issues are less with amalgam. If retreatment is selected, the material choice is re-evaluated. Amalgam preferred for cusp replacements, subgingival margins and other isolation issues.

3. Do you use the “Smart-Prep System” (SS White) of rotary instruments for selective dentin removal in student clinics? Describe how often it is used, what your indications are and give technique details if different from the manufacturer’s instructions. What is your opinion of these instruments.

UAB: The Smart-Prep System is not being utilized in a clinical setting. A few faculty members have utilized the system in selected cases. Other faculty are using the system in a research setting.

UFL: No. Faculty are evaluating them in faculty practice, and those faculty who have used the bur feel that it may be helpful to use in the student clinic for selective cases such as deep soft caries near the pulp. The manufacturer states that it should be used under very slow speed (500 RPM), which is almost impossible. It is felt that it may prevent the students from over-aggressive removal of tooth structure/caries at or near the pulp. As of yet the burs are not standard equipment in our clinics.

MCG: We do not use these instruments in student clinics. They have a limited use, as they are unable to excavate carious dentin at the DEJ. They will remove obvious carious dentin although the remaining surface looks like infected dentin. The company reps describe a moderate learning curve until you get used to it.

UKY: We do not use the Smart Prep System at UK. We feel conventional instrumentation and rotary burs are sufficient given adequate faculty supervision and student experience.

ULVL: **NO.** Expensive. Technique sensitive. Multiple burs may be necessary to complete procedure. May extend the time needed to complete a preparation. One study has reported that polymer bur removal of carious dentin resulted in lower bond strengths for Optibond and Single Bond while PQ-1 was not significantly reduced. (Bond strengths were reduced by 50% or more).

Silva, NRFA and Thompson, VP. Polymer bur for carious dentin removal – adhesive bonds to caries-affected dentin. 2003 IADR abstract #227

Nova: We do not use the “Smart-Prep System” (S.S. White).

MUSC: We do not use the Smart-Prep System.

VCU: Not at this time.

4. What are the minimum numbers of direct and indirect restorations that you expect a student to complete by the end of the junior year, and by graduation? If you do not have minimum requirements indicate how many direct and indirect restoration that the average student completes.

UAB: The following are minimum expectations clinical situations in OP clinic only. OP procedures are also carried out in Pediatric, Urgent Care, Hospital Dentistry, Community Dentistry and other Outreach Programs/Rotations. OP clinic does not rely exclusively on the minimum expectations to be completed by each student. The D3 and D4 clinics are geared towards Comprehensive Care of the patient with emphasis on his/her needs and attempting to match it to student's expectations and skill level. Classes are divided in groups (5 total) with staff who function as Patient Care Coordinators and Faculty Advisors or Managers to monitor student progress and sequence of care.

Procedures are to be carried out to completion during each academic year. In addition to the specified procedures, any OP procedure is assigned a certain number of points. The primary objective of using the point system is that it recognizes any procedure carried out (restorative/preventive) by the student in the comprehensive treatment of each patient. It maximizes the student's compliance

with the philosophy of Comprehensive treatment and also awards the students for varied procedures with a minimum number of set experiences for the class. Every competency procedure that receives a passing grade allows the student to accumulate points in OP as well.

	D3	Avg/Std	Max # per Std	D4	Avg/Std	Max # per Std
Amalgam Class II	10	10-12	15	10	10-12	21
Amalgam Complex	3	3	8	2	4	8
Esthetic Class III	10	12-18	31	10	16-18	25
Esthetic Class II	3	3-4	7	5	8-10	16
Minimum Points	275	375	538	200	370	684
Gold Onlays/Inlays	Not required			Not required		
Ceramic Onlays/Inlays	Not required			Not required		
Composite Onlays/Inlays	Not required			Not required		

Refer to table above for number of directly placed restorations. Indirect restorations placed in OP clinic are Inlays and Onlays only. Crowns are procedures that currently fall under the umbrella of the Department of Prosthodontics. Minimum number C&B units (single crowns or bridges) for:

D3: 15 units

D4: 18 units

- UFL:**
- A. We do not have "requirements" for indirect metal or tooth-colored restorations, however, students are expected to provide this treatment when indicated.
 - B. Students must demonstrate competency in providing CL II, CL III, CL IV direct composite restorations to graduate. They are required to have completed each procedure at least once before attempting to demonstrate competency.
 - C. Average number of units in Fixed Clinics = 15 - 16
- Other than this, we have no "number" requirement.

