

Consortium of Operative Dentistry Educators

(CODE)



REGIONAL REPORTS
FOR
FALL 2006

Web site: <http://www.unmc.edu/code/codeframe.html>

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Consortium of Operative Dentistry Educators (CODE)

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

On February 23, 2006, CODE held a National/International meeting during the annual meeting of the Academy of Operative Dentistry in Chicago.

Dr. Peter Yaman, Clinical Professor of Dentistry, University of Michigan School of Dentistry, presented a program on the ADEX licensure examination. An informative presentation which provided a short history of the examination as it relates to the current attempt for the development of a National examination. The examination content and evaluation process was described and discussed with time for questions and answers.

I had the privilege to attend the Region IV meeting at the Indiana University School of Dentistry. Another great meeting with good discussion and sharing of information. Thank you to everyone for the warm hospitality.

Please make sure your Deans and Department chairs are familiar with CODE's objectives and it's value to their school. Their support is crucial in providing the means for their faculty to attend or host regional meetings.

The members of CODE must continue to spread the word about CODE and work to provide input to Licensure Boards on Restorative Dentistry. Continue to encourage/invite members of the Licensure examining boards to attend the Fall Regional meetings. Invite our colleagues in the Armed and Public Health Services to our meetings - both Regional and National.

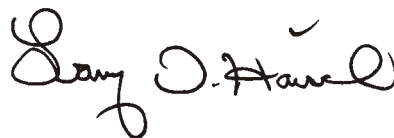
Support of CODE by payment from the schools for annual dues is excellent, although not without follow-up efforts by the National office. The same can be said for the collection of the Fall Regional Reports - always a challenge but just part of the annual process.

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 of the web site:

(<http://www.unmc.edu/code/codeframe.html>)

I wish to thank the Directors and the meeting hosts (Drs. Karen Gardner, Debra Cobb, William Tate, Robert Rashid, Richard Lichtenthal, and Andre Ritter), the Operative Section of ADEA and, especially, the general membership for helping to make CODE what it is and what it accomplishes.

A special thank you to Drs. Alan Ripps and William Gray, CODE Directors of Regions III and IV, respectively, who have completed terms as Directors. Their support, diligence, suggestions and effort on behalf of CODE has been greatly appreciated. Bill will retire during 2007, while Alan will now serve on the CODE Advisory Committee. I would like to welcome Drs. Robert Sergent and Edward DeSchepper who have agreed to serve as Regional Directors for Regions III and IV, respectively.



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 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, 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 the 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 operation, each region devised a system of rotation so that a different school hosted the regional meeting each year, thus 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 or a test bank was started in early 1976. This bank 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.

Reaffirmation of CODE official title (2003)

CODE changed its name from *Conference of Operative Dentistry Educators* to *Consortium of Operative Dentistry Educators* due to a ratification vote 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 11-27-06)

| | Region | Regional Director | Phone/E-mail | Term (3 years) |
|-----|----------------------|---|---|----------------|
| I | Pacific | Dr. Edmond R. Hewlett UCLA Los Angeles, CA | 310-825-7097 eddyhedent@ucla.edu | 2006-2008 |
| II | Midwest | Dr. R. Scott Shaddy Creighton University Omaha, NE | 402-280-5226 shaddy@creighton.edu | 2006-2008 |
| III | South Midwest | Dr. Robert Sergent LSU New Orleans, LA | 225-334-1786 rserget@lsuhsc.edu | 2007-2009 |
| IV | Great Lakes | Dr. Edward DeSchepper Indiana University Indianapolis, IN | 317-274-2419 edeschep@iupui.edu | 2007-2009 |
| V | Northeast | Dr. Richard Lichtenthal Columbia University New York, NY | 212-305-9898 rml1@columbia.edu | 2005-2007 |
| VI | South | Dr. Kevin Frazier MCG Augusta, GA | 706-721-2881 kfrazier@mail.mcg.edu | 2005-2007 |
| II | At-Large | Dr. Poonam Jain SIU Alton, IL | 618-474-7073 pjain@siu.edu | 2005-2007 |
| III | At-Large | Dr. Alan Ripps LSU New Orleans, LA | 540-619-8548 aripps@lsuhsc.edu | 2007-2009 |
| II | National Director | Dr. Larry D. Haisch UNMC Lincoln, NE | 402-472-1290 lhaisch@unmc.edu | 2005-2007 |
| II | Web Master | Dr. William W. Johnson UNMC Lincoln, NE | 402-472-9406 wwjohnson@unmc.edu | |

**Consortium of Operative Dental Educators (CODE)
2006-2007
Paid - Regions and Schools**

✓ = Paid Member as of October 24, 2006

67 schools (10 Canada, 57 United States)

| | |
|--|--|
| <p><u>Region I (Pacific) -11</u></p> <ul style="list-style-type: none"> ✓ Alberta - Canada ✓ Arizona ✓ British Columbia - Canada ✓ Loma Linda ✓ Nevada ✓ 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 ✓ Pittsburgh ✓ 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>Region VI (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 |

The National Agenda for 2006

was established after review of the suggestions contained in the reports of the 2005 Fall Regional meetings, National CODE Meeting and from the Regional CODE Directors. Previous National agendas are reviewed to avoid topic duplication. Inclusion of a previous topic may occur for discussion from the aspect to what has changed and the response/action taken and the outcome.

Thank you to the Regional CODE Directors and the 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 is requested to bring their responses to the National Agenda in written form AND electronic media This information is vital to the timely publication of the Annual Fall Regional Report.

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

Each Region should select next year's meeting site, date or tentative date during your Fall Regional CODE meeting so this information may be published in the Annual Fall Regional Report and on the Web site.

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://www.unmc.edu/code/codeframe.html>
or in the introduction of this report).

NOTE: to locate the web site via a search engine,
enter Academy of Operative Dentistry and
then use the link CODE and ADEA.

Send a hard copy and an electronic 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.

National CODE Meeting:

The meeting will be held Thursday, February 22, 2007 from 4:00 pm to 6:00 pm at the Fairmont Hotel in Chicago, Illinois. Suggestions as to how to make this meeting productive and efficient are requested.

National Directory of Operative Educators:

The CODE National Office maintains the National Directory of Operative Educators as a source for other professionals. It is imperative that the information be as current as possible.

To update your university's directory listing of th the CODE website, <http://www.unmc.edu/code/codeframe.html>, and click on the red link, "Please help update," found under the CODE menu on the left side of the screen. Make any necessary changes and click "submit form".

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

School name and complete mailing address

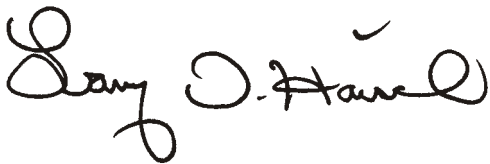
Individual names: (full time), phone #, fax #, e-mail address of faculty who teach operative dentistry.

(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 by mailing a hard copy and an electronic copy to the National Office of CODE. All update information received by mail will be forwarded by the National Office to the Webmaster for inclusion on the Web site.

Your help and cooperation in accomplishing the above tasks helps save time and effort in maintaining a complete web site and publishing the Annual Fall Regional Report in a timely fashion.

Thank you,



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

2006 NATIONAL CODE AGENDA

(Please cite the evidence were applicable. **If utilizing reports/forms/schedules from your Regional schools, please submit these as PDF files for utilization in the Annual Fall Regional Report)**

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

- II. What is the current use of **digital radiographs** in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

Which of the two main categories of **intraoral sensors** are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

Does your school have a **dental acquisition/ceph** (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

- III. Discuss the use of **carbide bur use versus diamond burs** for intracoronal procedures in Operative Dentistry at your school.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

- IV. **Electric Handpieces** (Topic Revisited)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

- V. **Direct placed composite resins** are over taking amalgam as the basic restorative material.

How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

VI. Discuss **matrixing**.
Full band versus sectional band. Which is used? When is it used? Why is it used?
Which systems are used for full and sectional matrixing?

VII. Who/which departments are placing **implants**?
Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

Any commentary on “*Let’s take the tooth out and place an implant versus doing endodontics.*” In other words, have implants had an effect on your students' experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

Regional CODE Agenda

To be established by the respective Region and Regional Director. Please also report on responses to the Regional Agenda from all participants.

Suggestions for CODE.

- What can the organization do to improve its effectiveness?
- Any comments or suggestions to improve the Web site?
<http://www.unmc.edu/code/codeframe.html>
NOTE: to locate the web site via a search engine, enter Academy of Operative Dentistry and then use the link CODE and ADEA.
- Other comments/suggestions?

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 (following page)

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:

University of British Columbia

Vancouver, BC, Canada

October 19 - 20, 2006

CHAIRPERSONS:

Name: Dr. Karen Gardner

Phone #: 604-822-3566

Address: University of British Columbia

Fax : 604-526-7998

2199 Wesbrook Mall

E-Mail: drkg@interchange.ubc.edu

Vancouver, BC, Canada

List of Attendees:

Please complete the CODE Regional Attendees Form (following page)

Suggested Agenda Items for Next Year:

- Intellectual property issues: how do we balance a spirit of sharing and collaboration with the fact that developers of such materials are entitled to the economic, marketing, and academic promotion benefits related to their efforts?
- Teaching to state board criteria vs. Evidence-based
- What/How do we teach regarding concepts of resin bonding to enamel and dentin?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Morrie Reisbick

Phone #: 520-275-5784

Address: ATSU

Fax #:

Arizona School of Dental and Oral Health

E-mail : mreisbick@atsu.edu

Mesa. AZ 85206

Date: TBD

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.

**2006 NATIONAL CODE AGENDA
REGION I
SUMMARY RESPONSES TO NATIONAL AGENDA**

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

This item generated extensive discussion on many subtopics. Teaching and use of cast gold inlays occurs rarely/not at all at three schools and is in decline at some others. One school with a strong tradition in this area describes the market driven aspect of dental education (we need to teach what patients want) and the increasing difficulty in training students to build value for cast gold in their patients' minds. There was a corresponding general sense that more curriculum time needs to be devoted to developing the knowledge and skills needed for direct resin restorations. This has resulted in difficult decisions for some schools, e.g. eliminating the cast gold inlay from the core curriculum. No one disputed the excellent qualities of gold or the abundant evidence supporting amalgam as a restorative material. It was uniformly agreed, however, that the current realities of dental practice demands that students and faculty get more robust training in the materials science, case selection, and clinical techniques for resins.

Other salient points from the discussion: Caries Risk Assessment must have a high priority in any preclinical operative curriculum; CAC/CAM, air abrasion, and lasers were generally regarded as the lowest priority items; students and faculty need to appreciate that the "current" knowledge base is temporary inasmuch as new evidence continually becomes available; dental educators and CODE must expand beyond our focus on technical aspects of dentistry and consider more behavioral aspects of teaching – modern students learn in multiple ways, many of which are fundamentally different from the ways that students learned a generation ago.

Core Curriculum Consensus:

1. Caries Risk Assessment
2. Remineralization Therapies (non-surgical management of caries)
3. Detection of Carious Lesions
4. Rubber dam and other isolation techniques
5. Indications and techniques for debridement of carious lesions
6. Sedative restorations and pulp capping
7. Adhesive resin technology
8. Sealants and PRRs
9. Direct composites (Classes I, II, III, IV, V, VI, diastema closure, veneers)
10. Amalgam (I, II, V)
11. Glass Ionomers as both transitional and definitive restorations
12. Amalgam foundation restorations
13. Composite foundation restorations
14. Porcelain veneers
15. Onlays (gold & ceramic)
16. Inlays (composite and ceramic)

2006 NATIONAL CODE AGENDA
REGION I RESPONSES
(Evidence cited where applicable)

Region I School Abbreviations

| | | | |
|------|--------------------------------|------|-----------------------------------|
| UA | University of Alberta | OHSU | Oregon School of Dentistry |
| ATSU | Arizona School of Dentistry | UOP | University of the Pacific |
| UBC | University of British Columbia | UCLA | University of California - LA |
| LLU | Loma Linda University | UCSF | University of California - SF |
| MUC | Midwestern University College | USC | University of Southern California |
| UNLV | University of Nevada | UW | University of Washington |

The attendance at this year's meeting at the University of British Columbia in beautiful Vancouver exceeded even that of last year's excellent turnout hosted by UNLV. The only Region I school not represented was the University of Alberta. We were delighted to welcome a new Region I member, the Midwestern University College of Dental Medicine in Arizona. MU is slated to start its first class in Fall, 2008. We were also treated to a wonderful presentation by Dr. Karen Gardener on her "Dentportfolio" project at UBC (see the Regional Agenda notes and visit www.dentportfolio.com for more details).

We are deeply grateful to our local coordinator Dr. Karen Gardener and the UBC Faculty of Dentistry for their efforts and hospitality.

- I. **The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.**

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are "non-negotiable" in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- **Amalgam (Class I, Class II, Class III, Class V).**
- **Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)**
- **Diastema Closure (Elective with composite or porcelain)**
- **Composite Indirect (Class I, Class II)**
- **Veneers (Porcelain, composite)**
- **Inlays (Gold, composite, ceramic)**
- **Onlays (Gold, composite, ceramic)**
- **Glass Ionomer Restoratives (Class I, Class V)**
- **Sealants and Preventive Resin Restorations**
- **Isolation Techniques (Rubber dam, others)**
- **Caries Risk Assessment**

- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

UA: No responses noted

ATSU: No responses noted

UBC: Amalgam (Class I, Class II, Class III, Class V) - Operative
 Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI) - Operative
 Diastema Closure (Elective with composite or porcelain) - Operative
 Composite Indirect (Class I, Class II) - Operative/Pros
 Veneers (Porcelain, composite) - Operative/Pros
 Glass Ionomer Restoratives (Class I, Class V) - Operative
 Isolation Techniques (Rubber dam, others) - Operative/Pros
 Caries Diagnosis and Removal - Operative/Cariology
 Amalgam Core Build-ups (Pin, slot, or adhesive retention) - Pros
 Composite Core Build-ups (Mechanical and adhesive retention) - Pros

LLU: All the following are taught within the framework of the department of Restorative Dentistry:
 Amalgam restorations – Class I, II, V
 Direct Composite restorations – Class I, II, III, IV, V, Veneers
 Glass Ionomer restorations – Class I, III (root caries), V
 Sealants and Preventive Resin Restorations
 Isolation techniques - rubber dam
 Caries diagnosis is taught by Restorative faculty in the “Caries course” which is in a basic science department. An introduction to removal of caries is taught in the preclinical operative course.
 Sedative fillings, pulp capping
 Onlays – gold, ceramic

Amalgam core build-up – chamber retained, pin retained, post retained, and bonded types
 Composite core and also fiber post and composite core
 Veneers – ceramic
 Inlays – gold
 Diastema closure – with composite
 Laser procedures – this is elective but there is a pre-clinical component
 CAD-CAM – would like to do this if we had the facilities
 Caries risk assessment is taught in the clinical setting
 Remineralization therapies are taught in the clinical setting

- MUC:**
1. Caries Risk Assessment
 2. Caries Diagnosis and Removal
 3. Amalgam (Class I, Class II, Class III, Class V).
 4. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 5. Onlays (Gold, composite, ceramic)
 6. Sealants and Preventive Resin Restorations
 7. Glass Ionomer Restoratives (Class I, Class V)
 8. Isolation Techniques (Rubber dam, others)
 9. Veneers (Porcelain, composite)
 10. Diastema Closure (Elective with composite or porcelain)

UNLV: No responses noted

- OHSU:**
1. Caries Risk Assessment
 2. Caries Diagnosis and Removal
 3. Isolation Techniques (Rubber dam)
 4. Composite Direct (Class I, Class II, Class III, Class IV, Class V): Class VI omitted
 5. Amalgam (Class I, Class II (complex amalgam), Class V): Class III omitted
 6. Glass Ionomer Restoratives (Class I, Class V)
 7. Caries Control (Sedative fillings, pulp capping)
 8. Sealants and Preventive Resin Restorations
 9. Onlays (Gold only): composite onlay is not taught at the school. Porcelain onlay is taught in the Esthetics course.
 10. Remineralization Therapies
 11. Veneers (Porcelain, composite): both porcelain and composite veneers are taught in the Esthetics course.

- UOP:**
1. Amalgam (Class I, II III V)
 2. Composite Direct (Class I, II, III, IV, V,)
 3. Sealants and Preventive Resin Restorations
 4. Glass Ionomer Restoratives (Class I, V)
 5. Isolation Techniques
 6. Caries Diagnosis and Removal
 7. Caries Control (Sedative fillings, pulp capping)
 8. Composite Indirect (Class I, II)
 9. Onlays (Gold, Ceramic)
 10. Inlays (Gold)
 11. Lasers for restorative procedures
 12. Air abrasion techniques

UCLA: Note that we are in the process of a major curriculum revision. One of the six thematic “tracks” of the curriculum will be Caries Management, and the content areas of the current restorative curriculum will be incorporated into the Caries track and appropriately sequenced in the hierarchy of a modern caries management protocol.

Current topic content of our preclinical restorative curriculum:

- Caries Diagnosis
- Caries Removal
- Isolation Techniques (Rubber dam, others)
- Sealants and Preventive Resin Restorations
- Caries Control (Sedative fillings, pulp capping)
- Amalgam (Class I, Class II)
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Veneers (Porcelain, composite)
- Inlays (Gold, ceramic - currently taught in preclinical fixed prosthodontics; composite omitted from preclinical operative)
- Onlays (Gold, ceramic) (currently taught in preclinical fixed pros)
- Glass Ionomer Restoratives (Class V; Class I and II sandwich)
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Caries Risk Assessment (currently taught in Preventive Dentistry course)
- Antibacterial Therapies
- Remineralization Therapies

UCSF:

1. Caries Risk Assessment
2. Remineralization Therapies
3. Sealants and Preventive Resin Restorations
4. Glass Ionomer Restoratives (Class I, Class V)
5. Caries Diagnosis and Removal & Caries control included
6. Isolation Techniques (Rubber dam, others)
7. Amalgam (Class I, Class II, Class V). slot preparations first and then some pit& groove designs
8. Composite Direct (Class I, Class II, Class III, Class IV, Class V,)
9. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
10. Operative diagnosis & treatment planning summary and review
11. Veneers (Porcelain, direct composite veneers)
12. Diagnostic study models and cosmetic dentistry treatment planning
13. Diastema Closure (Elective with composite or porcelain)
14. Onlays Gold
15. Indirect tooth colored restorations (inlay onlay, ceramic, composite)
16. Adhesive technology, selection, and applications

We also have a new Advanced Cosmetic Elective class. Next year many of the modules in the class will be incorporated into the regular curriculum.

USC: The following concepts or techniques are core to the Operative Dentistry Curriculum, but do not necessarily reflect what we are teaching.

1. Caries Diagnosis and Removal
2. Caries Risk Assessment
3. Remineralization Therapies

4. Sealants and Preventive Resin Restorations
5. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
6. Isolation Techniques (Rubber dam, Class V isolation with 212 clamp)
7. Amalgam (Class I, Class II).
8. Onlays & Crowns (Gold, ceramic)
9. Composite Core Build-ups (Mechanical and adhesive retention)
10. Diastema Closure (composite)
11. Composite Indirect (Class I, Class II)
12. Veneers (Porcelain, composite)
13. Inlays (Gold, composite)

UW: Amalgam (Class I, Class II, Class V).
 Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 Veneers (Porcelain, composite)
 Inlays (Gold, ceramic)
 Onlays (Gold, ceramic)
 Glass Ionomer Restoratives (Class V, liners, bases)
 Preventive Resin Restorations (sealants are taught in the Cariology course)
 Isolation Techniques (Rubber dam, others)
 Caries Control (Sedative fillings, pulp capping)
 Amalgam Core Build-ups (Pin, slot, or adhesive retention)
 Composite Core Build-ups (Mechanical and adhesive retention)

II. What is the current use of digital radiographs in your school?

UA: No responses noted.

ATSU: The entire school was digital from day one.

UBC: Everything in our school is now digital.

LLU:

- * Have been fully digital in Orthodontics for approximately eight years.
- * Have been 90% digital in Post Graduate Endodontics for 3 years.
- * Have been 90% digital in pedodontics, both Post Doc and Pre Doc
- * Have been 30% digital, main pre-doc clinic approximately 18 months
- * Present D3 class is taught digital

MUC: When facilities are complete, both pre-clinical and clinical, the whole system will be digital and wireless. This will include patient charting to digital radiography.

UNLV: We use digital radiography throughout the school in all clinical areas, and have been entirely digital since the school opened. We have two digital panoramic units. Each 30 to 40-chair clinic team has a digital radiography room – these are commonly used for single intraoral films to verify crown seating, post position, etc. We also have two digital units in the simulation lab – used mostly for preclinical endodontics.

OHSU: The Pediatric Dentistry department is the only one that currently uses digital radiographs. The pediatric dental clinic was renovated a year ago and digital radiographs and an electronic record were implemented.

- UOP:** Endo has been all digital for the past three years. Currently using digital and analogue FMX.
- UCLA:** All extraoral radiography (panoramic, cephalometric, tomography) is currently digital. Intraoral digital radiography is not currently in use at the dental school.
- UCSF:** We will begin using digital radiography in about one year.
- USC:** Currently we use digital radiography (DR) in addition to conventional radiography for patient screening as well as for daily clinical procedures.
- UW:** Not implemented yet. Plans for DR is in progress, survey of needs right now, staggered implementation will likely take 5 years, depending on funding.

In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

- UA:** No responses noted.
- ATSU:** All areas since the school opened.
- UBC:** Digital radiography is being used in all areas and has been since August 2006.
- LLU:**
- * Have been fully digital in Orthodontics for approximately eight years.
 - * Have been 90% digital in PostGrad endo for 3 years
 - * Have been 90% digital in pedodontics, both Post Doc and Pre Doc
 - * Have been 30% digital, main pre-doc clinic approximately 18 moths
 - * Present D3 class is taught digital
- MUC:** See previous answer
- UNLV:** We use digital radiography throughout the school in all clinical areas, and have been entirely digital since the school opened.
- OHSU:** Departments other than pediatric dentistry do not utilize digital radiographs, but goal of the school is to go paperless. This will probably happen within three years and the transition will include the introduction of digital radiography will for the whole school.
- UOP:** Endo has been all digital for the past three years. Currently using digital and analogue FMX.

UCLA: Intraoral digital radiography will be introduced to the general clinic in 2007. A potential vendor (CMI) that will customize the system for our use has been identified. The person responsible for coding the system is the same person who will be teaching us how to use it so we will have a direct link for questions and concerns. It will take approximately 3 to 4 months to do the coding. The system will be installed in the General Clinic first and it will be totally integrated with electronic records system Software of Excellence (SOE).

UCSF: No responses noted.

USC: DR is used by many of the dental disciplines in the school, including endodontics, periodontics, hygiene, operative/restorative dentistry, prosthodontics, orthodontics, oral medicine, oral pathology, oral surgery and emergency dentistry. DR is used by both undergraduate and postgraduate students, and by faculty in the Oral Health Center faculty practice. There is a dedicated staff member to assist students in using the sensors. We have used DR for extraoral projections (panoramic, cephalometric) for 4 years and intraoral projections for 1 year with acceptable results. Disciplines that do not use DR in the school do so for various reasons, but not because of availability. For example, some faculty members still prefer to look at conventional films on a lightbox rather than a scanned and digitized version on a computer screen.

UW: There are plans for utilization of digital radiographs to be implemented in the next couple of years.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

UA: No responses noted.

ATSU: No responses noted.

UBC: Helped as we can now expand an area in question to help with the diagnosis.

LLU: We don't have enough experience to comment.

MUC: We believe it has helped overall. It is a different paradigm, but with software capabilities and the advance of technology improvements, it will continue to expand the capability of digital software and greatly enhance our ability to interpret data.

UNLV: Faculty eventually adapted to using digital instead of film, then began to opt for the monitors in each cubicle instead of the student laptops because they found the laptop resolution to be too low. Students no longer use laptops in the clinic.

OHSU: No responses noted.

UOP: Digital has helped our ability to diagnose incipient interproximal caries.

UCLA: No responses noted.

UCSF: No responses noted.

USC: Some faculty members here still prefer plain or conventional films, citing that DR hinders their ability to diagnose incipient interproximal caries. Other faculty members prefer DR, citing the possibilities that the digital reconstruction and enhancement tools can provide and the lesser amount of radiation exposure to the patient. Currently there is little evidence to show that either type of film (conventional or digital) is less diagnostic than the other.

UW: Lack of meaningful experience to render an opinion.

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

UA: No responses noted.

ATSU: We initially used CCD but have since changed over to SPP. Response to this change has been uniformly positive.

UBC: CCD

LLU: We use both CCD and SPP systems.
(According to Dr. Paul Richardson, Assoc. Dean for Clinics: "In my opinion, both systems should be used. CCD's are good for rapid singles, easy to manipulate mouths and other single film applications. SPP's are better for Pendo and multiple film applications, i.e., complete mouth studies.")

MUC: Our clinics and systems will not be built for another three years, so it is difficult to say what technology we will embrace.

UNLV: We use mostly SPP – including routinely for FMX – but CCDs are also available. We have found that the placement of the CCD is *critical!* We are exploring the use of handheld units and are compiling safety documentation for the Nevada State Dental Board. We will likely purchase 10 handheld units in the near future.

OHSU: No responses noted.

UOP: CCD.

UCLA: The plan at this time is to build a system that can accommodate both the CCD and SPP platforms. SPP will likely be used for full-mouth surveys and other routine intraorals, with CCD being available for disciplines such as endodontics where the rapid availability of the image is desired.

UCSF: No responses noted.

USC: Currently using direct sensors (CCD). It is a good device but considered large and bulky by many, making it difficult for easy intraoral use, and the sensor size is not the same as for conventional films. USCSD originally chose this system because of the compatibility with the computerized charting system (Axiom®) utilized here.

Importantly, acquired images should be backed-up regularly (i.e. by IT staff), since hard copies may not exist and the potential exists for losing the image database during a crash or other unforeseen error; such an occurrence carries the risk of medico-legal consequences.

UW: Plan is to use SPP. SPP is preferred because the plates are small and thin, very much the same dimensions as traditional film (Rinn-compatible). Also, SPP plates are relatively inexpensive and cordless (replace after 300 exposures – up to 500?). Also, SPP system is more backwards compatible with older x-ray equipment whereas CCDs have more demanding specifications for the x-ray output. BUT, easy to scratch and get damaged if mishandled; lesser resolution than CCD (but not clinically significant?); still requires 'processing' (scanning and erasing) and thus not instantaneous like CCD. Examples are Soredex Optime, Air-techniques Scan-x and Gendex Denoptix. Important for images to be DICOM-compliant instead of proprietary format – open platform imaging software? What about transparency adapter for scanners to digitize conventional radiographs? (Epson 1680 and Microtek 1800)

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

UA: No responses noted

ATSU: We have the iCAD cone beam device.

UBC: No.

LLU: We have Ceph's and cone beams. We have Serona, PlanMecca, New Tom and soon, iCAT.

Pros: All systems provide great information, fairly easy to use.

Cons: NewTom does not have easy access through our clinical information system, stands alone. Will get better as DICOM standards are implemented. All machine systems are becoming DICOM driven, at present still some issues. At present not all systems are compliant with image management system. Expensive and outdated rapidly.

MUC: We will definitely be incorporating this technology into the clinical curriculum.

UNLV: We will acquire the iCAD system in six months – we are currently using an off-site vendor for orthodontic and implant case imaging.

OHSU: No.

- UOP:** The school has a DIGITAL ACQUISITION / CEPH.
i-CAT has been in use for 1 year.
ACCV / I / TOMO has been in use for 2 ½ years.
Our experience with both systems has been excellent
- UCLA:** We use the NewTom, and it has been very well received by the surgical and prosthodontic disciplines for implant treatment planning.
- UCSF:** No.
- USC:** We have been using a NEWTOM® Cone-Beam CT for almost 5 years now. Many of the dental disciplines, particularly advanced programs such as orthodontics, use it frequently. Imaging services are also available to clinicians outside the university, and many use it, but mainly for implant and ortho cases. The NEWTOM® is a good system, but with advantages and disadvantages like every system.
The pros are the lower radiation exposure radiation to the patient, and the image acquisition in the supine position (some of our patients cannot stand still during the acquisition period). The cons are that scatter radiation can diminish the image quality, and the size of the system may be a problem depending on space availability in a facility.
- UW:** No. Using Spiral CT.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

- UA:** No responses noted.
- ATSU:** No responses noted.
- UBC:** 556 – composite preparations, endo access
330 – amalgam preparations
Needle nose – fine, medium, course – composite finishing
Footballs 5379 – fine, medium, course – composite finishing
Chamfers 8878 K – crown preps, chamfer margins
Butt margins – 6846
Butt margins end cutting - 10839
- LLU:** Preference is for the use of diamonds for intracoronal and extracoronal preparations, however carbide burs are also used. The use of diamonds on typodont teeth presents a problem due to clogging of the diamond which leads to burning the typodont tooth.
- MUC:** We will be teaching both systems. We will be using all the standard armamentarium of diamond and carbide burs.

UNLV: No responses noted.

OHSU: We are not using diamond burs for intracoronal procedures, and we have never considered it. We are currently teaching the use of carbide burs for intracoronal procedures. We haven't found much of anything on "quality" of intracoronal preps for carbide vs. diamond. Most of the literature seems to relate to the effect on adhesion, with the preponderance of evidence pointing to worse adhesion if a tooth has been prepared with a diamond vs. a carbide. A study showed that adhesive restorations prepped with diamonds had less leakage than those prepped with carbides (*Kihn PW, Spanganberg PA, von Fraunhofer JA. The role of cavity preparation and conditioning in the leakage of restorations. J Adhes Dent. 2004 Winter;6(4):287-91*) whereas another study showed just the opposite (*Oliveira SS, Pugach MK, Hilton JF, Watanabe LG, Marshall SJ, Marshall GW Jr. The influence of the dentin smear layer on adhesion: a self-etching primer vs. a total-etch system. Dent Mater. 2003 Dec;19(8):758-67*). Our impression is that diamonds create a thicker smear layer and this can reduce bonding compared to carbide burs, especially with self-etch adhesives, but there is some evidence it can also reduce bond for total etch adhesives as well. (*Ogata M et al, Effect of self-etching primer vs phosphoric acid etchant on bonding to bur-prepared dentin, Oper Dent 27:447-454 (2002)*; *Ogata M et al, Effects of different burs on dentin bond strengths of self-etching primer bonding systems, Oper Dent 26:375-382 (2001)*; *Tay FR et al, effect of smear layers on the bonding of a self-etching primer to dentin, J Adhes Dent 23:99-116 (2000)*; *Gupta R, Tewari S. Effect of rotary instrumentation on composite bond strength with simulated pulpal pressure. Oper Dent. 2006 Mar-Apr;31(2):188-96*. *Dias WR, Pereira PN, Swift EJ Jr. Effect of bur type on microtensile bond strengths of self-etching systems to human dentin. J Adhes Dent. 2004 Autumn;6(3):195-203*). Another paper (*Ayad MF, Rosenstiel SF, Hassan MM. Surface roughness of dentin after tooth preparation with different rotary instrumentation. J Prosthet Dent. 1996 Feb;75(2):122-8*) showed that carbide burs gave a smoother finish than diamond burs. So, from what we have been able to find, the evidence seems to support carbide intracoronal prep over diamond, especially for adhesive preps, which we are obviously going to more and more

UOP: The use of carbide burs for intracoronal preparations is taught at Pacific. In general, it has been our experience that students do not have as much control over preparation size (pulpal, axial, gingival depths, isthmus width, clearances etc) when they use diamonds. A diamond bur in the hands of an experienced practitioner may be fine for intracoronal preparations. For our students we feel that carbides are safer and should result in a more conservative preparation.

UCLA: We use Brasseler diamond burs for all indirect extra- and intracoronal preparations except for the Tucker conservative cast gold technique wherein we use carbide burs. We also use fine-grit diamonds for initial contouring of composite resin and bonded ceramic restorations. Schematics of the student issue bur kits for fixed prosthodontics and ceramic restorations showing Brasseler catalog numbers follow:

| | | | | | | | | | |
|-----|------|------|------|------|------|------|------|------|-------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| O | O | O | O | O | O | O | O | O | O |
| 850 | 8850 | 878K | 7653 | 877 | 8877 | H282 | 856 | 7675 | 10839 |
| 012 | 012 | 012 | 012 | 009 | 009 | 009 | 016 | 016 | 012 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| O | O | O | O | O | O | O | O | O | O |
| 256 | 56 | 57 | 169L | 170L | 7404 | 379 | 7406 | | |
| 009 | 009 | 010 | 009 | 010 | 014 | 018 | 018 | | |

UCLA FIXED PROSTHODONTICS PREPARATION KIT

| | | | | | | | | | |
|------|-------|-------|--------|------|------|-------|--------|-------|--------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| W16D | W16DM | W16DG | | | | | W17D | W17DM | W17DG |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| O | O | O | O | O | O | O | O | O | O |
| H274 | 8274 | 274EF | H274UF | H135 | 135F | 135EF | 135UF | 7408 | H379UF |
| 016 | 016 | 016 | 016 | 014 | 014 | 014 | 014 | 023 | 023 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| O | O | O | O | O | O | O | O | O | O |
| 828 | 828 | 6844 | 6844 | 1557 | 4 | 845KR | 8845KR | 846 | 8846 |
| 022 | 026 | 014 | 016 | 010 | 014 | 016 | 016 | 012 | 012 |

UCLA ALL-CERAMIC PREPARATION AND FINISHING KIT

Our current student instrument list and preclinical and clinical protocols reflect and exclusive use of carbides for intracoronar direct restorative procedures, diamonds and carbides for cast gold, and diamonds for ceramic inlays.

UCSF: We have moved almost exclusively to operative diamond burs. Diamond 330, 34, fissurotomy and small round burs are the main ones we use. Carbide 245, 244, and 330 are also used. For composites, we use diamond pre-finishing Brasseler burs, ET9, ET-3, Football diamonds in both fine 30um and EF 15um grits. 12 fluted carbides also used but sparingly and used especially for glass ionomer pre-shaping.

USC: For bonded intracoronar restorations – whether composite or porcelain – we have moved to a set of diamond instruments that comprise the “Biomimetic” bur block (Brasseler). This consists of round and tapered shapes having medium and fine grits. These permit handling the preparation phase with conservation of tooth structure in mind. For less accessible margin areas, we also use the NSK SonicSys (oscillating) handpiece along with various Kavo tips for creating bevels. These are all documented in our teaching materials

on bonded restorations. A USC faculty study group did extensive literature review and reached consensus on materials and techniques. From this came the anterior and posterior bonded restoration manuals now in use for the preclinical program.

We have used carbide burs for all intracoronal procedures in Operative Dentistry. This would include direct and indirect restorations.

We have traditionally used carbide burs for amalgam and cast gold intracoronal procedures. On the other hand, for bonded intracoronal restorations – whether composite or porcelain – we have moved to a set of diamond instruments that comprise the “Biomimetic” bur block (Brasseler). This consists of round and tapered shapes having medium and fine grits. These permit handling the preparation phase with conservation of tooth structure in mind. For less accessible margin areas, we also use the NSK SonicSys (oscillating) handpiece along with various Kavo tips for creating bevels. These are all documented in our teaching materials on bonded restorations. A USC faculty study group did extensive literature review and reached consensus on materials and techniques. From this came the anterior and posterior bonded restoration manuals now in use for the preclinical program.

| Feature | Carbide Bur | Diamond Bur |
|-------------------|---|--|
| Durability | New burs prep very well, but as they age their efficiency goes down rapidly. It is hard to tell by visual inspection whether the bur will work efficiently or not. | Tends to maintain usability for an extended period and visual inspection can give an indication of its efficiency. |
| Touch | Depending on sharpness, the instrument could require very light touch or a heavier hand to accomplish the same thing. | Tends to have a fairly consistent feel when prepping, regardless of newness. |
| Smoothness | Capable of creating very sharp and polished surfaces free of surface texture. | Grit of instrument determines cutting power and surface texture. Internal features are gentler, rather than sharp. |
| Margins | Can be smooth, but also tends to be wavy or chattered in student hands. White stones are generally smoother for margins. Configuration options seem to be more limited. | Creates configurations and acceptable smoothness more predictably. |
| User-friendliness | Harder for novices to handle. | More consistent performance and ease of use. |
| Restoration | More suited for amalgam and cast gold intracoronal preps; also good for gingival finish lines (margins). | Good all around for intracoronal preps, but particularly for bonded restorations. |

UW: The diamond burs (Brasseler) being used now are:

- D 232 – pear shaped
- D 830 – pear shaped 2mm
- D 835 – straight fissure
- D 838 – bullet shaped with rounded end
- D 849 - tapered

We have been using both, diamond and carbide burs, for about 5 years now. The use of diamond burs proved to be very effective for cutting the plastic dentoform teeth, with less burning and grabbing.

IV. Electric Handpieces (*Topic Revisited*)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

UA: No responses noted.

ATSU Electric handpieces (KaVo) are used exclusively at the on-site clinics. A student rental system is used. During the six months of off-site clinic rotation during Year 4, students exclusively use air-driven handpieces. Students seem to adapt well after an initial adjustment period.

UBC: Yes, on every unit since Aug 2006. Most instructors say they are a smoother handpiece to work with, the students do not have a preference.

LLU: These are not used due to cost.

MUC: We are not planning to use electric handpieces. One of the main problems with electric, along with the many others, is the inability to sterilize the delivery system. This poses a serious problem in the delivery of sterile dentistry. Especially in light of the current published CDC Standards.

UNLV: We are all-electric (KaVo), and the school owns all handpieces. Our experience with the KaVo handpieces has been good – they are durable. We find that students are reluctant to switch from the high speed unit to latch head in situations that require it.

OHSU: Electric handpieces are not being used at OHSU, and we are not considering switching any time soon.

UOP: Electric handpieces are not being used at this time. We are considering their future use in our clinic.

UCLA: We are not currently using electric handpieces in the student clinics nor are we considering switching in the next 2-4 years. Electric handpieces are used in two of the twelve operatories of the faculty practice, and will be incorporated in other operatories as they are renovated. Faculty opinion on electric handpieces has been varied and covers the entire spectrum from pro to con.

UCSF: We have evaluated electric and will use them in the future. Both air and electric will be used and eventually electric will be the only standard.

USC: Electric handpieces are not currently being used on patients by our students. Electric handpieces are available in the faculty practice section of our school. Some faculty do use them and prefer them over traditional air driven handpieces. We have recently had an in-service training for our faculty to see what the reaction is. The results were positive and most faculty do like them. We are planning on using electric handpieces as an adjunct to the air driven handpieces within the next 2-4 years.

UW: Trial basis in faculty practice, over several months. Not at this time (primarily funding). Definite learning curve, different technique, all-or-nothing. Consistent cutting speed (torque), variable speed and reduced noise/vibration are nice features; concentricity and rotary endo option? Tendency to overcut, large head and body, weightier, expensive to purchase and repair – cannot self-repair; DUWL contamination? Micromotor autoclavable or disinfected only? Examples are A-dec EA-50LT, NSK Ti-Max NL400, KaVo Electrotorque and Sirona Motor EL1. Interchangeable standard E-type connector, 40-200K rpm.

V. Direct placed composite resins are over taking amalgam as the basic restorative material.

How has this impacted the teaching of operative skills to new dental students?

UA: No responses noted.

ATSU: No responses noted.

UBC: The operative course spends as much time on posterior composite as we do on amalgam.

LLU: No responses noted.

MUC: The switch to a completely different restorative material, different technology, and different technique has led to a myriad of changes; the overall shift in the emphasis in the curriculum; a new material science section, new technique section, new knowledge base in faculty, etc. All of this has led to a huge curriculum inflation just within the operative section.

UNLV: No responses noted.

OHSU: The students still do a lot of amalgams. It's hard to divide the limited time to teach composite, amalgam, and gold. Nonetheless in the preclinical courses the students do more composite than amalgam or gold exercises. Because the caries risk of the patients is taken into account and the majority of our patients are low-income patients, the students still place a lot of amalgams in the clinic.

UOP: In response to the increase in use of direct composite as the restorative material in clinical practice, we increased the time in pre-clinical operative dedicated to composite (more than 1/3 of the course) and introduced two preparation and restoration practical exams. Amalgam preparations and restorations make up about 1/3 of the pre-clinical operative course. This is because amalgam restorations continue to be done quite frequently in our clinic, approximately 50% of the intracoronal procedures, and Class II amalgam procedures are done as part of the WREB and CA board exams.

UCLA: No responses noted.

- UCSF:** Composite restorations are taking a larger percentage of the teaching time. We still value amalgam and gold restorations and still teach them as a valuable restorative technique given the appropriate clinical conditions. Because of composites, we have moved our entire 2nd year Operative curriculum to natural teeth.
- USC:** We are presently teaching amalgam, bonded restorations, and cast restorations as separate classes. There has been discussion about changing the organization of these classes to teach concepts and techniques for treating minimal disease entities and then progressing to more extensive or complex problems
- UW:** Placement of composite is a more technique-sensitive procedure, and as such, it takes good understanding of the concept and time to develop a proper and adequate technique. A series of lectures on adhesion and composite techniques have been incorporated into the operative curriculum. The skill required for cavity preparation is still expected, since we ask for very similar preparations as those used for amalgam. The students, however, are informed of the advantage of tooth structure preservation when composite resin is indicated as a restorative material. They also learn how to prepare a tooth for bonding by proper finish of enamel

Describe new or different teaching methods/technologies as Web CT.

- UA:** No responses noted.
- ATSU:** No responses noted.
- UBC:** Tablet computer- wonderful for demonstrating a point during PowerPoint or during an in-class assignment/presentation by students. First year students use the tablet for an ePortfolio assignment which is completely electronic with marking and dialogue via email/blogs and digital radiography. This has been hugely successful and will develop an international scope next year (Australia). WebCT has been used for years for with previous exams and in-class quizzes posted, photos for assignments, presentation PowerPoints.
- LLU:** No responses noted.
- MUC:** We will be using as much interactive simulation-based learning environment and curriculum as possible, allowing more time for faculty to mentor and guide individual students.
- UNLV:** No responses noted.
- OHSU:** No responses noted.
- UOP:** No responses noted.
- UCLA:** Not as yet using new teaching methods/technologies, but this will change with the curricular revision now underway. We will soon be adopting the

ANGEL curriculum management system currently in use by the UCLA medical school.

UCSF: WebCT is ever increasing it's role in syllabi, lecture notes, online quizzes, and video demos of the procedures.

USC: The major innovation we have introduced is the use of dentoform teeth that are constructed with dentin, enamel, and caries. These teeth are used to teach the concepts of preparation design and skills in the bonded restoration class. Additionally, we have introduced digital videos to demonstrate the various bonded restoration procedures that were filmed through the surgical microscope to depict the procedures as seen by the operator. The videos are available on the school web site. They are a bit outdated as they were made six years ago.

UW: No responses noted.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

UA: No responses noted.

ATSU: No responses noted.

UBC: Grouping of the materials, not by complexity but we would like to know about grouping by complexity. Amalgam and composite are both taught in the Operative course.

LLU: This is our instructional sequence in Operative Dentistry:

- Introduction to caries diagnosis, risk assessment, and management
- Isolation and moisture control
- Composite resins – physical characteristics and handling
- Composite preparation and restoration principles – minimally invasive dentistry
- Treatment of pit and fissure defects and lesions – sealants, fissurotomy, PRR, minimal lesions, extensive lesions
- Gingival restorations – carious and non-carious
- Glass Ionomer restorations and root caries
- Class III composite restorations
- Class IV composite restorations
- Diastema closure and direct composite veneers
- Composite restorations as replacement of existing Class II restorations
- Posterior Class II composite restorations – traditional outline
- Posterior Class II composite restorations – slot design
- Principles of amalgam restorations, instrument sharpening
- Class I amalgam restorations
- Class V amalgam restorations
- Class II amalgam restorations and matrix application
- Complex amalgam restorations and auxiliary retention procedures
- Finishing of amalgam restorations
- Review of amalgam and composite restorations

- MUC:** The approach to multiple materials and multiple procedures will be approached in a more integrated fashion and not dealt with in separate topic sections. For example, class two amalgams will be taught at the same time as class two composites. All of the modalities will be approached from the minimal invasive approach.
- UNLV:** No responses noted.
- OHSU:** We usually start to teach resin composites because the preparations are smaller, and then we teach amalgams, and gold in the pre clinic.
- UOP:** We start with amalgam preparations in pre-clinical operative because it allows us to more quickly identify those students with hand skills and/or concept problems, start them in remediation, and bring them up to speed. Starting with direct composites would not allow us to quickly identify hand skill problems because the preparations are easier and have fewer features to evaluate than Class II amalgam preparations. Class I's amalgams are followed by Class II's amalgams, the level of difficulty of the Class II's increasing through the course. Composites are introduced after Class II amalgams.
- UCLA:** Amalgam and composite procedures have traditionally been taught separately – amalgam first, then composite. Students progress from simple to complex restorations in each of these phases. The revised curriculum will position operative dentistry in the Caries core curriculum track, positioning it as a treatment modality for late stages of the caries disease process.
- UCSF:** Simple to complex with an overview related to diagnosis and treatment planning. CRA- remineralization-- minimally invasive restorations -- resin restorations -- amalgams -- complex resin restorations -- complex amalgam restorations -- buildups-- cast gold onlays -- Composites & amalgams taught together via complexity.
- USC:** We are presently teaching amalgam, bonded restorations, and cast restorations as separate classes. There has been discussion about changing the organization of these classes to teach concepts and techniques for treating minimal disease entities and then progressing to more extensive or complex problems.
- UW:** The curriculum in operative dentistry is based on complexity. Therefore, we start by teaching one surface restorations and cover amalgam, composite, gold and glass ionomer when applicable. The sequence is: class I (all materials and preparation modifications), class V (all materials and preparation modifications), class II (all materials and preparation modifications), class III (composite), class IV (composite), veneers (composite), complex amalgams and onlays, build-ups (with and without pins), ceramic inlays and onlays, porcelain veneers.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

UA: No responses noted.

ATSU: No responses noted.

UBC: No, if anything we feel that composite is more difficult and requires more motor skill, although it is for a different muscle memory set.

LLU: We don't know whether motor skills are increasing or decreasing, but we perceive that attention to detail is decreasing.

MUC: In our minds they are not. There always has been, always will be change in the delivery of dental care. We believe the attitude to embrace the paradigm shift and based in evidence based foundations will lead the school and the students to be forward thinking decision makers that will be flexible with the times.

UNLV: No responses noted.

OHSU: We don't think that the motor skills development is being diminished so far. At the preclinical courses the composite and amalgam preparations are very similar except that the amalgam preparations have to be in dentin, therefore they are deeper and larger. We also teach that it's not absolutely necessary to break the contact for composite preparations, although we teach to place proximal bevels if the cavosurface margin forms a 90-degree angle with the tooth surface. In the Fall term students use Ivorine teeth and have criteria sheets for each preparation with the measurements. In the Winter and Spring terms the students prep on human teeth which are often decayed, so they no longer have to prep according to the criteria sheet, but according to that specific case, just as in clinic.

UOP: We start with amalgam preparations in pre-clinical operative because it allows us to more quickly identify those students with hand skills and/or concept problems, start them in remediation, and bring them up to speed. Starting with direct composites would not allow us to quickly identify hand skill problems because the preparations are easier and have fewer features to evaluate than Class II amalgam preparations.

UCLA: This has not been our perception. We contend that properly executed direct composite procedures demand well-developed motor skills as do other restorative procedures.

UCSF: We feel that composite restorations require as much skill and artistry as amalgams. In fact, the matrixing & the pre-finishing and polishing steps are more complex.

USC: We definitely do not believe motor skills are diminished by the increased utilization of direct placed composite restorations. To achieve the excellence required for successful, long lasting and esthetic bonded restorations requires more attention to detail than it does to do amalgam restorations; and

as much attention to detail as it does for successful gold restoration. Of course the skills are slightly different. We would venture to say that a student who is skilled with bonded restorations will be equally skilled with amalgam or gold, if they value the procedure and have careful instruction in that area. We do perceive, however, that the overall attention to detail, as we once taught, has diminished. We do not know how to explain this phenomenon, but believe that at our school it is a fact. We are on our way to re-emphasizing the importance of basic skills in restorative dentistry.

UW: The internal configuration of a cavity preparation for composite is very simple when compared to the more demanding preparation for gold or amalgam. Therefore, it is important to teach gold techniques to the students to maintain a certain degree of motor skills. On the other hand, the concept of tooth structure preservation needs to be emphasized, so that students learn to avoid unnecessary removal of tooth structure

VI. Discuss matrixing.

Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

UA: No responses noted.

ATSU No responses noted.

UBC: Palodent is taught with conservative posterior composites due to the nice interproximal contouring and when there is only one interproximal surface involved (protection of the gingivae on the proximal surface which is not prepped).

LLU: Amalgam: Tofflemire matrix or Omnimatrix (Ultradent).
Composite: sectional matrix system for better proximal contact – Palodent and Composi-Tight systems.

MUC: We use all systems of matrixing depending on which system will be the easiest to apply properly and do the best job.

UNLV: No responses noted.

OHSU: We teach full matrix band placement with the Tofflemire retainer for amalgam restorations. The students have the universal and MOD narrow Tofflemire matrices, .0015". We find that this system works well for amalgam condensation. Nonetheless, the students have the option to use the sectional band (Composi-Tight, GDS) with the G-ring if the situation is appropriate. We teach sectional matrix (Composi-Tight, GDS) placement with the G-ring for composite restoration. The students have three different matrix bands: small for bicuspid and small molars, standard size for molars, and large design for deep cervical restorations. They also have two G-rings: standard length tines for Class II restorations, and extended length tines for MOD or multiple tooth restorations. We believe that the sectional matrix produces a better contact than with the Tofflemire matrix. A study showed that sectional matrices give significantly stronger contact vs. a circumferential matrix in Class II composite

restorations (Loomans BAC et al., *J Dent* 34: 292; 2006). Another study showed that the sectional matrix contacts had returned to pre-restoration levels, while circumferential contacts remained weaker, at 6 months post composite placement (Loomas BC et al., *in press*, 2006).

- UOP:** A Class II amalgam is routinely restored with Tofflemire retainer and full band (#1, #2 or #3). A sectioned piece of tofflemire band may be used when the rubber dam clamp has to be on the prepped tooth preventing the use of the Tofflemire retainer. A sectioned piece of tofflemire band may be used for a deep Class II amalgam prep when the use of a full band would not allow formation of an adequate interproximal contact. Class II composites are restored using the Compositi-Tight Gold matrix system.
- UCLA:** We use the Tofflemire system for amalgam restorations and composite & amalgam buildups. We use the Palodent matrix system for Class II composites because it facilitates development of appropriate proximal contact and contours.
- UCSF:** We use both depending on the situation. In general, composites more commonly sectional (Compositite) and amalgams tofflemire.
- USC:** We are using full banded matrix techniques (tofflemire) for amalgam restorations and sectional matrix techniques (Palodent, Bitine) for direct bonded restoration. The sectional matrix technique is used because it is more predictable to achieve good proximal contacts and contours with the burnishable matrix materials used.
- UW:** Tofflemire matrix: Universal (#1) is the most commonly used matrix; indicated for amalgam restorations and/or placement of temporary restorations. Number #2 bands are also available for deep boxes in amalgam cavity preparations. Not recommended for use with composite due to the resulting flat contour (in spite of pre-burnishing) and high proximal contact position. Dixiland pre-contoured bands are also available for amalgam restorations. Sectional matrices: (Palodent system) are being used for class II composite restorations. The contour of the band results in adequate proximal contour and contact area when using composite, and barely any condensation force is utilized against the matrix.

VII. Who/which departments are placing implants?

- UA:** No responses noted.
- ATSU:** No responses noted.
- UBC:** Graduate Periodontics
- LLU:** Implants are placed by the graduate students in Implantology, Oral Surgery, Periodontics, and to a minor extent by Endodontics, and Prosthodontics. All diagnostic procedures and templates are made by the dental student and they are encouraged to assist in the surgical placement.

- MUC:** We are planning on requiring all undergrads to have a certain requirement and knowledge in implants. The restorative procedures will most likely be administrated through the restorative pros department.
- UNLV:** No responses noted.
- OHSU:** Oral and Maxillofacial Surgery and Periodontology residents place the fixtures under supervision of an attending surgeon.
- UOP:** Implants are placed in the Oral Surgery Department and are restored in the implant clinic or by removable pros. Department. They are not considered an easy solution to treating a tooth with challenging restorative condition.
- UCLA:** Implants are placed by Oral & Maxillofacial Surgery and Periodontics. Residents in these programs place implants for students' cases.
- UCSF:** 3rd year simulation lab has a tyodont model simulation exercise. Impressions, lecture series, treatment planning and clinical lecture materials presented. Also have an implant clerkship for selected students through our graduate prosthodontics program.
- USC:** The surgical placement of implants is provided by Advanced Periodontics and Oral and Maxillofacial surgery residents.
- UW:** Periodontics and Oral Surgery are placing the implants. Grad perio residents and the oral surgery residents are mainly in charge of the surgical phase, but undergrads allowed to place implants with simple cases.

Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

- UA:** No responses noted.
- ATSU:** No responses noted.
- UBC:** This is currently under curriculum planning.
- LLU:** Undergraduate students are placing implant restorations. Implant crown impression and fabrication is taught at the beginning of the third year in the fixed prosthodontic course
- MUC:** We are planning on requiring all undergrads to have a certain requirement and knowledge in implants. The restorative procedures will most likely be administrated through the restorative pros department
- UNLV:** No responses noted.
- OHSU:** Implant restorations are managed jointly by Operative and Prosthodontics. Operative is involved because we needed somebody to start the implant program and that is where an open faculty line existed at the time. We would like to move it into Prosthodontics completely, but are having a bit of a

difficult time finding the right person. Pre-clinically, the DS2 students have a 12 week course in implant basics. This includes 12 one hour lectures and 6 three hour labs where they wax a case, make surgical and radiographic stents, use their stent to place an implant in a plastic maxilla, make an impression, fabricate a provisional, and pick up some locator attachments in an exercise where they convert a mandibular denture made in their Removable Prosthodontics course. Clinically the students have to restore a fixed single unit and restore an implant retained lower denture.

- UOP:** Implants are placed in the Oral Surgery Department and are restored in the implant clinic or by removable pros. Department. They are not considered an easy solution to treating a tooth with challenging restorative condition.
- UCLA:** Now that protocols and interdisciplinary agreements & systems are in place for restoration of implants by undergraduate dental students, they are increasingly acquiring opportunities to restore implants in the student clinic. Typical student cases are mandibular overdentures supported by a Hader bar on two implants, and single posterior tooth replacements with implant retained PFM crowns. Students present to a dedicated implant clinic with their patient and appropriate records for a multidisciplinary consultation with faculty from OMFS, Periodontics, Advanced Prosthodontics, and Restorative Dentistry. Students fabricate radiographic/surgical stents. All implant surgeries are performed in the implant clinic. Following implant placement, students complete the prosthetic/restorative phase in the general student clinic covered by Advanced Prosthodontics (overdentures) or Restorative (posterior crowns) faculty. We anticipate that in the very near future every graduating student will have at least one implant restoration experience.
- UCSF:** 3rd year simulation lab has a typodont model simulation exercise. Impressions, lecture series, treatment planning and clinical lecture materials presented. Also have an implant clerkship for selected students through our graduate prosthodontics program.
- USC:** Predoctoral dental students are restoring any missing posterior teeth with implants provided the patient does not need to alter vertical dimension of occlusion. Immediate implant placement (after tooth extraction), bone grafts, sinus elevations and soft tissue augmentation are included within the scope of the predoctoral implant program. Implant placement is performed by both Advanced Periodontics and Oral and Maxillofacial surgery residents. Implant restoration is also performed in the Advanced Prosthodontics program. Single unit anterior implants and their restoration are currently beginning at USC. Predoctoral dental student involvement with Implants: Treatment plan, diagnostic work up, radiographic and surgical stents, CT evaluation, pre-surgical consultation, assisting with surgical implant placement, abutment placement, impressions, and placement of definitive implant restorations. Anterior implants will involve implant provisional restoration with emphasis on implant submucosal contours
- UW:** Restorative/prosthodontics. Both grad and undergrad students, but Grad Pros usually involves more complex C&B. Undergrad program started 4 years ago as elective, last two years has been upgraded to a required course

that involves a hands-on component in the simulation clinic. They are restoring single unit implants in the clinic, or two adjacent implants at the most under close supervision by one of the Full-time Faculty from the implant group. Restricted to 3 systems: Nobel, ITI and Zimmer – occasionally 3I and Astra. All other implant cases are being restored by the Graduate Prosthodontics residents or the Faculty Practice.

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

UA: No responses noted.

ATSU: No responses noted.

UBC: No responses noted.

LLU: We perceive that implants have had a very minor effect on the experience of the students with core build-ups.

MUC: Most definitely. Over the years as we have seen the tremendous success rates and evolution of the science, the decision point as to when to save a tooth and not has definitely changed.

UNLV: No responses noted.

OHSU: Yes, no doubt there are less FPDs being done and less hero-dontics being done. We are hopeful that this is a good thing, but can’t prove it....yet. There are still plenty of buildups being done.

UOP: Implants are not considered an easy solution to treating a tooth with challenging restorative condition.

UCLA: We are generally more apt to recommend extraction/implant now than previously when the prognosis is, at best, no better than guarded for an endodontic/periodontal/restorative course of treatment AND a patient is willing/able to undergo the implant procedures. That said, students’ experiential learning opportunities for foundation restorations have not been diminished as of yet. We are anecdotally, however, experiencing a reduction in instances of minimally-restored or unrestored teeth being prepared as FPD retainers now that students’ restoring of implants is becoming more commonplace.

UCSF: No responses noted.

USC: Unable to answer the question – the majority of our patients present to the implant consultation with missing teeth already. However, in the consideration of placing an implant versus saving the tooth, predictability becomes an important differentiator and is part of informed consent. This also includes discussion of risks, benefits, and alternatives. Endodontics and the concomitant restorative treatment will not be disappearing any time soon.

Predoctoral dental students are exposed to the dental literature regarding endodontically treated teeth, conventional dentistry (FPD & RPD) and implants and present that information to the patient. The patient can then select the treatment on an individual basis

UW: No. Students continue doing large core build-ups or RCT and post and cores, when indicated. Implants are mainly used when the tooth's prognosis after treatment that involves different specialties and expense, is still compromised. If tooth requires endodontics, crown lengthening, cast post and core, and crown, and yet end up with a guarded status, R/C/B analysis favors extraction and implant. If tooth can be successfully endodontically treated, without complicating perio abscess, bone loss, furcal involvement, extensive caries, then RCT should be done. Proximity of maxillary sinus and mandibular canal would favor endodontics. They are also used when the teeth adjacent to an edentulous space are sound or with minimal restorations. In our experience, since an implant is comparable in cost to a 3-unit bridge (by design), some students are graduating without ever placing a bridge, i.e. too many implants instead of bridges – it's a good deal. Issues – hard to ensure equanimity of experience for students in terms of numbers of cases (luck of draw), complexity. Also hard to calibrate faculty for implant competency, especially older generation who have had less experience and exposure to implants. Systems and parts keep evolving, evolution from external hex to internal hex.

Regional CODE Agenda

Dr. Karen Gardener made a most stimulating presentation on the Dentportfolio program that she has instituted at UBC. Dentportfolio is Dr. Gardener's adaptation of the ePortfolio concept for predoctoral dental education. It has initially been used as a year-long project in the preclinical operative dentistry course, and compels students to critically analyze and explain their own work. The resultant portfolios – each a unique, website-mounted presentation of photos, text, etc. – are available for review and critique by other students as well as faculty. We were favored with impressive examples of these creations as well as a provocative discussion of the seemingly limitless potential applications of this approach, such as a globalized educational experience wherein students at schools around the world would each work on a common assignment and communicate via blogging on the work of their peers. Please visit www.dentportfolio.com for more information and examples of the work by UBC students.

Suggestions for CODE.

- What can the organization do to improve its effectiveness?
- Publish a QUARTERLY which presents a review of articles pertinent to CODE members.
 - Change the name so it will appeal to more than “Operative” instructors.

- CODE has traditionally focused on technical aspects of Operative dentistry. The National Agenda for this year is a prime example: what core content to teach, type of radiographs, bur usage, electric handpieces, composite and amalgam teaching, matrixing, and implants. Technical aspects of Operative dentistry are certainly central to the organization. However, the organization appears to be more reactionary to issues, rather than being proactive. Might the regional directors meet to develop or refine the current vision and mission for CODE? This might involve a SWOT (strengths, weaknesses, opportunities, threats) analysis and development of a strategy that sets some performance goals. Additionally, it would be worthwhile to envision where the organization needs or wants to be five to ten years from now. What would it take to achieve this? For example the CODE National Agenda easily occupies the regional meeting time-frame in discussing what we teach in Operative dentistry and how we go about doing it with materials and equipment. What hasn't been addressed is how we can be more effective educators. What are some alternative pedagogies and processes that might apply? Are the details of these beyond what a regional meeting could address?

Being more market sensitive seems to be beneath CODE, yet should be factored into its actions. The organization is more comfortable being evolutionary and sticking to the tried-and-proven, rather than taking risks. Yet we see social issues of consumer (patient) demand altering our core teaching content for direct restorations in the shift away from gold foil and amalgam to composite or tooth-colored materials. The licensure landscape is undergoing nationalization (globalization, not yet), but there was no representative of any licensure agency present at this year's meeting. Yes, we had people on the WREB Operative committee, but they did not represent the organization; and Canada doesn't have live patient licensure exams.

CODE's comfort zone appears to be peering internally, but not factoring the external environment (consumer demands, licensure, etc.) enough into its discussions, thereby undermining the organization's effectiveness, relevance to the profession, and leadership.

Any comments or suggestions to improve the Web site?

<http://www.unmc.edu/code/codeframe.html>

Enable more open communication with a chat room and blogging where we could present concepts/problems for others to offer their comments

Other comments/suggestions?

UCSF: Our Operative philosophy for the second year students has made a shift from stylized ideal preparations to non-ideal caries treatment involving diagnosing the caries on a micro-level and then applying the proper preparation design and material selection to the tooth. We are encouraging the use of the Diagnodent laser, other CRA factors in our patient profile, Occlusion, etc..... to have the student create their own preparation outline and extensions. We are using natural extracted teeth.

CODE Region I Attendees Form

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|-----------------------|------------|--------------|--------------|--------------------------------|
| Loris Abedi | USC | 213-740-7403 | 213-740-6778 | labedi@usc.edu |
| Jolanta Aleksejuniene | UBC | 604-822-7800 | 604-526-7998 | jolantaa@interchange,ubc.ca |
| J. Martin Anderson | UW | 253-852-2155 | | jma@u.washington.edu |
| Janet Bauer | UCLA | 310-825-6987 | 310-641-0523 | jbauer@dentnet.dent.ucla.edu |
| Paul Buchanan | UOP | 415-351-7152 | 415-929-6531 | |
| Juliana da Costa | OHSU | | | |
| Lamia El-Adwar | UBC | | | |
| Ingrid Emanuels | UBC | | | |
| Mark Fogelman | UBC | | | |
| Karen Gardner | UBC | 604-822-3566 | 604-526-7998 | drkg@interchange.ubc.ca |
| Robert Hasel | MUC | | | |
| Edmond Hewlett | UCLA | 310-825-7097 | 310-825-2536 | eddyh@dent.ucla.edu |
| Samuel Huang | UCSF | 415-892-4845 | 415-246-5801 | samuelhuang@earthlink.net |
| Gabriela Ibarra | UW | 206-543-5948 | 206-543-7783 | gibarra@u.washington.edu |
| Calvin Lau | USC | 213-740-1525 | 213-740-6778 | cslau@usc.edu |
| Lex MacNeil | UBC | | | |
| Cheri Porth | UBC | | | |
| Morrie Reisbick | ATSU | 520-275-5785 | | mreisbick@atsu.edu |
| Doug Roberts | LLU | 909-558-4640 | 909-558-0235 | droberts@llu.edu |
| Lance Rucker | UBC | | | |
| Dan Tan | LLU | | | |
| Ray Tozzi | UNLV | 702-774-2673 | 702-774-2501 | Raymond.Tozzi@cmail.nevada.edu |
| Wendy Woodall | UNLV | | | |

CODE REGIONAL MEETING REPORT FORM

REGION: II (Midwest)

LOCATION AND DATE OF MEETING:

University of Iowa

Iowa City, Iowa

September 17 -19, 2006

CHAIRPERSON:

Name: Dr. Deborah Cobb

Phone #: 319-335-7214

Address: University of Iowa
College of Dentistry

Fax #: 319-335-7267

S 229 DSB

E-mail: deborah-cobb@uiowae.edu

Iowa City, IA 52242

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

Suggested Agenda Items for Next Year:

1. Future of Dental Education
Curriculum (pre-clinical, clinical, comp care vs block system, group practice)
Clinic renovation and design
Financial support strategies (i.e., International DDS Program, research, faculty practice)
Virtual reality teeth (Kilgore, Strassler, Viade)
2. Incentives for dental students to practice in underserved areas
3. Dental Photography
4. Implant training for faculty (Nobel Biocare, Straumann)
5. MID or possible topic for CODE forum

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Scott Shaddy

Phone #: 402-280-5076

Address: Creighton University

Fax #: 402-280-5094

Omaha, NE 68178-0001

E-mail : shaddy@creighton.edu

Date: September 17 -18, 2007

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.

**2006 NATIONAL CODE AGENDA
REGION II
SUMMARY RESPONSES TO NATIONAL AGENDA**

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

Core Curriculum Consensus:

1. Amalgam (Class I, Class II, Class V)
2. Direct Composite (Class I, II, III, IV, V, VI)
3. Rubber Dam and other isolation techniques
4. Caries Risk Assessment
5. Caries Diagnosis and Removal
6. Amalgam Core Build-ups
7. Inlays/Onlays
8. Caries Control (Sedative fillings, pulp capping)
9. Sealants and Preventive Resin Restorations
10. Diastema Closure
11. Glass Ionomer Restoratives (Class I, Class V)
12. Porcelain veneers
13. CAD CAM
14. Composite Core Build-ups
15. Air Abrasion
16. Lasers

2006 NATIONAL CODE AGENDA
REGION II RESPONSES
(Evidence cited where applicable)

Region II School Abbreviations

| | | | |
|------|------------------------|------|------------------------------|
| COLO | University of Colorado | MINN | University of Minnesota |
| CRE | Creighton University | UMKC | University of Missouri - KC |
| IOWA | University of Iowa | UNMC | University of Nebraska |
| MAN | University of Manitoba | SASK | University of Saskatchewan |
| MARQ | Marquette University | SUI | Southern Illinois University |

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List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
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- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
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- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
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- Caries Control (Sedative fillings, pulp capping)
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- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
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- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- **Amalgam (Class I, II, And V only). Class III was omitted.**
- **Veneers (Direct composite only). Porcelain taught by Fixed.**
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Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

COLO: No response noted.

CRE: List of importance:

1. Amalgam (Class I, Class II, no Class III, Class V).
2. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
3. Onlays (Gold, no composite, very little ceramic)
4. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
5. Caries Diagnosis and Removal
6. Inlays (Gold, no composite, very little ceramic)
7. Caries Control (Sedative fillings, pulp capping)
8. Isolation Techniques (Rubber dam, others)
9. Caries Risk Assessment
10. Diastema Closure (Elective with composite or porcelain)
Veneers (Porcelain, composite)
Sealants and Preventive Resin Restorations
11. Lasers for restorative procedures
CAD-CAM restorations (CEREC III)
Glass Ionomer Restoratives (Class I, Class V)
Remineralization Therapies
Air abrasion techniques
12. Composite Core Build-ups (Mechanical and adhesive retention)
Composite Indirect (Class I, Class II)

IOWA: List of importance:

1. Direct Composite (Class III, IV, V, I and II)
2. Amalgam (Class I, II and V)
3. Isolation technique mainly Rubber Dam
4. Dental Anatomy and waxing related with clinical application
5. Amalgam cusp coverage build-ups (with retention slots and grooves/no pins)
6. Caries Diagnosis and Removal (working in incorporate early diagnosis of caries into the curriculum)
7. Preventive Resin restorations and sealants (sealants also taught in Preventive)
8. Glass Ionomer Restoratives as :definitive restorations (class V, root caries) and as transitional restorations (rampant caries, step wise).

9. Esthetic procedures (diastema closure, peg laterals, polychromatic class IV with matrix technique, composite veneers, porcelain veneers, bleaching, indirect restorations)
10. Gold Inlays and Onlays, Cerec preparations (esthetic indirect procedure) lecture, demo and hands-on in the lab-primarily to teach intracoronal preparations that draw

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: List of importance:

1. Isolation Techniques (Rubber dam, others)
2. Caries Risk Assessment; Remineralization Therapies
3. Caries Diagnosis and Removal
4. Caries Control (sedative fillings, pulp capping)
5. Sealants and Preventive Resin Restorations
6. Amalgam (Class I, Class II, Class III, Class V).
7. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
8. Amalgam Core Build-ups (pin, slot, or adhesive retention)
9. Composite Core Build-ups (Mechanical and adhesive retention)
10. Veneers (Porcelain, composite)

UNMC: List of importance:

1. Amalgam (Class I, Class II, Class V).
2. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
3. Diastema Closure (Elective with composite or porcelain)
4. Veneers (Porcelain, composite)
5. Glass Ionomer Restoratives (Class I, Class V)
6. Sealants and Preventive Resin Restorations
7. Isolation Techniques (Rubber dam, others)
8. Caries Diagnosis and Removal
9. Caries Control (Sedative fillings, pulp capping)
10. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
11. Composite Core Build-ups (Mechanical and adhesive retention)

SASK: No response noted.

SIU: No response noted.

II. What is the current use of digital radiographs in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

COLO: No response noted.

CRE: Very limited; Clinical endodontics; There are future plans to incorporate digital radiography into our paperless record system. A review of systems is being done at this time.

IOWA: Most resident cases and some faculty cases in orthodontics are digital. These include pantomographs, lateral skulls and CMSs. Some DSP images in OMS are digital. None of the above are on MiPACS yet, but that is about to change. For about two years. We are implementing digital images for minor operative, preventive and dental hygiene clinics, and for the Ambulatory Surgical Care unit (Dr. Burke). We plan to be completely digital in about 2 years.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: Digital radiography has been in use for the last 5 years at UMKC School of Dentistry for intra-oral and extra-oral diagnostic imaging procedures (all departments and laboratories). We use the Gendex Storage phosphor plates for a panorex, full mouth x-rays and screening patients. We use a Gendex Visualix #2 direct digital sensor for e-chair.

UNMC: Digital radiography is used in graduate endodontics and in limited cases in undergraduate endodontics. Used in graduate endodontics for 3 years. There is a committee that has studied the issue. Transition to digital radiography will most likely occur in the future, but no firm date has been established.

SASK: No response noted.

SIU: No response noted.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

COLO: No response noted.

CRE: We have no experience using Schick CCD digital radiography, and it enhances our ability to diagnose interproximal decay. Not sure about occlusal caries diagnosis.

IOWA: We have no data yet

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: In our experience the diagnostic efficacy of digital radiographs for interproximal caries is similar to film-based techniques. Although traditional radiographic techniques give a better image quality the digital radiograph

works just fine. In studies there are no statistically significant differences between the two techniques.

UNMC: NA

SASK: No response noted.

SIU: No response noted.

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

COLO: No response noted.

CRE: Our x-ray working group has recommended the CCD technology due to very good definition and contrast; immediate capture into the computer and assessment of image; cost may be prohibitive as compared to PSP.

IOWA: The question, as I stated in my presentation, is not well worded. The two categories are CR (PSSP/PSP/SP) or DR (CCD/CMOS/CID/Flat Panel). I would choose both. The CMOS seem to give better images but because of the cable, cannot be used in certain situations. E.g. vertical bitewings. The CR receptors are more prone to artifacts, and can be more easily damaged. They are, however, an easy segue from film to sensor. DR sensors are expensive and can also be broken.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: We use both. SPPs (Gendex) are used in the general clinic and CCD-based (Gendex) detectors are used in the emergency clinic and Endo clinic and labs. The Gendex CCD is more convenient, has better resolution and image quality, less time consuming but has a high initial cost. Both systems work well and of course both have advantages and disadvantages: The CCD based systems are somewhat more difficult to use but this can be controlled with proper training and use of sensor holders; despite the initial concern that they may be abused (students not taking care of the instruments) in a teaching environment, we never had any problems. SPPs are easier to use (no different than film) but include further processing steps (placement in barriers, scanning etc) but their durability is questionable (they scratch too easy and this may compromise diagnosis). In the future we will convert to direct digital except for Panorex's. We would like to convert the Panorex to CCD but it would cost about \$35-90,000. It takes about 3 seconds to get a result with the CCD and about 2 min with our SPP's to get a scan so we can look at the radiograph.

In our experience both systems can function well as long as they are seamlessly integrated to the clinic management software. We use MIPAC for school use because of the massive amount of radiographs that have to be stored.

My personal preference would be CCD-based systems for the fast image acquisition and durability.

Storage for one Perapical x-ray is about 50 KB for a JPEG and for a Pano about 528 KB.

Department production is about 600 radiographs (PAX)/day, 30-40 Panorex/day and 20 cat scans a month.

The CCD sensors cost about \$6,000 per sensor. We currently have 6 SPP scanners and 4 CCD's sensors in the clinic and 2 CCD's in the labs. For the labs students print out their results. We were the first school in the nation to go digital. Now our SPP's scanners are outdated, they take about 4 min to scan and the new ones scan in 10 seconds. So we have to replace our equipment one day.

If any school is interested in our experience they can call Dr. Christos Angelopoulos at 816-235-2664-office or 816-235-2140-clinic.

UNMC: Our endodontic graduate program uses CCD sensors.

SASK: No response noted.

SIU: No response noted.

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

COLO: No response noted.

CRE: Yes. I-Cat CBCT (imaging Services) has been in use since October 2005.

Pros:

- All information obtained within 40 seconds
- Ability to display 3-D models
- Utilizes Dolphin software for Ceph tracing & implant placement
- No magnification, so surgeon may measure directly for implant placement
- Can be limited to maxilla or mandible
- Automatically calculates bone density
- Reduced radiation exposure
 - i-CAT 20 second scan: 68 uSv
 - i-CAT 10 second scan: 34 uSv
 - Daily background: 8 uSv
 - Panoramic (Average): 10-15 uSv
 - Digital Panoramic 4.7 – 14.9 uSv
 - Highest Film Pan 26 uSv
 - Full mouth series: 150 uSv
 - Medical CT 1200-3300 uSv*

Cons:

- If patient moves during scan, the result is blurry

- Some other systems have better resolution
- Expense

IOWA: Again, bad wording. We certainly have digital cephalometric systems. We do not have a CBCT, but are looking into it.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: Yes, since December 2005. We have the I-CAT (Imaging Sciences International).

- Fast image acquisition
- Seated patient
- Variable imaging volume (mandible, maxilla, both, whole head)
- Fairly reduced radiation exposure in comparison to medical CT and other cone-beam CT units
- The I-CAT is used for all complicated surgery, all implant and treatment planning for implants, TMJ patients, special patient care patients for cancer follow-up and diagnosis.
- High initial cost \$170,000 which includes a \$25,000 printer. This printer prints on film. One can use an ordinary printer that costs about \$500 if they don't want to print on film.

UNMC: We recently installed an Imaging Sciences I-Cat cone beam imaging system. The system has been in place for only 1 month so our familiarity with it is limited, however our radiologist is very pleased with it.

SASK: No response noted.

SIU: No response noted.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

COLO: No response noted.

CRE: Carbides are used for intracoronal preparations

IOWA: University of Iowa uses carbide burs.(no operative diamonds) for intracoronal procedures. Based on Jeff Nordin's May 2000 thesis: "Cutting Effectiveness of Operative Diamond and Carbide Cutting Instruments" Carbides dull more quickly with sterilization than with cutting on composite. The diamond is recommended for cutting composite as carbides dull more quickly cutting on composite than on amalgam. The diamond was much more effective cutting on composite (after one use). The carbide was unable to make a test cut after 5 standardized preparations on composite (Herculite XRV). Diamonds were still cutting effectively after 10 uses. Both

the carbide and diamond were effective in cutting amalgam (Tytin). Final cutting rates after 10 standardized preparations on amalgam were similar for carbide and diamond. The choice of diamond vs carbide for amalgam removal is more of a personal preference for the clinician. The diamond creates less particulate matter and the slurry produced is more easily rinsed by water spray.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: We use carbide burs for intracoronal preps.

UNMC: For intracoronal preparations we use carbide burs.

SASK: No response noted.

SIU: No response noted.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

COLO: No response noted.

CRE: Diamond burs for intracoronal preparations have not been considered

IOWA: We use some diamond fissurotomy burs. Otherwise diamonds are only used for crown preps.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: We have not tried diamond burs for intracoronal preps.

UNMC: NA There have not been any discussions on this topic.

SASK: No response noted.

SIU: No response noted.

IV. Electric Handpieces (*Topic Revisited*)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

COLO: No response noted.

CRE: Very limited. There was a trial in Faculty Practice for a number of months. The manufacturer then took back the demo units. There is one used as a bench unit in the Research Department. Our experience has been very favorable, however we are not planning on switching.

IOWA: We do not use electric handpieces but have tried them out. Generally they are quieter, have good torque, same high and low speed, but costlier and heavier than turbine handpieces. We are not planning to change to electric.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: Our experience after borrowing an electric handpiece in faculty practice was quite good. When the cost is more reasonable we might look at them. One can use water spray with slow speed. You get a constant speed, much more uniform finish because of the speed. Cost – control unit = \$1925 and slow speed attachment = \$835, and high speed handpiece = \$1020. Air has to be between 35-40 psi. Air is an on and off switch inside the electric box. Control unit senses a heavier load and makes automatic adjustments to maintain the speed, so the torque is also increased. No turbine, all gear driven. It is much quieter. The handpiece head may be too large for use in pedodontic patients.

UNMC: We do not use electric handpieces in our clinics. They are used to some extent in laboratories. We just replaced all of our handpieces, so there are no plans to convert to electric in the near future.

SASK: No response noted.

SIU: No response noted.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT.

COLO: No response noted.

CRE: With turbulence and measured implementation. Required amalgams still far outnumber required posterior composites. New teaching methods/technologies: BlackBoard is strongly promoted within the University;

Each year, more faculty are making use of it for their courses; The Dental School is committed to the adoption of a digital curriculum.

IOWA: Direct composite is not taking over amalgam but is integrated into restorative options. Students first learn the conventional amalgam preps and then emphasize defect specific cavity preparation. Our course material is on the Web through ICON.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: No. It has not. We teach posterior composites are good for restorations when we can bond to the ends of the enamel rods with a slight to moderate load on the restoration. Not for very deep or posterior restorations where caries has been. Blackboard and Respondus for exams. We have one faculty member who uses this for a review of Operative Dentistry during the fall and winter integrated into our clinic.

UNMC: Since composite resin is now used in more situations than it had been years ago, we spend more time on teaching the skills needed to prepare and restore posterior teeth with resin. However during the past 5 years there has not been a great change in the way we prepare our students. Newer materials, bonding and matrix systems are introduced as they come available. While not new, we use Blackboard Academic Suite 7.1 in many of our courses. Many faculty use Blackboard to post grades, place copies of PowerPoint or video presentations, give sample tests and in general communicate with students. Some of our preclinical courses utilize our 2 year old simulation clinic.

SASK: No response noted.

SIU: No response noted.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

COLO: No response noted.

CRE: Amalgams in one group and composites in another group. Black's traditional cavity preparation forms first, then complex preparations, lastly, minimally invasive procedures.

IOWA: In pre-clinical Operative students are taught amalgam first from simple to complex and then composites, more traditional, then esthetics (diastema, Class IV, realignment). In the clinic students are taught disease control and minimal invasive approach.