MCG: At the end of the junior year we expect all students to have completed a minimum of 55 direct restorations and 7 units of indirect restorations. The indirect restorations can be 7 individual castings or 4 castings plus a fixed partial denture. The graduation requirements are 100 direct restorations and 22 units of indirect restorations that must include 2 FPD's along with 16 individual casting units.

UKY: No minimum numbers of procedures. On average, most 3rd year students would have approximately 35 restorative experiences of all types and 50-60 for fourth year students.

ULVL: Average number of amalgams.....30
 Average number of composite resins.....25
 Average number of indirect restorations.... 12 units
 (one was a post/core and one was an inlay or onlay with minimum of two surfaces.)

Nova: Minimum number of direct restorations each year: (last year's seniors averaged 57 completed direct restorations): D-3: 22; D-4: 25
 Minimum number of fixed indirect restorations (units) each year: D-3: 4; D-4: 4
 Minimum number of removable indirect restorations each year: D-3: 7; D-4: 3

MUSC: Presently no differentiation between direct & indirect rest. Average total restorations per student at graduation is about 75.

5. Please indicate your student fees for the following procedures:
 The following fees represent an average fee for the 6 responding schools

Code	Procedure	Fee
01330	Oral Hygiene Instruction	10
01310	Diet/Nutritional Counseling	8
01110	Dental Prophylaxis	35
01204	Topical Fluoride Tray	12
01204	Topical Fluoride Varnish	9
00425	Caries Susceptibility Tests	10
09630	Antimicrobial Treatment (Chlorhexidine)	15
01351	Sealant (first tooth)	14
01352	Sealant (additional tooth)	11
02940	Sedative Filling	26
02140	Amalgam 1 surf	33
02150	Amalgam 2 surf	42
02160	Amalgam 3 surf	50
02161	Amalgam 4+ surf	60
02330	Resin 1 surf anterior	41
02331	Resin 2 surf anterior	47
02332	Resin 3 surf anterior	55
02335	Resin 4+ surf anterior	65
02391	Resin 1 surf posterior	48
02392	Resin 2 surf posterior	61
02393	Resin 3 surf posterior	69
02394	Resin 4+ surf posterior	109
02520	Inlay-metallic 2 surf	147
02530	Inlay-metallic 3 surf	182
02544	Onlay-metallic 4+ surf	232
02620	Inlay ceramic 2 surf	247
02630	Inlay ceramic 3 surf	262
02644	Onlay ceramic 4+ surf	285
02651	Inlay-composite 2 surf (lab)	222
02652	Inlay-composite 3 surf (lab)	243
02644	Onlay-composite 4+ surf (lab)	272
02740	Crown-porcelain/ceramic sub	316
02750	Crown-porcelain/high noble metal	302
02790	Crown-full cast high noble metal	300
02960	Veneer-chairside (composite)	87
02962	Veneer-porcelain (laboratory)	292
06241 & 0645	Maryland Bridge Pontic (1) and 2 retainers (total)	526

**2003 REGIONAL CODE AGENDA
REGION VI
Summary Responses to Regional Agenda**

The Regional Agenda Questions were submitted by The University of Florida and Nova Southeastern University.

Are repairs and/or refurbishing of restorations taught in the operative curriculum? Are these procedures also taught on the clinic floor?

There was no consensus on teaching this subject. Most at least present the factors to be considered in deciding to repair or replace a restoration. Clinical activities to support this are variable and up to the individual faculty.

Is the pin technique as a retentive/resistant feature in placing complex amalgam restorations taught in the preclinical operative curriculum?

Yes, unanimously along with other forms of mechanical retention.

Is amalgam bonding technique being taught in the operative preclinical curriculum? What guidelines are taught for use of amalgam bonding?

All but one school (UPR) teaches this subject. Amalgam bonding is done when adequate isolation is present and it is used as supplemental retention and for sealing.

Are indirect and direct pulp capping procedures taught in the operative curriculum? What materials? One or two-step procedure for indirect pulp capping?

All schools teach pulp capping in operative (some with endodontics). Calcium Hydroxide followed by a Glass Ionomer base are standard materials. One or two-step procedures are variable.

Who is using DIAGNOdent® for caries diagnosis?

Half do and half do not. One school (VCU) routinely uses it in treatment planning and operative clinics.

Is the Medical Management of Caries (non-surgical) taught? How is it monitored?

Most schools do teach it. Two schools do Caries Risk Assessment on every patient. Others do selective risk assessment. Monitoring is by faculty and students. One school has a related competency exam.

What protocol is taught for diagnosing secondary caries (apart from radiographs)?

Visual, Tactile, Trans-illumination, Patient History, Indicator Dyes.

How much time is designated in your curriculum for operative dentistry, direct restorations? Where is it placed in your curriculum?

The average answer was 1-2 semesters in the Freshman and occasionally into the Sophomore year. The time allotted as 1 – 3 half days per week, variable. Some schools have an additional course- Advanced Operative or Esthetics in the Junior year.

Do you have a clinical competency exam in CI III / other anterior composite resin?

All schools do (Class III or IV), mostly in the Junior year.

Does your patient pool provide the students with sufficient virgin Class II lesions?

No or minimally adequate supply.

Has there been a shift in the number of live patient examinations vs. typodont exams in your program?

Most have not added more typodont exams.

**2003 REGIONAL CODE AGENDA
REGION VI
Responses to Regional Agenda**

1. Are repairs and/or refurbishing of restorations taught in the operative curriculum? Are these procedures also taught on the clinic floor?

- UF:** Yes. Repairs and/or refurbishing of restorations are taught in the Operative course and also taught and emphasized on the clinic floor.
- MCG:** Repairs are taught only in theory in the lecture portion of our pre-clinical Operative Dentistry course. Finishing and polishing for all direct restorations is taught and preformed in the pre-clinical lab which includes the basic principles for “refurbishing”. When identified in the oral medicine clinic during work-ups, these procedures are listed as “margination” in the treatment plans. Repairs are done clinically when indicated although this is up to the individual clinical faculty. We probably repair restorations done at MCG more frequently than those of unknown origin.
- UKY:** Repairs/refurbishing of restorations are not taught specifically as a lecture, but are mentioned as an option to consider without real technique specifics. The techniques are however utilized on the clinic floor when felt appropriate by supervising faculty and taught chairside one-on-one.
- UofL:** Repairs/refurbishing of restorations is taught in the pre-clinic Operative course. Whether they are done in the clinic is up to the discretion of the faculty. They are not “taught” on the clinic floor, per se.
- MUSC:** Yes. Procedures are taught on the clinic floor even more than in pre-clinic.
- NSU:** Repairs to existing restorations are taught in the pre-clinical curriculum with regard to composite resin more so than to amalgam. Clinical application of repairing restorations is done very selectively in the pre-doctoral clinic.
- UPR:** Not formally. Special situations.
- VCU:** No (teaching), but it may be discussed in appropriate lectures.
Yes (procedures), more so composite than amalgam. Close contacts, small carious lesions at margin of extensive restoration, etc.

2. Is the pin technique as a retentive/resistant feature in placing complex amalgam restorations taught in the preclinical operative curriculum?

- UF:** Yes. Other retentive/resistant features such as slots, grooves, locks and amalgam bonding are also taught. Placement exercises are required in our pre-clinical Operative course.
- MCG:** Yes, along with slots, grooves, locks and adhesives (Amalgambond).

- UKY:** Yes, threaded pins are taught as a retentive/resistance feature pre-clinically in lecture and in pre-clinical laboratory.
- UofL:** Yes. Pins are taught and there is a placement exercise. Pins are presented in the same lecture as posts and slots for additional retention. Pins are not automatically placed in the clinic.
- MUSC:** Yes, lecture and with hands-on experience.
- NSU:** Yes. The pin technique is included in the pre-clinical course with the other retentive/resistant techniques.
- UPR:** Yes.
- VCU:** Yes, pins are utilized in the sophomore Operative course.

3. Is amalgam bonding technique being taught in the operative preclinical curriculum? What guidelines are taught for use of amalgam bonding?

- UF:** Yes. Amalgam bonding is taught as a supplemental technique for additional retention. It is not taught as the only means of retaining an amalgam restoration.
- MCG:** Yes. Amalgam bonding is always used as a supplemental form of retention along with more significant forms such as pins or slots. It is not intended to be the main form of retention for core-build ups or even definitive restorations. It is used when normal retention form is compromised by missing tooth structure.
- UKY:** The technique of amalgam bonding is taught pre-clinically. On the clinic floor, we generally use only Optibond FL. Its function is primarily as a dentin sealing agent and possibly to gain some small bond strength from the air-inhibited layer of the resin, according to manufacturing claims. We do not rely on this weak bond, if indeed there is any, to retain restorations without other retention devices/techniques.
- UofL:** We teach placing a bonding agent in all preparations where we can achieve adequate isolation. We teach this for sealing of the tubules, not to retain a restoration.
- MUSC:** Yes, lecture and lab. We use Bisco Primers A&B plus a filled autopolymerizing bonding resin (Resinomer). We do not do many of these clinically.
- NSU:** Amalgam bonding has been included, but not emphasized. We are planning on incorporating more into the pre-clinical curriculum and clinical application.
- UPR:** No.
- VCU:** Yes, in D-2 Operative. Extensive restorations, core buildups, endodontically treated teeth.