- MAN:** No response noted.
- MARQ:** No response noted.
- MINN:** No response noted.
- UMKC:** Yes we group amalgam and composite procedures together. In the lab we have an exercise where we start with the MO conservative Composite prep, then it is extended to an MOD Composite prep, then it is modified to an MOD porcelain inlay prep, then it is modified to an MOD gold inlay, then it is modified to an MOD gold onlay prep.
- UNMC:** We generally teach each restorative material separately. The skills are developed first from the simple and minimally invasive techniques proceeding to the more complex restorations
- SASK:** No response noted.
- SIU:** No response noted.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

- COLO:** No response noted.
- CRE:** With the greater utilization of direct placed composites, there is less reliance and need for cavity definition and mechanical retentive form.
- IOWA:** No, but critical thinking skills are increasing as students have to treat caries as a disease and with minimal invasive approach.
- MAN:** No response noted.
- MARQ:** No response noted.
- MINN:** No response noted.
- UMKC:** No. We think it is imperative that they have the motor skills to use the handpiece and recognize line angles so they can communicate with faculty about their preparations.
- UNMC:** Since we continue to teach amalgam, inlay and onlay techniques, the impact of direct placed composite resin has little effect on this. Amalgam continues to be used in the majority of our posterior restorations.
- SASK:** No response noted.
- SIU:** No response noted.

**VI. Discuss matrixing.
Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?**

COLO: No response noted.

CRE: For composites, sectional matrices are recommended. Bitine ring system is used for Class 2 composite restorations because of better predictability for a successful proximal contact.

IOWA: Amalgams: traditional metal matrix band, Ho band or #2 band and tofflemire. Composites: Palodent sectional matrix band with G-Ring from Garrison

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: We use both techniques. Palodent sectional matrix. As long as it does not extend past the line angles.

UNMC: Tofflemire and Automatrix matrix bands are generally used for amalgam restorations. For posterior composite resin restorations sectional matrix systems (Composi-Tight Gold – Garrison) are used. For Class III and IV composite resin restorations Mylar strips or Teflon ribbon is used

SASK: No response noted.

SIU: No response noted.

**VII. Who/which departments are placing implants?
Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?**

COLO: No response noted.

CRE: Oral Surgery and Periodontics are placing implants. Prosthodontics is restoring implants. Undergraduate exposure. Seniors only, that are capable may be permitted to place implants. Juniors may work up the case for restoration, and perform these restorative procedure.

IOWA: Perio and Oral Surgery are placing implants at the graduate and faculty level. Pros is restoring them at the grad level and senior dental students. Operative Dentistry does not restore implants but we plan to add this to the graduate program curriculum.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: Periodontics (A-M), Oral Surgery (N-Z) last names of patients. Undergraduate students in dental clinic. About 125-150 per year. 60% of the implants in the undergrad clinic are done by our Prosthodontists and 40% by our generalists. We use Nobel Biocare (SteriOss about 90% of the time and Strohmann about 10% of time but our goal is 50/50 for each system.

UNMC: Our Periodontal department places the implants. The implants are restored by the section of prosthodontics. Our students take a pre-clinical course on implantology. All clinical students are offered the opportunity to observe implant placement and must complete the restoration of at least one implant.

SASK: No response noted.

SIU: No response noted.

Any commentary on “*Let’s take the tooth out and place an implant versus doing endodontics.*” In other words, have implants had an effect on your students' experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

COLO: No response noted.

CRE: No.

IOWA: Not really, the only difference is we would extract more teeth with a guarded restorative prognosis and do an implant.

MAN: No response noted.

MARQ: No response noted.

MINN: No response noted.

UMKC: No, it is still less expensive to do endo and a crown at the school.

UNMC: This has not had a significant effect on the number of core build-ups our students do in the clinic, however the option of an implant is considered and offered to the patients in cases where the prognosis of a tooth is questionable.

SASK: No response noted.

SIU: No response noted.

Regional CODE Agenda

To be established by the respective Region and Regional Director. Please also report on responses to the Regional Agenda from all participants.

NO REGIONAL AGENDA SUBMITTED**Suggestions for CODE.**

- What can the organization do to improve its effectiveness?

- Any comments or suggestions to improve the Web site?

<http://www.unmc.edu/code/codeframe.html>

NOTE: to locate the web site via a search engine, enter Academy of Operative Dentistry and then use the link CODE and ADEA.

- Other comments/suggestions?

UMKC: Setting up a regional pool of test questions.

CODE Region II Attendees Form

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|------------------------------------|-------------------|----------------|---------------|-----------------------------------|
| Anthony Ziebert | Marquette | 414- 288-3704 | 414- 288-5752 | anthony-ziebert@marquette.edu |
| Gary Stafford | Marquette | 414- 288-5409 | 414- 288-5752 | gary-stafford@marquette.edu |
| Kalid Aziz | Marquette | 414- 288-0772 | 414- 288-0678 | kaalid-aziz@marquette.edu |
| Hide Watanabe | UNMC | 402- 472-3049 | 402- 472-5290 | hwatanabe@unmc.edu |
| Bill Johnson | UNMC | 402- 472-9406 | 402- 472-5290 | wwjohnson@unmc.edu |
| John Purk | UMKC | 816- 235-2168 | 816- 235-5524 | purkj@umkc.edu |
| Gerald Denehy | Ulowa | 319- 335-7209 | 319- 335-7267 | gerald-denehy@uiowa.edu |
| Deborah Cobb | Ulowa | 319- 335-7214 | 319- 335-7267 | deborah-cobb@uiowa.edu |
| Justine Kolker | Ulowa | 319- 335-7209 | 319- 335-7267 | |
| Marcela Hernandez | Ulowa | 319- 335-7313 | 319- 335-7267 | marcela-hernandez@uiowa.edu |
| Murray Bouschlicher | Ulowa | 319- 335-7210 | 319- 335-7267 | murray-bouschlicher@uiowa.edu |
| Sandra Guzman Armstrong | Ulowa | 319- 335-7216 | 319- 335-7267 | sandra-guzman-armstrong@uiowa.edu |
| Satish Khera | Ulowa | 319- 335-7209 | 319- 335-7267 | |
| Saulo Geraldeli | Ulowa | 319- 384-3250 | 319- 335-7267 | saulo-geraldeli@uiowa.edu |
| Steve Armstrong | Ulowa | 319- 335-7211 | 319- 335-7267 | stevem-armstrong@uiowa.edu |
| Thomas Schulein | Ulowa | 319- 335-7209 | 319- 335-7267 | |
| R. Scott Shaddy | Creighton | 402- 280-5226 | 402- 280-5094 | shaddy@creighton.edu |
| Larry Haisch, National Director | UNMC | 402- 472-1290 | 402- 472-5290 | lhaisch@unmc.edu |

CODE REGIONAL MEETING REPORT FORM

REGION: Ill South Midwest

LOCATION AND DATE OF MEETING:

University of Texas Health Science Center at Houston

Houston, Texas

November 1 - 3, 2006

CHAIRPERSON:

Name: Dr. William H. Tate

Phone #: 713-500-4264

Address: UTHSCH

Fax #: 713-500-4108

6516 M.D. Anderson Blvd, 493

E-mail: william.h.tate@uth.tmc.edu

Houston, TX 77030-3402

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

Suggested Agenda Items for Next Year:

1. Experiences (if any) with electronic patient record (EPR) systems (paperless records)
2. Teaching philosophies for the "new" generation of students (altered approaches)?
3. Experiences (recommendations) regarding post and core cements.

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Terry Fruits

Phone #: 405-271-5735

Address: University of Oklahoma
College of Dentistry

Fax #: 405-271-3006

1001 Stanton Young Blvd

E-mail : Terry-fruits@ouhsc.edu

Oklahoma City, OK 73190-3044

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.

**2006 NATIONAL CODE AGENDA
REGION III
SUMMARY RESPONSES TO NATIONAL AGENDA**

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

Overall consensus list (in no particular order)

- Amalgam (Class I, II, V) Class III mostly omitted
- Composite Direct (Class I, II, III, IV, V)
- Caries Diagnosis and Removal
- Isolation Techniques (rubber dams , others)
- Caries Control (sedative fillings, pulp capping)
- Glass Ionomer Restoratives (usually involving Class V reparations/restorations)
- Sealants and Preventive Resin Restorations
- Amalgam Core Build-ups (pin, slot, or adhesive retention)
- Inlays & Onlays (gold, composite, and/or ceramic)
- Remineralization Techniques/Caries Risk Assessment (both are often covered in Operative and elsewhere, depending upon curriculum, nevertheless these concepts and techniques are recognized as core)

2006 NATIONAL CODE AGENDA
REGION III RESPONSES
(Evidence cited where applicable)

Region III School Abbreviations

| | | | |
|------|----------------------------|------|-----------------------------------|
| BAY | Baylor University | OKU | University of Oklahoma |
| LSU | Louisiana State University | TENN | University of Tennessee |
| MISS | University of Mississippi | UTSA | University of Texas - San Antonio |
| | UTH | | University of Texas - Houston |

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts. Pre-clinical Operative Dentistry Curriculum Survey**
- List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.**

Examples (in no particular order) include, but are NOT limited to:

- **Amalgam (Class I, Class II, Class III, Class V).**
- **Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)**
- **Diastema Closure (Elective with composite or porcelain)**
- **Composite Indirect (Class I, Class II)**
- **Veneers (Porcelain, composite)**
- **Inlays (Gold, composite, ceramic)**
- **Onlays (Gold, composite, ceramic)**
- **Glass Ionomer Restoratives (Class I, Class V)**
- **Sealants and Preventive Resin Restorations**
- **Isolation Techniques (Rubber dam, others)**
- **Caries Risk Assessment**
- **Caries Diagnosis and Removal**
- **Caries Control (Sedative fillings, pulp capping)**
- **Remineralization Therapies**
- **Amalgam Core Build-ups (Pin, slot, or adhesive retention)**
- **Composite Core Build-ups (Mechanical and adhesive retention)**
- **Air abrasion techniques**
- **Lasers for restorative procedures**
- **CAD-CAM restorations (CEREC III)**

Please be as specific as possible. For example:

- **Amalgam (Class I, II, And V only). Class III was omitted.**
- **Veneers (Direct composite only). Porcelain taught by Fixed.**
- **Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.**
- **Composite Core Build-ups only. (Amalgam excluded).**

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

BAY:

List of importance:

1. Conservative preparation design: to establish proper outline from and to conserve tooth structure taking into account the restorative material to be used for the final restoration
2. Caries Diagnosis and Removal
3. Caries Control(sedative fillings, pulp capping)
4. Use of liners and bases (indications, materials and their usage)
5. Isolation Techniques (rubber dam taught and used in D2 year and clinically, other means discussed and used in D3 year)
6. Amalgam (Class I, Class II, Class V)
7. Composite Direct (Class I, II, III, IV, V, VI)
8. Amalgam Core Build-ups (pin, slot, groove or adhesive retention)
9. Composite Core Build-ups (mechanical and adhesive retention)
10. Onlays (gold taught in D2 and D3 years and used clinically; ceramic taught in D4 and used clinically when indicated)
11. Inlays (gold taught in D2 and D3 years and used clinically; ceramic taught in D4 and used clinically when indicated)
12. Caries Risk Assessment
 - Diastema Closure (elective with composite or porcelain) Diastema closure with direct composite is taught in D3 operative rather than in pre-clinical operative. Diastema closure with porcelain is taught in the Fixed Pros courses.
 - Composite Indirect (Class I, Class II) This is not taught at Baylor.
 - Veneers (porcelain, composite) This is taught in pre-clinical Fixed Pros as well as on a case by case basis in the D3 Operative (direct composite) and Fixed Pros (porcelain) clinical setting.
 - Glass Ionomer Restoratives (Class I, Class V) This is taught in Preventive and Pedodontic courses. Occasionally Class V glass ionomer restorations are placed in the D3 Operative clinic.
 - Sealants and Preventive Resin Restorations. This is taught in Preventive and Pedodontic courses. Sealants and composite PRRs are done in the D3 Operative clinic.
 - Remineralization therapies. This is taught in Preventive and Pedodontic courses. Fluoride varnishes are placed in the D3 Operative clinic.
 - Air abrasion techniques. This is not taught at the undergraduate level.
 - Lasers for restorative procedures. This is not taught at the undergraduate level.
 - CAD-CAM restorations (CEREC III). This is taught in Fixed Pros and in the D4 clinical year as an eight week selective. Students place CAD-CAM restorations in the D4 year only.

LSU:

List of importance:

1. Amalgam restorations: all classes except 3, 4, and 6
2. Direct composites all classes
3. Isolation techniques, RD
4. Caries diagnosis and removal
5. Sedative restorations, vital pulp therapy
6. Caries risk assessment
7. Amalgam core build-ups, pin retained restorations and composite core build-ups with mechanical and adhesive retention
8. Sealants and Preventive Resin Restorations
9. Glass ionomer restoratives (goes with #5)
10. Onlays both gold and ceramic equally

- MISS:** List of importance:
1. Amalgam (Class I, Class II only)
 2. Composite Direct (Class I, II, III, IV, V, VI)
 3. Caries Diagnosis and Removal
 4. Caries Control(sedative fillings, pulp capping)
 5. Glass ionomer Restoratives (Class V)
 6. Isolation Techniques (rubber dam, others)
 7. Amalgam core build-ups (pin, slot, or adhesive retention)
 8. Composite Core Build-ups (mechanical and adhesive retention)
 9. Onlays (gold, composite, ceramic-in fixed)
 10. Sealants and Preventive Resin Restorations
 11. Diastema closure (direct composite)
 12. Veneers (Direct composite)
 13. Lasers for restorative procedures

- OKU:** List of importance:
1. Amalgam (Class I, Class II, Class V) Class III omitted.
 2. Isolation Techniques (rubber dam, others)
 3. Composite Direct (Class I, II, III, IV, V, VI)
 4. Glass Ionomer Restoratives (Class V)
 5. Sealants and Preventive Resin Restorations
 6. Caries Diagnosis and Removal
 7. Caries Control (sedative fillings, pulp capping)
 8. Amalgam core build-ups (pin, slot, or adhesive retention)
 9. Onlays (gold taught by Fixed Pros)
 10. Pulp Protection
 11. Remineralization Therapies
 12. Caries Risk Assessment

- TENN:** List of importance:
1. Caries Diagnosis and Removal
 2. Amalgam (Class I, Class II, Class III, Class V)
 3. Isolation Techniques (rubber dam, others)
 4. Composite Direct (Class I, II, III, IV, V, VI)
 5. Composite Build-ups (mechanical and adhesive retention)
 6. Amalgam Core Build-ups (pin, slot, or adhesive retention)
 7. Sealants and Preventive Resin Restorations
 8. Glass Ionomer Restoratives (Class I, Class V)
- Though important, these are handled on a case by case basis:
 - Caries Risk Assessment
 - Caries Control (sedative fillings, pulp capping)
 - Remineralization Techniques
 - Discussed, but are not taught in the clinic:
 - Air abrasion techniques
 - Lasers for restorative procedures
 - These procedures are part of the Esthetics Curriculum:
 - CAD-CAM restorations (CEREC III)
 - Diastema closure (elective with composite or porcelain)
 - Composite Indirect (Class I, Class II)
 - Veneers (porcelain, composite)
 - These procedures are part of the Fixed Pros Curriculum:
 - Inlays (gold, composite, ceramic)
 - Onlays (gold, composite, ceramic)

UTSA:

List of importance:

1. Amalgam (Class I, No Class 5 project in the pre-clinical course)
2. Composite Direct (Class I, II, III, IV, V)
3. Glass Ionomer (Class V)
4. Dentin Bonding
5. Amalgam Core Build-ups (TMS Link pins, slots and Amalgambond Plus with HPA)
6. Rubber dam
7. Sealants and Preventive Resin Restorations
8. Caries Risk Assessment
9. Caries Diagnosis and Removal
10. Remineralization Therapies
11. Operative Armamentarium
12. Instrument sharpening
13. Carbide burs
14. Ergonomics
15. Indirect Pulp Capping Technique

There is a CAD-CAM elective that more than half the junior class took in 2006. The CAD-CAM course is small group (2-5) students per group and three half-day sessions in length. We have a mandatory Esthetics course taught by Operative for all juniors in July for the junior year. The course is dedicated to porcelain laminate and 360 veneers. There was an onlay preparation taught in the Fixed Pros course until 2 years ago. Pros now has an onlay/inlay reading assignment but no pre-clinical lab training is provided. There is no consensus at UTSA about the suitability of resin composite as a crown foundation material. Most instructors see resin composite as the material of choice in the esthetic zone. Some instructors find resin composite the material of choice for all build-ups because no matrix is required. There is a small group that prefer that all build-ups be amalgam.

UTH:

The request to identify essential core Operative Dentistry Curriculum items that are “non-negotiable” in a certain school suggests a somewhat firm initiative. What is considered “non-negotiable” by pre-clinical Restorative/Operative faculty may or may not be considered as “non-negotiable” by others within that school. In the opinion of the pre-clinical faculty at our school, the following are considered essential elements in the teaching of, the understanding of, and the proper application of Operative Dentistry (techniques and the course in which the techniques are presented):

| <u>Technique</u> | <u>Course</u> |
|--|---------------|
| Amalgam (Class I, II, V) Class III omitted | Operative |
| Composite Direct (Class I, II, III, IV, V) Class VI omitted | Operative |
| Isolation Techniques | Operative |
| Sealants and Preventive Resin Restorations | Operative |
| Caries Diagnosis and Removal | Operative |
| Remineralization Therapies | Operative |
| Caries Control (sedative fillings, pulp capping) | Operative |
| Inlays & onlays (gold, composite, ceramic) | |
| ▶ Indirect Class II Composites - Operative & Inlay/onlay | Operative |
| ▶ Gold, inlay/onlay - Inlay/onlay course | Inlay/Onlay |
| ▶ Ceramics - Esthetics course (D3 year) | Esthetics |
| Amalgam Core Build-ups (pin, slot, or adhesive retention) | Operative |
| Composite Core Build-ups (mechanical and adhesive retention) | Operative |

| | |
|--|-----------|
| Glass Ionomer Restoratives (Class I, Class V) | Operative |
| ▶ Glass ionomer cements are covered in lecture within Operative; however, there are no hands-on projects | |
| Caries Risk Assessment | Operative |
| ▶ Briefly covered in Operative; the need for substantive guidelines are continually discussed for inclusion within the Diagnosis (Dx) and Treatment Planning Curriculum. | |
| Air Abrasion techniques | Operative |
| ▶ Discussed/explained, but no hands-on projects. Our units have been used clinically for minimally invasive procedures; however, since there is a time consuming acquisition (check-out) and system set-up, most students defer to a flame-shaped diamond or a small carbide bur for the procedure(s). | |
| Diastema Closure | Esthetics |
| Veneers | Esthetics |
| CAD-CAM restorations (CEREC III) | |
| ▶ To be implemented (possibly) within Inlay/Onlay and Pros (after acquisition of a system at some point). Restorative/Operative faculty attended a two day hands-on seminar on the CERAC 3D when it was first introduced. Restorative faculty supported and recognized CAD-CAM as a developing technology. An opinion was expressed that the technology should be incorporated into the school to increase the understanding of this technology and for future (potential) clinical and pre-clinical application. The Restorative/Operative faculty would also like to incorporate this technology into the Inlay/Onlay course (as well as the Operative courses); however, the plans, if any, to obtain such an instrument are unknown. | |
| Lasers for restorative procedures | |
| ▶ The Department is considering a unit (soft tissue instrument) to be used by the Restorative faculty to help with restorative procedures (an adjunct as needed.) The unit would be used similar to an electrosurgery unit since both instruments have similar overall application in many situations; aiding in tissue removal for better impression taking (if needed.). etc. | |
| ▶ A harder tissue laser would be a welcome instrument to evaluate and apply in pertinent clinical situations; a developing technology to understand and contribute to the growth of both the students and the faculty; however, the plans, if any, to obtain such an instrument are unknown. | |

II. What is the current use of digital radiographs in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

BAY: We are in the process of converting to all digital radiography throughout the school. Some smaller clinical areas converted within the last year or so. Our graduate endodontic program has been digital for a little over one year. Our radiology clinic has been using digital panoramic radiography for our undergraduate emergency clinic for the past six to eight months. Our plan is that by January 8, 2007, we will have completed our transition to 100% digital radiography with computers at each undergraduate as well as graduate dental unit throughout the school. By June 2007, we will have our electronic record system running throughout the school. Paper records will be phased out over a five year period.

- LSU:** Currently using exclusively in all clinics in the school. We've been using them since we opened our new clinics in Baton Rouge. All radiographs are digital even Panorex.
- MISS:** Digital radiographs are the main source of radiographs taken at our school. There is access to digital radiography in all student clinics. Digital radiographs have been used as a primary source of radiographs since June 2006.
- OKU:** Mainly for extraoral radiography and limited intraoral imaging. At our college, currently the oral surgery department and graduate orthodontic program is utilizing digital extraoral panoramic and cephalometric images for the past 6 to 9 months. In the area of advanced imaging, cone-beam CT scans are being used, if indicated, in treatment planning of implant patients by oral surgery, implantology, and the department of graduate periodontics. This has been in practice since March 2006. We will be acquiring a digital pan ceph unit and it will be placed in oral radiology clinic. Various clinics will be connected and will be able to view those images on monitors. There is a plan to go completely digital throughout the school in about 2 years time. Also, the AEGD at school is using intraoral dental images for implant cases and during endodontic procedures. It has been used for almost the past 2 years.
- TENN:** Endo uses the Digora System (SPP). Endo has had the Digora system for over six years. Ortho used the Instrumentarium OP 100 (CCD). Ortho has also had their system for over six years. Grad Perio used to have a digital radiograph, but it no longer works. Digital radiographs were installed and implemented at the end of August. We are using GenDex Visualix eHD (KaVo) (CCD) and Vix Win software. We will have the ability to take both digital single films and digital pantographs.
- UTSA:** We have been using digital radiographs in Endo since 1996. We have been digital in all the graduate areas since 2004 and in undergraduate since 2005. We are now close to 100% digital.
- UTH:** We had planned to institute digital radiography at the start of the Fall semester, however, there are technical issues in the UT network integrating the image management software (i.e., PACS - Picture Archiving and Communication Systems) with the Electronic Patient Record clinical software program (EPR). As soon as they are worked out, we will institute the use of digitally acquired images in the clinic. There are Beta testing sites in the school right now but network issues are still to be resolved. Half of the pre-clinical radiology labs exercises are scheduled for digital imaging. The students will be learning to use photostimulable phosphor plates and solid state sensors in the labs because they will be using both types of intraoral imaging technologies with patients.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

- BAY:** We cannot answer at this time since we have not used digital radiography at our school except on a limited basis.
- LSU:** Interpretation varies between faculty but overall the quality of radiographs is at least comparable with conventional and the ability to diagnose is enhanced by the option of zooming in.

- MISS:** Digital radiographs have helped in the students being able to take and develop the images faster, have access to the radiographs with or without the chart, and they can be accessed in any area of the school with the wireless laptop system. The hinders have been due to the learning curve of operating the software, the wireless system being slow or hard to access at times, the resolution of the laptop screens, and the students bringing their laptops to clinic. We have found the desktop hard wired computers to be faster and have better resolution than on the laptops. With the proper resolution the digital images have done as well as traditional radiographic technique in diagnosing incipient interproximal and occlusal caries.
- OKU:** Currently we are not using intraoral digital images for diagnosis of caries.
- TENN:** Unknown at this time.
- UTSA:** The student laptop computer screens do not have sufficient brightness/resolution to ideally review the radiographs. The lights need to be dimmed and the computer infection control cover usually needs to be removed. Viewing the images on the high definition monitors in the radiology area and at several monitors set up around the clinic is better. The digital radiographs can be adjusted for contrast, density, and sharpness for optimal viewing.
- UTH:** Our Radiology department does not anticipate any hindrance of diagnostic capability. In peer-reviewed journals, digital images do not lose any diagnostic information despite having slightly less resolution than film images. The Radiology department reports that it will probably make test comparisons when digital clinical protocols are established within the school.

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

- BAY:** Our graduate endodontic program has been using the Schick CCD wired system used with student owned lap top computers for the last year. They are not planning to change from this type of system. Our undergraduate clinic as well as most of our other graduate clinics will be using the Photostimulable Phosphor Sensors.
Considerations include the following:
1. CCDs are sensitive to overexposure or “blooming” while the Phosphor sensors or plates have wider latitude, i.e., it is more difficult to over- or underexpose the sensor.
 2. CCD and CMOS systems are less user and patient friendly than the Phosphor sensors since they are bulkier, attached to a wire (in many cases) and a little harder to place than the latter. Using Phosphor sensors is more like using conventional film so there is also less of a learning curve for auxiliaries who are trained to take conventional films.
 3. The Phosphor sensors or plates are less expensive than either of the CCD or CMOS sensors per unit.
- LSU:** We are using the Schick system with direct sensors. Quality of radiographs is fine. Concern is for the longevity of the sensors in undergraduate clinic use and the cost of replacement. The school is looking at insurance for the sensors to reduce replacement cost.

MISS: Our school uses both direct sensors and storage phosphor plates. Phosphor plates are used in the radiology clinic for periapical, bitewing, and occlusal films. The direct sensors are used mainly in the endo clinic, but there is a direct sensor in each of the student clinics if only one or two updated radiographs are needed. The phosphor plates seem to be the easiest for the students to use. The phosphor plates cost less and have been able to be used many times, and seem to be a little more durable in student's hands. The direct sensors are great for the endo clinic, but due to their high cost and multiple students handling, they are limited in their use.

OKU: Again, at this time our school has limited usage for intraoral digital images. AEGD department has CCD sensors and is used frequently by the AEGD residents. Endodontic department had SPP system but currently not utilized due to lack of availability for monitors at each station. Recommendation for use in school: Based on experience and information gathered from various dental schools, SPP can be utilized for FMX and various periapical combinations. CCD would be the choice for emergency patients, and endodontic procedures. CCD sensors are much more expensive to replace compared to SPP.

TENN: We are using the direct sensor (CCD). The school we talked to who were using the phosphor plates were either changing to the direct or wanted to. Therefore, we sought and obtained the direct sensors (CCD).

PROS:

SPP

Reduction in radiation doses
(vs. Conventional)
Reusable photosimulated screen
Wider exposure latitude than CCD
More flexible plates than CCD
Thinner than CCD
No cord attaching to computer

CCD

Reduction in radiation doses
(vs. Conventional)
Quicker image acquisition vs. SPP
Better image resolution than SPP

CONS:

SPP

More time need to readout image
Need for readout device to scan plates
Plates must be exposed to light to erase
Image resolution less than CCD
Durability? Scratches on image?

CCD

Cord attaches sensor to computer
Thicker sensor
Less flexible than SPP
Fragile Cord? Patient biting cord?

Reference: *Bedard A, Davis TD, Angelopoulos C. Storage Phosphor Plates: How durable are they as a Digital Dental Radiographic System? J Contemp Dent Pract 2004 May;(5)2:057-069*

UTSA: Our school has the graduate areas using a CCD/CMOS type system and undergraduate areas using a SPP system. The rationale for this is:

- Graduate areas usually need rapid or instant imaging (i.e, Endo, Pedo, OMFS) CCDs deliver this.
- Closer supervision is possible in graduate areas to prevent loss or breakage of expensive CCD sensors.
- Undergraduate students can learn on SPP imaging, but still get a similar experience to using film. So we don't have to teach both and they could easily transition to film if they had to.
- SPP systems are sturdier and the plates relatively inexpensive which makes them preferable for undergraduate use.

UTH: We will use both; however, the majority will initially be with storage phosphor plates (SPP). The advantage of the SPP is that they are handled in a manner very similar to film. Once exposed, they also require processing (not with chemicals but with a laser light scanner). The problem with the SPPs is that there is an increased workflow concerns. Once we have overcome the initial learning steps of digital imaging, we plan to shift to direct sensors (CCD). Although a little harder to use initially, there is a significant reduction in staff and equipment workflows with CCDs.

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

BAY: We do have a cone beam 3-D dental imaging system, the I-CAT. We have been using this system since November 2005.

Pros and Cons for this specific system:

One advantage of this system is the fact that this system has a small footprint. We also have an excellent rapport with the company, Imaging Sciences International, who also provides excellent technical support. This system is user friendly, has a wide user network, and is less expensive than others on the market. There are no real disadvantages of this particular cone beam system. The "free" user software lacks some features on the one hand, but it does have the advantage of being user interactive.

LSU: We don't have equipment at the schools. Oral surgery is using then from Local Imaging Service in New Orleans.

MISS: Our school does have a digital cephalometric and panoramic acquisition (Plan meca). We do not have a cone beam 3-D imaging system. We have been using the digital cephalometric and panoramic since June 2006. The digital cephalometric and panoramic have mostly been pros. The quality and speed of acquiring the images has been very good. The only con has been the learning curve of a new system as would occur with any new system.

OKU: Yes, we do have Iluma cone-beam CT system. We started using it towards the end of March 2006.

Pros: Upright seating position for the patient

Higher image resolution

Multiple buying or leasing options offered for buyers by the company

Cons: Relatively longer exposure compared to some other systems available

Somewhat bulky machine

Can be esthetically improved

TENN: No.

UTSA: Our cone beam machine is the Morita Accuitomo FPD.

Pros: High resolution

Low radiation dose

Reliability

Image quality

Cons: Cost

We have had the cone beam system since February 2004. We just upgraded the unit in May of 2006.

UTH: Not yet. This is a longer term goal. However, volume scanning and reformatting of images does not have much practical value for caries detection (viewpoint of the Radiology department) There may be some value for pre-cementation checks of large prosthodontic restorations. There may also be value for root fractures, but this is in the developmental stages.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

BAY: Neither currently nor in the past have diamond burs been used at Baylor for intracoronal procedures in any pre-clinical or clinical courses at the undergraduate level. Students purchase carbide burs in their student kits for pre-clinical laboratory courses in Operative Dentistry. They are provided carbide burs at the dispensary window for clinical use. There is no plan to use diamond instruments for intracoronal procedures in the future. The AEGD Program uses a kit of diamonds for porcelain preparation (inlay and onlay) which includes the following Kerr diamonds:

220R flame

216C flame

825C wheel (donut) - occlusal reduction

620C football - occlusal reduction

760R flat end taper - isthmus walls, pulpal and gingival floors, shoulders

755C round end taper - isthmus walls, shoulders

785C round end taper - isthmus walls, shoulders

This kit is also used for crown and bridge.

LSU: In the Esthetics course, diamond burs, KR series are preferred for ceramic and composite indirect restorations. In our preclinical course we don't have water. These diamonds will burn up and the typodonts teeth if cut dry. We are using 271 carbide in these clinics and I assume the students are using them in clinic. Diamond burs are furnished in clinical kits for the students. We've recommended the KR series diamonds from Brasseler. They provide more rounded internal line angles and come in coarse and fine grits. We would like to see the slightly coarse texture for bonding. This provides more surface area and thus greater bond.

MISS: We use carbide burs for most intracoronal operative procedures. Diamond burs are introduced in the onlay course as an instrument to prepare and refine the occlusal isthmus and proximal boxes (845kr.018) for inlays/onlays.

OKU: We use carbide burs for most intracoronal procedures. We have considered diamond burs for intracoronal procedures but not utilized them.

TENN: We have looked into the use of diamond operative burs on a limited basis. The rationale was due to the occasional tendency for carbide burs to "grab," pulling the bur into ivory teeth. One concern we had in using diamond burs was the "roughness" caused by the diamond burs and its affect on the DentSim's grading of a preparation for smoothness. To answer some of our concerns we had some of the first year dental students while in DentSim lab try Brasseler's 830-030 diamond bur (similar to a FG 330). The students were amazed with how smooth

the bur cut compared to the FG 245 carbide bur but they were using the DentSim Lab. Students were asking if the diamonds would be available in their operative course. The director of the DentSim lab also tried the diamond burs and he was impressed with how easy the burs were to manipulate while working on ivory teeth and he felt implementing diamond burs into the operative course would be a wise move, especially with composites becoming the restoration of choice in operative.

UTSA: Coarse and fine diamonds are used for extra-coronal preparation sin crown and bridge. Diamond burs may be used to roughen existing composites for a repair and fine flame shaped diamonds are occasionally used for beveling enamel. (We have not considered or tried diamond burs for intracoronal procedures.) Currently we use a fourth generation bonding agent which does not seem to be as affected by bur choice. There is some literature that suggests self-etch systems may do better with carbide bur preparations.

UTH: For Operative Dentistry procedure, we use carbide burs for intracoronal procedures and have not considered or tried diamond burs for traditional intracoronal polishing. However, diamond burs are used for some (conservative/caries directed/minimally invasive) composite resin restoration procedures; mainly conservative Class I preparations [preventive resin restorations (PRRs) or even with very conservative Class I composite restorations]. Diamond burs are used mostly for beveling (as needed with composite resin preparations) in Operative and for beveling (gold) Inlay/Onlay preparations. Burs used for Operative include 8862-31-010 (tapered) and 801-31-016 (round for beveling Class V composite resin preparation), both from Brasseler.

IV. Electric Handpieces (Topic Revisited)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

BAY: Electric handpieces are not being used in the D3 clinic or in D2 pre-clinical training. Dour D4, General Dentistry department, is creating four “state of the art” or “high tech” operatories to be used by the fourth year students and these operatories will be equipped with the Kano ELECTROtorque plus handpieces. At this time, no other plans have been made to expand the use of electric handpieces within the school.

LSU: We haven’t played with these since we lost them in the flood. They worked pretty well. Had good/great torque. Similar to the old belt driven slow speed we used when we were in school 50 years ago. We are about to evaluate 2 manufacturer’s systems - Kavo and NSK.

MISS: Yes, electric handpieces have been used in the clinical laboratory by 3rd and 4th year students for approximately 2 years. The experience has been relatively good with the Kavo units, no problems so far. E will have electric handpieces (W&H) installed in the bench (wet lab) portion of our new simulation suite for the spring quarter. Also on the simulation units there will be a connection for an electric handpiece (W&H) for endo use. Not using any for direct patient care at the present time.

- OKU:** No. The operative department has no plans to switch to an electric handpiece. The endodontic department plans to switch to an electric handpiece (Aceptico) for rotary instrumentation in the Summer/Fall of 2007.
- TENN:** Yes. First year class will have Brasseler NSK handpieces as part of their kits. Electric handpiece units were installed in the Esthetic Section off the clinic. Trial electric handpieces were placed in the Esthetic clinic for evaluation. NSK and W&H for 1 year. Kavo and Dentsply/Midwest for 3 months. Students and faculty have liked the electric handpieces better than air driven turbines. More torque and less noise and vibration. Yes, (we are switching). NSK electric handpieces are part of this year's incoming class. Electric handpieces will be phased into the clinic with this class.
- UTSA:** For the last three years the faculty practice clinic has had one room (of nine) set up with an electric handpiece. Operative acquired an electric handpiece in the summer of 2006 to use for preparation of demonstration models and photographs for the Sophomore Operative Course. Our experience with the electric handpiece has been good. The following are the pros and cons that we have experienced.
- Pros:
- They have high consistent torque compared to air-turbine where torque degenerates after a relative short period of time.
 - Does not stall out when load is applied.
 - In cases where cutting efficiency is poor, you can lock at the exact torque read-out and know that the inefficiency is due to a dull bur and not to stall out.
 - Have low levels of vibration and runs smoother than air-turbine.
 - They have a wide range of speed and the operator can dial the exact speed that is needed.
 - You do not have to change handpieces when going from high speed to low speed.
 - They are quieter than air-turbine.
 - Provide more precise cutting without the problems of concentricity that air-turbine have.
 - Mobile and can be placed in any room with little to no set up.
 - They are easier to repair and have less break down.
 - Ability to do a procedure without compressed air in the mouth if needed.
 - One motor runs several attachments.
- Cons:
- Learning curve because operation is very difficult than air-turbine.
 - Can not use pedal to stall out, must touch a dial.
 - Higher speeds may cause more rotary damage with new learners.
 - The head is larger which limits visibility.
 - The handpiece is heavier.
- There are no plans for the use of these handpieces in the clinic at this time.
- UTH:** No, not in the undergraduate clinics or in the pre-clinical laboratories. Electric handpieces (NSK, Adec, Kavo) were evaluated (hands-on) by the Restorative/Operative faculty and a product was recommended around 3 years ago. A transitional implementation was suggested, beginning with first year class (in Operative). Seemingly, decisions and arrangements have been made for the inclusion of this technology within our clinics (since our new clinic chairs have the proper connection), however, at this time, we are unable to answer when or if the school will switch (totally or partially) to electric handpieces clinically or per-clinically. However, graduate Endodontics does use electric handpieces. Their

observation/comments are as follows: research has shown that the electric do very well as far as maintaining the proper RPM required by the instruments; they last quite a long time if they are properly maintained; it is questionable as to whether there is any advantage to having torque control with auto reverse or working length control combined in the control box; the primary disadvantages are the cords/wires/pedal that are needed, however, you can use a cart system or across the chest delivery system that will avoid those problems.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT.

- BAY:** Preparation design for direct composite resin materials as well as restorative technique is taught in D2 and D3 Operative courses. During the D2 Operative course, students perform procedures on typodonts and extracted teeth in the simulation lab. Preparation design follows the same stringent guidelines as for amalgam with few exceptions. The students are instructed that clinically speaking, composite preparation design is largely dictated by decay and that often a more conservative outline form involving the removal of only the infected enamel and dentin would be indicated and that this is determined on a case by case basis. The amalgam preparation design for Class I and II composites is used preclinically to give the student guidelines to follow and instructors criteria by which to judge the student's hand skills. (Describe new or different teaching methods/technologies as Web CT.) None in use at this time for Operative dentistry.
- LSU:** This is old business to us. We've been placing composites for years. We require just as many posterior composite restorations as amalgams and in the junior year Class II required experiences may be amalgam or composite. Our build-up for crowns are all in composite as long as we can isolate the tooth. The first half of our pre-clinical operative course is based on composite restorations. Actually much more time is spent on resins than amalgam. LSU uses a Microsoft software program titled Share Point. This is a program designed for small business applications, however, it has worked well as a BlackBoard/Web CT type of medium to manage and distribute notes and lectures on-line allowing student access.
- MISS:** With adhesive technology, our principles of cavity preparation are changing. We are encouraging students to be conservative and their hand skills are developing accordingly. We have found that students are able to develop appropriate hand skills, and keep preparations extremely conservative. Some have had issues with being able to fit a necessary instrument into their conservative preparation. We are aware that Eagle instruments are fabricating smaller spoon excavators for this purpose. Many of the faculty recommended bonded composites for large buildups rather than the traditional pin amalgam. Spring of 2007 we plan to open our pre-clinical simulation suite. The biggest advantage of the simulation suite will be live demonstrations for the class instead of individual demonstrations, and the ability to archive procedures; lectures and tutorials can be made available for students outside of class and courses.
- OKU:** Direct placed composite restorations are not over taking amalgam as the basic restorative material in our clinic. This may be the case in some private practices, but we feel that amalgam still is the best material for the majority of posterior restorations. We have certainly seen an increase in the use of resin composites

for conservative posterior restorations, but amalgam is still considered the material of choice for restorations exposed to the heavy occlusal forces in these areas. Most of our patients choose amalgam restorations over resin composite when presented with information comparing the advantages and disadvantages of these two types of posterior restorations. We have introduced more pre-clinical lab projects teaching conservative restorative techniques with resin composite. The larger selection of restorative approaches to the treatment of various carious lesions requires more emphasis on diagnosis, treatment planning and decision-making. (Describe new or different teaching methods/technologies as Web CT.) None other than developing digital teaching videos of various operative procedures.