4. Are indirect pulp capping and direct pulp capping procedures taught in the operative curriculum? What materials are recommended? Is the one or two-step procedure taught for indirect pulp capping?

UF: Both procedures are taught. The majority of faculty encourages and emphasizes the one-step procedure. Standard materials for the one-step procedure are placement of calcium hydroxide followed by a glass ionomer base.

MCG: These procedures are taught in Operative Dentistry and Endodontics. The standard material used in all pulp capping procedures is calcium hydroxide (Dycal). In a one-step procedure, Dycal is placed on the near (0.5mm from the pulp) or small exposure (<1mm) followed by a glass ionomer base (Vitrebond). The tooth is then restored with amalgam or composite as the definitive restoration. In a two-step procedure, Dycal is placed on the near or small exposure followed by IRM or a glass ionomer material as a provisional until the tooth is re-entered later for complete caries excavation or a definitive restoration. The average provisional period is from 3-4 months.

UKY: Both IDPT and DPT are taught.
IDPT - chlorhexidine rinses, then Ketac Fil x 12-16 weeks.
DPT - Dycal, GC lining LC, and restorative.

UofL: Both indirect and direct procedures are taught.
Indirect: Application of calcium hydroxide over questionable dentin that is left approximating the pulp, cover with resin-modified glass ionomer (Fuji II LC) and restore. Which technique (one or two step) is done in the clinic is left to the faculty's discretion. We don't mandate either one. Literature would probably support both methods.
Direct: Spot application of calcium hydroxide over the exposure or near exposure, cover with Fuji II LC, and restore. We don't re-enter at a later date.

MUSC: Indirect/direct pulp capping procedures are taught. For small direct exposures when caries is likely eliminated, we use (in the following order):
A cavity cleaner/disinfectant,
Calcium hydroxide (Dycal),
Vitrebond over and beyond the Dycal.
For larger exposures and/or exposures where caries remains, we do endo or extract. For indirect pulp caps (caries remains but exposure imminent, age being a factor with pulp reparability):
Remove as much as caries as possible without exposing,
A cavity cleaner/disinfectant,
Calcium hydroxide over all caries,
ZOE provisional for minimum of 3 months (4-6 months preferable)

NSU: Indirect pulp capping is taught primarily in the Endodontic course, but is also included in the Operative course and Dental Materials course. Direct pulp capping is not advocated by the Endodontic Department at this time.

- UPR:** Yes. Ca(OH)₂ for direct pulp capping and Vitrebond or a glass ionomer hybrid (Fuji II LC) .
Both but one-step is preferred.
- VCU:** Yes, Dycal covered with Vitrebond, one-step, etc.

5. Who is using DIAGNOdent® for caries diagnosis?

- UF:** We are using two units for caries diagnosis. One in treatment planning and one in the Operative clinic.
- MCG:** We have one unit. We have not used it routinely for caries diagnosis in student clinics although it has been our experience that it has an extremely high sensitivity for detecting pit and fissure lesions.
- UKY:** Not using.
- UofL:** Not using.
- MUSC:** Not using.
- NSU:** We have one unit and plan to incorporate it further into the pre-clinic and clinic curriculum.
- UPR:** Not using.
- VCU:** Occasional use in undergraduate clinic. Helpful in treatment planning.

6. Is the medical management of caries (non-surgical) taught in the curriculum? If so, how is it monitored?

- UF:** Yes. It is taught and strongly emphasized throughout the students' curriculum. A Cariogenic Profile is required in every patient chart and is completed during treatment planning. All steps and procedures involved in the caries management of patients are included as part of the overall treatment plan, caries management competency is required during the student's junior and senior years.
- MCG:** Medical management of caries is taught in lecture format in both the pre-clinical Operative Dentistry course and in the multi-disciplinary Cariology course. Selected cases are monitored by individual faculty along with students providing the comprehensive care for those patients.
- UKY:** Didactic presentation of model, but poorly reinforced on the clinic floor.
- UofL:** Yes, if caries has penetrated less than half way through the enamel., Monitored by visual exam/radiographs at scheduled 6-month recalls. Active patients also have 6-month recall exams.

- MUSC:** We are now beginning to incorporate the medical model of caries management into our curriculum. We teach it pre-clinically now and are switching to this clinically.
- NSU:** This is taught in the Cariology, Operative Dentistry and Treatment Planning courses. It is monitored by the clinic group leader and student doctor.
- UPR:** No.
- VCU:** Yes, philosophy is reinforced in Cariology and implemented in clinic with the use of CRA for all patients. Preventive measures are included on treatment plans and must be utilized in order to complete oral disease control therapy.

7. What protocol is taught for diagnosing secondary caries (apart from radiographs)?

- UF:** Visual and tactile along with patient's history of caries.
- MSG:** Visual, tactile and transillumination are the common diagnostic methods used to determine if secondary caries is present in a restored tooth. The patient's personal caries experience is used to aid in the decision to replace restorations along with clinical signs.
- UKY:** Primarily transillumination with a fiberoptic.
- UofL:** Visual exam if the restoration is accessible.
- MUSC:** Tactile, visual, operators "best shot".
- NSU:** Visual, tactile, transillumination, previous history of caries.
- UPR:** Transillumination.
- VCU:** Transillumination, visualization, clinical exam, caries indicator dyes and stain present at the DEJ.

8. How much time is designated in your curriculum for operative dentistry, direct restorations? Where is it placed in your curriculum?

- UF:** January of Freshman year to December of Sophomore year. Classes meet 2 half-days per week except for 6 weeks when classes meet for 3 half-days per week. An advanced Operative Dentistry course covering indirect esthetic inlays and onlays is taught in the summer between the students' junior and senior years. It involves 20 hours of lecture and laboratory instruction.
- MCG:** Freshman year - 1/2 of fall semester (1/2 day/week) and all of Spring semester (two 1/2 days/week). Thirty-eight 4 hour sessions in total. Advanced operative procedures are taught in a Junior Esthetics course, Fall semester, 1/2 day/week.

UofL: Freshman year- ½ of Fall semester and all of Spring semester, 8 hours a week (This would be two 4-hour sessions per week with the first hour for lecture and a 3-hour lab).
Junior year - 1-hour lecture for 9 weeks to review techniques and new materials in the clinics.

MUSC: Two semesters in the Sophomore year.

NSU: One semester - Freshman year, second semester.

9. Do you have a clinical competency examination in Class III composite resin or other anterior composite restorations?

UF: Yes. Clinical competencies are given for Class III, IV and V anterior composite restorations.

MCG: Junior year - 1 Class III or IV composite.

UofL: Junior year - 2 Class II, III or IV composite resins
Senior year - 2 Class II, III or IV composite resins

MUSC: Yes, Class II, III and IV.

NSU: D-3 - Class III or IV patient, CCE
D-3 & D-4 - Class IV typodont exam

10. Does your patient pool provide the students with sufficient virgin Class II lesions?

UF: No. Replacement restorations are allowed on Mock Board exams.

MCG: Just enough so far.

UofL: Minimally adequate.

MUSC: No.

NSU: We have allowed students to use replacement restorations as well as virgin lesions for clinic requirements, prerequisites, and CCE's in order to increase the available Class II patients.

11. Has there been a shift in the number of live patient examinations vs. typodont examinations in your program?

UF: Not yet.

MCG: We have added more live patient exams.

UofL: No. We use typodont for Mock Board, live for everything else.

MUSC: In clinical procedures for credit in the junior and Senior years, we use live patients only.

NSU: Yes. We have added more typodont examinations.

National CODE Meeting

Suggestions for CODE.

What can the organization do to improve its effectiveness?

1. Improve communication between CODE and Licensure Boards
2. As much as possible, encourage the importance of all schools attending their respective Regional CODE meetings.
3. Discuss what schools are doing to protect time allocated for teaching preclinical Operative Dentistry and what is being done to have enough time to teach important new and improved procedures?
4. Interactions between regions.
5. Discuss the role of Licensure boards in curriculum planning. (proper or improper?)
6. Have a formal mechanism of communication with Licensure boards.

What is suggested to improve the Web site? <http://netserv.unmc.edu/code/codeFrame.html>

Looks good! Easy to use.

Other suggestions?

CODE must live forever!

Suggested topics for next year's National C.O.D.E. agenda:

- a. What is the remediation mechanism for your preclinical Operative course? Please specify for both lecture and laboratory.
- b. What is the remediation mechanism for Operative Dentistry in clinic? Is the need for remediation based on Clinical Competency Exams, periodic clinic grades, or a combination?
- c. How does the curriculum in your school relate biomedical sciences to preclinical Operative Dentistry?

CODE Region VI (Southeast)**Attendees Form**

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