- TENN:** Less time is spent on amalgam preps now as compared to several years ago, but through intense use of our DentSim facilities, our students still are able to develop their hand skills. One of our challenges is balancing the need of our students to learn how to place composites properly and our students are still needing to know how to place amalgam, since Class II amalgams are still part of the Southern Regional Testing Agency (SRTA). All classes are placed on BlackBoard. Class information, announcements, lectures, instruction and other information are posted on the BlackBoard site for students. Students can be e-mailed with needed information. Grades are posted in the BlackBoard "Gradebook". BlackBoard allows us to place quizzes/tests online for the students to take, quizzes/tests are graded and placed into the "Gradebook" automatically.
- UTSA:** In academic year 2005-2006 at (our school) 2,963 posterior resin composite restorations were placed in the undergraduate clinic in comparison to 1,936 amalgam restorations. 1,746 core buildup/pins (ADA code 02950) were placed using either amalgam or composite as foundation restorations. Our coding system does not distinguish the material but many of these buildups were bonded amalgam restorations. Amalgam remains an important restorative material at (our school) although direct placement composite resin restorations have surpassed amalgam as final restorations. Operative Dentistry is taught for the first time at (our school) in the Sophomore Year. This course is one year long. Each week the students receive a lecture on clinical application of the skills being taught and a detailed description of the project they will accomplish in the laboratory. The projects generally fall into one of three categories: hand skill exercises (where students make preparations of specific dimensions); clinical simulations (where students prepare and restore teeth with simulated caries), and a small number of exercises on preparation of extracted teeth. A multi-million dollar renovation of the pre-clinical labs has begun which will enhance the simulation of the dental operatory. We currently use BlackBoard but a transition to Web CT is slated for the spring of 2007.
- UTH:** We base the fundamental development in Operative (restorative philosophy and hand-skill development) on foundational cavity design and theory as they relate to the rules and guidelines of traditional cavity design and amalgam placement [a foundation is formed and expanded/builds as the semester(s) progresses]. Over our two semesters of Operative, we probably spend a little more time on composite preparations and restorations than amalgam in terms of hands-on projects. Caries directed theory (minimally invasive procedures), techniques, and procedures that are utilized with composite are covered as well as the slot type of preparation (restored with either composite or amalgam). In lecture, topics related to composite (direct or indirect) and glass ionomer hold the edge over discussions concerning (strictly) amalgam due to the complexity (technique sensitivity) of the composite bonding procedure(s) and the ever growing list and

forms of available bonding and composite products. Reportedly, the company formed from the merger of Wwb CT and BlackBoard will remain under the BlackBoard brand. Our school from all indication swill likely remain with the BlackBoard software. Some courses/instructors utilize BlackBoard more than others. There are mixed philosophies on how this and similar types of technology can be successfully utilized to truly enhance a student's understanding, development, and growth with Dentistry as opposed to being utilized as a handy way to improve examination scores with (possibly) reduced effort by the student or applied as a student recruiting strategy.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

BAY: Lectures in the D2 year cover amalgam preparation design and restoration at length beginning first with Class I amalgams and progressing to Class II and Class V amalgams. Direct composite restorations are taught next beginning with Class III composites, followed by Class V, Class I and Class II composites. Class Iv composites are taught on natural teeth later on in the course. Pin amalgam buildups, inlay and onlay preparation and restoration techniques are taught in the latter part of the D2 year. During the D3 Operative Course, lectures on restoratives are sequenced by material. Students receive five hours of lecture on "Caries and Pulpal Considerations," "Enamel and Dentin Adhesion," "Anterior Composites" (including materials), "Posterior Composites," and "More Composite Stuff." The students are taught the minimally invasive approach. Clinically, students are guided in the development of judgement and skills in this approach by their instructors which often requires more than one-on-one time at chairside. In the D3 year, we have two lecture hours dedicated to amalgams which focus on more complex amalgam preparations including pins. D3 lectures using Power Point are required to have 60% or more clinical relevancy. In addition, students take clinical progress exams on patients during which they prepare and restore selected teeth with a Class II amalgam, a Class composite, and a Class III composite.

LSU: We group our pre-clinical course by material. It is also by complexity. We start with very minimal preparation, PRR the ideal minimal preps for resin. When we start the amalgam portion we repeat this by cutting minimal size preparations. After the minimal preparation is cut to minimal dimension we increase the prep size to make restoration more involved. This way the student will be able to practice carving and building larger restoration and learn to handle the material.

MISS: At (our school) we have two different courses grouping amalgam and composite. The amalgam course, known as Caries I, is in the spring of the freshman year, and the direct composite course, known as Esthetic Problems I, is in the fall semester for the sophomore year. The Caries I course starts with the diagnosis of caries, instrument identification, isolation, and takes the students through all their amalgam preparations and progresses to complex preparations and restorations with amalgam. This year we will move our complex preparation and restoration to our third year operative course, Caries III, which covers indirect gold restorations and teach is as a foundation, "crown build-up," to our students. This puts the more complex preparation and restoration later in their curriculum and gives a chance to review principles of amalgam preparation closer to the students' entry to clinical dentistry. The Esthetics Problems course covers cosmetic dentistry, Class III, IV, V, I and II, diastema closure, peg lateral, direct veneers, sealants

and conservative composite restorations and whitening. The students are given preparation guidelines in this course for Class I, II, III, and V, however, they are told that caries will dictate the outline of these preparations in a clinical situation. Since they are given prep guidelines for their graded exercises, their motor skills continue to develop. In this course they also are introduced to air abrasion and laser dentistry which also contributes to conservative preparations. We have a Waterlase MD in the school now but it is not being used in pre-clinic as yet. This esthetic course spends a great deal of time on larger composite restorations such as veneers. The students do several exercises involving different methods of finishing and polishing composites which also contribute to their hand skills.

- OKU:** In the past, we have taught mainly amalgam restoration in the first pre-clinical operative course (first year students) and resin composite in the second course (second year students). We are in the process of revising our curriculum to base it on addressing each type of caries lesion one at a time. We will begin the course with basic foundational materials such as nomenclature, instrumentation, rubber dam isolation, and adhesive bonding. Next we will approach each type of restorative situation, and go through the diagnosis, various treatment options, treatment planning, and teach each of the procedures for the various treatment options. We will begin this by introducing pit and fissure caries. After discussing the detection, diagnosis and treatment planning for pit and fissure caries, we will teach procedures for sealants, preventive resin restoration, resin composite restorations, and amalgam restorations for the treatment of pit and fissure caries. When pit and fissure caries is completed, we will introduce smooth surface caries in the same way breaking it down into sections on proximal posterior caries, proximal anterior caries, and cervical caries. Each section will be approached in a similar manner as described for pit and fissure caries (detection, diagnosis, treatment options, treatment planning and various procedures). In the later portions of the pre-clinical courses we will introduce other procedures such as bonded amalgams, pin retained restorations, and tooth whitening. The final portion of the pre-clinical courses will consist of several simulated patients requiring the student to review the material presented earlier, and assimilate the information for use in diagnosing, treatment planning and treating the problems presented in the patient simulations. The intent of this approach is to get away from just teaching individual procedures, and instead teach a process and overall philosophy for approaching the various types of problems faced in the discipline of operative dentistry.
- TENN:** (Our school) starts with minimal invasive approach, progressing to more complex procedures. Last year, we began to incorporate Class III composite preparations into the first year operative course. This year the composite course will be given before the complex restoration course allowing us to incorporate complex composite restorations/buildups into this course.
- UTSA:** The curriculum was designed to increase in complexity as hand skills increased. The Learn-A-Prep™ device is used to introduce handpiece skills. We used a Learn-A-Tooth concept to introduce indirect vision and prepare teeth to dimension. Eventually students will remove simulated caries and place complex restorations replacing cusps, using TMS pins etc. the sequence of amalgam and composite restorations are mixed throughout the year so that both skill sets are maintained. Minimally Invasive Dentistry is reinforced including the use of sealants, preventive resin restorations, and a preventive amalgam restorations. Detection and assessment of lesions along with conservative management is emphasized throughout the course.

UTH: Learn-A-Prep is used to introduce the range of equipment within Operative Dentistry (handpieces, burs, hand instruments, as well as handpiece grasps and finger rests). Students are increasingly challenged both conceptually and by hand skill requirements (development). We begin with rationale, technique, and guidelines of placing amalgam preparations/restorations (Class V, Class I, Class II) and progress into the rationale, technique, and guidelines of placing bonded composite resin materials (sealants, minimally invasive preparations, flowable composite, combinations of minimally invasive preparations and/or sealants > caries directed rationale and procedures; Class V, Class I, Class II, Class III, Class IV). However, throughout the Operative courses, projects for amalgam and composite restorations are somewhat intermingled in terms of the course sequence. Introduced (presented) concepts and skills are reinforced time and again as the courses progress. In second semester Operative, two projects require the preparation and restoration of teeth with simulated caries. Radiographs are shown of these teeth and the students are instructed to properly prepare and properly restore the teeth using a restorative technique and material of their choice (preparation and situation appropriate). In the subsequent Inlay/onlay course, we have a project in which the students mount and prepare natural (cariou) teeth. This introduces them to the feel and texture of actual caries, the procedure and guidelines for removing all decayed tissue, and application of foundational (ideal) cavity design to the resulting non-ideal cavity form [attempting to bridge the often observed (initial) disconnect between actual (clinical situations) and ideal (laboratory projects)].

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

BAY: Perhaps a better question would be, “at the end of five years post-doctorate, are the motor skills of young dentists as developed as their parents that are dentists?” All kidding aside, at the D2 and D3 levels, diminished motor skills as a result of placement of more direct placed composite restorations rather than amalgam is not a problem.

LSU: True, preparations for composite are less demanding than for amalgam and amalgam is less demanding for gold preparations. Since we start the students with composite preparations we require them to achieve skills needed for amalgam. We are also trying to develop hand skills by setting specific criteria for their preparations. Bur carving composite takes a great deal of hand skill in itself.

MISS: In clinical situations, a few faculty that do not practice with amalgam in their private offices may sometimes overlook some of the principles of cavity preparation such as convergent walls. Therefore, we plan to have the printed guidelines available in the clinic. Our anecdotal evidence suggests that several students are having problems with adhering to the cavity guidelines when in clinic. This is not the case with all students. Since students still need to have the principles of cavity prep for amalgam for competencies, clinic recommendations, and board exams, they do have to continue to perfect their skills.

OKU: The preparations for conservative resin restorations probably require less refined motor skills than the amalgam preparations. The insertion and finishing of resin composite restorations require a certain amount of motor skills. Overall, there are definitely less motor skills developed with resin composite restorations than amalgam, this is similar to the decrease in motor skills required when we went from direct filling gold to amalgam. The demand for hand skills may even be decreasing in the area of Fixed Pros with the increased use of resin bonded

indirect restorations. Many suggested procedures or techniques seem to assume that the fact that the restoration is bonded to the tooth means that there is little need to pay attention to retentive features for inlay, onlay, or crown preparations.

TENN: No. From the first week of classes in August, the first year students are immersed into a three month tooth preparations course utilizing the DentSim to develop hand skills. After a month, tooth preparation lectures are incorporated. This course is immediately followed by the Operative Course.

UTSA: Junior students are required to pass skill assessments on the placement of amalgam and composite restorations in the clinic before they are allowed to advance to the Senior year. To qualify for the examination, they must have demonstrated proficiency in the skill by performing several similar procedures. Students who do not achieve a satisfactory score on the skill assessment must perform the procedure on a manikin before they are allowed to retake the assessment. Many ADEA articles support the notion that manual dexterity is not a good predictor of success in Dental School and that hand skills can be taught. In the accomplishment of direct placement restorations spatial orientation and the ability to visualize the final result are as important as motor skills. Students who develop the manual skills to prepare teeth for crowns, do periodontal treatments, or to do tooth extractions should be able to prepare and place direct restorations. The incomplete understanding of caries removal and dental anatomy is the most likely cause of restorative errors. The ability to create something with the hands that exists in the "mind's eye" is the skill that must be developed. It is more difficult to identify the student with poor skill development when we are evaluating resin composite preparations because they do not require a specific geometry. Scores on resin composite preparations are consistently higher than similar carious lesions prepared for conventional amalgam restorations.

UTH: In our opinion, the increased utilization and emphasis placed upon direct placed composites is not diminishing motor skill development with our students. Our pre-clinical foundational structure (hopefully) assures steady progress toward total proficiency, both conceptually and handskill-wise to meet or surpass most if not all dental challenges in a proficient manner. Hopefully, each student will have the foundation to efficiently perform proper, competent, can compassionate patient care while operating at a level far below their actual (technical and intellectual) skill limit.

VI. Discuss matrixing.

Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

BAY: Both full and sectional matrix systems are used in Operative Dentistry at (our school). Several types of full matrix systems are used and are discussed below. The Composit-Tight Sectional System is currently the only true sectional system used here. Mylar strips and crown formers are also used as modified sectional systems and are also discussed below. Each system has its uses and its advantages and disadvantages. Sectional matrix systems are best used with very conservative preparations that have minimal F/L extensions. They provide good proximal contours and contacts. Preparations with wide F/L extensions and/or missing axial surfaces require a full band matrix system to replace those missing surfaces. Many of the full matrix bands can be difficult to contour on axial surfaces and can leave significant gaps between the band and cavo-surfaces, Often invention and imagination are needed in applying various matrix system to difficult situations. Full and sectional systems may require modification to fit the

conditions presented by different cavity preparations and restorative material choices.

Full band systems

1. Tofflemire Matrix System - universal and contra-angle retainers with #1 and #2 flat bands. Pre-contoured bands are available but are not used here. Pre-clinical and clinical use: Class I - two surface amalgam - double band technique: Class II - amalgam/composite and temporary (IRM); B/U - amalgam/composite
2. AutoMatrix System (Dentsply Caulk). Pre-clinical and clinical use: Class II - amalgam/composite; B/U - amalgam/composite
3. Copper bands (Moyco). Limited clinical use for an amalgam build-up when insufficient axial surfaces exist to support the Tofflemire or AutoMatrix and when tight interproximal contacts are not a requirement.

Sectional Matrix systems

1. Composi-Tight Sectional Matrix system - Pre-clinical and clinical use (provides for good proximal contours and contacts): Class II - amalgam/composite - conservative preparations with minimal F/L proximal box wall extensions; Class III - amalgam/composite - when allowed by F/L extensions.
2. Mylar matrix strips (modified sectional). Pre-clinical and clinical use: Class III and IV - composite; Class II - composite 0 minimal F/L proximal box extensions. Poor proximal contours; Class V - composite - with interproximal extensions. Strip is wedged to allow placement of composite and separation from adjacent teeth.
3. Crown forms - clear. Clinical use for Class IV composite - provides F/L and proximal contours.

LSU: For amalgams we use full bands, Tofflemire system. For composite we use sectional bands with Composi-Tight system. We've been placing posterior composites for years. One of the problems is establishing proximal contact. When we started using the Composi-Tight system we, for the most part, eliminated this problem. From some of Burgess' studies, clear bands do not provide any advantage.

MISS: Many of the following clinical banding situations are determined chair-side by the attending clinical faculty's personal preferences. We use both full banding (Tofflemire retainer, Omnimatrix, and Automatrix) along with sectional banding (Composi-Tight-Garrison dental solutions). **Tofflemire with metal band** for most amalgam restorations. Ho band (PRN) **Omnimatrix** ultra thin (.001 inch) for some posterior composites and difficult amalgam contact solutions, **Composi-Tight** sectional matrices with ring for posterior composites in ideal conservative preparation situations (best contacts if used properly). **Automatrix** mostly used for large build-ups with either amalgam or composite when the Tofflemire system doesn't adapt properly to the tooth.

OKU: Amalgam restorations: We use a stainless steel matrix band in a Tofflemire retainer for most amalgam restorations. We have the automatrix system available along with welded band or copper band for some large cores.
Resin composite restorations: We use a mylar strip for anterior restorations. We use a contoured stainless steel sectional matrix band with a bitine ring as the primary matrix system for our posterior resin restorations. We also have full stainless steel matrix bands that are dead soft and ultra thin for use with the Tofflemire retainer. We have found in our student clinic that the contoured sectional matrix with the bitine ring produces much better proximal contours and contacts (we are currently using the palodent sectional matrix system). The full

stainless steel band with the Tofflemire retainer tends to produce restorations with straight proximal contours with light contacts that are positioned too far occlusally.

TENN: We use both full band and sectional band matrices. The type of matrix used depends on the size and type of restoration. The Tofflemire matrix system is used primarily for Class II amalgams. It may also be used with posterior composites when a sectional matrix can not be used such as with large posterior composite restorations/buildups. This system has a long history of use, variation in band shape, size, and thickness and is economical. Full matrix - Tofflemire matrix system - in situations with limited access we have the option of using the Dentsply Caulk Automatrix. The Palodent Sectional Matrix system is used for the majority of Class II composites, where sufficient buccal and lingual proximal walls remain to keep the bitine ring from collapsing the matrix band. This system is used to help insure a tight proximal contact. Sectional - Palodent sectional matrix system.

UTSA: (Our school) has four amalgam matrix choices. Sectional, Tofflemire, Automatrix and Denovo Matrix Band techniques are all taught. There are lab projects involving all four at various times in the Sophomore Pre-Clinical Operative Dentistry lab Course. In the Junior course, the Tofflemire is, of course, the favorite followed closely by a sectional matrix. The Denova Matrix is used frequently for build-ups. By some small number the Denovo is a little more popular in the clinic than the Automatrix. Metal sectional matrix bands are definitely the dominate choice for posterior resin composites. Mylar is an uncommon choice for posterior composites. Some instructors teach Mylar on anterior teeth. Many instructors are advocates of metal matrix bands or Teflon plumber tape for anterior teeth. Composi-Tight and Bitine rings are available in the pre-clinic and clinic. Some of the instructors have had success with a "Jerk Technique" in which a Mylar strip is quickly pulled through the contact in the manner in which a magician removes the table cloth leaving the plates and glasses on the table. The composite is allowed to slump into contact with the adjacent tooth prior to curing with a light. If the clinician has a deft touch this works very well for achieving a good tight contact for both Class III and Class II restorations.

UTH: We use both full band and sectional band matrices. The choice of matrix is dependant upon the clinical situation (the type/design fo the preparation and the restorative material). Full band systems: We use the Tofflemire system for Class II amalgams and composites (with burnishing to enhance proximal contact and contour). Also available is the Automatrix system (Dentsply Caulk) for Class II amalgam restorations. Further, we have Omnimatrix (Ultradent) disposable bands (mylar and metal). There are mostly used for Class II amalgam. The mylar bands are rarely used (for composites) due to their increased thickness. Sectional band systems: We use the Composi-Tight (Garrison Dental) system for composite restorations. Mylar strips are also used mostly for anterior restorations; however, they have been used for Class II composites as determined by the clinical situation. Posterior composite preparations/restorations begin with firm pre-wedging.. The Tofflemire system still accomplishes what it was designed to accomplish in terms of full band matrixing. Other systems are used depending on the clinical situation. Full matrix: Tofflemire, Automatrix, Omnimatrix. Sectional Matrix: Composi-Tight.

**VII. Who/which departments are placing implants?
Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?**

BAY: Currently, implants are placed into the graduate Periodontics program, graduate Oral Surgery program and in the Implant Fellowship program. In the D1 year, students begin to get some information on implants in their Dental Materials course as well as other basic science courses. In the D2 year, the students receive background information in introductory lectures on implants and restore two implant cases on the typodont in the Simulation laboratory during the pre-clinical Fixed Pros course. In the D3 year, two lecture hours in the Fixed Pros lecture course is dedicated to implants. In the spring of the D3 year, students take a course in implantology consisting of twelve or thirteen lectures. During the D3 year, students diagnose and work up their implant cases as well as fabricate the radiographic and surgical guides. The student is required to observe the surgical placement of the implant(s) on his or her patient. Some students have worked on more than one implant case in the D3 and D4 years and some have, with direct supervision, placed implants themselves as determined on a case-by-case basis. D4 students are given lectures and more information on implants and complications that can arise. The students each restore at least one implant during this year. At this time, the implant program at the undergraduate level is being restructured to incorporate more implant lectures and procedures into the D2 year. Some implant cases require more time to complete and therefore are not finished by the D4 student before graduation. These cases are passed on to new D3 students for restoration requiring the students to be more knowledgeable in implantology earlier in their D3 year.

LSU: Oral surgery and Periodontics are placing implants. This year we have a senior elective in implants where the student learns to restore the placed implant. This program is being run by the periodontics department. They (the senior) will work with a Perio resident and design where the implants are placed and what type of implant is to be used. The student will assist the resident in placing the implant. The student may restore up to four implants. Up to two single tooth and one overdenture. They will then be required to restore two implants. One a single unit crown and the other a denture abutment. Next year they are requiring all the seniors to do this. Full time faculty in our department will be trained in treatment planning and restoring single tooth implants and overdentures prior to implementation of the undergraduate implant program scheduled for July 2007.

MISS: Implants are being placed and restored by both residents in the AEGD and GPR graduate programs. In the undergraduate program, faculty from oral surgery and periodontics are placing the implants on the student patients. The student of the patient having the implants is required to assist during the placement surgery. The students are working along with the faculty from the fixed and/or removable pros areas for all preliminary diagnosis, mounting, and stent fabrication. The dentist placing the implant on the student patient decides what radiographs he will need and if a CT scan is necessary. In the graduate programs, the residents are restoring the implants placed. In the undergraduate program, the student dentists are restoring the implants on those patient that they have. The restoration process is being directed by the fixed and/or removable faculty working with the student on the case. The majority of implants are being utilized for implant retained mandibular complete dentures. At present, Locator attachments are the attachments most utilized in the removable area. The number of single-tooth and multiple teeth replacement via implants and crowns are increasing as directed by the fixed faculty. The students are encouraged to experience surgical assistance and restoration of two implants during their two-year clinical program. There are cases where more are allowed. However, we want to help ensure that all the students have some exposure to the implant process.

- OKU:** Implants are being placed by students in our graduate Periodontal and graduate Oral Surgery programs. Implants are being restored by our undergraduate students. The undergraduate students rotate through the implantology clinic. On average, the undergraduate students restore 1 - 2 implants. The students in our AGED program place and restore implants also.
- TENN:** Residents in OMFS, Grad Perio, AEGD, and occasionally in Grad Pros (are placing implants). Implants are restored in the AEGD, Grad Pros by residents. Undergraduates restore implants with the AEGD clinic and within the Restorative Department in the undergraduate clinic. All third year students have 16 hours of lecture during the spring. There is also an elective course on implant placement and restoration given by the director of the AEGD program. This past year over thirty of the graduating class has placed at least one implant restoration.
- UTSA:** Residents from Periodontics and Oral Surgery place implants for patients of record. Odd number patient charts go to Perio and even number charts go to Oral Surgery. Prior to this system, perio got most of the referrals from the pre-doctoral clinic because Perio was/is definitely more user friendly. Some pre-doctoral students will restore one or more implants in the general dentistry pre-doctoral clinic. In 2005-2006, 19 implant crowns were done by D3s and 84 implant crowns by D4s. There were 86 seniors and 85 juniors in clinic last year.
- UTH:** All surgical placements are done by OMFS or Periodontics at the graduate level only. Graduate programs including AEGD and the GPR, and graduate Pros (are restoring implants). At the undergraduate level, Pros faculty supervise 3rd year and some 4th year students, while Restorative faculty supervise some 4th year students. Didactic exposure for all students comes in a triad of courses: 2nd year: one intro course by the Perio department in the Spring semester and one restorative pre-clinical course in the Summer semester by the Pros department; 3rd year: one semester course by OMFS (Oral and Maxillofacial Surgery); 4th year: 2 lectures for updates. Clinical exposure is limited to about 30 students selected in the 3rd year as an elective.

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

- BAY:** Up to this point in time, we have not seen an increase in tooth extractions and implant placements over performing endodontic therapy and conventional restorative treatment at Baylor. The determination is first made as to whether or not a tooth is restorable, If a tooth is restorable, treatment options along with their commensurate costs, advantages and disadvantages and timelines for treatment are given to the patient. The patient consults with the student and supervising faculty but ultimately it is the patient who makes the final destination as to which treatment option is best for him or her.
- LSU:** Not yet anyway. The students need core buildups in clinic. In cases of questionable prognosis for endo and restoration implant replacement may be considered.
- MISS:** At this point, we have not followed the philosophy of some to reduce or eliminate the retention of natural teeth just because an implant can be placed. Each case is still considered on an individual basis as to what is best for the given patient. The alternatives including the advantages, disadvantages and cost are discussed

with the patient and a sound treatment plan is developed with the input of the patient. Our students are still getting experience in build-up and cores as well as pre-fabricated and cast post and cores.

OKU: At this time the “let’s take the tooth out and place an implant” philosophy has not substantially affected our student’s experiences in core build-ups or endodontics.

TENN: It has not been a problem so far. With the option of an implant, some patients elect to have a tooth extracted and an implant placed due to financial reasons and to avoid going through multiple dental treatments, i.e., endodontic treatment/retreatment, crown lengthening, crown buildup/post and core, and crown. Some of the literature cited to students have shown the prognosis of implants to be better than endodontic treatment, however, many of these studies are comparing implants to teeth which require endodontic retreatment (surgical and non-surgical), have had prior periodontal surgery and/or have questionable periodontal health. With the rapid changes in implant technology, it may be prudent that some teeth be retained to “buy” time rather than choosing to place an implant as the first option. Regardless, treatment options should be discussed with the patient in an unbiased manner. Proper patient education and informed consent should be done.

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Mordohai N, Reshad M, Jivraj SA. To Extract or Not to Extract? Factors That Affect Individual Tooth Prognosis. *J CDA* 2005;33:319-328

Tand CS, Naylor, A. Single-Unit Implants Versus Conventional Treatments for Compromised Teeth: A Brief Review of the Evidence. *J Dent Educ* 2005;69:414-417.

UTSA: Pre-doctoral students as a group are not allowed to do 1st molar endodontic therapy. No pre-doctoral student can do 2nd molar endodontics. Select seniors can do simple first molar endodontics. The endodontic residents charge 60% of the faculty practice fee which places endodontics out of the financial possibility of more than half our patients. “Let’s take the tooth out and plan an implant” is a very common discussion if the consideration is for endodontic re-treatment of a failing endodontic effort. After the discussion, extraction and no replacement is the most common choice. Implants have had the largest impact on our training in finding simple fixed partial denture cases because the implant/crown fee can be very similar to a 3 unit fixed partial denture. My summary right now is that extraction and no replacement is more common now than in the past because our patients cannot afford endodontics or implant therapy. At this time Pros requires a new foundation for 99% of all crowns done in the Junior year. We do not have a shortage of large core build-ups.

UTH: Our Endodontics department has not observed a tendency to promote the placement of an implant in cases where endodontics would be appropriate (with a favorable prognosis). They have not noticed any particular changes in the referrals from the undergraduate students nor the graduate residents from other disciplines. The Pros department related that it depends on the department and the reason responsible for the treatment planning. There may be a tendency to be a bit less heroic in our efforts to save a tooth that may require excessive crown lengthening, a tooth that will be difficult to achieve a ferrule, or a tooth which has

a repetitive history of failed post and cores. For these, the Pros department would likely consider an implant first. The biggest determining factor is often whether excessive crown lengthening would lead to poor esthetics in the esthetic zone. Therefore, rather than reduce the bone, the current thought is to preserve the bone and place an implant. The biggest change in philosophy within our Pros department) may be with removable prosthodontics./dentures. From their viewpoint, it is beginning to be far more common to consider an implant-retained overdenture, rather than a conventional root-supported overdenture. From their observations, the natural root overdenture is becoming a rare treatment, whereas the implant-retained overdenture is readily treatment planned. Within our Pros department, there is a tendency to perform less endodontics in situations as those described above; however, from the overall restorative faculty viewpoint, preservation of the natural tooth is still considered best, with all prognosis being equal. Restorative faculty working mainly with Seniors have not felt an affect of the implant alternative (overall). They are not encouraging removal of a "compromised" tooth in order to place an implant. However, implants have given us another restorative option, and in severely compromised teeth and in patients with only one missing tooth, they are/will play an increasing role in treatment options and (possibly) patient acceptance. However, the following areas limit the viability of implants as a primary restorative option at the Dental Branch:

1. Cost of implant and crown vs a RCT, build-up or crown.
2. Length of time between decision to place implant and final restoration.
3. Guidelines limiting implant placement to single tooth posterior restorations or two overdenture abutments for undergraduate students.
4. Relative contraindication, though not absolute, for the placement of implants in smokers and diabetics, which constitutes a large percentage of our Dental Branch population.

Implants like all other restorations have a finite life span. If bone preservation is of primary importance, then it seems prudent to maintain natural dentition in all patients as long as possible, assuming a relatively healthy and maintainable periodontal condition. Again, restorative faculty favor retaining the natural tooth if at all possible and sensible.

Regional CODE Agenda

No Regional Agenda established

Suggestions for CODE.

- What can the organization do to improve its effectiveness?
- Any comments or suggestions to improve the Web site?
<http://www.unmc.edu/code/codeframe.html>
NOTE: to locate the web site via a search engine, enter Academy of Operative Dentistry and then use the link CODE and ADEA.
- Other comments/suggestions?

CODE Region III Attendees Form

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|--------------------|------------|--------------|--------------|------------------------------|
| Alan Ripps | LSU | 225-334-1794 | 225-334-1794 | aripps@lsuhsc.edu |
| Bill Tate | UTH | 713-500-4264 | 713-500-4108 | william.H.tate@uth.tmc.edu |
| Bob Sergent | LSU | 225-334-1794 | 225-334-194 | rsergent@lsuhsc.edu |
| Chris Beninger | BAY | 214-828-8281 | 214-874-4544 | cbeninger@bcd.tamhsc.edu |
| Dan Shea | LSU | 225-334-1794 | 225-334-1794 | dshea@lsuhs.edu |
| Dave Overton | UTSA | 210-567-3705 | 210-567-6354 | overton@uthscsa.edu |
| Gary Frey | UTH | 713-500-4475 | 713-500-4108 | gary.n.frey@uth.tmc.edu |
| George Cramer | BAY | 214-828-8468 | 713-874-4544 | gcramer@bcd.tamhsc.edu |
| James Lott | MISS | 601-984-6030 | 601-984-6039 | jrlott@sod.umsmed.edu |
| Jay Ferguson | UTH | 713-500-4266 | 713-500-4108 | james.p.ferguson@uth.tmc.edu |
| James Fritchie | MISS | 601-984-6036 | 601-984-6039 | jfritchie@sod.umsmed.edu |
| Janet Harrison | TENN | 901-448-6692 | 901-448-1294 | jharrison@utmen.edu |
| Jim Simon | TENN | 901-448-6641 | 901-448-1294 | jrsimon@utmem.edu |
| Joe Connor | UTSA | 210-567-3693 | 210-567-6354 | connorj@uthscsa.edu |
| Karen Troendle | UTSA | 210-567-3658 | 210-567-6354 | troendle@uthscsa.edu |
| Kenneth King | TENN | 901-488-6639 | 901-448-1294 | kking12@utmem.edu |
| Lynn Montgomery | OKU | 405-271-5735 | 405-271-3006 | lynn-montgomery@ouhsc.edu |
| Pia Chaterjee Kirk | MISS | 601-984-6030 | 601-984-6039 | pchatterjee@sod.umsmed.edu |
| Rita Parma | UTSA | 210-567-3690 | 210-567-6354 | parma2uthscsa.edu |
| Robert Dosch | UTH | 713-500-4257 | 713-500-4108 | robert.o.dosch@uth.tmc.edu |
| Scott Phillips | MISS | 601-984-6030 | 601-984-6039 | smphillips@sod.umsmed.edu |
| Scott Hollis | TENN | 901-448-6288 | 901-488-1294 | whollis@utmem.edu |
| Stan Cobb | BAY | 214-828-8281 | 214-874-4544 | scobb@bcd.tamhsc.edu |
| Steve Magee | MISS | 601-984-6046 | 601-984-6039 | smagee@sod.umsmed.edu |
| Terry Fruits | OKU | 405-271-5735 | 405-271-3006 | terry-fruits@ouhsc.edu |
| | | | | |

CODE REGIONAL MEETING REPORT FORM

REGION: IV (Great Lakes)

LOCATION AND DATE OF MEETING:

Ohio State University

Columbus, Ohio

October 13 - 14, 2006

CHAIRPERSON:

Name: Dr. Bob Rashid

Phone #: (614) 292-3071

Address: 305 W 12th Avenue

Fax #: (614) 292-9422

Columbus, OH 43210-1241

E-mail: rashid.1@osu.edu

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

Suggested Agenda Items for Next Year:

- Are laptops being used by students? Are they compulsory? Where are they used (lectures, Preclinical, clinics)?
- What part does "evidence-based teaching" play in your programs? What are your sources for the evidence-based material(s)?
- What is the use of typodont vs natural teeth in your operative/restorative program? What typodont teeth are being used? What are the advantages/disadvantages of the typodont teeth you use?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Ed DeSchepper

Phone #: (317) 274-5331

Address: Indiana University

Fax #: (317) 274-2419

School of Dentistry

E-mail : edschep@iupui.edu

Indianapolis, IN 46202

Date: October 2007 (Dates TBD)

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.

**2006 NATIONAL CODE AGENDA
REGION IV
SUMMARY RESPONSES TO NATIONAL AGENDA**

I. Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

This question resulted in the most discussion of all. In fact we had to re-visit it at the end of the meeting in order to come to a consensus. Since some aspects of operative dentistry (the background required to diagnose and treat caries) were taught outside the actual operative lectures and labs it was difficult to agree on what the ideal program should be. In the end we agreed that the follow are important and should be included in an “operative dentistry course” and are listed in the sequence/order of importance agreed upon:

1. Caries risk assessment
2. Caries diagnostic/caries removal
3. Isolation
4. Sealants/preventative resin restorations (PRR)
5. Amalgam (preps, pins, slots, grooves, “shoeing” cusps, restoration)
6. Composite preps and restorations (Cl.1,2,3,4,5,6)
7. Bases/liners
8. Glass ionomers (included in liners and bases but also as Cl. 5 restorations)
9. inlays/onlays (gold, indirect composite, porcelain)
10. veneers (direct, indirect, diastema closure)

**II. What is the current use of digital radiography in your school?
In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans to utilization and what is your time frame?**

Only one school, CWRU, reported using digital radiography in all aspects of their programs. Most, if they use it at all, use digital radiography in the grad. programs and in specialty clinics (endo). For the most part time frames are several years down the road for those not now using it. Some are just not sure which way they will go – future use unknown.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

Most schools are not using digital radiography for caries diagnosis. They do not see the quality they see in conventional radiographs at this point.

Which of the two main categories of intraoral sensors are used: direct sensor/charged-couple device (CCD) or storage phosphor plates (SPP)? What advice /recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advice/recommendations?

There was a mix of responses – but most are using CCD over SPP. The reasons were cost and the availability of an immediate picture. Some used SPP because it they said it was a lower cost, more durable, easier for students to use – and you do not need a computer to view the image. No recommendations except to be aware of how delicate CCD sensors can be in the hands of students!

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

Michigan has had i-CAT for 1.5 years. No other school reported having a dental acquisition/ceph.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

All schools are using carbide burs for clinical tooth preparations in operative dentistry; however, one uses diamonds for intracoronal inlay/onlay type preps. In general diamond burs are restricted to crown and bridge type preparations.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

In general, diamonds are not used in operative dentistry. Most schools limit their use to C&B procedures. None of the schools are considering switching from carbides to diamonds. Most use Brasseler burs/diamonds. Diamonds are expensive and in the preclinical environment they burn typodont teeth too easily.

IV. Electric Handpieces (Topic Revisited)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

Most schools reported they did not use electric handpieces in the undergraduate program. CWRU has issued first year students with electric handpieces and they are using them in their preclinical courses. They will use them in the clinics as well as they progress through the years. WVU's clinics are set-up for electric handpiece use but they are not in use at this point. Many schools use electric handpieces in their endo programs.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students?

There is a general feeling this has not impacted on the teaching of operative skills. All schools are teaching amalgam just as they have in the past, as well as composite resin techniques. Some are just spending more time on posterior composite resin restoration than they use to. Amalgam is still ranked high in the operative programs.

Describe new or different teaching methods/technologies as Web CT.

There was a mixture of teaching methods reported by schools – Blackboard, PowerPoint, electronic curriculum (DVD), school specific electronic teaching programs, CTools, Podcasting, video tapes, 3-D images, etc.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course?

Most schools still teach amalgam first, then composite resin. Michigan teaches minimally invasive techniques first (composite) then more complex restorations which includes amalgam. Ohio State teaches according to complexity and therefore composite resin restorations are come in early in their program.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

Generally the response to this question was that there was no, or not much, effect. One school (MICH) stated that it was felt since the requirement for gold restorations decreased at their school it did affect motor skill levels.

VI. Discuss matrixing.

Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

All schools used Tofflemire bands for amalgam. Sectional matrices were favored by most schools for class 2 composite resins. Others systems used are Automatrix, clear strips for anterior class 3, Clear-Thru matrices for class 5 composite resins.

VII. Who/which departments are placing implants?

Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

This question had the most varied responses. In general the oral surgery and perio departments placed the implants, as well as faculty practices. There is a real mix when it comes to placement of the restoration. It varies from no student involvement at all to students being involved with treatment planning, placement, and restoration. In most schools the undergraduate involvement appeared to be somewhat limited due to the fact not all students had suitable patients. In some cases they would observe other undergraduates or grad. students place and restore implants.

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students' experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

Most schools have seen little or no change. Only one school (MICH) reported seeing a decrease in endo teaching cases.

2006 NATIONAL CODE AGENDA

REGION IV RESPONSES

(Evidence cited where applicable)

Region IV School Abbreviations

| | | | |
|-------|----------------------------------|------|----------------------------------|
| CWRU | Case Western Reserve University | OSU | Ohio State University |
| UDM | University of Detroit Mercy | PITT | University of Pittsburgh |
| ILL | University of Illinois - Chicago | SUNY | State University of NY - Buffalo |
| IUPUI | Indiana University | WVU | West Virginia University |
| MICH | University of Michigan | UWO | University of Western Ontario |

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- **Amalgam (Class I, II, And V only). Class III was omitted.**
- **Veneers (Direct composite only). Porcelain taught by Fixed.**
- **Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.**
- **Composite Core Build-ups only. (Amalgam excluded).**

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

CWRU: We sent a survey to the members of the Comprehensive Care Department to rank the following concepts/ techniques according to the guidelines above. Response rate was good with about half of the faculty responding. We then took each item and categorized the item as either (1) top ½ or ranked as 1-5, (2) bottom ½ or ranked as 6-10, or (0) not ranked at all.

The following were ranked in top ½

- 1) Composite Direct – for Class I, II, III, IV, V, and VI
- 2) Amalgam- Class I, II, V
- 3) Caries Diagnosis and Removal –
- 4) Isolation Techniques- Rubber Dam (listed by all who included this)
- 5) Inlays – Composite and Ceramic
- 6) Composite Core Buildups – Mechanical accompanied by Adhesion

The following were ranked, but were in the bottom ½

- 7) Veneers
- 8) Amalgam core build-ups
- 9) Onlays – ranged from gold-composite-ceramic
- 10) Sealants

The following were not listed by anyone (or only by 1 person)

- Air abrasion
- Lasers
- Cad-Cam restorations

Many of the items were thought to be important by the Case faculty, but they commented that perhaps the concept should not be taught as part of an Operative or Restorative course. This was especially true for item -Caries Risk Assessment and Remineralization therapies.

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

The following are traditionally taught in the pre-clinical Operative course : 1) Amalgam, 2) composite direct, 3) composite indirect (lecture only), 4) Veneers (the restoration with composites is part of Dental Anatomy Course), 5) Onlays (only preparations), 6) Isolation techniques – (rubber dam placement is not only taught, but it is evaluated for all pre-clinical operative competency examinations), 7) Caries Diagnoses and Removal – lecture and preclinical experience with natural teeth (students use caries indicator, remove caries, and place dycal on

extracted teeth as preclinical experience in Preclinical Operative Course), 8) Amalgam Core build ups lecture and complex amalgam preparation and restoration (one or two cusps replaced).

- UDM:**
1. Complete caries diagnosis and removal
 2. Conservative amalgam treatment techniques
 3. Conservative esthetic treatment techniques and composite diastema closure
 4. Caries risk assessment and management
 5. Sealants and PRRs
 6. Rubber dam isolation where possible
 7. Caries control and remineralization strategies
 8. Amalgam core and pin retention treatment techniques
 9. Glass ionomer restoratives
 10. Indirect restoration treatment techniques for large lesions
 11. Phase I followed by Phase 2 Treatment Plans

ILL: No responses noted.

- IUPUI:**
1. Isolation Techniques (Rubber dam, others)
 2. Amalgam (Class I, Class II, Class V).
 3. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 4. Glass Ionomer Restoratives (Class I, Class V)
 5. Inlays (composite, ceramic)
 6. Onlays (Gold, composite, ceramic)
 7. Caries Risk Assessment
 8. Caries Diagnosis and Removal
 9. Sealants and Preventive Resin Restorations
 10. Caries Control (Sedative fillings, pulp capping)
 11. Remineralization Therapies
 12. Amalgam Core Build-ups (Pin, slot)
 13. Composite Core Build-ups (Mechanical)
 14. Diastema Closure (Elective with composite or porcelain)
 15. Veneers (Porcelain, composite)

MICH: This question was given to full time clinical faculty as a survey. The following topics were unanimous or nearly unanimous by those that took the survey. They are listed in relative order of importance:

1. Caries Risk Assessment
2. Caries Diagnosis and Removal
3. Caries Control (Sedative fillings, pulp capping)
4. Amalgam (Class I, Class II, Class III, Class V).
5. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
6. Sealants and Preventive Resin Restorations
7. Isolation Techniques (Rubber dam, others)
8. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
9. Composite Core Build-ups (Mechanical and adhesive retention)
10. Glass Ionomer Restoratives (Class I, Class V)
11. Remineralization Therapies

The following topics received a few votes:

- Diastema Closure (composite)
- Onlays (Gold, composite, ceramic)
- Inlays (Gold, composite, ceramic)

Veneers (Porcelain, composite)
CAD-CAM restorations (CEREC III) was noted to be the most cost effective way to teach ceramics.

The following topics received no votes:

Composite Indirect (Class I, Class II)
Air abrasion techniques
Lasers for restorative procedures

- OSU:**
- 1) Amalgam/Composite/GI:
 - 2) Class I (AC), II (AC), III (C), IV (C), V (ACGI-rmgi and gi)
 - 3) Core Build-ups (A) with pins and wells (almost all procedures tested)
 - 4) Rubber Dam (Lecture/lab/clinic exp.)
 - 5) Preventive Resins/Sealants (Lecture)
 - 6) Caries Diagnosis/Risk Assessment/Prevention (Lecture)
 - 7) Veneer/Diastema (P,C) (Lect/lab)
 - 8) Inlays/Onlays (P,C-indirect, Gold) (Lect/lab – limited: may not restore)
 - 9) Bases/Liners/Temporaries (Lect/lab)
 - 10) Caries Dx/Removal is taught clinically (there may be one pre-clinic exercise, but it is very early in the curriculum)
 - 11) Dental anatomy and occlusion – a must as an adjunct (Lect/lab)

PITT: The order of importance of the following is very difficult to determine.

1. amalgam (Class I, II, and V)
2. isolation techniques (rubber dam)
3. caries diagnosis and removal
4. direct composite restorations
5. caries control (sedative restorations, pulp capping)
6. amalgam core build-ups (pin, slot, adhesive)
7. composite core build-ups (mechanical and adhesive)
8. glass ionomer restoratives
9. sealants and preventive resins
10. diastema closure

- SUNY:**
1. Isolation Techniques (Rubber dam)
 2. Sealants and Preventive Resin Restorations
 3. Amalgam (Class I, Class II, Class III, Class V). NB: This is the last year that we will teach the use of amalgam for a Class III.
 4. Composite Direct (Class III, Class IV, Class V). Currently do no Class I
 5. Glass Ionomer Restoratives (Class V) on extracted teeth
 6. Veneers (Porcelain, composite) Direct composite #6 F-prep and direct resin restorations
 7. Inlays (Gold) #29 DO inlay-prep only-taught as precursor to onlay
 8. Onlays #13 MOD gold onlay-prep and rest, #30 MODB gold onlay-prep and rest, #3 MOB ceramic onlay-prep only
NB: This is the last year that we will teach metallic inlays and onlays
 9. Amalgam core build-ups #18 MODB pin amalgam-prep and restoration
 10. Diastema Closure (Elective with composite or porcelain)
Composite Indirect (Class II)
Caries Risk Assessment
Caries Diagnosis and Removal
Caries Control (Sedative fillings, pulp capping)
Remineralization Therapies

Composite Core Build-ups (Mechanical and adhesive retention)
Air abrasion techniques
Lasers for restorative procedures
CAD-CAM restorations (CEREC III)

- WVU:**
1. Amalgams Class II, III, and V. We teach Class I as a first procedure preclinically, but prefer PRR in the clinic for occlusal restorations, if small.
 2. Direct composites. Class II, III, IV, V and VI.
 3. Gold onlays. There is still a performance assessment for this procedure.
 4. Glass Ionomer Cement. Resin reinforced
 5. Isolation technique. Every procedure in the clinic is done under Rubber Dam unless instructor says otherwise
 6. Caries risk assessment. Preliminary screening for all patients.
 7. Caries diagnosis and removal
 8. Gold inlays.
 9. Preventive resin restorations.
 10. Diastema closures
 11. Veneer (Composite only)
 12. Amalgam cores. Composite cores are placed in the clinic but not in operative.
 13. Composite indirects. Prepare a MOD inlay in preclinical lab
- UWO:**
1. Amalgam (Class I, Class II, Class V, “shoeing” of cusps, pins, slots, grooves) (no Class III taught)
 2. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 3. Isolation Techniques (Rubber dam, others)
 4. Inlays (Gold, composite, ceramic) (all taught with emphasis on gold)
 5. Onlays (Gold, composite, ceramic) (all taught with emphasis on gold)
 6. Diastema Closure (Elective with composite or porcelain, discussed in both Oper. And Fixed prosth)
 7. Composite Indirect (Class I, Class II)
 8. Sealants and Preventive Resin Restorations (we stress conservative dentistry)
 9. Caries diagnosis
 10. Caries Control (Sedative fillings, pulp capping)

The subjects noted below should be noted in lectures so students are aware they exist but not included in clinical requirements:

Air abrasion techniques
Lasers for restorative procedures

CAD-CAM restorations (CEREC III) are being fabricated more as the technology keeps improves. However, at present we only introduce the students to the concept by way of several lectures. They do not design, mill or cement any CAD/CAM restorations.

**II. What is the current use of digital radiographs in your school?
In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?**

CWRU: Yes, but limited in non-specialty areas. We are using digital radiography in the Admitting Area. We have one unit – Scan-X purchased 6 years ago. All students

have a half day rotation with its use; but all students can use it for their patients if they would like, however this is based on availability of the unit. Case would like to increase the number of units when we digitize all the records.

- UDM:** Graduate Endodontic clinic and Graduate Orthodontic clinic utilize digital radiography. It is planned for our undergraduate curriculum and clinic in the near future.
- ILL:** No responses noted.
- IUPUI:** Do not use. Future use unknown.
- MICH:** Minimal, in Endo, Ortho, OMFS, probably within next 3 years.
- OSU:** There is no pre-doctoral use of digital radiographs currently. Students are exposed the technology and can use a system (CCD) for experience. However, it is not used for pre-doctoral radiography. We do not have the facility available to make the radiographs available for pre-doctoral treatment. Until then, we will continue to monitor the technology. However, the units are in use in various areas of our graduate programs and Dental Faculty Practice. Currently, there are Pan/Ceph machines installed in orthodontics and periodontics besides the faculty practice. Graduate endodontics has an intraoral unit installed. All machines are CCD and have been installed for about 1 year or less
- PITT:** Currently only panoramic and cephalometric extraoral radiographs utilize digital radiography. This is done only in the orthodontic program. Pitt does not currently utilize electronic patient records, so digital radiography is unwarranted at this point. It is projected that within a year and a half, patient records will be electronic. Digital radiography will then be implemented some time after that. We do not have a cone beam 3-D dental imaging system.
- SUNY:** Digital radiography is used in all aspects of our predoctoral clinics and advanced education clinics, with the exception of our Advanced Education Program in Dentistry and the hospital-based General Practice Residency. The first introduction of digital radiography was limited and program specific. Digital panoramic and cephalometric radiographs were introduced into the Advanced Education program in Orthodontics in December of 2004. Direct Digital Radiography was introduced into the Advanced Education Program in Endodontics in July of 2005. We began the transition to school wide digital radiography in August of 2006. We estimate that 2/3 of all radiographs taken are now digital. As we gain experience and improve we will transition to 100% digital in our educational clinics
- WVU:** The school does not have digital radiography equipment.
- UWO:** At this point digital radiographs are only utilized in endodontics. This has been for approximately four years. This was introduced into the endo clinic first because this clinic was a new one and we decided to equip it with the most up-to-date equipment we could. Radiographs for the main clinics are still the traditional variety.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

CWRU: The faculty responsible for student experiences in admitting clinic and the radiology course feels it can improve diagnoses of interproximal lesions through magnification, but that it is not different than traditional radiographs for occlusal caries.

UDM: NA.

ILL: No responses noted.

IUPUI: NA.

MICH: Not applicable since not used for caries diagnosis.

OSU: Because we don't use digital radiographs for most of our diagnoses, there is no (valid) consensus regarding their diagnostic value. Dr. Jaynes relates that his experience with film and the digital radiographs is that the digital film is no less diagnostic than F-speed film and the F-speed film is no worse than the D-speed film (based on taking radiographs for NERB patients last year. However, we have not really had much experience and appreciate the potential advantages of inverse images and contrast/exposure changes for enhancement

PITT: NA.

SUNY: At this stage it is difficult to say, but there is a fair amount of consternation with this new system. We do not use radiographs to diagnose occlusal caries, and we still are learning the diagnostic value with diagnosing interproximal caries. We have set all our exposures to 0.16 impulse (>1/4 of a second), based on evaluations with our radiology manikins. This setting may need to be changed as we progress with more experience and will probably vary with the different Xray heads in use. We are also playing around with the options of changing the brightness, contrast (sharpening), and inversion. The general consensus is that our system gives us a quality radiograph similar to 'E' or 'F' speed film

WVU: No response.

UWO: The digital x-ray has been used only for endodontic diagnosis and thus incipient caries lesions have not been evaluated as a routine. However the ability for diagnosing the extent of larger caries lesions has been acceptable with digital but less accurate when compared with traditional films. In either case the accuracy of bite wings has overcome the accuracy of periapical views

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

CWRU: Although the CCD uses much less radiation, because of the cost along with other considerations the SPP is used. The SPP is used because of lower cost, durability (less sensitive) and easier to use by students.

- UDM:** NA.
- ILL:** No responses noted.
- IUPUI:** NA.
- MICH:** SPP - it is more similar to conventional film.
- OSU:** Current thinking (courtesy of Dr. Bob Jaynes) is that the resolution is with the CCD units, but they are bulky. SPP technology allows for thin (film-like) sensors, but has more limited line-pair resolution (about 8 lp/mm v.s. in the 20's for CCD). It also requires another step in the 'processing' of the image before it can be visualized.
- PITT:** NA.
- SUNY:** We are using the storage phosphor plates (SPP) in all clinics, with the exception of our Advanced Education program in Endodontics, which uses the direct sensor/charged-couple device (CCD). We chose the SPP because that system was cheaper to buy, cheaper to operate, and easier to use, in that the mechanics are similar to traditional film. The SPP is also more comfortable to the patients than the CCD, which is larger, although neither is as comfortable as traditional film. The sensor of the CCD system is very expensive, and is more fragile than the SPP. When you consider this fragility and the inexperience of our students, the SPP also made sense. The CCD does reduce radiation more (90% reduction) than the SPP (50% reduction). We are also having a problem with the size of the printed radiographs; we can get an anterior film of a mandibular central incisor that is 8X10, and yet a full mouth set is printed on two 8X10 sheets of acetate. This is a problem only when we print on the acetate, and would not happen if we printed on paper, but most clinicians like to hold a film up to view. We hope someday to have a computer screen at each operator, but because we do not as yet, we print, on acetate, a good number of films. We also did not spend a lot of money on the printer, and this has proven to be somewhat of a problem
- WVU:** NA.
- UWO:** We use CCD but have SPP well (it is not in use). We use CCD in endo as you get immediate image. With the SPP system you have to "process" the image, however, with SPP you don't need a computer in every operator as we have in our endo clinic. Our endodontists prefer the CCD system as they feel it gives better resolution, is faster, and the radiation for patients and operator is reduced. At present we are using the Dentsply GENDEX system and having problems with damage to the CCD sensors (due mostly to student handling), but also having problems due to the data software from GENDEX. Company representatives have not been much help in solving our problems. We are presently looking at ways to solve the problem, perhaps another system.

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

- CWRU:** Case School of Dental Medicine has recently opened an Imaging Center that has the CB MercuRay Maxillofacial Imaging System from Hitachi. Drs. Palomo, Kau and Hans of Case Western Reserve University have just written an article about 3-D cone beam computerized tomography in dentistry which is in press. The article describes the risks and benefits of the system. We refer the readers to the article, which is scheduled to be published in the November 2006 Dentistry Today
- UDM:** No.
- ILL:** No responses noted.
- IUPUI:** No.
- MICH:** iCAT for about 1 ½ years.
- OSU:** The college (multiple sections together) is working toward acquisition of a cone beam/3D unit. However, that is in the future.
- PITT:** We do not have a cone beam 3_d imaging system.
- SUNY:** We do not have a Cone 3-D imaging system, but we have been asking for one. We are beginning to do a fair amount of implants, and this would be very valuable.
- WVU:** No.
- UWO:** No, we do not have this system.

III. Discuss the use of carbide bur use versus diamond burs for intracoronaral procedures in Operative Dentistry at your school.

- CWRU:** At Case the students purchase all their burs and instruments. In general for the pre-clinical courses use carbide burs (Brasseler – part of their kit, but students are free to buy other manufacturer) for Intracoronaral preparations. However, several clinical faculty (as part of the survey) commented that they would be willing to use diamond burs for intracoronaral preparations, especially if using an electric handpiece. Diamond burs (Brasseler— part of their kit, but students are free to buy others) used for crown and bridge preparations, and for also placing bevels on composite preparations.
- UDM:** Bur(s) of choice are carbide for operative dentistry procedures at this time.
- ILL:** No responses noted.
- IUPUI:** Have not used.
- MICH:** Diamond burs are only used for preparation of indirect restorations (crowns, onlays etc). They are not used for preparation of direct restorations primarily due to cost and the desire to have a unit dose (one use bur) system in the student clinics as much as possible. In addition, at least one study (Barros et al, Journal

of Oral Rehabilitation, 2005) compared the surfaces prepared by both diamond and carbide burs and concluded that carbide burs left a surface more conducive to bonding. Fine diamond burs are used for composite finishing.

- OSU:** We continue to use carbide for pre-clinical and clinical operative procedures. Many years ago operative diamonds were evaluated. However, the increased cost was probably the reason for ruling them out.
- PITT:** Students are didactically taught the use of diamond burs for intracoronal preparations especially for composite resins as a means to increase surface area for bonding. However, carbide burs are used in the pre-clinic and clinic for economic reasons. The use of diamonds in the pre-clinic is also troublesome as the diamond burs and typodont teeth tend to burn easily in inexperienced hands. Students do have intracoronal diamond burs for inlay and onlay preparations.
- SUNY:** Mainly carbides used for intracoronal procedures.
- WVU:** We use carbide for all amalgam and gold work. Diamond is used for indirect porcelain restorations. We use rounded end tapered diamond the same used in fixed prosthodontics.
- UWO:** (We) use carbide burs exclusively for intracoronal procedures and diamond burs for extracoronal.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

- CWRU:** Refer to previous answer to first part of the question.
- UDM:** Only used in fixed pros. No serious evaluation for intracoronal procedures has been done.
- ILL:** No responses noted.
- IUPUI:** NA
- MICH:** Does not use diamond burs in operative dentistry.
- OSU:** No response.
- PITT:** Refer to previous answer to first part of the question.
- SUNY:** Brasseler microfine diamonds are used in operative for polishing composite resins. Yes, but primarily for cuspal reductions on onlays. Occasionally a fine diamond is used to bevel the proximal walls of a cast gold preparation. Report on the considerations/findings. We've been very happy with carbide burs for intracoronal procedures. What's the problem we're trying to solve? Our new restorative chair was very surprised that we don't use diamonds for intracoronal procedures. Perhaps this is a west coast phenomenon? He is most recently from Loma Linda.

WVU: Refer to previous answer to first part of the question.

UWO: We use Brasseler diamonds for composite resin restorations and extracoronal crown and bridge procedures. Four that we use routinely in operative dentistry are:

1. 2 Stripper microprep series by Premiere for preventative resin preps
2. End cutting (45° end) FG 30005-31-048 fro gingival bevels
3. Fine grit egg shaped diamond for contouring C.R. lingual concavities
4. 856-31-014 (chamfer - medium)

Fixed pros uses an assortment of chamfer, and football shaped Brasseler diamonds in medium and fine grit. Our school has not tried diamonds for intracoronal procedures.

IV. Electric Handpieces (Topic Revisited)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

CWRU: The electric handpiece has just this year been issued to all 1st year dental students to be used in their pre-clinical courses. Since these have been purchased by the students, they will be used in the clinics within the next two years. The decision to change to electric handpieces was made with the support of the faculty. We will report next year on the success of the implementation next year. Reasons for choosing the electric handpieces were the following : (1) constant torque, (2) smoother operation - no wobble, (3) less noise, (4) less vibration, (5) the control of speed and torque allows one to (use) the same bur for different applications.

UDM: Not using. No plans to use. Clinic Administration often makes this type of decision for the program.

ILL: No responses noted.

IUPUI: Not using. Do not intend to switch.

MICH: Yes, for the last several years for laboratory work (NSK Volvere 10 used for lab work) and intraorally for endo only (rotary endo set up in 8 cubicles - uses Dentsply equipment). Our experience has been satisfactory. No, our school is not considering switching to electric handpieces.

OSU: We do not use electric handpieces (nor do we plan to) in any pre-clinical and clinical labs. There are some units in the building (research labs and support labs) but not for general availability to students.

PITT: Electric handpieces are not being used clinically. Electric low speed straight handpieces are used in the pre-clinical laboratory. Electric handpieces have not been considered for use in the clinics.

SUNY: Yes, but only in post grad Endo. We do have about 20 electric handpieces available in the pre-clinical lab, but they are not currently being used. Endo has

been using electric handpieces for four or five years now. No, there are no plans to switch in the next 2-4 years.

WVU: Our new clinic is equipped for electrical handpieces but the headpieces themselves have not been introduced as of this date. Probably will be when the clinic is completely converted.

UWO: Yes, but at this point only in Endo. They have been used for about 5 years now. We have discussed going to electric handpieces but the cost is too high. No one seems to dislike what we are now using (Adec W&H high/slow speed sets). The electric handpiece used in Endo is the DTC motor from Dentsply Tulsa Dental with an 8:1 reduction handpiece. The experience in Endo has been positive. We are not considering switching from air turbines to electric handpieces for other disciplines in the next 2-4 years.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students?

CWRU: No response.

UDM: No significant impact at this time, our patient population rarely will opt for the more expensive restoration even by just a few dollars. Our department is not yet comfortable with posterior interproximal direct composites. They are done only in selected PRRs for small pit and fissure lesions.

ILL: No responses noted.

IUPUI: Not much. We are doing more of them, but that is about it. Went to sectional matrices for composites.

MICH: Teaching has not been significantly impacted other than:

1. Spending more classroom and pre-clinic lab time on composite restorations
2. Equipment purchases to insure sufficient numbers of curing lights available in pre-clinic and clinic. Increased demand due to more light cured materials being used.

OSU: We have increased the number of pre-clinical posterior composite restorations taught. We continue to teach the concepts of preparation design determined by material choice. However, for ivory teeth, we teach one basic posterior preparation for placement of Class II resin and amalgam restorations.

PITT: Amalgam is still the primary posterior restorative material here. As such, the teaching focus has not changed as much as, perhaps, some other schools where composite resin is the primary restorative material. The amalgam and composite resin courses are taught separately. Amalgam is taught first (spring term) and composites are taught that summer. The composite course builds off of many aspects of the amalgam course (chair position, instrumentation, caries recognition and removal, etc.). This also includes some of the preparation designs as many of the posterior composite preps are modifications of amalgam preps. It is difficult to teach a truly modified composite preparation where only caries are removed

and the tooth restored in the pre-clinic as might be done in a clinical setting. We still use ideal depths and widths in the pre-clinic to better standardize concepts and grading. We do not sense motor skills diminishing due to an increased use of composite resins, as it takes certain motor skills to manipulate, finish and polish a composite restoration correctly. The posterior preparations are also taught as modifications of amalgam preparations, so the motor skills are still taught. That said, we do see a decrease in motor skills due to a lack of time devoted to developing these skills in the curriculum.

- SUNY:** It hasn't impacted the teaching of operative skills. We are seeing very poorly carved amalgams on our clinic floor. Is this because of the above, or our fault as faculty?
- WVU:** If the time spent in the amalgam course is reduced, the skill levels may fall (because) tooth colored restorations do not require the same skills as does amalgam and gold preparations.
- UWO:** Since we are aware that the emphasis is moving toward greater use of composite resins in private practice we are spending more time teaching this area, especially the placement of posterior composites. Although I personally disagree with the "composite guru" approach to dentistry, I realize it is happening and therefore we try to ensure our graduates are well versed in the placement of posterior composite resin restorations. We teach amalgam restorations - it is a full 28 week course with one 3-hour lecture/lab followed by 10 weeks fo intracoronal gold restorations. Composite resin has its limitations so we teach amalgam and gold as well. Our policy is to use the most appropriate material and technique for a given situation.

Describe new or different teaching methods/technologies as Web CT.

- CWRU:** No response
- UDM:** Our Clinic Manual, which is not on-line, contains procedures, protocols, and PowerPoint shows of most operative procedures. Students can access the Manual through our wireless network and their tablet computers (required and issued to all students). Students also receive immediate feedback in the clinic, both verbally and in writing through our evaluation forms.
- ILL:** No response noted.
- IUPUI:** Use "oncourse", a locally (IU) developed teaching software. It is used for resources, some testing, review quizzes, posting grades, etc.
- MICH:** CTools are used by some instructors for posting class information (schedules, lectures, handouts). UM was one of the first, if not the first, to introduce Podcasting of lectures. The new simulation lab has allowed the videotaping of in-class demonstrations which can then be replayed in later course sessions or checked out by students. Sitemaker is used for posting grades online to ensure security and privacy of grade posting.
- OSU:** We are increasing the use of video, Podcasts and 3-D images for teaching the preparations and restorations. Our university has "Desire2Learn" as the teaching

portal (called "Carmen"). However, we also maintain course sites in house for the students. Additionally, we are integrating Turning Point (clickers) into lectures. All students will be purchasing their own starting this year.

PITT: No response.

SUNY: We use Blackboard. PowerPoint handouts, syllabi, grades, etc. are posted to this site. We have an electronic curriculum (DVD).

WVU: No response.

UWO: At present the range of teaching methods includes overhead projections, 35 mm slides, PowerPoint presentations, live video, DVD presentations, VHS video, and filmed hands-on demos. Most lectures are PowerPoint and this is supplemented with hard copy pass-outs and often DVD presentations when available. Several of our faculty are working with our audio-visual person to record DVD demos. However, this can be time consuming and costly. Some are posting lecture material on a website. My personal experience has been that if you give students lecture material they do not attend classes and miss out on the explanations and discussions that take place in the classroom around the subject matter.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

CWRU: No response.

UDM: Normal GV Black instruction for amalgam followed by basically same preparation with composite filling techniques. The course variable is the material, not complexity. Thus, we have an amalgam course and a composite course. We teach PRR's, but not tunnel preps or air abrasion techniques.

ILL: No responses noted.

IUPUI: Amalgams grouped: easiest to most difficult. Class II composites after Class II amalgams. Other composites grouped.

MICH: For the last 6 years, we have sequenced the teaching of restorative dentistry in the first year course starting with a minimally invasive approach and moving on to more complex restorations. This has resulted in teaching basic composite resin restorations before amalgam restorations. Initial hand skills, handpiece skills, and indirect vision skills are introduced immediately by students cutting a standard occlusal preparation on flat teeth. Principles of cavity preparation and management of caries are introduced early along with isolation techniques. Sealants and PRR restorations are taught early to introduce concepts of bonding and conservative restorative techniques. Class III, IV and V composite resin restorations are taught next followed by Class I, V, and II amalgam restorations. Since amalgam preparations are usually more complex and more difficult for students to master than composite preparations, this allows additional time for students to develop handpiece and indirect vision skills before having to cut Class II amalgam preparations. Class II composite resin restorations are taught at

the end of the first year for several reasons. If students can cut a satisfactory amalgam prep, they can cut a composite prep so this allows more time and emphasis to be placed on the actual restorative technique. It provides an opportunity to review bonding at a later date to refresh the students' skills. It also allows them to compare the differences and technique sensitivity of placing Class II amalgams and composites. Complex amalgam restorations, core buildups, post & core techniques, and indirect restorations are taught in the 2nd year course.

- OSU:** We teach based on complexity. After using all materials (A, C, GI) for Class V, we proceed from Class I to Class III. Then there is practice on composite handling and finishing with the Class IV before moving to the posterior with slot preparations and Class II. The second year is where complex amalgam restorations are taught.
- PITT:** No response.
- SUNY:** Currently we group by restorative material. Amalgam is taught in a six week summer session to the new second year students. In the fall we teach composite, glass ionomer, and cast gold. We are in the process of changing this. We will be teaching restorative materials based upon caries classification.
- WVU:** We start with the amalgam course and spend as much time there as we have the last 10 years. The tooth colored restoration course that follows have increased the last 5 years and will probably increase soon again. In the tooth colored course, composite porcelain, GIC, sealants and whitening is taught.
- UWO:** Amalgam and composite are presently taught separately - amalgam in D1 and composite resin in D2. There is enough difference in materials, preparation, and placement that I feel keeping them as separate courses makes sense.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

- CWRU:** No response
- UDM:** That has not been studied and would take several years to validate.
- ILL:** No response noted.
- IUPUI:** Not at our school. We still teach waxing and some limited casting.
- MICH:** Though these observations are not scientifically based, there is agreement among many faculty that when the teaching of gold restorations decreased (especially inlays, onlays, and partial coverage restorations), this resulted in a decline in motor skills and particularly a decline in attention to detail among students. In a gold restoration, if errors were made in the preparation or impression phase, the student usually received immediate feedback in that the restoration would likely not fit and it was remade immediately. With direct restorations, students can get a deluded sense of success. They do not see immediately how their errors may affect the overall success of the restoration because it may appear to be successful when the patient walks out the door, even when it is ultimately compromised. Because

they do not see patients for an extended period of time, they do not see the impact of their mistakes later on either.

- OSU:** Since we are essentially teaching what we did before (with increase of resin restorations), I don't feel that we have sacrificed motor skills training or evaluation. However, we don't teach minimal preparations or preparations that simply address 'caries' pre-clinically for this reason.
- PITT:** No response.
- SUNY:** YES?????. Another factor is that our students do not do their own lab work!
- WVU:** No response.
- UWO:** I don't believe so. Even though cavity preparations tend to be more conservative now than in the past in some cases the composite preparation/restoration can be as demanding as an amalgam one. One still has to have the manual dexterity skills no matter which material is being used.

VI. Discuss matrixing. Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

- CWRU:** We are using a full band matrix system for amalgams and sectional matrices for posterior composites (and mylar strips for anterior composites).
- UDM:** Full band matrixing is still the standard at our school in traditional Class II amalgam restorative situations. Have not found a better system. Use mainly Tofflemire for full-matrix application for amalgams. Dead soft metal bands for those posterior composites that are done, Mylar strips for anterior composites. Cure-Thru™ cervical matrices for Class V restorations
- ILL:** No responses noted.
- IUPUI:** Full band for amalgam (Not broke) Sectional matrix for composite (Seem to get better proximal contacts. We used Danville Engineering brand mainly because of cost.)
- MICH:** Conventional Tofflemire bands are used for routine amalgam restorations due to ease of use, satisfactory performance in most situations, and low cost. Automatrix systems are available for use for complex amalgam restorations where a Tofflemire matrix cannot be used. Clear mylar strips are used for Class III and IV composite resin restorations. The Composi-Tight sectional matrix system is taught in preclinic and available in the student clinic for placing Class II composite resin restorations. Though there is some debate whether the contacts and contours obtained with the sectional systems are superior to those obtained with a Tofflemire band (to justify the added expense), they may of some benefit in some situations. Given that and the popularity of the technique, it was agreed to expose the students to the sectional band technique and have it available for use

OSU: We have Toffelmeire bands, Caulk Automatrix bands, Mylar strips, Clear-Thru bands and Palodent sectional matrices available clinically to pre-doctoral students. We teach the Tofflemire system in the pre-clinic and have a little exposure to the Palodent system. However, it does not easily work with the Kilgore typodont and so is difficult to teach pre-clinically. There is no real rationale for use of one system over the other the rationale for the Palodent is increased separation prior to direct resin restoration. Otherwise, there is no real rationale for use of one system over the other.

PITT: The amalgam course stresses the use of the Tofflemire retainer. A Waterpik original band (.0015 stainless steel) is used in the clinics. The students are taught contouring of the band and wooden wedge placement. This provides good marginal adaptation and re-establishes contact well. The Palodent sectional matrix is taught for posterior resins. This also provides the means to establish interproximal contact, but seems to minimize flash more effectively than the Tofflemire when placing posterior resins

SUNY: Full Tofflemire for amalgams. Automatrix is also available. Mylar strips for anterior composites. We teach the use of a circumferential dead soft band for composites. Tofflemire retainer is used. Sectional matrices are often used on the clinic floor (Palodent). **CLINICAL OPINION:** You have to cut the wedges down when using a sectional matrix. Tofflemire tends to produce a flatter interproximal contour. For occasions when the ring won't stay on the tooth-use Tofflemire. We are in the process of making a clinical slide series for sectional matrices for use in the third year lecture course.
The Tofflemire retainer and stainless steel bands (.00010 and .00015 thickness) are used where appropriate. We pre-contour them with contouring pliers. If a Tofflemire band is used for composite resin restorations we use a "contact maker" instrument such as the Trimax composite resin instrument to obtain good contacts. With either matrixing system "pre-wedging" is emphasized to help in tooth separation and the establishment of good contacts. For sectional matrixing we use the Palodent band and Bitine ring system

WVU: For amalgam restorations we use full metal band with Tofflemire retainer. For posterior composite we use sectional metal band and the Palodent system. For anterior composite we use clear polyester bands.

UWO: We teach and use both. Sectional matrices are not sturdy enough for amalgam condensation. In cases where the lingual-buccal dimension of the proximal boxes are wide the sectional matrix cannot be secured with the ring clamp. In these cases a full stainless steel band such as the Tofflemire must be used. The sectional matrix is preferred for Class II composites due to its built-in contours.

VII. Who/which departments are placing implants? Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

CWRU: Regarding the clinical aspect, at Case the implants are placed by either the oral surgery or periodontology departments. The restoration of the implants is being done by the predoctoral students in the undergraduate clinics. The predoctoral students work with the graduate students through the entire process from

consultation with the respective departments including providing a surgical guide for the patient case.

Regarding pre-clinical teaching, implants have been imbedded in the typodonts and the restoration of these implants will be taught as part of the preclinical crown and bridge courses starting this year.

- UDM:** Perio and Oral Surgery place implants. Restorative Dentistry and AEGD program restore them. There is a Selective course for undergraduate DS 4 students – 14 students only working in pairs. Undergraduate exposure is limited, selective course as noted above with didactic information presented to all students with a hands-on section.
- ILL:** No responses noted.
- IUPUI:** Placement is done by Grad Oral Surgery and Grad Perio departments on a rotating basis. Equal exposure. Restoration primarily done by Pros. Undergrads do them. Must work with a designated Prosthodontist. Grad Pros and Grad Operative also restore them.
- MICH:** OMFS, Grad Perio residency, Grad Pros residency, faculty practice are placing implants. Predoc dental students, Grad Oper residency, AEGD residency, Grad Pros residency, faculty practice are restoring implants. At the undergrad level implant cases are available on a case by case basis. About 25% of the predoc dental students get an implant restoration case at this time.
- OSU:** Implants at OSU are placed by the sections of Periodontics and Oral Surgery. They are restored by Faculty Practice, Grad. Pros., GPR and the Implant Clinic Fellows (part of the section of Restorative and Prosthetic Dentistry). Pre-doctoral students have an incentive to work with their patients in the implant clinic – they receive full credit for each crown placed (up to three). They assist in the implant placement, impression and seating. There is a one-half-day rotation as assistant through the implant clinic. For students wanting more experience, there is an option for an elective (limited availability) for a week rotation through the clinic.
- PITT:** We have a designated implantology clinic staffed by two prosthodontists. They as well as periodontal, prosthodontic, endodontic, and AEGD residents place and restore implants in this clinic. Undergraduates have direct exposure to this clinic. If any of their patients require implants, the undergraduate student treatment plans, places and restores the implant in the implantology center. Along with the regular undergraduate implant course and rotation (3rd year), an elective course is also offered in the 4th year which provides increased clinical experience and learning opportunities.
- SUNY:** Grad Perio, grad OMFS and faculty practice place implants. Postgrad Pros and AEGD students restore them. There is no undergraduate exposure to implants.
- WVU:** Implants with students are all placed in the Oral and Maxillo-Facial department. All students take a preclinical implant course. About 25% of the students will have a patient that needs a single implant. In these cases the student will do the work. The rest of the class will have an opportunity to observe the fixed prosthodontic graduate students working on their patient or someone else's.

UWO: We have no prosthodontic or oral surgery graduate programs so all implants are handled by in the undergraduate program. The cases are worked up by the prosthodontic section and the implants are placed by oral surgeons associated with the school (at a reduced fee), then the students restore them. Each student is assigned two implants. These may be for overdenture cases or single unit crowns. If there are more than 2 implants per patient then students share the treatment and experience.

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

CWRU: No, we do not think that implants have an effect on the reduction of endodontic and restorative rehabilitation. The philosophy of the school and the Department of Comprehensive Care is that “restorable teeth are to be maintained, cost should not be an issue, the prognosis of the tooth is of primary importance.”

UDM: That does not see to be the case. The department still feels that a healthy and restorable root with a good prognosis is a better alternative than an implant.

ILL: No responses noted.

IUPUI: No hard data, but it seems that I hear the implant option much more than I used to hear. Anecdotal.

MICH: Yes. This has decreased the number of endo teaching cases.

OSU: The availability of implants has affected our students and the decision regarding treatment of endodontically involved teeth. Cost of the implant over endo treatment is a factor in one direction. The ability to restore a lost tooth with one restoration (non-fpd) is a different motivation. Additionally – we still require foundation restorations to use only amalgam. Since we do not use pre-fabricated posts in our clinics, there are some cases where we might have restored endodontically, but instead go toward an implant for the restoration.

PITT: We do not see an increase in extraction/implant versus endodontics. However, when a tooth is diagnosed as having a questionable to poor prognosis, we are now more likely to suggest implant placement as opposed to heroic endo/post-core/crown treatment based upon the prosthodontic and periodontic consultations.

SUNY: We really haven’t observed any impact on our students’ experiences doing large cor build-ups. We still attempt to restore teeth if there is a favorable short/long term prognosis.

WVU: No response.

UWO: No, implants have had no effect on the number of endos and core build-up experiences for our students. We do what is best for the patient, within the limits of their financial capabilities. We charge about \$350.00 (molar) for an endo procedure and a total cost of \$1500.00 for an implant. Endodontic procedures are covered if patients have insurance. No insurance company in Canada will cover implants!

Regional CODE Agenda

1. *Are schools using laptops? Are they compulsory?*
Only 4 schools required students to have laptop computers (SUNY, IUPUI, UDM, CWRU). Some schools determined which make of laptop which had to be purchased, others gave the students a choice. This was suggested as a possible National Agenda item topic for 2007.
2. *Evidence-based teaching*
this was very briefly discussed. All agree we should be using evidence-based teaching in our programs when possible. This topic has been on the National Agenda in past years, however, it was thought it might be time to re-visit it in 2007.
3. *The use of typodont teeth with built-in caries*
This topic generated a fair amount of informal discussion. It was noted Kilgore has teeth available with caries patterns. However, it was pointed out that the decay patterns tended to be inconsistent from tooth to tooth and the cost per tooth was high. SUNY representatives noted that Buffalo was conducting a project on this and would report on the progress/results at the 2007 meeting.
4. *OSCE format for examinations. Who is using them?*
UDM representatives asked if there was anyone using OSCE format exams. Only UDM and MICH indicated they were. Most indicated they were not using them because they were lab and time intensive.
5. *NERB examinations*
Since NERB examinations have been a hot topic they were brought up again. In the past there was concern about how schools were dealing with differences in what the board examiners were looking for versus what is being taught at dental schools. According to the discussion which followed it appears the situation is much improved, especially since they did away with the temporary bridge. Some still felt the failure rate was too high. There was some discussion on the value of the NERB examination.

Suggestions for CODE.

- What can the organization do to improve its effectiveness?
There seem to be a lot of repeat questions from recent years (such as electric handpieces and digital radiographs). We seem to be rehashing the same topics over and over. Let's stick with new subjects for discussion and let's keep them confined to operative dentistry.

We feel that increasing CODE's visibility would be an excellent way to improve its effectiveness. It is an organization that seems to appreciate the art as well as the science of dentistry, and understands the need for pre-clinical and clinical training of dental students. The decrease in this part of dental school curricula is disheartening. Perhaps articles could be submitted for publication and administrations made aware of these concerns.

Have National office contact deans of schools and restorative/operative dentistry chairs to explain the CODE organization and its purposes and to encourage them to send school representatives to CODE annual regional meetings.

What is suggested to improve the Web site?

<http://www.unmc.edu/code/codeframe.html>

Some participants still think the CODE URL should be more distinctive and easier to remember. Some had no problem connecting to the CODE website using the existing pathways. Once located and bookmarked, it is easily retrieved.

Other comments?

All agree Dr. Larry Haisch and his CODE National office staff are doing a great job!

CODE Region IV Attendees Form

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|----------------------|------------|--------------------------|----------------|------------------------------|
| Bill Gray | UWO | (519) 661-2111 x86097 | (519) 661-3416 | william.gray@schulich.uwo.ca |
| James Hoddick | SUNY | (716) 692-4242 | (716) 694-5774 | jhoddick@pcom.net |
| T. Roma Jasinevicius | CWRU | (216) 368-2237 | (216) 368-3204 | trj2@case.edu |
| David Brown | SUNY | (716) 829-2862 | (716) 829-2440 | dhbrown@buffalo.edu |
| Ed Deschepper | IUPUI | (317) 274-5331 | (317) 274-2419 | edeschep@iupui.edu |
| Ilze Bekeny | CWRU | (216) 328-2486 | (216) 368-3204 | iab2@case.edu |
| Dincer Gurun | UDM | (313) 494-6784 | (313) 494-6781 | gurundi@udmercy.edu |
| Larry Haisch | UNMC | ((402) 472-1290 | (402) 472-5290 | lhaisch@unmc.edu |
| Andrew Nigra | PITT | (412) 648-8655 | (412) 383-7796 | abn3@dental.pitt.edu |
| Gary Wieczkowski | SUNY | (716) 829-2862 | (716) 829-2440 | gwhiz@buffalo.edu |
| Bob Rashid | OSU | (614) 292-3071 | (612) 292-9422 | rashid1@osu.edu |
| Janet Bolina | OSU | (614) 292-3316 | (612) 292-9422 | bolina.1@osu.edu |
| Larry Abbott | UDM | (313) 494-6783 | (313) 494-6781 | abbottlj@udmercy.edu |
| Steve Rosenstiel | OSU | (614) 292-0941 | (612) 292-9422 | rosenstiel1@osu.edu |
| Tim Matuszak | PITT | (412) 488-7750 | (412) 383-7796 | tematusz@dental.pitt.edu |
| Mary Ellen McLean | MICH | (734) 615-8353 | (734) 936-1597 | memclean@mich.edu |
| Cornel Driessen | UWO | (519) 661-2111 X86101 | (519) 661-3416 | driessen@uwo.ca |

CODE REGIONAL MEETING REPORT FORM

REGION: V - Northeast

LOCATION AND DATE OF MEETING:

Columbia University

October 5,6, 2006

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: **TBA**

Phone #:

Address:

Fax #:

E-mail :

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.

**2006 NATIONAL CODE AGENDA
REGION V
SUMMARY RESPONSES TO NATIONAL AGENDA**

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

The summation of the survey of the institutions that responded indicated that the number 1,2, and 3 most important concepts were Isolation techniques (Rubber Dam, others), Amalgam (Class I, Class II, Class V) and Composite Direct (Class I, Class II, Class III, Class IV and Class V) . This was followed by number 4, Caries Diagnosis and Removal, number 5, Veneers (Porcelain, composite), number 6, Onlays (Gold, Composite or Porcelain), number 7, Sealants and Preventive Resin restorations, number 8, Composite Indirect (Class I, Class II), number 9, Caries Risk Assessment and number 10, Caries Control Sedative Fillings, Pulp Capping)

All other concepts listed were taught in each participating school but generally were assigned less importance than those concepts listed. All concepts listed were taught in the traditional Operative Dentistry course.

There was much discussion regarding the need for a reevaluation of the importance of the grouping including “Caries Risk Assessment”, “Caries Diagnosis and Removal”, “Caries Control” and “Remineralization Therapies”. The consensus was that this is where the emphasis should be placed in the curriculum in the future. A meeting of the Region V schools will be planned for early in 2007 to discuss implementation of this concept.

II. What is the current use of digital radiographs in your school?

In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

Of all the reporting schools, only one uses digital radiography universally. Most have digital radiography in the post doctoral endodontics and periodontics programs but not throughout the institution. Some institutions indicate that digital radiography is included in their future plans and two indicate that no plans exist at the present time.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

Programs utilizing digital radiography contend that there is little or no difference in their ability to diagnose. They contend that the ability to enlarge, zoom in and out, enhance and focus on areas actually assists in making diagnoses. It is agreed that retakes are also reduced. It was also agreed that traditional radiographs are very dependable. It was noted that NERB licensure examinations do not accept digital radiographs.

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

Institutions that utilize digital radiography use both CCD (CMOS) and SPP intraoral sensors. Results with both are good. Pediatric patients and /or patients with small intraoral dimensions prefer the SPP but require an additional step.

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

Most schools are planning to order a cone beam 3D imaging system or are beginning to use it this fall. The I-CAT is the system most widely mentioned. Size, cost and ease of installation are the prime reasons supporting this system.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

Carbides appear to be the favorite for the bulk of intracoronal preparations in Operative Dentistry. Diamond abrasives are used for finishing and bevels for onlays and composites.

IV. Electric Handpieces (*Topic Revisited*)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

None of the reporting schools were currently utilizing electric handpieces widely. Only one school anticipated their general use in the near future.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT. What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course. Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

Region V schools are teaching directly placed composite resins at a rate equal to, or exceeding that of amalgam restorations. Amalgam restorations continue to be taught with the Amalgam preparation honing "operative" skills and the composite placement teaches meticulous placement and finishing techniques. Some basic skills (such as use of hand instruments) are diminished but over all operative skills remain the same. There are some who long for the "old "days of skills reaching that of the gold foil and cast gold inlay requirement, but resigned to "changing times".

Information is disseminated by power point presentations which are available in web based formats (Blackboard, Intranet, etc) and video presentations , live and canned as well as iPod technology with video, sound and written files available.

Curriculum is divided between those teaching by material classification to those teaching by cavity classification. Most agree that teaching by cavity size, beginning with remineralization/risk assessment techniques and working up to onlays and pin amalgams/crowns deserves serious consideration.

VI. Discuss matrixing. Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

Full bands and sectional bands are used. Tofflemire retainer with circumferential metal bands are used generally in amalgam restorations. Sectional retainers (Palodent or Compositite) with system affiliated ring are used for composites. Sectional matrices are though to be better for maintaining contour with composite because of the inability to condense.

**VII. Who/which departments are placing implants?
Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?**

In the majority of schools, implant fixtures are surgically place by the Periodontics and/or the Oral Surgery departments. Two schools include postdoctoral prosthodontics in the surgical mix (Columbia, Toronto) Implant retained restorations are generally placed by students in postdoctoral prosthodontics and predoctoral students in restorative dentistry. At present only one school has a predoctoral implant requirement , but several anticipate a requirement shortly.

Any commentary on “*Let’s take the tooth out and place an implant versus doing endodontics.*” In other words, have implants had an effect on your students' experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

The consensus in Region V is that Implant Dentistry has little or no impact on the decision to treatment plan endodontic therapy or fixed partial dentures in the school environment. Only one institution reports that implant dentistry has a definite negative effect on the number of endodontic and fixed cases treatment planned.

2006 NATIONAL CODE AGENDA

REGION V RESPONSES

(Evidence cited where applicable)

Region V School Abbreviations

| | | | |
|------|---------------------------|------|--------------------------------------|
| BU | Boston University | MTRL | University of Montreal |
| CLMB | Columbia University | UMNJ | University of New Jersey |
| CONN | University of Connecticut | NYU | New York University |
| DAL | Dalhousie University | PENN | University of Pennsylvania |
| HARV | Harvard University | SUNY | State University of NY - Stony Brook |
| HOW | Howard University | TEMP | Temple University |
| LAV | University of Laval | TORO | University of Toronto |
| UMD | University of Maryland | TUFT | Tufts University |
| MCG | McGill University | USN | United States Naval Dental School |

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Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

- BU:** Preclinical curriculum – Ten Core Curriculum Items:
1. Minimally Invasive Dentistry (treatment planning and preparation design)
 2. Direct Composite Restorations, all classes
 3. Amalgam Restorations
 4. Caries, incipient to deep
 5. rubber dam techniques
 6. ergonomics, indirect vision, patient and operator comfort.
 7. Complex Amalgam Restorations and tooth fractures
 8. Cast Gold Onlay Preparations, temporization.
 9. Ceramic inlays, onlays, preparation and temporization
 10. Pulpal Protection

- CLMB:** Preclinical curriculum – Ten Core Curriculum Items:
1. Caries risk assessment, remineralization therapies
 2. Isolation techniques (rubber dam, others)
 3. Amalgam (Class I, II, V)
 4. Composite Direct (Class I, II, III, IV, V)
 5. Caries diagnosis and removal
 6. Caries control
 7. Indirect Inlays, Onlays (gold, composite, ceramic)
 8. Amalgam core buildups
 9. Composite core buildups
 10. Veneers (composite, porcelain)
 11. Diastema Closure
 12. CAD-CAM (CEREC IIID)
 13. Lasers for restorative procedures

CONN This question is unclear as to what information is being sought and some parts of the question seem to contradict each other. Nevertheless, the preclinical course is minimal; most instruction is on the clinic floor with a patient.

Amalgam (Class I, II, II, V)
Composite Direct (Class I, II, III, IV, V, VI)
Sealants and Preventive resin Restorations
Isolation Techniques (Rubber Dam)
Caries Risk Assessment
Amalgam Core buildups (pin, slot or adhesive retention)
Composite Indirect (Class II inlay)

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: Ten most important Operative Dentistry concepts (can be more than ten) non-negotiable.

Caries risk assessment
 Remineralization therapies
 Caries diagnosis and removal
 Isolation techniques
 Pulpal protection and caries control
 Adhesion
 Amalgam routine procedures
 Composite resin direct placement routine restorations – anterior and posterior
 Sealants and conservatively minimally invasive cavity preparations (PRR and Slot preparations)
 Cusp replacement restorations with amalgam and direct composite resins as definitive restorations and as foundations for full coverage restorations
 Glass Ionomer restorations
 Direct Composite veneering for esthetics
 Laboratory fabricated partial coverage preparations and restorations (gold, resin and ceramic)
 Porcelain veneers basic concepts (advanced porcelain veneers is an elective)

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

NYU: Preclinical curriculum – Ten Core Curriculum Items:

1. Caries risk assessment
2. Isolation techniques (rubber dam, others)
3. Composite Direct (Class I, II, III, IV, V, VI)
4. Diastema closure (Elective with composite or porcelain)
5. Composite Indirect (Class I, II)
6. Veneers (Porcelain, Composite)
7. Amalgam (Class I, II, III, V)
8. Sealants and preventive resin restorations
9. CAD-CAM restorations (CEREC III)
10. Caries diagnosis and removal
11. Caries control (sedative fillings, pulp cap)
12. Remineralization therapies
13. Inlays (gold, composite, ceramic)
14. Onlays (gold, composite, ceramic)

PENN: Preclinical curriculum – Ten Core Curriculum Items:

1. Caries diagnosis and removal
2. Isolation Techniques
3. Amalgam (Class I, II, V, complex, pin retained)
4. Composite – Direct (Class III, IV, V, conservative class I, II)
5. Composite, Indirect (Class I, II)
6. Inlay- gold, ceramic
7. Onlay-gold, ceramic
8. Diastema closure (composite)
9. Veneers (Direct Composite) Porcelain veneers currently covered in P2 Fixed Prosthodontics.

Remaining concepts are taught in other courses:

Caries risk assessment is taught in Community Oral Health D1

Caries control – Endodontics D2
 Remineralization techniques – D1 Community Oral Health
 Amalgam Core buildups – D2 Prosthodontics
 Composite Core buildups – not currently taught
 Air Abrasion techniques – not currently taught
 Lasers for restorative procedures – not currently taught
 CAD-CAM restorations (CEREC III) – covered in D3 Operative Dentistry
 Sealants – taught in D3 Pediatric Dentistry
 Glass Ionomer restoratives - not currently taught
 Preventive resin restorations – not currently taught or done clinically

- SUNY:** Preclinical curriculum – Ten Core Curriculum Items:
1. Direct (Class I, II, III, IV, V, VI) Composite. Including enamel and dentin bonding
 2. Amalgam (Class I,II,V) including dentin bonding
 3. Isolation techniques. Rubber dam, operative dentistry technique year 1
Other types isolation, i.e. cotton roll isolation, are taught in different courses such as Introduction to Clinic in Year and Pediatric Dentistry
 4. Caries Diagnosis and Removal. Lecture in preclinical Operative Dentistry Year 1
 5. Caries Control – Taught in operative Dentistry Year 1 only and in Pediatric Dentistry
 6. Sealants and PRR – PRR taught in Operative Dentistry Technique Year 1
Sealants taught in Pediatric Dentistry
 7. Inlays (Gold, Ceramic, includes CadCam) – taught in preclinical operative technique Year II
 8. Onlays (Gold, Ceramic includes CadCam) Taught in preclinical operative technique Year II
 9. Porcelain and Composite Veneers – taught as part of year II esthetics course
 10. Amalgam and Composite Core buildups, the composite core build up is not taught.
- Others:
11. Caries Risk Assessment (taught by Oral Biology)
 12. Diastema Closure – taught as Class IV composite in operative dentistry technique Year II
 13. Glass Ionomer restorations not taught in preclinic
 14. Air abrasion – not taught
 15. Lasers for restorative procedures – not taught
 16. Composite Indirect – not taught

TEMP: Before identifying specifics, our faculty wants to brief CODE members with the structure of our preclinical programs and our teaching philosophy. The preclinical Operative Program (here), Department of Restorative Dentistry has three components, starting with RD (restorative Dentistry) I , RD II and RD III. RD I is a dental anatomy and materials manipulation/application course and parallels the Dental Materials Course (a separate course). Students in RD I are given prepared teeth (Class I, II, III, IV, V) and are asked to restore to proper form and function incorporating knowledge gained from the materials course. Philosophy: The intent in the preclinical teaching is first to learn the concepts of restoring teeth with amalgam and composite to proper form and function as the students are learning about dental morphology as well as the properties of those material in the dental materials course. It is during this course that they learn the use of matrix placement, finishing and polishing of the restorations placed.

RD I and RD II teaching principles of cavity preparation are strongly emphasized with a goal on optimum hand skills and self evaluation. We start with classical preparations because we think that they are more difficult and demanding and then later in the course introduce less invasive techniques. Caries identification and removal is covered in several places in the course. If students properly learn the principles of cavity preparation and restorations and understand properties of the materials used they should be able to follow directions to prepare any tooth form and with any restoration.

“Non Negotiable: items:

1. Detection of caries, caries risk assessment, periodontal health relationships
2. Conventional amalgam preparations (Black Class I, II, III, V) (Less emphasis on pin retained amalgams))
3. Conservative amalgam cavity preparations and restoration
4. Direct composite cavity preparations and restoration (Class I, II, III, IV, V) Matrix placement emphasized in Class II, III, IV.
5. Sealants and Preventive Resins
6. Moisture Control and Isolation techniques
7. Material manipulation/[physical and mechanical properties
8. Direct composite veneers and inlay/onlay cavity preparations and restorations
9. Indirect ceramic veneers and single all ceramic crowns
10. Indirect cast gold onlays
11. Restoration of a single tooth implant
12. Tissue retraction, impression materials and techniques
13. Provisional fabrication
14. Occlusal concepts

TORO: Curriculum concept preferences:

1. Composite, Direct (Class I, II, III, IV, V, VI)
2. Amalgam (Class I,II,V)
3. Composite resin core buildups (mechanical and adhesive retention)
4. Amalgam core buildups (mechanical and adhesive retention)
5. Crown restorations (metal, all porcelain, metal ceramic)
6. Isolation techniques – rubber dam
7. Inlays and Onlays (gold, ceramic, composite)
8. Glass ionomer restorations (Class V)
9. Diastema Closure
10. Sealants and preventive resin restorations
11. Caries control and pulp capping
12. Caries diagnosis and removal
13. Remineralization therapy

TUFT: Preclinical curriculum – Ten Core Curriculum Items:

1. Amalgam (Class I, II, III)
2. Composite Direct (Class I, II, III, IV, V)
3. Caries Diagnosis and Removal
4. Isolation Techniques (Rubber Dam)
5. Preventive Resin Restoration
6. Caries Control (sedative filling, pulp cap, glass ionomers)
7. Onlays (Composite in operative course)
8. Veneers (Porcelain in fixed, composite in operative)
9. Composite core buildup (mechanical and adhesive retention)
10. Amalgam Core Buildup (pin, slot or adhesive)

USN: No responses noted

II. What is the current use of digital radiographs in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

- BU:** They are being used routinely for dental emergencies that are treated in the Oral Diagnostic Center. They are also being used in Endodontics, Orthodontics and Panoramic radiographs. Digital radiographs have not yet become part of the basic patients record or for routine service, but will as soon as the charts are a part of computer system.
- CLMB:** Digital radiography is utilized is postdoctoral endodontics, orthodontics and prosthodontics. It has been in use for about 4 years. There are plans to introduce digital radiographs generally in phases – post doctoral to predoctoral clinical areas over the next few years as new construction and remodeling progresses.
- CONN:** Digital radiographs have been used in Graduate Endodontics for a number of years. Film is still otherwise used. There has been some talk of switching to digital, but a time frame is not common knowledge.
- DAL:** No responses noted
- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted
- UMD:** All radiographs in the adult clinic are digital.
Radiographs in Pediatric Dentistry are a mix of digital and film
Digital system is a sensor system (Planmeca) with plans to have SPP available in the near future for special applications.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** The use of digital radiographs in our school is minimal. Endodontics and Orthodontics have been using digital radiography this year. There are plans for future expansion of digital radiography. Endodontics uses and recommends CCD intraoral sensors.
- PENN:** (We) currently do not have digital radiography.
- SUNY:** The radiology clinic at SUNY StonyBrook has been paperless since September 2004. We started “going digital” in December 2003 but only had two or three operatories capable of taking digital radiographs. The date of the first student digital radiograph was May 2004. We have utilized digital radiography for single films, bite wing films and full mouth series. We have a digital panorex / cephalometric. Digital radiography interpretation is similar to traditional interpretation except that there is a learning curve.

TEMP: Digital radiographs re used only in endodontics and periodontics. There are no plan at present to introduce them generally.

TORO: At this stage they are not widely used.

TUFT: We are currently all digital with respect to radiography and have been so since 2005.

USN: No responses noted

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

BU: Because the digital images can easily be magnified the students feel that they can identify incipient caries more easily.

CLMB: Our experience has indicated that digital radiography is equal to or better than traditional imaging because of the ability to enhance, enlarge and isolate areas.

CONN: No responses noted

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: Digital radiographs using the processing features of the software (Romexis) have improved diagnosis of incipient and proximal lesions.

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

NYU: No responses noted

PENN: No responses noted

SUNY: With digital one can enhance the radiographs, enlarge the radiograph, zoom in and out, get regions of interest, reduce the time spent in obtaining radiographs. Retakes due to processing errors and underexposure/overexposure can be eliminated due to the ability to manipulate the image.

TEMP: Digital radiographs appear to have helped the ability to diagnose caries, however, traditional radiographic techniques are very dependable.

TORO: No responses noted

TUFT: Digital radiography does not hinder diagnosis of any dental pathology , caries, periodontal or periapical. Diagnosis is still dependent on the clinicians expertise and research has indicated that the diagnostic efficacy of various digital systems

are comparable to conventional films and their performance is dependent on the observers experience

USN: No responses noted

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

BU: We use CCD/S-MOS sensors. Our 3D imaging system was installed last week. Information will be available in due time.

CLMB: We use both CCP and SPP intraoral sensors. Patient comfort drives the selection.

CONN: No responses noted

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: Our maxillofacial radiologist makes the recommendation to have both available. Sensor is the most used system and the implementation of SPP in one area for those patients not able to tolerate the size of a sensor.

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

NYU: No responses noted

PENN: No responses noted

SUNY: We use both CMOS (a newer version of the CCD) and SPP system. All of our digital radiographs are taken with wired sensors. The only exception would be with a very difficult pedodontic patient where we would utilize SPP since they are not as bulky as the wired sensor. Our wired sensors are size 2,1,and 0. The SPP require an extra step of putting the phosphor plates in the scanner.

TEMP: We do not have a Cone Beam 3D imaging system. The Gendex system in place is very versatile.

TORO: No responses noted

TUFT: We have panoramic and cephalometric units (Kodak dn Instrumentarium imaging units).

USN: No responses noted

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

BU: We do not have dental acquisition/ceph systems.

CLMB: No responses noted

CONN: We do not have cone beam 3D imaging at present but I have heard that there is a plan to procure this.

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: 3D cone beam digital panoramic system is the standard for both panoramic images and bitewing pans. We have had the system in operation for about one month.

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

NYU: We have digital ceph and cone beam imaging systems.

PENN: Ortho has a cone beam 3-D imaging system.

SUNY: Our digital pan/ceph is the Instrumentarium OC100D for the ceph and the OP100D for the pan. We are in the process of purchasing a cone beam x-ray system. We will probably use the i-Cat system which fits our cost, size and installation requirements.

TEMP: No responses noted

TORO: No responses noted

TUFT: ICAT, imaging systems international dental CT unit will be operational in November, 2006.

USN: No responses noted

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school. Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronal procedures? Report on the considerations/findings.

BU: Only carbides are used. Faculty prefer the sharpness of diamonds and the price that we get from Brasseler is a significant reason. Various faculty on the

instrument committee have evaluated both systems and their decision in favor of carbides has been adopted. Carbides are used for onlays and to finish composites.

- CLMB:** We use carbide burs for intracoronal procedures. Diamond are used for bevels, shoulders, chamfers in composite/ceramic onlay preparations, veneer preparations and cavosurface bevels in facial extension Class III composites.
- CONN:** Carbide burs are used. Plans to switch to disposable carbides are supposed to be in motion. Diamonds are primarily used for extra coronal preparations. Round diamonds are available to facilitate removal of existing composite resin restorations.
- DAL:** No responses noted
- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted
- UMD:** Carbide burs are standard for operative preparations. Diamonds are used for veneer preparations and full coverage preparations. Diamonds are used for specialized bevels and chamfers for Class III, IV, and V preparations.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** We use carbide burs for intracoronal preparations.
- PENN:** Currently, carbide burs are used for intracoronal procedures preclinically and clinically. The switch from carbide burs to diamond burs for intra coronal composite preparations will be done this current year for the Operative preclinical laboratory course. The switch in the clinics is also anticipated
- SUNY:** In preclinical Operative Dentistry we teach the use of carbide burs for intra coronal preparations. Diamond burs are also used in some composite restorations on enamel facial areas to enhance retention and bonding of composite. Diamond burs are taught for inlay and onlay preparations of gold and for the proximal, box of porcelain restorations in order to avoid undercuts
- TEMP:** We use both types, but carbide burs are used primarily. We tried diamond burs and have used them preclinically/ primarily #329, 30, 245, 56, 169, 170 and round burs. It seems that the diamond burs are used more frequently on typodont teeth because they do not cut as aggressively as a new carbide bur. In the clinic, carbide burs are used for the most part, except for placing bevels on enamel, but not intracoronally.
- TORO:** Diamond burs are used for limited applications in intracoronal procedures such as: beveling cavosurface margins of certain preparations (class IV, V for composite). Finishing of composite restorations. We have not considered the use of nor tried diamond burs for intracoronal restorations

TUFT: Carbide burs are used in the Operative Course and Diamond burs are used in fixed prosthodontics. WE have not introduced the diamond burs to prep intracoronally in the preclinic but they are used in the clinic after initial preparation with carbides or lab processed composite, ceramic or Cerec restorations.

USN: No responses noted

IV. Electric Handpieces (*Topic Revisited*)

Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

BU: They have been tested and evaluated. We have found no reason based on performance and cost to change the current handpiece system.

CLMB: Electric handpieces are not generally utilized. There are two in postdoctoral prosthodontics for trial purposes. There are no plans to introduce them in the near future.

CONN: Alternate handpiece designs are being considered in preparation of the revision of the clinics. There are some new handpieces in the faculty practice for faculty to try.

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: Electric handpieces are available in all clinics including the preclinical simulation area. We are in transition to be all electric in the next 18 months in clinical areas and continue to have both electric and air turbine and air motor in the preclinical areas.

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

NYU: We do not use electric handpieces.

PENN: Restorations

SUNY: Only used in the dental laboratory. There is no plan to use electric handpieces in preclinic or clinic.

TEMP: Electric Handpieces are used only in the AEGD program, but not routinely. They are not used elsewhere in the school. They are bulky and a learning curve is required. There are no plans to switch to electric handpieces in the next 2-4 years

TORO: Electric handpieces are not being used currently and are not being considered for use.

TUFT: Electric handpieces are not currently used.

USN: No responses noted

V. Direct placed composite resins are overtaking amalgam as the basic restorative material.

How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT.

BU: More time is spent on composites than on amalgam in the preclinic. This teaching methodology has been in place for ten years. There have been no drastic changes but it continues to evolve. It consists of lectures followed by videos, power point presentations and demonstrations utilizing video projection. All lectures and syllabi are available electronically.

CLMB: Direct placed composites are gaining in use but are not overtaking amalgam as the basic restorative material. Composite resin technique is taught after the students master the concept of basic cavity preparation in the amalgam section of the preclinical course. We group amalgam, composite, indirect gold and esthetic restorations (Veneers, inlays, onlays, etc.)

CONN: The preclinical course is organized by cavity classification and students learn how to apply each material to each class

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: In our clinics composite resin usage in the posterior has increased, especially for class one restorations. For Class II restorations only a slight increase in use due to fee differential. Our patient socioeconomic level is such that fee is a major consideration for the acceptance of care. At one time Class II amalgam and composite resins were the same fee, but in recent years the decision was made to differentiate fees following the fee differentiation in outside dental practices. This has been detrimental to the acceptance of posterior Class II composite resin treatment plan acceptance. We are currently using Blackboard as our online software education tool. Also, students can access recorded Powerpoint and live presentations from the school using the Mediasite software. The students use the Blackboard program in operative to review techniques in the clinic during patient visits and the students have complete access to Blackboard in the preclinical simulation area to include the viewing of videos of the procedures to be accomplished.

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

- NYU:** Direct placed composite restorations require a different set of skills. Faculty must work hard to assure the same quality standard is applied. We use Blackboard, treatment planning and testing, Vital book, CPS classroom feedback, iPodcasts, all manuals and lectures are available on Blackboard posting.
- PENN:** We have incorporated conservative posterior composite restorations, esthetic onlays and bonding agents as dentin sealer into the preclinical curriculum. Bonded amalgam procedures will be added in the future. The time spent on other procedures in preclinical operative dentistry has diminished to accommodate these extra units. All lecture and seminar materials are posted on Blackboard for preclinical operative dentistry. Laboratory procedures are not yet developed in digital format, but is planned. The laboratory manual is not electronic at this time.
- SUNY:** This has not affected the way we teach operative skills to new dental students. We do use composite for the restoration of more teeth but still teach amalgam for non esthetic areas.
- TEMP:** It is our opinion that direct placed composites are still not overtaking amalgam, although it seemed to be the case a couple of years ago. Now, we have observed a high failure rate, especially with Class II posterior composites and still recommend amalgam for large posterior restorations.
- TORO:** More time has been allocated for teaching didactic, preclinical and clinical aspects of the posterior composite. We now have Blackboard and all of our courses will be on it within this year.
- TUFT:** Direct placed composite resins are being emphasized much more in the preclinical operative course. They are taught simultaneously with amalgams - complexity increasing in both areas as the year progresses. There are many more required composite restorations including a composite onlay.
- USN:** No responses noted

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

- BU:** The teaching sequence is : Class II amalgam> Class III composite> Complex amalgam> Class IV composite> Class V Composite> Class V amalgam> Class I and Class II composite> Gold Inlay> Gold Onlay. The minimally invasive approach to tooth preparation is taught.
- CLMB:** No responses noted
- CONN:** No responses noted
- DAL:** No responses noted
- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted

- UMD:** In preclinical we teach amalgam preparations first followed by composite resin preparations. We break each segment into skill acquisition with solid ivory teeth followed by case based projects using bilayered teeth that have a digital electronic sim patient record that includes radiographs that can be displayed at each station.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** No responses noted
- PENN:** Amalgam procedures are grouped first in sequencing, beginning with simple preparations and restorations progressing to the more complex. This is followed by a composite component of the course. Both these procedures are presented in one course. Procedures are integrated, for example, where small amalgam restorations are removed and replaced with the direct composite restoration
- SUNY:** We continue to teach an amalgam preparation and restoration first as a group and composite procedures thereafter.
- TEMP:** New Web CT teaching methods are utilized especially in RD II. We use the intranet and blackboard which link to the operative manual, handouts, drawings, lectures and the on line videos and external websites. Teaching sequence is that we group composite and group amalgam; Simple to complex amalgam ; Complex to simple composite.
- TORO:** The course is sequenced by grouping amalgam procedures together and composite procedures together. We do not mix the techniques according to lesion size.
- TUFT:** No responses noted
- USN:** No responses noted

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

- BU:** Although techniques have evolved, it is not believed that motor skills have diminished
- CLMB:** The highly exacting geometric requirements of metallic restorations and the motor skills developed to provide this care will be (are) definitely diminishing. They may be replaced by a different set of motor skills(manipulation of composite material, artistry, etc), but the meticulous geometric preparation skills are diminishing.
- CONN:** Motor skills are probably not diminished. It is necessary to be meticulous with composite procedures even though the preparation designs are less rigid. For example, isolation, matrixing and regenerating proximal contact can be a greater challenge with composite resin.
- DAL:** No responses noted

- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted
- UMD:** Skills have not been affected with the operative program but it is obvious that students are not as well prepared in the fixed partial dentures due to the decrease in laboratory related procedures in the simulation course.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** Motor skills are possibly being diminished. If motor skills have not been degraded, at minimum they are losing their “meticulous” approach to dentistry.
- PENN:** It is the feeling that the motor skills required to place, shape and contour direct composites anteriorly and posteriorly are a different set of psychomotor skills that are being developed, thereby, not diminishing the motor skill development.
- SUNY:** No responses noted
- TEMP:** Operative skills may well have declined to some degree overall in that we use less and less of hand instruments and depend on rotary instruments (especially high speed) to accomplish “everything”. Nevertheless, I don’t think it relates directly to doing more composites.
- TORO:** We do not believe that motor skills are being diminished by greater composite utilization.
- TUFT:** It is our feeling that motor skills are more highly developed by placing direct composite restorations, although the preparations themselves are not as technique driven as they are with amalgam. Certainly the precision of gold foil preps or cast gold inlay/onlay preps is becoming a “lost motor skill” as the demand for more esthetic materials increases (for good or bad). Students enjoy working with composite materials and the immediate satisfaction they get by providing an esthetic material.
- USN:** No responses noted

VI. Discuss matrixing. Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

- BU:** For amalgams – full matrix / Tofflemire. It is used to provide resistance to condensation pressure, to permit a tight gingival seal and full contour of the final restoration.
For composites – sectional matrix / Palodent. It seals the margin, permits access to place resin, seal gingival margins and can be burnished for good contact.

- CLMB:** We use the full band with Tofflemire retainer for amalgam and the Palodent sectional matrix with BiTine ring for posterior composites for ease in developing contour.
- CONN:** Everything is used depending on the situation. For example, the use of a metal matrix is not exclusive to posterior teeth. More precise and anatomical matrixing can often be achieved with metal. Generally the Tofflemire retainer and bands are used for amalgam posteriorly and the Palodent system is used for posterior composite resin. But, that does not preclude the use of the Palodent system with amalgam or the use of a sectional matrix for anterior teeth.
- DAL:** No responses noted
- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted
- UMD:** For Class II amalgam restorations we are using conventional Tofflemire-like matrices and retainers. For Class II composite resins we recommend prewedging both mesial and distal for all preparations. We are using two different sectional bands-Palodent matrices with BiTine ring and G-ring with Garrison Dental sectional contoured band. Our most used system is a Tofflemire retainer with a dead soft stainless steel Ho band with the recommendation to prewedge both mesial and distal even for 2 surface preparations to acquire a more anatomic and closed proximal contact.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** We use both conventional Tofflemire and Palodent. They are selected based on the individual case.
- PENN:** For amalgam restorations, full band matrixing is utilized with the Tofflemire retainer and bands. For posterior composite restorations, the sectional matrix is utilized. Palodent is currently used preclinically. Garrison sectional matrix will be utilized next year preclinically to match that of the clinic setting.
- SUNY:** In preclinic we only use full band matrix systems. Tofflemire matrix for amalgam and Mylar matrix for composite Class III restorations. We plan to introduce, next academic year, sectional matrices like Palodent or Garrison in Class II posterior composite restorations. Today we use autoband or Tofflemire matrix for posterior Class II composites, with pre-wedging, in clinic.
- TEMP:** In the preclinic we use a full band with a Tofflemire retainer {very thin(.0001)}, both metal and plastic. In the clinical setting we have the sectional Palodent available. In general students tend to use metal bands with the Tofflemire retainer.
- TORO:** We use both the full and sectional matrix band. WE use the full band for Class II amalgam restorations and we use both the full and sectional bands for Class II

composite restorations, to provide for producing anatomical restorations without overhangs and to optimize marginal adaptation. We utilize Tofflemire/Dixieland Band for full circumferential matrix and Palodent for sectional along with the BiTine ring.

TUFT: We use full Tofflemire bands in .0015 and .0010 thicknesses for the majority of amalgam restorations. We also use the Automatrix system for some complex amalgams and even occasionally copper bands for the same. We use the ComposiTight system with sectional .0010 matrices for posterior composites. We seem to have more predictable interproximal contacts with this system when doing class II composites.

USN: No responses noted

VII. Who/which departments are placing implants?

Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

BU: Implants are placed by Implantology, Oral Surgery, Periodontics and soon by Endodontics. They are restored by postdoctoral Prosthodontic and AEGD residents (80%) and by predoctoral students (20%).

CLMB: Post doctoral Periodontics, Oral Surgery and Prosthodontics are placing implants. The bulk of the surgical placement is currently done by Periodontics and Oral Surgery. Post doctoral Prosthodontics and Predoctoral students are restoring implants, All predoctoral students treatment plan and restore implant cases including overdentures, single and multiple unit fixed restorations.

CONN: Perio and Oral Surgery place implants. Implants are restored in Prosthodontics AEGD, Postdoctoral Prosthodontics and undergraduates restore implants and may, to varying degrees, be involved with implant placement. There is a protocol which allows each dental student to offer a single tooth implant restoration to two patients in their pool.

DAL: No responses noted

HARV: No responses noted

HOW: No responses noted

LAV: No responses noted

UMD: Implants are placed through both oral and maxillofacial surgery and periodontics. There is an extensive implant curriculum in the undergraduate program. All students can restore implants. They are restored in the general undergraduate clinic for routine posterior cases but no anterior cases under both prosthodontic and general dentistry supervision. All implant cases are being treated in the postgraduate area

MCG: No responses noted

MTRL: No responses noted

UMNJ: No responses noted

- NYU:** Periodontics, Implantology, Oral Surgery and Endodontics are placing implants. Implantology, International Dentistry, Prosthodontics and undergraduates restore implants. Both undergraduate and postgraduate students restore implants. All undergraduates must complete an implant retained overdenture. 25% restore single-multiple implant crowns.
- PENN:** Implants are placed by students in the Department of Periodontics. Implants are restored by the undergraduate dental student in the main clinics if the case involves less than 6 implants. More complex cases are restored by graduate Periodontal students.
- SUNY:** Implants are placed by postdoctoral students in Oral Surgery and Periodontics. Simple implant restorations are done in the undergraduate clinic. These include single unit implant crowns and simple overdentures (2 implants). More complex restorative cases are done in the General Practice Residency Program. Undergraduates are given a didactic course of 19 hours in the placement and restoration of implants.
- TEMP:** Implants are integrated into the undergraduate curriculum in a variety of courses. The entire 4th year course in restorative dentistry is devoted to implants. Implants are placed by Oral Surgery and Periodontics. They are restored by the Division of Fixed Prosthodontics, AEGD and, to a limited degree, Operative Dentistry. The undergraduate clinical student gets to restore the implant in two ways: either assigned a patient, or while in treatment planning. Learning takes place in coordination with a faculty member. This implant is restored in our Fixed Prosthodontics Division, although a single tooth implant can be restored in the Operative Division. Presently our department is in the process of introducing some component of implantology into the preclinical curriculum
- TORO:** Prosthodontics, Periodontics and Oral Surgery place implants. Prosthodontics and Restorative Dentistry restore the implants. Both graduate and undergraduate students restore implants, but undergraduate students restore only single tooth implants. In addition to the didactic course taught by prosthodontics, undergraduate students observe surgical components of implant placement and prove the restorations for single tooth implants.
- TUFT:** Implants are placed by the PG Perio and PG oral Surgery residents (Turf War). Implants are restored by PG Pros and undergraduate dental students under the department of prosthodontics and operative dentistry.. All undergraduate students must work up diagnostically a case for implants (to include implant placement stents) for which they will receive a grade; if a student has a patient that requires implant restoration then the undergraduate will restore the case
- USN:** No responses noted

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

- BU:** Implants have their proper place and are offered wherever faculty think they are indicated. Given our patient population, they are not accepted as often as they would be in private practice. Implants are not “pushed” instead of other restorations. While years of experience demonstrates that tyodont preparation

skills do correspond to clinical abilities, there has been found no documented evidence that can prove or disprove this belief

- CLMB:** Implant diagnoses and treatment plans have not diminished the number of endodontic and fixed partial denture cases as yet. But it could have an effect in the future as systems become more simplified, user friendly and less costly to the consumer.
- CONN:** No doubt this has to have had some effect, but students still have many opportunities to restore severely broken down teeth. We have a prerequisite and progress exam for teeth requiring cusp replacement with amalgam and students fulfill this. Many of those cases are core buildups.
- DAL:** No responses noted
- HARV:** No responses noted
- HOW:** No responses noted
- LAV:** No responses noted
- UMD:** Depending on the faculty member the statement of taking a tooth out and placing an implant is used only if the tooth is severely periodontally compromised or the endodontic prognosis is extremely guarded. Each case stands on its own merits. There are no one size fits all philosophies with implants.
- MCG:** No responses noted
- MTRL:** No responses noted
- UMNJ:** No responses noted
- NYU:** Implants are absolutely competing for endodontics as well as three unit fixed bridges.
- PENN:** It is the belief that implant dentistry has no effect on buildups and/or endodontics at the University of Pennsylvania.
- SUNY:** This is not really the case at our school. The teeth that this effects are the marginal teeth that saving would be considered heroic. These are teeth that are either periodontally compromised or whose remaining tooth structure was insufficient to support a restoration. Endodontics works and it is always better to have your own tooth than an implant.
- TEMP:** It does occur, but it does not have a large effect on students experiences to prevent students from doing large core buildups. The cost and expertise of undergraduate faculty are influencing factors.
- TORO:** No responses noted
- TUFT:** Implants have not had a significant impact on our students endodontic or core buildup experiences. More significant is the decreased complexity of the patients needs and desires of the patients who are coming into the school for treatment. It would be nice to progressively increase a students exposure to more complex procedures – unfortunately in many instances it is impossible.

USN: No responses noted

Regional CODE Agenda

The Region V schools will hold a meeting in January, 2007 to discuss caries management by risk assessment (CAMBRA), its implications and requirements for integration as a major component in the predoctoral operative dentistry curriculum. It is suggested that the National CODE organization help support this effort.

Suggestions for CODE.

What can the organization do to improve its effectiveness?

What is suggested to improve the Web site?

<http://www.unmc.edu/code/codeframe.html>

Other comments?

CODE Region**V****Attendees Form**

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|---------------------|----------------------|----------------|--------------|--------------------------------|
| George Keleher | Boston | 617-638-4682 | 617-414-1061 | gkeleher@bu.edu |
| Richard Lichtenthal | Columbia | 212-305-9898 | 212-305-8493 | rml1@columbia.edu |
| Alice Urbankova | SUNY | 631-632-8932 | | alice,urbankova@stonybrook.edu |
| David Newitter | CONN | 860-679-3749 | 860-679-1370 | newitter@ns02.uhc.edu |
| Arnold Ray | NYU | 212-998-9455 | 212-995-4889 | ar9@nyu.edu |
| Cheryl Fryer | Howard | 202-806-0389 | 301-622-4453 | cfryer@howard.edu |
| Janice Mercer | Howard | 202-806-0270 | 301-249-4604 | jmercerc@howard.edu |
| Howard Strassler | Maryland | 410-706-7047 | 410-706-3028 | hstrssler@umaryland.edu |
| Margrit Maggio | Penn | 215-573-7847 | | mmaggio@pobox.upenn.edu |
| Joe Rossa | NERB | 847-921-6836 | 847-550-9926 | mccullyrossa@ameritech.net |
| Ross Wyman | NERB | 207-229-7949 | 207-967-3383 | tigersriot2@adelphia.net |
| Maureen McAndrew | NYU | 212-998-9333 | 212-998-4889 | mm154@nyu.edu |
| Marc Rosenblum | New Jersey | 973-972-8622 | 973-972-0370 | m.rosenblum@umdnj.edu |
| Barnett Bucklan | NYU | 212-998-9617 | 212-995-4889 | bb23@nyu.edu |
| Penny Pichardo | Columbia Dentofom | 718-482-1569 | 718-482-1585 | ppichardo@columbiadentofom.com |
| Benjamin Godder | NYU | 212-750-3478 | 212-750-8929 | bg1@nyu.edu |
| James Kaim | NYU | 212-998-9720 | 212-995-4867 | jmk2@nyu.edu |
| James LoPresti | NYU | 212-998-9709 | 212-443-1331 | jtl1@nyu.edu |
| Andrew Schenkel | NYU | 212-998-9722 | 212-995-4119 | abs5@nyu.edu |
| Mark Wolff | NYU | 212-998-9666 | 212-995-4119 | Mark.wolff@nyu.edu |
| David Glotzer | NYU | 212-998-9265 | 212-995-4119 | dlg2@nyu.edu |
| Jerry Klaczany | NYU | 212-998-9701 | 212-995-4889 | gk5@nyu.edu |
| Ariel Ben-Amar | Tel-Aviv Israel | 972-35405078 | 972-35479135 | ariel@benamar.com |
| Bonnie Lipow | SUNY | 631-499-1800 | | lipowdds@msn.com |
| Doug Foerth | SUNY | 631-632-8920 | | douglas.foerth@stonybrook.edu |
| Klara Alperstein | Temple | 215-707-8360 | | kalperstein@dental.temple.edu |
| Susan Coco | Ultradent | 888-445-3749 | 888-445-3751 | susan.coco@ultradent.com |
| Kenneth Allen | NYU | 212-998-9426 | 212-995-4889 | kea2@nyu.edu |
| | | | | |

CODE REGIONAL MEETING REPORT FORM

REGION: VI (Southeast)

LOCATION AND DATE OF MEETING:

University of North Carolina at Chapel Hill

Chapel Hill, NC

October 25 - 27, 2006

CHAIRPERSON:

Name: Dr. Andre V. Ritter

Phone #: 919-843-56356

Address: 441 Brauer Hall

Fax #: 919-966-5600

Chapel Hill, NC 27599

E-mail: Rittera@dentistry.unc.edu

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. Juan Agosto

Phone #: 778-758-2525

Address: University of Puerto Rico

Fax #: 787-751-9551

Medical Sciences Campus

E-mail : jagosto@rcm.upr.edu

San Juan, Puerto Rico 365067

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.

2006 NATIONAL CODE AGENDA REGION VI

SUMMARY RESPONSES TO NATIONAL AGENDA

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

Each individual school ranked the operative concepts or techniques and the combined results for Region VI are:

1. Amalgam
2. Composite
3. Caries Diagnosis
4. Isolation
- 5/ 6. Caries Risk Assessment / Caries Control *
7. Sealants & Preventive Resin Restoration
8. Glass Ionomer Restorations
9. Diastema Closure
- 10/11. Veneers / Amalgam Core Build-ups *
- 12/13 Inlay-Onlay / Composite Core Build-ups *
14. Remineralization therapies

(*Combined rank scores were close enough to be considered even.)

Other “write-in” topics included- Adhesive bonding, Material Science / Selection, Instrumentation, Critical Thinking, and Biological Considerations.

- II. What is the current use of digital radiographs in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame? Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques? Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations? Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.**

The Region VI Schools have limited experience with digital radiography with the exception of Endodontics and Orthodontics. Schools have either started using digital techniques in the pre-doctoral clinics within the past 6 months or are going to go digital in the near future. The SSP techniques are more common for reasons of cost, durability, and patient comfort. The image quality is lacking compared to conventional radiography for incipient caries diagnosis. MCG is the only school with Cone beam 3-D technology in place and their experience is so limited that they have no opinion on its merits. Concern was expressed over the potential to modify images for board exams. All schools preparing to go digital need to have lots of storage room on their servers.

- III. Discuss the use of carbide bur use versus diamond burs for intracoronaral procedures in Operative Dentistry at your school. Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronaral procedures? Report on the considerations/findings.**

All schools in our region use carbide burs in the student clinics for direct intracoronaral operative procedures due to cost, utility, and because they are less aggressive than diamonds. Diamonds are primarily used for indirect procedures, some margin refinement and finishing esthetic restorations. Adv- durable, Dis- stubborn smear layer produced

- IV. Electric Handpieces (*Topic Revisited*) Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?**

(These are) not currently being used in student clinics with the exception of MUSC and their experiences are very limited to specific clinics. Most schools are not considering using them in the near future due to hand weight, high torque and less control. A few schools are considering them for their reported lower maintenance requirements and to reduce the number of handpieces needed (high and low speed).

- V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT. What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course. Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.**

The sequence of teaching has some variability among our schools but most teach amalgam before composite in a sequence that starts with simpler procedures and progresses to more complex. New technology use for instruction is increasing with the use of school-based Web CT, Blackboard and virtual reality labs (Dent-Sim, etc.) where available. Motor skills in preparation design and execution may be slightly decreasing but restoration skills are perceived to be increasing in the shift from amalgam to composite. More emphasis on sculpting through the Dental Anatomy course may be beneficial to creating better composite restorations. Amalgam techniques are still considered to be important for board exams and due to its continuing value as a cost-effective restorative option. More natural tooth use can be beneficial for composite procedures but sterilization and disposal issues complicate their use

- VI. Discuss matrixing. Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?**

All schools in the Southeast Region use the conventional Tofflemire matrix retainer with a full band for amalgam. Sectional bands are occasionally used for amalgam when the contact at the uncut surface is too tight for a full band. Sectional matrices are primarily used for posterior composites although full bands may be used as well. Advantages of full matrix bands- ease of use and stability. Advantages of sectional bands- tighter contacts and better anatomical contours. Sectional band systems- Palodent and Garrison (Composi-tight)

- VII. Who/which departments are placing implants? Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school? Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?**

The departments/programs that place implants in our region’s schools include- Periodontics, Oral Surgery, Prosthodontics and Hospital Dentistry / General Practice Residency / AEGD. Graduate Students and Faculty place the vast majority of implants. Implant restorations are done by faculty, residents and pre-doctoral students in Comprehensive Care Clinics, Fixed Prosthodontics, and Restorative. Pre-doc experiences for the individual student ranges from none to at least two cases “required”. Our schools anticipate increases in these experiences. The reduction in the number of teeth requiring endo and large core build-ups lost due to extraction-implant is perceived as none to a definite reduction although no schools have any data to support their conclusions.

2006 NATIONAL CODE AGENDA

REGION VI RESPONSES

(Evidence cited where applicable)

Region VI School Abbreviations

| | | | |
|------|----------------------------|------|--------------------------------------|
| UAB | University of Alabama | MMC | Meharry Medical College |
| UFL | University of Florida | UNC | University of North Carolina |
| MCG | Medical College of Georgia | NOVA | Nova Southeastern University |
| UKY | University of Kentucky | UPR | University of Puerto Rico |
| ULVL | University of Louisville | MUSC | Medical University of South Carolina |
| | VCU | | Virginia Commonwealth University |

- I. The following agenda item is a joint project between ADEA and CODE. The information should be useful to all for revision or confirmation of our teaching efforts.

Pre-clinical Operative Dentistry Curriculum Survey

List the ten most important Operative Dentistry concepts or techniques that should be taught in a pre-clinical lab course in relative order of importance. One can identify more than ten, but please choose at least ten essential core Operative Dentistry Curriculum items that are “non-negotiable” in your school. The concepts or techniques that are identified should be those that are routinely used in your clinics (adult patients) and/or that faculty believe are useful to a practicing dentist.

Examples (in no particular order) include, but are NOT limited to:

- Amalgam (Class I, Class II, Class III, Class V).
- Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
- Diastema Closure (Elective with composite or porcelain)
- Composite Indirect (Class I, Class II)
- Veneers (Porcelain, composite)
- Inlays (Gold, composite, ceramic)
- Onlays (Gold, composite, ceramic)
- Glass Ionomer Restoratives (Class I, Class V)
- Sealants and Preventive Resin Restorations
- Isolation Techniques (Rubber dam, others)
- Caries Risk Assessment
- Caries Diagnosis and Removal
- Caries Control (Sedative fillings, pulp capping)
- Remineralization Therapies
- Amalgam Core Build-ups (Pin, slot, or adhesive retention)
- Composite Core Build-ups (Mechanical and adhesive retention)
- Air abrasion techniques
- Lasers for restorative procedures
- CAD-CAM restorations (CEREC III)

Please be as specific as possible. For example:

- Amalgam (Class I, II, And V only). Class III was omitted.
- Veneers (Direct composite only). Porcelain taught by Fixed.
- Inlays (Gold only). CAD-CAM Ceramic/Composite taught in Esthetics or as an Elective.
- Composite Core Build-ups only. (Amalgam excluded).

Some of these procedures may be covered in another course such as Fixed Prosthodontics or even a separate Esthetic Dentistry Course. Indicate what is taught in the traditional Operative Dentistry Course(s) in your school so that a consensus on a National Operative Dentistry Core Curriculum can be developed.

In addition to providing the requested information by school, if possible provide a consensus list for the Region. Report on the discussion which took place.

- UAB:**
1. Amalgam (Class I, Class II, Class III, Class V).
 2. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 3. Sealants and Preventive Resin Restorations
 4. Isolation Techniques (Rubber dam, others)
 5. Pulp protection (glass ionomer liner as indicated)
 6. Veneers (composite) porcelain is taught in fixed pros
 7. Caries Control (Sedative fillings, pulp capping)
 8. Caries Diagnosis and Removal
 9. Caries Risk Assessment
 10. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
 11. Composite Core Build-ups (Mechanical and adhesive retention)
 12. Inlays and onlays: general technique and concepts (CAD/CAM is taught in the clinical years)
- CRA should be prioritized

- UFL:**
1. Amalgam (Class I, II)
 2. Composite Direct (Class I, II, III, IV, V, VI)
 3. Diastema Closure (Composite)
 4. Veneers (Composite)
 5. Onlays (Composite, Porcelain)
 6. Caries Risk Assessment
 7. Caries Diagnosis and removal
 8. Composite core build-ups
 9. Isolation Techniques (Rubber dam, others)
 10. Caries control (indirect and direct pulp capping)
- CRA should be prioritized

- MCG:**
1. Caries Diagnosis and Removal
 2. Caries Control (Sedative fillings, pulp capping)
 3. Caries Risk Assessment
 4. Amalgam (Class I, Class II, Class III, Class V).
 5. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 6. Sealants and Preventive Resin Restorations
 7. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
 8. Composite Core Build-ups (Mechanical and adhesive retention)
 9. Isolation Techniques (Rubber dam, others)
 10. Glass Ionomer Restoratives (Class I, Class V)
 11. Remineralization Therapies
 12. Diastema Closure
(Elective with composite or porcelain) NE; taught in Esthetics
 13. Composite Indirect (Class I, Class II) NE; taught in Esthetics
 14. Veneers (Porcelain, composite) NE; taught by Fixed
 15. Inlays (Gold, composite, ceramic) NE; taught by Fixed
 16. Onlays (Gold, composite, ceramic) NE; taught by Fixed
 17. Air abrasion techniques NE; few units available in clinic; demonstrated in class
 18. Lasers for restorative procedures NE; lecture only in Operative
 19. CAD-CAM restorations (CEREC III) NE; taught by Fixed

Students get little credit for CRA

- UKY:**
1. Caries Risk Assessment - identifying patient risk assessment categories, etiologies, current national statistics, fluoride and fluoridated water exposure, salivary flow, radiation treatment, etc.
 2. Caries Diagnosis and Removal - recognizing infected/affected dentin, four different types of caries, types of burs to use in excavation, use of caries

indicating dyes versus tactile sensation, techniques for removing caries, use of radiographs and explorers in diagnosis, new technologies such as Diagnodent, QLF, and DIFOTI Imaging.

3. Use of adhesive bonding in operative dentistry – This is a broad area that includes concepts in use of all adhesive systems including techniques for direct composites, resin-lined amalgam, indirect porcelain and composite, resin luting systems, and desensitizing agents.
4. Composite Direct - Class I through VI, composition of composite, classifications, physical properties, rationale and chemistry surrounding dentin bonding agents, and advantages of the new nanofilled hybrid composites.
5. Amalgam - Class I, II, III, and V. Different categories of amalgam (spherical versus lathe-cut), chemistry behind high-copper amalgam reactions, physical and clinical properties, and the theory behind new amalgam alloys.
6. Isolation Techniques - rubber dam and paraphernalia, types of clamps, cervical retainers, three methods of placing rubber dams, and other isolation techniques.
7. Sealants and Preventive Resin Restorations - rationale, four methods for sealing teeth, three types of PRR's, and air abrasion tooth principles.
8. Glass Ionomer Restorations -emphasis on conventional glass ionomers, chemistry, advantages/disadvantages, and fluoride release. Resin-modified glass ionomers is covered in a separate board review course.
9. Core Buildups – Using amalgam, composite, and glass ionomer. Indications for the types of material and techniques including corono-radicular buildups.
10. Anterior Esthetic Procedures in operative dentistry – These include direct composite veneers, diastema closure, and porcelain veneers.

All of these procedures are taught in operative at UKCD. In addition, single unit indirect restorations are taught by the operative faculty. Items listed are a “wish list” more than what is actually taught

- ULVL:**
1. Amalgam (CI I, CI II, CI III, CI V). Class III in distal of canine; may also be resin
 2. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 3. Isolation Techniques (Rubber dam, others)
 4. Glass Ionomer Restoratives (Class I, Class V) Class V mostly; Class III rarely, Class I never
 5. Amalgam Core Build-ups (Pin, slot, or adhesive retention). We use bonding agent but not for retention.
 6. Caries Diagnosis and Removal
 7. Caries Control (Sedative fillings, pulp capping)
 8. Remineralization Therapies. Taught in Junior lecture series.
 9. Veneers (Porcelain, composite) Porcelain taught in FPD.
 10. Sealants and Preventive Resin Restorations. Sealants taught mostly by Pediatric Dentistry.
 11. Operative & Pediatric Dentistry teach PRR.

- MMC:**
1. Caries Diagnosis and Removal
 2. Amalgam (Class I, Class II, Class III, Class V).
 3. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 4. Isolation Techniques (Rubber dam, others)
 5. Caries Control (Sedative fillings, pulp capping)
 6. Glass Ionomer Restoratives (Class I, Class V)
 7. Sealants and Preventive Resin Restorations
 8. Remineralization Therapies
 9. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
 10. Composite Core Build-ups (Mechanical and adhesive retention)
 11. Caries Risk Assessment

12. Veneers (Porcelain, composite)
13. Diastema Closure (Elective with composite or porcelain)
14. CAD-CAM restorations (CEREC III)
15. Onlays (Gold, composite, ceramic)
16. Inlays (Gold, composite, ceramic)

- UNC:**
1. Amalgam (Class I, Class II, Class III, Class V)
 2. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI)
 3. Diastema Closure (composite)
 4. Glass Ionomer Restoratives (Class III, Class V AND Class II slot PREPS)
 5. Sealants and Preventive Resin Restorations
 6. Isolation Techniques (Rubber dam, others)
 7. Caries Risk Assessment
 8. Caries Diagnosis and Removal Caries Control (Sedative fillings, pulp capping)
 9. Amalgam Core Build-ups (Pin, slot, or adhesive retention) Comp build-ups are taught in Pros.

- NOVA:**
1. Caries diagnosis and removal (including the use of the Diagnodent)
 2. Caries Risk Assessment (including caries control and use of Triage)
 3. Isolation
 4. Composite direct (CI I-VI including matrices and finishing and polishing)
 5. Composite core build-ups (mechanical and adhesive retention)
 6. Sealants and preventive resin restorations
 7. Amalgam (Class I, Class II, Class III, Class IV)
 8. Selection of appropriate restorative materials including remineralization therapies (critical thinking)
 9. Diastema closure
 10. Amalgam core buildups including pins and slots
- CRA is part of a computerized system that requires approval prior to any restorative treatment is initiated with a patient

- UPR:**
1. Isolation Techniques (Rubber dam, others)
 2. Amalgam (Class I, Class II, Class III, Class V).
 3. Composite Direct (Class I, Class II, Class III, Class IV, Class V, Class VI (no
 4. Caries Diagnosis and Removal
 5. Caries Control (Sedative fillings, pulp capping)
 6. Sealants and Preventive Resin Restorations
 7. Amalgam Core Build-ups (Pin, slot, or adhesive retention)
 8. Composite Core Build-ups (Mechanical and adhesive retention)
 9. Onlays (Gold, composite, ceramic)
 10. Diastema Closure (Elective with composite, porcelain taught by fixed)
 11. Inlays (Gold, composite, ceramic)
 12. Veneers (Porcelain – taught in Fixed, composite)
 13. Glass Ionomer Restoratives Bases

- MUSC:**
1. Operative materials science
 2. Hand and rotary instrumentation
 3. Biologic considerations – Microstructure of enamel/dentin
 4. Caries diagnosis and removal
 5. Caries risk assessment
 6. Isolation techniques
 7. Caries control (sedative restorations, pulp capping)
 8. Amalgam (Class I, II and V)
 9. Composite direct (Class I, II, III, IV, V, VI)
 10. Remineralization therapies
 11. Amalgam core build-ups (pin, slot, or adhesive retention)

12. Composite core build-ups (mechanical and adhesive retention)
 13. Glass Ionomer restoratives (Class V)
 14. Sealants and Preventive Resin Restorations
- Students rotate in a CRA clinic at a diagnosis and treatment planning level

- VCU:**
1. Amalgam (class I, II, V)
 2. Composite Direct (class I, II, III, IV, V)
 3. Diastema Closure (Elective with composite)
 4. Veneers (Porcelain, Composite)
 5. Onlays (Gold, Composite, Ceramic)
 6. Glass Ionomer Restoration (class I, temporary, class V)
 7. Sealants and Preventive Resins
 8. Isolation Techniques (Rubber dam, others)
 9. Caries Risk Assessment
 10. Caries Diagnosis and Removal
 11. Caries Control (Sedative fillings, pulp capping)
 12. Remineralization. Therapy
 13. Amalgam Core Buildup (pin, slot, adhesive retention)
 14. Composite Core Buildup Mechanical and Adhesive Retention)

II. What is the current use of digital radiographs in your school? In what areas and for how long have digital radiographs been utilized? If not utilizing digital radiographs, are there future plans for utilization and what is your time frame?

- UAB:** Endo has implemented Digital Radiography (2nd or 3rd year). Future plans for school in 2-3 years (?). Students have computers formatted to accommodate digital radiography.
- UFL:** Digital radiography has been in use exclusively at our College for periapical and pan films for several months now.
- MCG:** SoreDex Optime system used school-wide in conjunction with the newly implemented Axiom computer system. The Endodontic department started to use SoreDex Optime system two years ago.
- UKY:** Digital radiography has been used here since 1998 in the endodontic clinic (with some periods of remission). We are preparing to go fully digital within the next 12months.
- ULVL:** Digital Pans - 6 months at the moment we print and place in patient chart. Future: Paperless charts and digital radiographs when facilities are renovated; maybe sooner if clinical management system software is changed.
- MMC:** Used in Endodontics. Not used in Operative.
- UNC:** They are used exclusively in our school. They have been used exclusively for 2-3 years if not longer.
- NOVA:** Undergraduate and post-graduate endodontics : 3 years
 Post-graduate orthodontics : 3 years
 All other undergraduate clinics will go live with AxiUm startup (October 2006)
 All other post-graduate clinics will go live within 6-months of AxiUm startup
- UPR:** Minimal usage (two units). (Used for) oral diagnosis.

MUSC: We have digital radiography only in the graduate Periodontics section at this time. We anticipate having digital radiography available for operative in our new clinical facility in 2008.

VCU: Orthodontics has been completely digital (intraoral, panoramic and ceph) for about six years, using Dolphin imaging software. Pediatric dentistry has had a CCD system in the hospital for two years. Radiology has an old CCD used exclusively for surveying potential Endo board lesions. Radiology clinic is planning on going completely digital by 2007 if funding comes through.

Has digital radiography helped or hindered your ability to diagnose incipient interproximal or occlusal caries compared to traditional radiographic techniques?

UAB: No response noted

UFL: The jury is still out, however many practitioners are not happy with the diagnostic quality for incipient caries.

MCG: It is more difficult to read incipient decay even when one magnifies it. The pixels are evident in the magnification, obscuring the diagnosis.

UKY: Not used at this time. We are assuming that the ability to manipulate images (color, contrast, brightness) will improve our diagnostic abilities!

ULVL: NA

MMC: Not used in Operative.

UNC: They have hindered. There are a significant number of false-positives and false-negatives associated with digital radiographs here. On the positive side, access to and management of radiographs has been greatly improved. It is a significant advantage to be able to access radiographs from my office or my home.

NOVA: The answer is subjective as no comparison studies have been made. Unlikely to be any difference.

UPR: We haven't worked enough with the units, but traditional radiography may provide more details.

MUSC: NA

VCU: No response noted.

Which of the two main categories of intraoral sensors are used: direct sensor/ charged-coupled device (CCD) or storage phosphor plates (SPP)? What advise/recommendations would you make as to which system to select? (CCD or SPP)? What is the rationale for this advise/recommendations?

UAB: We use digital radiography in Ortho and Endo and use direct sensors.

UFL: We are using SPP, and the system seems to be time-consuming and the quality of the images seems to be deteriorating over time. This system was chosen because it was felt that it would be most applicable to a student clinic due to cost and fragility of the CCD sensors. Faculty that are experienced with other systems feel that the CCD images are of better quality.

- MCG:** SoreDex Optime system uses storage phosphor plates (SPP).
- UKY:** Not used for this at this time. We are assuming that the ability to manipulate images (color, contrast, brightness) will improve our diagnostic abilities! In the endodontic clinic we are using CCD devices (SUNI). These provide immediate images (seconds) and if needed, the student can reorient the sensor and take another film for his endodontic case. We feel like CCDs are the way to go for an endodontic practice. However for our full school conversion, we are seriously considering storage phosphor plates. These are being seriously considered for ease of technique in taking the radiographs (use the traditional radiographic techniques) and for patient comfort (no need for large, hard sensors). When the school changes to all digital radiography, there is a good chance that the endodontic clinic will remain using the CCD sensors.
- ULVL:** NA
- MMC:** No.
- UNC:** No response noted.
- NOVA:** CCD and SPP for panoramic and cephalometric
 CCD for endodontics, emergency, some oral surgery (exodontia), pre-and post-cementation checks.
 SPP for bitewings and FMX on adults, adolescents, and children.
 SPP: Increased patient compliance, ease of use, satisfactory results for vertical and horizontal bitewings, no need for instant image
- UPR:** No response noted.
- MUSC:** CCD. Still looking at this issue for the new clinical facility in 2008 but have not yet decided which system to use.
- VCU:** The radiology clinic plans to use SPP systems (Soredex OpTime). Cost of CCD systems in dental students' hands is astronomical. Also, sensors (CCD) are bulky and many patients object to their use. We will be purchasing the Medcore MiPACS software system.

Does your school have a dental acquisition/ceph (Cone beam 3-D dental imaging system)? Which system are you utilizing and how long have you had the system? Please list the pros and cons for this specific system.

- UAB:** We do not have a Conebeam but are planning on it as well as routine digital radiography in about a year or so.
- UFL:** No responses noted.
- MCG:** We do have a new Cone beam 3-D dental imaging system installed just this summer so it is too early to know the pros and cons.
- UKY:** The College has spent considerable time and effort looking at cone beam technology. UK currently does not have a system, however as the price has dropped we are much closer to making a purchase.
- ULVL:** We have had an iCAT CBCT system (Imaging Sciences International) since June 2004

Pros:

Rapid acquisition - 20 sec or less.

Rapid display - 1 min or less.

Able to scan limited regions or full head - can be used for multiple purposes from implants to craniofacial anomalies.

Capable of variable resolutions depending on imaging requirements.

Data can be displayed in a variety of modes appropriate to the task - e.g. cross-sections (implant, TMJ), axial, coronal and sagittal and 3D (pathology).

Enables the use of numerous software programs to facilitate diagnosis, treatment planning and in some instances treatment - e.g. Nobel Biocare Surgical guided implant placement.

Cons:

Equipment is expensive.

Yearly maintenance fee is expensive.

Potential for inappropriate/overuse.

Data storage requirements are large.

Able to be purchased and operated (in some states) by inexperienced providers.

Reference: (Clinical applications of cone-beam computed tomography in dental practice. Scarfe WC, Farman AG, Sukovic P. J Can Dent Assoc. 2006 Feb;72(1):75-80)

MMC: NA

UNC: No responses noted.

NOVA: Not at the present time.

UPR: No responses noted.

MUSC: Planned for the new clinical facility in 2008.

VCU: We do not have a Cone Beam CT system currently, but are looking at the Hitachi Mercu Ray.

III. Discuss the use of carbide bur use versus diamond burs for intracoronal procedures in Operative Dentistry at your school.

UAB: Carbide burs are the bur of choice (here) for intracoronal procedures.

UFL: Carbide burs are used for amalgam and direct composite preparations.

MCG: We use mainly carbide burs for our intracoronal procedures.

UKY: Carbide burs are used for all operative intracoronal procedures (i.e. Class I-VI amalgam, composite, glass ionomer preparations). Round end fissure burs are used for posterior preparations (#245, #330, #256). Round burs and some round end fissure burs are used for anterior preparations (#2, #4, #330).

- ULVL:** We do not use diamond burs for operative intracoronar preparations.
- References:
1. Effect of cutting instruments on permeability and morphology of the dentin surface. Sekimoto T, Derkson GD, Richardson AS. Oper Dent. 1999 May-Jun;24(3):130-6. Nippon Dental University, School of Dentistry at Niigata, Department of Pediatric Dentistry, Japan.)
Conclusion: Dentin bonding agents may have their effectiveness reduced when placed following cavity preparation by use of a diamond.
 2. Effect of bur type on microtensile bond strengths of self-etching systems to human dentin. Dias WR, Pereira PN, Swift EJ Jr. J Adhes Dent. 2004 Autumn;6(3):195-203. (Department of Operative Dentistry, School of Dentistry, University of North Carolina, Chapel Hill, NC 27599-7450, USA.) To compare the microtensile bond strength (microTBS) of five adhesives to human dentin prepared with 600-grit SiC abrasive paper (SiC), a diamond rotary instrument, or a carbide bur.
Conclusion: Surface preparation using a carbide bur generally yielded higher bond strengths than preparation using either a diamond rotary instrument or SiC abrasive paper.
 3. Effect of surface roughness of cavity preparations on the microleakage of Class V resin composite restorations. Shook LW, Turner EW, Ross J, Scarbecz M. Oper Dent. 2003 Nov-Dec;28(6):779-85 Department of Restorative Dentistry, University of Tennessee Health Science Center, College of Dentistry, Memphis, TN, USA.) This study determined whether surface roughness of the internal walls of a Class V resin composite preparation, using a carbide bur, a medium-grit diamond bur and a fine-grit diamond bur, affected the degree of microleakage of the restoration.
Conclusion: For both the enamel and the dentin margins, the analysis revealed no statistically significant differences in microleakage across bur types.

MMC: We mainly use carbide burs for intracoronar procedures. Diamonds were used in the late 60's and early 70's because the low speed handpiece was being used in more cases.

UNC: We prefer the use of carbide burs. They are less expensive. They are less aggressive in student hands, and they represent one less instrument for students to master.

NOVA: At this time we are still using carbide burs for intracoronar procedures. We primarily use the 329, 330 and 245. The burs are economical and reusable. They also cut dentin very efficiently.

UPR: Carbide for intracoronar procedures.

MUSC: Mainly use carbide burs due to cost. Our bur blocks have a straight fissure and two tapered diamonds that can be used. Other diamond burs are available for use in the clinic on "as needed" basis.

VCU: Diamond burs are not used for intracoronar procedures.

Which diamond burs are used and for what purposes? Has your school considered or tried diamond burs for intracoronar procedures? Report on the considerations/findings.

UAB: Diamond burs are too aggressive for the student's hands for intracoronar procedures.

UFL: Diamond instruments are used for indirect restorations.

MCG: 330 and 245 diamonds available in Faculty Practice for posterior resin preparations.

- UKY:** Diamond burs are used for extracoronary/intracoronary procedures related to all indirect restorations including crown/inlay/onlay preparations.
- ULVL:** See previous answer.
- MMC:** Not used.
- UNC:** Diamonds are used in OD for beveling and roughening enamel walls and to some extent for gross finishing of composite restorations. Diamonds are used exclusively in Pros for C&B preparations.
- NOVA:** We are currently looking at disposable diamonds for operative preps for refinement.
- UPR:** Diamond points (kit from Brasseler) are used for onlay procedures, finishing composite restorations and for laminate procedures.
- MUSC:** We teach diamond burs for margin refinement and for Class II and II direct resin composite preparations.
- VCU:** We are not considering the use of diamond burs for intracoronary procedures.

IV. Electric Handpieces (*Topic Revisited*)
Are electric handpieces being used? Where? For how long? What has been the experience? Is your school considering switching to electric handpieces in the next 2-4 years?

- UAB:** Electric handpieces have been evaluated in the faculty practice for more than two years (two units have electric handpieces). Most faculty feel it generates less noise, and cuts smoother than conventional handpieces. However, from my understanding, we are not planning to use electric handpieces in the next few years in the student clinic due to cost.
- UFL:** There is one electric handpiece in Faculty Practice. Some faculty feel they are too bulky. No plans at present to switch in the pre-doc clinics.
- MCG:** We do not use electric handpieces in the student clinic at this time. The faculty practice clinic has plans to switch to electric handpieces. My personal experience is that the cutting efficiency is not as good as air driven handpieces. However the control is much better for precision cutting
- UKY:** No electric high speed handpieces are used at UKCD. We have several electric slow-speed lab handpieces that are used mainly by faculty and laboratory technicians. No we have no plans to convert to electric handpieces in the near future.
- ULVL:** Electric handpieces have been tested only in a few clinics and faculty practice for about 2 years. Experience has been generally positive. Handpieces are generally thought to be too large for use in pediatric dentistry. We are considering implementing but may not totally replace air-driven handpieces. Reps from several companies are coming to the school this Fall to demonstrate their products.

- MMC:** Some are being evaluated for possible use.
- UNC:** Not in student clinics. There is limited access to them in the Dental Faculty Practice. High torque for gross cutting and less control for fine cutting. (Switching) has been talked about.
- NOVA:** As of now we are not using electric handpieces but we came very close to ordering them for next year. We are considering them since they will require less maintenance and the students will have one machine which does both slow speed and high speed. We have a demo. model in the Sim Lab from KaVo
- UPR:** No, but Graduate Prosthodontics have tried them.
- MUSC:** Removable prosthodontics tried a KaVo electric handpiece, high and low speed, at one chair for a couple weeks. The only negative thought was it was heavy at one end. It had great torque, was quiet and cut very smoothly. If a student started with them, doubt if they would notice the heaviness. The faculty liked the handpiece. An electric handpiece was used minimally in the advanced restorative clinic for about a year with positive experience. We have no plans to move in this direction at this time, but we are considering them for our new clinical facility.
- VCU:** Electric handpieces are not presently in use here, but there is growing interest to evaluate them in the future.

V. Direct placed composite resins are over taking amalgam as the basic restorative material. How has this impacted the teaching of operative skills to new dental students? Describe new or different teaching methods/technologies as Web CT.

- UAB:** We are teaching the anterior composite restorations first. (As opposed to teaching Class I amalgam first as in the past).
- UFL:** We are adjusting our per-clinic courses to spend more hours covering composite restorative procedures.
- MCG:** We have spent proportionately more time on composite teaching, incorporating more exercises and emphasizing posterior composite techniques.
- UKY:** Considerably more time is being used in the curriculum to teach direct placed composites. There is more didactic time, pre-clinical time, and more clinical procedures are being done with direct composites. Several years ago, a new direct composite course was established in the first year curriculum that is separate from the course in amalgam restorations. There have been discussions in the past about what order to teach these in (with some arguing that composite should be taught first as the first choice of a restoration), however we have chosen to continue to teach amalgam preparations and restorations first. These are technically more demanding and the thought has been that it is good to first establish with new dental students the importance of attention to detail in prep design (a concept that is hard to teach with composite preparations
- ULVL:** We now have competencies in pre-clinic and clinic.
- MMC:** No influence, we emphasize amalgam (SRTA). This system (BlackBoard, Web CT) is used in the Basic Sciences, but not the SOD.

- UNC:** We still teach amalgam preparation and restoration first (before comp prep and rest). We feel that the exacting requirements of amalgam preparations offer a better introduction to the discipline of OD than comp preparations. Also the color contrast of amalgam restorations and the use of hand instruments for carving and contouring offer a better introduction to the requirements of restoration than the color similarity of composites and need for rotary contouring and finishing.
- NOVA:** We divided the operative course into units starting with amalgam preparations and restorations and working our way into composite restorations.
- UPR:** We are teaching the use of composite. In more complex procedures such as onlays. We are using BlackBoard (students have access to distant learning).
- MUSC:** It has made it more difficult.
- VCU:** The new dental students seem to be aware that there is a shift toward composite resins. As a result, they are beginning to question the efficacy of the more tradition model of amalgam placement. Many of the present students have experiences in the dental setting prior to their courses; thus, they bring with them preconceived notions on how things are do in operative dentistry.

What teaching sequence is utilized - group amalgam procedures together and composite together or based on complexity. Minimal invasive approach on to more complex procedure mixing the teaching of amalgam and composite together in one course.

- UAB:** Amalgam restorations: Class I and V, then Class II, Complex and pins. The main thing we have changed is in the sequence of what we teach rather than in the course content. We begin with anterior composite procedures and then later in the course we teach amalgam vs. The traditional teaching of amalgam first. (We teach Class II resins after the amalgam Class I and Class II's). Last year we did not include the composite veneer in the preclinical course (due to time and since the sophomore course would cover porcelain veneers). There were complaints from freshmen and nay students used class time and self study later in the year to practice a veneer during the operative course. This year, the veneer is a required procedure in the course.
- UFL:** There is much controversy between faculty regarding the sequencing of amalgam and composite preparations – some fear that less time spent on conventional Class II amalgam preparations will result in poorer performance on the Florida State Board Exam. Many faculty members want to place more emphasis on minimal preparations for composites.
- MCG:** Traditionally we have been teaching in terms of modules. In certain areas, for example Class V lectures; we have combined all materials together and ask the student to evaluate the situation before prescribing a suitable material. It has been suggested that we should use the same teaching philosophy for all cases.
- UKY:** No. Very significant new teaching methods are being used. Students do have access to some web-based instruction through the Sturdevant text (Thanks!!). Our courses have always used a lot of audio-visual instruction including video and now most all of this is now digitized. Teaching of first year operative is done by grouping procedures. Amalgam Preparations and restorations are taught first, moving from simple to complex. Then composite preparations are taught moving from anterior to posterior in the first year course. More complex composite

techniques are taught in a 3rd year Advanced Esthetic Dentistry Course which is also multidisciplinary (Periodontics, Orthodontics, OMFS, and local AACD certified private practitioners)

- ULVL:** Based on complexity and mixed together in one course (Class I amalgam, Class V composite resin/amalgam, Class II amalgam, Class III composite resin/amalgam, PRR, Class II composite resin, Class IV composite resin, veneer).
- MMC:** Amalgam - Composite - Indirect Gold
- UNC:** We teach the procedures in this order -- first amalgam classes I, II, V and (III), then composites sealants, preventive resin restorations classes III, IV, V, I, II, then complex amalgams (pins, slots, foundation.)
- NOVA:** All lectures outlines and lab outlines are posted at the beginning of the course on the Web CT. Any changes to daily activities can be posted through the Web CT message board. Taught in units with written and lab practicals after each unit. In order to avoid this problem we teach each preparation with specific criteria and grade the lab projects and practicals based on those criteria. We also incorporate the use of the Virtual Reality Lab to develop and evaluate psychomotor skills
- UPR:** Group amalgam procedures together and composite together based on complexity. We have started to see more failures in competency exams. We have to figure out what is causing the deficiency. During the last curriculum revision, time (for the operative course) was reduced. The use of Simulation requires more faculty and more one to one teaching. We are tied in faculty numbers and participating faculty is overload.
- MUSC:** We teach Class I and II direct resin composites and up to this year have taught an indirect composite technique using the Mach II silicone chairside die technique. Amalgam and composite restorations are taught in two separate courses with the basic operative technique and amalgam being taught first. Within each course we progress from simpler to more complex preparation/restoration.
- VCU:** During the D-1 year, we group amalgam and composite exercises together based on complexity. CI & CII Amalgams, proximal box (slot) preparations, enamel bonding, pit and fissure sealants and preventive resins, posterior composites CI & II, followed by CIII & IV composites, CV composite and amalgam restorations. We start the D-2 year with MOD preps and extensive amalgam restorations, MODBL foundations with pins and adhesive sealing and bonding techniques. We revisit the CIV composite resin and then the composite veneer preparation and restoration. Next we follow with the composite foundation with pins. Root caries, glass ionomers, RMGIs.

Are motor skill developments being diminished with the greater utilization of direct placed composites throughout the Mouth? Discussion.

- UAB:** The preparations for composites are more lenient/forgiving, but the placement and contouring of composite requires more from the operator. Students gain motor skills in the contouring and polishing.
- UFL:** Though motor skills for composite preparations may be less demanding, sculpting skills are necessary to produce excellence in composite restorations. It is felt that more emphasis should be placed on carving in the Dental Anatomy course – returning to carving the entire crown.

MCG: No responses noted.

UKY: No. We do not think that motor skill development is being diminished. Although preparation design is far less technical for composite restorations, placement, contouring, and finishing composite restorations is very technically demanding and still requires fine motor skills. We find that our graduating students have good motor skills!

ULVL: No. Composite resin is more technique sensitive.

MMC: Yes and No. Cavity preparations have decreased, but isolation techniques, establishing proximal contacts and carving techniques have improved.

UNC: I don't think so.

NOVA: It is important for new dental students to develop skills that enable them to complete preparations with specific criteria. After developing these skills and gaining an understanding of minimally invasive dentistry, students can modify these preparations based on specific cases.

UPR: No response noted.

MUSC: Possibly so, in part due to the wide variation in preparation design for resin composite restorations and the ability to effectively bond to enamel and dentin

VCU: No response noted.

VI. Discuss matrixing. Full band versus sectional band. Which is used? When is it used? Why is it used? Which systems are used for full and sectional matrixing?

UAB: The freshmen learn to use a traditional Tofflemire matrix for composites and amalgams. The D3 students learn to use a sectional matrix in the Comprehensive Dentistry course (review D3 course at end of the year and before clinic exposure. Slot preps are taught in this D3 course and sectional matrix used for this minimal preparation.

UFL: We introduce sectional bands for composites (Palodent System) however many senior faculty are not comfortable with them, resulting in the majority of students continuing to use Tofflemire bands in preclinic and clinic.

MCG: We utilize full band technique for both our amalgam and composite restorations. The sectional band technique is prescribed for conditions that are needed since the equipment is not standard in our operative kit. Composit-Tight.

UKY: A variety of both full band and sectional banding are taught didactically, preclinically, and clinically. Full matrix bands are used for virtually all of our amalgam restorations and core buildups in clinic (usually Tofflemire bands, however occasionally automatrix or copper bands are also used). Sectional matrices are used for composite restorations, although this is left up to the student and the faculty coverage in clinic and often traditional Tofflemire matrices are used with composite resins as well. We have tried to emphasize the use of sectional matrices for direct posterior composites for the past several years because we believe that they produce more anatomic proximal contours and tighter proximal contacts than traditional full matrices. Full Matrices Used: Tofflemire, Automatrix, copper bands. Sectional Matrices Used: Composit-tight and Palodent.

- ULVL:** We use both. Full band is still the standard. Sectional bands have been used in some clinics and have been taught in the pre-clinic for composite resin and for amalgam when the contact at the uncut surface is too tight for a full matrix. Sectional systems also tend to produce tighter contacts for posterior composite resin restorations. More sectional systems will probably be put into the clinics this Fall. Full band: Standard Tofflemire Sectional: Garrison.
- MMC:** Full band. Most of the time. Easier to obtain and instruct in using properly.
- UNC:** We teach the use of sectional bands for all 2-surface composite restorations, and as an option for 3-surface comp restorations. Otherwise full bands are used. Composi-tight system. It's a good system and they offered us a good start-up deal. Our full matrix systems are Tofflemire for amalgams and ho bands for 3-surface composites.
- NOVA:** We use both the full band and sectional matrix in the pre-clinic and clinic. The Garrison sectional matrix system or the Palodent system is used for all composite posterior restorations. Universal full bands are used for amalgam posterior restorations. We believe that the sectional systems provide better contour and contact for the composite restorations.
- UPR:** Full band for any posterior procedure involving proximal contact. Stability.
- MUSC:** For amalgams we teach only full matrix. For resin composite we teach both full and sectional matrices. We expose the student to both techniques and it then becomes a matter of personal preference. Faculty may suggest a particular matrix if they feel it is indicated. Systems used for resin composite: Palodent or Garrison rings with sectional matrix. HO band (0.001") with Tofflemire retainer.
- VCU:** We basically teach four methods for matrixing with variations, these include: conventional Tofflemire retainer matrix system and automatrix system generally for amalgam restorations along with the copper band matrixing system for large complex amalgams, and the polyester strip and composite tight matrix systems for composites.

VII. Who/which departments are placing implants? Who/what departments are restoring implants? Graduate/undergraduate dental students? What is the under graduate exposure at your school?

- UAB:** Departments placing implants: Perio, Oral Surgery and Pros Hospital Dentistry
 Department restoring implants: see below
 Residents: Prosthodontics, Hospital Dentistry
 Students: D4 Comprehensive Care Clinic
 Undergraduate exposure: In 2005-06 academic year, D4 restored 134 single implant crown, 6 3-unit implant bridges and 35 implant overdentures.
- UFL:** Implants are placed in four uncoordinated areas: The Implant Center (an independent clinic in the OMS Department employing oral surgeons and prosthodontists), the Periodontology Department Graduate Clinic, the Prosthodontic Department Graduate Clinic, and the Periodontic Faculty Practice Clinic. Implants are restored in the Implant Center, Graduate Pros Clinic, and Prosthodontic and Operative Faculty Practice Clinic.

- MCG:** The Prosthodontic section of Oral Rehabilitation, Periodontics, Surgery departments all placed implants. By far the most productive section is the GPR component of the Oral Rehabilitation Department, both in placing and restoring implants.
- UKY:** Periodontics and Oral and Maxillofacial Surgery. These two divisions share student cases based on whether their chart number is even or odd. The Restorative division (Operative and Prosthodontics combined) and the Team Leaders restore all of the school's implants (there is no graduate program in Prosthodontics). The General Practice Residents and the Faculty Practice Clinic also restore a large number of implant cases. Overly complex implant cases are generally sent to the Faculty Practice Clinic for restoration. All undergraduates restore 2 or more implant cases with fixed restorations. In addition, all undergraduates are "required" to complete an implant-retained denture case using at least 2 implants. All students are required to assist in the surgical implant placements for their patients and a few are able to actually do the surgical placement of the implant IF the resident and faculty that they are assisting deem them capable and allows them.
- ULVL:** Periodontics and Oral & Maxillofacial Surgery
Prosthodontics, GPR
Both for restoring implants.
Pre-clinic course
- MMC:** Periodontics and Oral Surgery. Department of Restorative Dentistry and GPR Program. Both. About 10% of students have experience w/ implants, according to the Chair of Restorative Dentistry.
- UNC:** Placement: perio and oral surgery (grad-MS), implant clinic (undergrad-DDS). Pros and operative to some extent. Both. Limited, but some, exposure to implants clinically.
- NOVA:** Nova Southeastern University, College of Dental Medicine Department of Prosthodontics. PG Prosthodontic Residents and Select Faculty who have completed an Implant Fellowship are placing implants. The Department of Prosthodontics is restoring implants in the undergraduate and graduate areas as well as faculty practice. We now have a requirement for senior predoctoral students to restore at least one implant and junior predoctoral students to restore at least two implants. Each student will receive 6 free implants to place on their patients (2 each from 3 different companies). The parameters are that a maximum of 2 of these special implants may be placed in a predoctoral patient.
- UPR:** Surgical, Restorative, Both. They are exposed since freshmen year and at the end of the fourth year, each student will restore two single implants (posterior area) or an implant supported over denture.
- MUSC:** Graduate Periodontics and Graduate Oral Surgery
Restorative Department (Division of Implant Prosthodontics)
Undergraduate
Didactic lectures on diagnosis, treatment planning, and restoration of implants.
Observe implant placement and restore selected implants.
Implant exposure is mandatory...not an elective.
- VCU:** Implants are placed in three different disciplines: 1. oral surgery, 2. grad perio, 3. AEGD clinic. AEGD restores most of the implants but the undergraduate curriculum is expanding to allow for much more undergraduate participation.

Any commentary on “Let’s take the tooth out and place an implant versus doing endodontics.” In other words, have implants had an effect on your students’ experiences doing large core build-ups by reducing the numbers of teeth requiring endo and restorative rehabilitation?

UAB: No response noted.

UFL: Undergrads get a pretty thorough preclinical and didactic implant education, but undergraduate clinical exposure is not coordinated or directed by any one entity resulting in approximately 50% of our students restoring at least one single implant. Plans are to start a program this Spring in Prosthodontics with a goal for every undergrad restoring two single implants. There is an effort by Implant Center Faculty to tout implants as a desirable replacement for endodontic treatment. Pros faculty generally support this philosophy if the patient is High Caries Risk and the endodontic treatment will require crown lengthening, post/core, and crown.

MCG: Yes, but we don’t have data so this is an opinion.

UKY: Last year (July 1, 2005 – June 30, 2006) there were 272 implants placed and restored in our implant program by pre-doctoral dental students (50 graduating fourth year students). In our comprehensive care clinical program, there are no set requirements. As such a clinical decision is made on what treatment is the best clinical treatment for an individual patient. There is no pressure to either “do” or “not do” implants. Options are given to the patient with accompanying “prognosis”. The large number of implants being placed at our school has definitely reduced the number of endodontic procedures, post/core/buildup restorations, periodontal crown lengthening procedures, and bridges that are done. However, the use of implants has not resulted in teeth being taken out when they should be saved – probably to the contrary- it has resulted in teeth being removed that previously we would have done heroic treatments (endodontics, crown lengthening, posts, and/or crowns/bridges) that had a poor prognosis due to lack of any remaining tooth structure. The success rates of our implants and implant restorations have been extremely high (even in the hands of surgical placement by residents and restorations by undergraduate students!). Over the past 6 years, 1,025 have been placed in the program and there have been 19 failures (98% success rate).

ULVL: We have an Implant Clinic covered by specific faculty members. Most graduates have restored at least two implants.

MMC: No perceived drop in number of build-ups,

UNC: I haven't noticed a significant impact. But it must have some impact. There are cases in my practice where I previously would have tried RCT but now recommend extraction and implant placement.

NOVA: Our philosophy is to maintain the natural dentition. We examine the risks and benefits of doing endodontics versus extraction and placing an implant or placing a fixed partial denture. Each patient is given the optimum treatment plan and an alternative with risks and benefits outlined. There has definitely been a decrease in trying to do heroic risky treatment on teeth with a guarded prognosis due to the advent of implants. Patients are asking for implants and choosing implant therapy over traditional endodontics, crown lengthening, and post/cores. Cost at the school is similar for both especially with the donation of implants by the

implant companies. So in that sense it has impacted the program to an extent. This special implant program is just in its infancy, so the future will tell what impact it has.

UPR: It is possible but not yet. Implantation of tooth-buds is the future.

MUSC: Very slightly – yes. Limited, since implants still not as affordable and time delay of implants producing an edentulous appearance.

VCU: No response noted.

Suggestions for CODE.

What can the organization do to improve its effectiveness?

No responses noted

What is suggested to improve the Web site?

<http://www.unmc.edu/code/codeframe.html>

No responses noted

Other comments?

No responses noted

**2006 REGIONAL CODE AGENDA
REGION VI
SUMMARY OF RESPONSES TO REGIONAL AGENDA**

1. Enhancing the status of Operative Dentistry as a distinct discipline and important entity in our schools and nationally. Recommendations: Operative Dentistry procedures and education.

Suggestions: including Cariology and or Esthetic Dentistry in the department name or mission, staying contemporary but evidence-based with teaching, focusing our preventive and restorative expertise on the underserved, and establishing operative dentistry as the central focus of the new emphasis towards a general practice (comp care) curriculum. No other discipline has the primary role in dealing with the effects of Dental Caries as does Operative Dentistry. We may need to include more emphasis on Caries Risk Assessment and Prevention since we are on the “front lines” and therefore optimally positioned to do more than react to the appearance of carious lesions. Operative generally occupies the largest time segment of the clinical curriculum and as long as every licensing exam continues to require operative procedures on the clinical portion, our value to our schools should be secure.

The first step in making any recommendations for education or practice guidelines may be through CODE questions like National Agenda question #1 about our pre-clinical curriculum. Once we identify those “essential” topics, the next step could be to examine the evidence for these topics to ensure that our teaching is contemporary and effective.

2. Issues in Operative Dental Education.

a) Protection of intellectual property/copyright issues of teaching materials.

There is some variation from strict to loosely defined rules for faculty ownership of original intellectual materials that they develop (see the individual school answers for details). In general, it appears as though faculty can own the rights to teaching materials, however, in some cases; the university may be entitled to share profits from their sale. Password protection exists to protect web-based materials from unauthorized access.

b) Improving teaching effectiveness in Pre-Clinical restorative courses with new strategies or technology. Report on new experience & their outcomes; also list any recently discontinued teaching techniques.

Our schools report a general increase in student self-evaluation exercises and computer-assisted learning through Web CT. Examples of recent additions to teaching methods include- video demonstrations of common procedures, on-line exams, interactive DVD's for Dental Anatomy, layered composite teeth with simulated caries, and a Virtual Reality Lab at one school (Nova). Most of these additions are recent so outcomes assessments are preliminary but student feedback is positive and one school reports an increase in National Board Scores following the introduction of computer-assisted learning (Meharry). No teaching techniques were reported to have been discontinued.

c) Has the teaching of any traditional procedures been discontinued in Operative / Restorative pre-clinical courses? Why?

Some schools have dropped lab exercises in waxing and casting metallic restorations due to curriculum time or due to the accessibility of outside lab support. Specific procedures that are being de-emphasized, or may be dropped include- threaded pins, Class V amalgam, buccal / lingual pit amalgam, OL amalgam in Max molars (better materials, more conservative preps), Copal Varnish (effectiveness?), IRM (replaced by Triage™) and conventional sealant material, replaced by Triage.

3. Vital Pulp Therapy (pulp capping) policies.

The specific policies for vital pulp therapy varies among our schools from only indirect pulp caps (no direct pulp caps, only endo), to detailed policies outlining clinical scenarios for indirect and direct pulp capping or endodontics. Likewise, our schools report mixed agreement between departments regarding policies. It appears as though there is good potential for consensus building in this area, both among and within schools.

4. School policy on replacing existing amalgam and composite resin restorations that will receive full coverage (crowns).

The responses from our schools vary from “no established policy” to a “standard policy” of replacing existing restorations prior to doing crowns. Some schools evaluate existing restorations (as foundations) on a case-by-case situation for replacement with such conditions as the presence of caries, pins, symptoms, origin (school or outside of the school). The University of Florida has conducted research which indicates that many traditional criteria used in school policies have no evidence to predict outcomes.

5. Teaching indirect composite/porcelain restorations. Who teaches, requirements, types, value compared to full coverage?

Indirect non-metallic esthetic restorations are taught by Operative, Fixed, Comprehensive / General Dentistry Faculty during all years from freshman pre-clinics to senior clinics. There are no requirements for doing these restorations and the types range from CAD-CAM (CEREC) to lab-die processed restorations (e.g. Empress, Sculpture, OPC, Procera). Regarding the value of these restorations compared to full coverage; these restorations are reported to be equal or better in some areas such as conservatism, esthetics, and kinder to pulp and perio tissues.

6. Do you have a Generalist or Comprehensive Care Clinical Curriculum and how has it affected teaching Operative Dentistry?

Some schools have had approximately a decade of experience with this curriculum format (opposed to discipline-based clinics only), some have only recently implemented them and others are planning for them. The continuity with pre-clinical operative teaching varies widely and appears to be influenced by operative faculty participation in these comp care clinics.

7. Caries Risk Assessment- history, how administered, departments, outcomes?

Much variation here as well- some schools have a very formal program that is routinely administered during treatment planning, while others have an informal one that is done on a case-by-case basis, and some schools do not have any formal program at this time. Operative, Pediatric Dentistry, Prosthodontics, Comprehensive Dentistry, Oral Diagnosis, Public Health, Treatment Planning, and Oral Hygiene departments or disciplines are involved at different schools. Outcome assessments were not reported.

2006 REGIONAL CODE AGENDA

REGION VI RESPONSES

(Evidence cited where applicable)

Region VI School Abbreviations

| | | | |
|------|----------------------------|------|--------------------------------------|
| UAB | University of Alabama | MMC | Meharry Medical College |
| UFL | University of Florida | UNC | University of North Carolina |
| MCG | Medical College of Georgia | NOVA | Nova Southeastern University |
| UKY | University of Kentucky | UPR | University of Puerto Rico |
| ULVL | University of Louisville | MUSC | Medical University of South Carolina |
| | VCU | | Virginia Commonwealth University |

1. **The Status of Operative Dentistry as a distinct and viable discipline. How can we enhance or maintain Operative Dentistry as an important entity within our schools (and nationally)? Please make recommendations for establishing guidelines for operative procedures and education, for validating trends in practice and as a resource for the ADA. (National Agenda Question #1 may partially address this)**

UAB: No responses noted

UFL: By defining the department in modern terms that more completely describes our mission. We suggest a name change to "Department of Cariology and Esthetic Dentistry" This defines our role beyond the traditional "surgical treatment of caries" and includes medical management of caries, vital pulp conservation, minimally invasive restorative treatments, and esthetic treatment including bleaching, CAD/CAM, non-metallic crowns, veneers, and single implant restorations. This department would emphasize scholarly efforts in clinical research, and incorporate CE and a Graduate Program in Esthetic Dentistry.

MCG: Pre-clinical teaching in freshmen year needs to be more focused on techniques with good history and/or evidence of efficacy. Too many "acceptable" alternatives by individual faculty creates a "in-my-hands" mentality that leaves students thinking one can just do his/her own way. If it really doesn't matter how it's done then anyone can teach it.

UKY: Operative Dentistry is already valued as an integral part of our school's curriculum. It occupies the largest segment of the curriculum and the general practitioner will spend more time doing operative dentistry than any other discipline in dentistry. In order to maintain this importance, we need to be sure to keep current in our teaching to be sure that what we are teaching is relevant to the general practitioner over the next 25 years.

ULVL: There is an Operative Dentistry Academy and a board exam, although not recognized as a specialty. (One might question the currency of the board exam....gold foil??) Any guidelines, validating trends, etc., will need to be evidence-based. Is this question implying that we need another textbook? I think that Sturdevant's has been evidenced-based for years and has current operative procedures. Even gold foil has its rightful place...in the back of the book.

MMC: "Viable as ever...term is outdated. Operative hours of education have actually increased" quote from the Chair of Restorative.

UNC: No responses noted.

NOVA: Operative Dentistry is still the foundation of all other disciplines in the Dental profession. At Nova Southeastern we have moved towards a medical model in teaching restorative dentistry and have thus expanded the Restorative Department to include Cariology. The big issue here is that we must address what the patients desire.

1. We must teach the procedures that are relevant to the changing times.
2. Educators need to concentrate on what the consumer wants and is willing to pay for.
3. Schools must base their teaching on evidence based dentistry in order to maintain accountability.

Guidelines for operative procedures are taught through lectures and established reading materials. The criteria for each procedure is written in the lab handout and posted on the Web CT. New trends in dentistry are researched through publications and continuing education courses. New techniques are incorporated periodically based on evidence based research.

UPR: Searching for the needs of the serviced population, reaching the underserved, let the third parties get involve in covering preventive approach at all level (from prevention to repair and to replacement), High tech procedures such as laminates, all porcelain crowns and others. Again, clinical research to search the needs and trends of the serviced population.

MUSC: Keep Operative as a separate department.
Continue with emphasis on CODE meetings.
Question #1 of the National Agenda is a good initial guideline.

VCU: Operative dentistry as a distinct and viable discipline still maintains a strong foothold at VCU SoD, but it is slowly diminishing. Demands of other sectors of the curriculum have reduced the time allocation and emphasis on operative dentistry. Also, the students in general are more prone to gravitate toward what they consider to be the future of the practice of dentistry, i.e., implantology, etc. Here at VCU our operative faculty constantly reiterate the mantra that modern dental practice must have its basis on sound operative principles and performance. Our strongest recommendation to establish operative dentistry as the central focus of any general practice type curriculum is to stress the Medical Model of operative intervention. We focus very strongly on caries control and patient education as the most successful strategy for an effective practice.

2. Issues in Operative Dental Education.

a.) Intellectual property/copyright issues of teaching materials. Does your school have policies that protect the rights of the individual faculty to “own” teaching materials that they develop? Can teaching materials that faculty develop and place on the school’s webpage be used by anyone other than students enrolled in designated courses without specific permission? What safeguards are in place (passwords, etc.)? Please discuss and offer any comments or concerns pertinent to this issue.

UAB: Our school does not have this policy to protect faculty teaching materials. Teaching materials, handouts, power points, notes, photographs are placed on the course WebCT and can be used by UAB students only via a password.

UFL: The University has extensive policies regarding the ownership of intellectual properties as well as copyrights and patents developed by faculty members.

These are applicable in a variety of situations to protect the employer as well as allow and encourage commercial partnership development with the faculty member. The Gatorade story is a good example of this process. Generally speaking, scholarly writing such as papers, textbooks are the property of the faculty member and copyrights are solely owned by the faculty member. Inventions either developed on or off campus must be disclosed to the University and the University owns the patent unless it declines ownership. Actually the University will pay for patent acquisition and commercial development through the Office of Technology Licensing. Through contracts the profits are shared between the faculty member, their College, Department and the University. Teaching materials placed on ECO, Blackboard, or the College Web site can be password protected, however ownership of these items is tenuous. UF lost a landmark case to A-Plus Notes (a student note publishing company) in an attempt to protect ownership of classroom material.

MCG: MCG has an intellectual property committee to deal with intellectual property issues. The teaching materials in our courses falls in the category of "Copyrighted Materials" , which is defined as the following: (1) books, journal articles, texts, glossaries, bibliographies, study guides, laboratory manuals, syllabi, tests and proposals; (2) lectures, musical or dramatic compositions, unpublished scripts; (3) films, filmstrips, charts, transparencies, and other visual aids; (4) video and audio tapes or cassettes; (5) live video and audio broadcasts; (6) programmed instructional materials; (7) mask works;¹ and (8) other materials or works other than software which qualify for protection under the copyright laws of the United States (see 17 U.S.C. 102 et seq.) or other protective statutes whether or not registered hereunder. Normally, our manuals and lectures are automatically copyrighted if the individual faculty desires. Our WebCT is password protected. The course director has control as to who can access the course material. Our faculty uses diagrams and slides from textbooks and the Web for education purposes only and that is allowable per our institution policy.

UKY: University of Kentucky Administrative Regulations do provide some protection of the rights of individual faculty to "own" certain teaching materials that they develop. However there is some room for interpretation and these regulations are currently being looked at. The policy states:

"Traditional products of scholarly activity which have customarily been considered to be the unrestricted property of the author or originator are excepted from the general policy. Such traditional products include journal articles, textbooks; reviews; works of art including paintings, sculpture, and music compositions; and course materials such as syllabi, workbooks, and laboratory manuals. The University has not and will not claim any ownership rights to such traditional works and also specifically disclaims any potential rights to do so under the "work for hire" provisions of the U.S. Copyright Act."

"Works produced in certain University units whose specific mission includes the production of works for instructional, public service, or administrative use and who employ staff and faculty for the purpose of producing such works are deemed to be "works for hire" and, therefore, the property of the University."

ARII-1.1-3

This AR is open to interpretation based on whether the faculty member is hired for the purpose of producing educational materials for the courses they are teaching. Teaching materials that faculty place on the school's webpage are accessible only to enrolled students through password protection.

- ULVL:** The University of Louisville (not the School of Dentistry) has an Intellectual Property Policy:
3.b.iii the Intellectual Property related to same is a Traditional Work (include creative works and research materials that are educational, scholarly, artistic, musical, sculptural, or literary works. Examples include: books, articles, class notes, theses, dissertations, manuscripts, poems, films, videotapes, digital and analog recordings, musical works, dramatic works including any accompanying music, pantomimes and choreographic works, pictorial, graphic and sculptural works, works as outlined in an annual work plan, and other works of the artistic imagination or the kind that are not created as a result of a specific employment assignment or are specifically commissioned by the University. (The term "literary" has its ordinary dictionary definition, not the broader definition set out in the Copyright Act.) As defined herein, status as a Traditional Work will not be affected by the tangible medium in which it appears., unless the Traditional Work was specifically commissioned by the University (productivity measures as agreed to in a work plan – books, articles, paintings, etc. – unless specifically commissioned by the University, are exempt);
In the above situations 3.b.ii., 3.b.iii., and 3.b.iv. the work shall be deemed the property of the Creator and may be registered for legal protection and/or commercialized by the Creator at the Creator's expense. A letter stating such shall be provided by the Office of Technology Transfer as per Section 7.b.2. below. I have seen faculty place a copyright notice on their manuals, PowerPoint, etc. but I don't know how legitimate that is. I doubt that they actually paid to have it registered. Most PowerPoint presentations, etc. are placed on BlackBoard and would not be accessible by non-university personnel. BlackBoard is password-protected.
- MMC:** Acknowledge is given to authors. No fees are involved to students or faculty.
- UNC:** It is treated as copyrighted material. (Does your school have policies) No. (What safeguards) They are pass-word protected and they are uploaded in a way that they can only be read and not copied.
- NOVA:** Individual faculty members may own the rights to teaching materials. They may keep a log as to what materials were developed during school time versus private time. If the faculty member chooses at some time to sell this material the school may ask for some compensation. Teaching materials placed on the Web are safeguarded with passwords. Only students, teaching assistants, and faculty enrolled in the specific course can log onto that Web site.
- UPR:** Because we are using Black Board only students and participating faculty have access to lectures (password). However, we are developing continuing education courses for dentists using Black Board technology where individual password is assigned to each registered professional (specific period of time). We have almost 90% of the didactic component of the preclinical course in Black Board. This includes written examinations using wireless computers. Most of participating faculty was trained in Black Board.
- MUSC:** No clear policy on this. (Does your school have policies) Students or faculty only have access and it is controlled by password. (Safeguards) Outside access is available to online CE courses.
- VCU:** Individual faculty at VCU are entitled to retain any and all materials that they develop. Most materials used for teaching purposes are placed on the intramural blackboard system and are not accessible to those people outside the school community. Passwords and other security devices are in place to prevent access.

b.) Improving teaching effectiveness in PRE-CLINICAL dental courses with psychomotor components (specifically- Operative Dentistry, although there may be some promising strategies from Pros courses in your school that could be used in Operative). Have you initiated any new strategies to enhance teaching effectiveness in restorative courses? (e.g. more active learning techniques, more web-based instruction outside of the classroom, increased PBL exercises, more self-evaluation, computer-assisted instruction) How long have the new strategies been in place and what is/are the outcomes? Have you DISCONTINUED any recently added or traditional TEACHING TECHNIQUES in pre-clinical restorative courses? What techniques and Why?

UAB: No Web CT for the freshman procedures. There is a clinical component to the operative course where the students rotate to 2nd floor with a list of operative procedures to see during the quarter. They serve as assistants and observe to help make the operative “real” to them and to help introduce the D1 student to the clinic. Last year, we did not include the composite veneer in the preclinical course (due to time and since the sophomore course would cover porcelain veneers). There were complaints from freshmen and many students used class time and self study later in the year to practice a veneer during the operative course. This year, the veneer is a required procedure in the course. Dental Anatomy (M. Pezzementi) Waxing with white wax and more relevant portions of the tooth, example, an entire veneer for the central, full crown on a molar. This helps the student become more productive for carving amalgams, contouring composites and waxing a full crown in crown & bridge. There is an interactive CD that comes with the textbook. Comprehensive Dentistry (Waldo) The D2 students have a 4 week review of PCD procedures before going to clinic in the D3 year and this includes operative dentistry and crown & bridge. Procedures such as pin retained amalgam and complex preps are reviewed along with porcelain butt margins and using an ion crown as a temporary. The slot preparation is introduced and restored with amalgam and composite.

UFL: Streaming video demonstrations and Power-Point slide shows are available on-line through ECO (Educational Curriculum Organizer) or Web-CT. Though there is talk among administrators that hands-on faculty in the pre-clinic can be replaced by student teaching assistants and high-tech strategies such as self-paced/self-evaluation, computer assisted and DVD instruction a recent Curriculum Workshop of clinical faculty and Department Chairmen from all clinical disciplines concluded that in their collective experience pre-clinical instruction was most effective using a minimum 1:10 faculty/student ratio utilizing experienced, calibrated faculty members. We will be introducing CAD-CAM indirect restorations in the pre-clinic this year utilizing our two CERAC 3-D and one CERAC 2 units. We will be using more Bilaminate Composite Resin Dentoform teeth with simulated caries and natural hardness for our esthetic and minimally invasive techniques.

MCG: MCG has used many innovative teaching methods in use in our classrooms. Of note are the Classroom Performance System (CPS) and the teaching block in occlusion classes and operative classes. We are constantly looking to incorporate active learning techniques, web-based instruction outside of the classroom, increased PBL exercises, more self-evaluation, computer-assisted instruction in our courses. As a summary of the amalgam and composite modules, we conduct a review class where the students are called upon to give their comments on actual cases. The comments from the students are positive once they get over the stress of being “put on the spot”. We are currently in the process of putting a series of teaching videos together for use with IPOD system. Many of the topics in restorative are especially suitable to be included.

- UKY:** Enhancing teaching effectiveness:
1. Our operative textbook (Art and Science of Operative Dentistry) has a website that student have available to them to reference.
 2. Self-evaluation is an integral component to our preclinical curriculum.
 3. We have recently reduced the faculty-student ratio in preclinical courses to 8:1. This has a significant effect on student learning!
- Changes are too recent to comprehensively document outcomes, but the use of self-evaluation by students and faculty: student ratios have made a tremendous difference in student performance and student confidence – albeit this is anecdotal.
- We have not discontinued teaching any procedures in the past 2 years.
- ULVL:** None
- MMC:** Self evaluation and computer assisted learning.
Several years (8+) There seems to be an increase in board scores because of the use. Example -90% pass rate (Part 1) and above average in Operative (Part 2) Gold Inlays (Onlays) Not required on SRTA.
- UNC:** For the past 2 years, we have used 11 video clips (Developed by Dr. Al Wilder) of operative procedures taught in the preclinical course. For the past 10+ years, we have given a clinical judgment exam of common mistakes on operative procedures to assess how well students recognize clinical errors without being prompted by faculty preceptors. Feedback from students suggests the use of video clips has been very effective. It gives students an opportunity to see operative procedures performed "clinically" (on a dentoform) before going to lab to perform the same procedures themselves.
- NOVA:** The newest strategy used here would be the Virtual Reality Lab which is a computer based learning system for enhancing psychomotor skills in Operative Dentistry. We continue to evaluate whether or not this system makes a significant difference with psychomotor skills. This was the first year that we set up the entire Operative Course on the Web CT. All lecture outlines and labs including preparation design and criteria were on the Web from the beginning of the course. Students could log in and download any materials that they needed. Post course surveys showed positive feedback for the Web based systems.
- UPR:** We have almost 90% of the didactic component of the preclinical course in Black Board. This includes written examinations using wireless computers. Most of participating faculty was trained in Black Board.
About two years. It is a very time consuming process but once the information is digitalized the students appreciate the technology. Recently, we were given a written exam and we lost wireless connection. The exam was delayed for about 45 minutes, but the connection was re-established and the course coordinator re-programmed the time that the system will allow the student to finish the exam. However, once the student finish their exam immediate feed back is available to them (grade). Black Board platform may train the students to handle National Board Exams. In addition, we need to develop more interactive procedures rather than traditional lectures.
- MUSC:** Dental Morphology – Interactive DVD given to each student.
Prosthodontics – Some web-based material.
Operative – Plan to use a “layered composite” exercise in Spring operative course.
Digital document projector with double TV monitors and zoom capability at each instructor station in the laboratory for individualized critique and teaching.

VCU: PBL exercises are used in the fall semester, third year as part of the treatment planning seminar. We have not yet discontinued any traditional teaching methods.

c.) Have you recently discontinued the teaching of any traditional PROCEDURES in Operative/Restorative pre-clinical courses OR clinics although you may still teach them pre-clinically (for boards only)? What procedures and Why?

UAB: No responses noted.

UFL: We no longer wax and cast metallic restorations. Pins are being de-emphasized. We are considering discontinuing Class V amalgams, buccal pit and lingual pit amalgams, and OL amalgams in molars. We are teaching more minimally invasive preparations ie. CCR (Conservative Composite Restorations) We are considering teaching a different Class II prep for composite rather than restoring a traditional Class II amalgam prep with composite. We are spending more instructional time on perfecting the placement, matrixing, and finishing of composites. The reason for these changes is that in our present pre-clinic curriculum over 50% of lab and lecture time is spent on amalgams and 18% is spent on posterior composite. While in our clinics, 70% of posterior restorations are composite while only 30% are amalgam. This trend is a reflection of the practice in our State where the preponderance of restorations are composite resin. Our State Board Exam still requires a Class II amalgam placement on a live patient, but also includes a complex cusp replacement composite on a dentoform model.

MCG: No.

UKY: No.

ULVL: No.

MMC: Same as previous response.

UNC: No responses noted.

NOVA: Nova Southeastern has discontinued the use of Copal Varnish for any procedure and is considering both seventh generation bonding agents and possibly two coats of Peridex for amalgam restorations. Based on recent publications both materials lower the sensitivity of newly placed amalgam restorations. IRMTM is also being discontinued in the clinic as a intermediary restorative material. We continue to introduce it pre-clinically at this time. Triage™ is replacing IRMTM in the clinic for these procedures and is also being taught in the pre-clinic. Triage™ is also replacing traditional composite sealant materials as our choice for clinic and pre-clinic. This change is based on research completed at Nova Southeastern and reported at the IADR in 2006. Triage™ was shown to have better wear resistance than traditional sealants and superior adaptation to the fissures. Triage is also able to bond in a wet environment.

UPR: We are not doing cast gold, resin or ceramic restorations; external labs are taking care of these. No.

MUSC: Decreased use of “tooth block” (extracted teeth mounted in stone) and typodont exercises on lab bench and increasing typodont use in simulator (including extracted teeth mounted in typodont).

VCU: We no longer teach the indirect cast metal inlay procedures. No longer needed for the board examination. We do teach indirect cast inlay and porcelain inlay as needed in the clinical setting, one on one.

**3. Revisiting vital pulp therapy (indirect /direct pulp capping).
Is your school policy accepted by all disciplines? Do you incorporate vital pulp therapy exercises in your pre-clinical operative curriculum? Are you in agreement with treatment approaches taught in Endodontics? Pedodontics? Prosthodontics?**

UAB: Pedodontics Response (S. Mitchell):

The permanent pulp therapies are addressed by the endodontic department. Senior students are required to demonstrate competency in performing a formocresol pulpotomy during the senior year. We do not have a "requirement" based system that stipulates a specific number of procedures a student must complete. The competency can be completed on a live or simulate patient. Our department conducts a preclinical lab exercise on vital pulp therapy in the primary dentition during orientation to the junior year. We teach indirect pulp caps in non-symptomatic primary teeth with decay approaching the pulp. I think we are in defacto agreement with endo since we are the only ones who teach this in the primary dentition.

PCD and D3 D4-Endo (Dr. Coar):

Junior and Senior students do from 4 to 6 complete endodontic procedures each year, and average 10 to 11 complete cases by graduation. During the Junior clinic, students are required to complete thru obturation 2 small canals, typically the mesial canals of a mandibular molar. This is to refresh and reinforce the techniques. They also must demonstrate rubber dam application for endo, and use of digital radiography, of an electronic apex locator, and of a pulp vitality tester. During the Senior clinic, students are required to complete thru obturation an extracted molar tooth. Students do not treat molar cases clinically unless they complete a molar elective in the winter and spring quarters. Vital pulp therapy is touched on in lecture, but obviously is not part of the clinic procedures.

UFL: We have a protocol for vital pulp therapy that is very similar to the one used at the university of Texas at San Antonio. It is taught in pre-clinic and practiced in our clinic. It was accepted by the Departments of Pediatric Dentistry and Endodontics, but the Prosthodontic Department declined to sign off on it. Some members of the Endodontic Department still don't concur with it. We have an exercise in pre-clinic on simulated vital pulp capping procedures.

MCG: Attached is our division policy on direct & indirect pulp capping. The policy is devised by our faculty but was circulated to other departments especially the Endodontics Department and gotten their approval. The policy is reviewed periodically. The last update was in June of 2005.

Divisional Policy on Direct & Indirect Pulp Capping

Students are required to have a detailed knowledge of the principles and practice of vital pulp therapy. These must include:

1. Step-wise caries removal
2. Indirect pulp capping
3. Direct pulp capping
4. Knowledge of the materials available for pulp capping

I. Indirect Pulp Cap (D3120)

- To protect the pulp against possible injury and to stimulate healing and repair
- Near or suspected exposure
- Normal pulpal response, no periapical pathology
- Rubber dam isolation greatly increases chance of recovery

Recommendation:

- Remove all peripheral caries except the last portion of the firm leathery dentin immediately overlapping the pulp
- Ca(OH)₂ containing liner such as Dycal[®] and Life[®]. Confined to the area adjacent to the pulp only
- Glass ionomer liners may be used to cover the Ca(OH)₂ liner
- Restore tooth with restorative material of choice
- Advise patient of possible outcome

II. Direct Pulp Cap (D3110)

- To protect the pulp against further injury and to stimulate healing or repair
- Small (<0.5 mm) mechanical exposure
- Healthy pulp with no history of discomfort, no periapical pathology
- Rubber dam isolation greatly increases chance of recovery

Recommendation

- Stop bleeding with sterile paper point / cotton pellet
- Ca(OH)₂ containing liner such as Dycal[®] and Life[®]. Confined to the area adjacent to the pulp only
- Glass ionomer liners may be used to cover the Ca(OH)₂ liner
- Restore tooth with restorative material of choice
- Advise patient of possible outcome

III. Caries Exposure/Pulp debridement (D3221)

- History of pain/ discomfort
- Radiograph evidence of periapical pathology
- Lingering pain after hot or cold stimuli

Recommendation

- Remove all peripheral caries
- Rubber dam isolation greatly increases chance of recovery
- Sedative restoration with IRM
- Endodontic consultation

In line with our clinical policy, unrecognized pulpal exposure during cavity preparation will result in a critical incident report.

IV. Sedative filling/Caries control restoration (D2940)

- Temporary restoration intended to relieve pain or to eliminate bacteria. Not to be used as a base or liner under a restoration.

Recommendation

- When pulp pathology is believed to be reversible
- Examination usually reveals identifiable source of pulpitis (e.g. caries, deep restoration, fractured restoration or clinical crown)
- Remove all infected caries without exposure
- IRM and/or Resin Modified Glass Ionomer

UKY: Pulp Therapy as taught: Direct: A small direct pulp cap is completed on a mechanical or non-carious exposure placing calcium hydroxide precisely on the area in question and where the hemorrhaging is small and clearly controlled. Using a sandwich technique, a glass ionomer liner is then placed over the calcium hydroxide and adjacent pulpal floor. Remember that not all calcium hydroxide formulations “stimulate” the pulpoblasts, but rather “assist” in reparative dentin formation. Calcium hydroxide provides antibacterial action eliminating the inflammatory effects of bacteria (and their byproducts) to allow reparative dentin formation to occur. In cases of indirect pulp therapy, one of two scenarios arises whenever the teeth are asymptomatic and test vital. If the carious lesion is small and further removal will result in a pulp exposure, the small amount of caries remaining has a glass ionomer liner placed over the caries (followed by a sealer such as Optibond) and a permanent restoration placed. If the carious lesion is large (gross caries), a small amount of caries is left in place followed by placing calcium hydroxide and a temporary restoration such as Ketac-fil or IRM. These temporary restorative materials are then removed in 6-8 weeks, the remaining

caries excavated followed by a glass ionomer liner and permanent restoration placed. Of the two scenarios described, the first one is recommended most of the time since “re-entering” the carious lesion may risk a pulp exposure or cause further traumatic insult to the pulp. An indirect pulp capping procedure is always preferred to a direct pulp cap. This policy is not accepted by all disciplines.ital pulp therapy exercises are included in the pre-clinical curriculum using caries-simulated dentoform teeth and working with calcium hydroxide and glass ionomer liners. These dentoforms also have a yellow dentin layer to assist in distinguishing the caries. Endodontics does not entirely support the contention of using calcium hydroxide. Prosthodontics feels if the pulp is encroached upon during a crown preparation (blushing or “pink” appearance of the pulp), then endodontics is initiated.

ULVL: We have difficulties with conformity within one discipline much less across all! We do not provide a specific pulp therapy (capping) lecture. It is mentioned in the “bases and liners” lecture. There is no exercise.

MMC: Yes.

UNC: I think so. There has always been more difference of opinion about the indications and technique for direct pulp capping.

NOVA: We are always in discussion with the Endodontics Department with respect to direct and indirect pulp capping. At the present time the policy of the Department of Endodontics is that indirect pulp capping may be performed for cases of disease control at the discretion of the restorative faculty member. Direct pulp capping is not performed in the clinics. During the pre-clinical Operative I Course both direct and indirect pulp capping are introduced in the lecture material.

UPR: Yes.

MUSC: Yes

VCU: There is no one encompassing policy regarding vital pulp therapy at VCU. Vital pulp therapy is taught in both the operative and endo curricula. The GP department is in agreement with the other departments on approaches to vital pulp therapy. That is to say, we respect their individual approaches.

4. What is your school’s policy on replacing existing amalgam and composite resin restorations which will be receiving full coverage?

Comment on- Caries, no caries present. Done in the dental school vs. done outside. Pins vs. no pins. Proximity to pulp. Age, economics and any other criteria used to make the decisions.

UAB: There is not an established school policy. The restoration will be replaced if there is any sign of recurrent caries. C & B recommends that anterior teeth with large composites are replaced before full coverage. Pins: If there is radiographic evidence of a pin with no recurrent caries (radiographic) or signs or symptoms of caries or pulpitis, the restoration remains and used as a foundation for the crown.

UFL: We teach that secondary caries is a surface initiated process identical in etiology and progression to primary caries and therefore can be removed and eliminated without removing the entire restoration. Furthermore, remaining caries is dormant and will not progress under a sealed restoration. Therefore, replacing existing restorations is dependent on a case-by-case clinical judgment call. There is no

“school policy” and the decision to replace an existing restoration is left to the individual faculty member covering the crown preparation and placement. Other than pulp vitality being a given, whether the restoration was placed in a school clinic, patient’s age, economics, the presence of pins, has little evidence to support outcome prediction.

MCG: Our standard protocol is to replace most existing restorations to make sure there is no underlying disease before proceeding to full coverage. This is especially true in terms of restorations done outside the school. The only exception might be extensive amalgam-pin placed in root canals. We deem it more injurious to the surrounding tooth structure if the student attempts to remove everything. It’s up to the judgment of the supervising faculty. If we do have a record of previous procedures done in our clinic and we have documentation of a solid foundation, the faculty will generally waive the requirement to replace again. The supervising faculty will also make chair side judgment as to the type of retention needed. For amalgam core-build-up we advocate all types of auxiliary retention, pins, slots and Amalgambond Plus. For composite core-build up, normally we rely on adhesion alone. There is concern about the compatibility of certain bonding agents with self-curing composite cores. In general, we will attempt to preserve the integrity of the tooth structure over the pulp as much as possible. Therefore indirect pulp capping is prescribed if the surrounding periphery is on sound tooth structure and only a small amount of decay is left directly over the pulp. Age, economics and other criteria are all used to make the decisions.

UKY: If a tooth is to receive a crown, the standard policy states that if the original restoration has not been completed at the school, then the restoration is to be replaced. The rationale behind this is simply that we do not know what is beneath the original restoration. The only time this policy is waived is when there may be a large pin amalgam restoration present and removing this restoration may jeopardize the integrity of the remaining tooth structure making it difficult for the dental student to perform a crown preparation. If economics is a concern and a pin amalgam is in place, we would simply polish the amalgam and explain to the patient the long-term prognosis.

ULVL: Our policy is to replace existing restorations if done by an outside dentist. We do make exceptions. We would rarely, if ever, repair a restoration with recurrent caries if that tooth was to receive a crown. Pins or no pins would usually not be a deciding factor. **IF** the existing restoration is very deep with a base, the base might not be totally removed if the surrounding tooth structure appears solid.

MMC: If we did not place the original, we remove the entire restorations. Pins are viewed as “acceptable” as verified by radiograph and clinical inspection. Age is a factor only as determined by X-rays and history of pain or pathology.

UNC: I think so. There has always been more difference of opinion about the indications and technique for direct pulp capping. Generally, all existing restorative material is removed in each new tooth preparation. Generally, all caries is removed under definitive restorations. I think that the philosophies of DDS’s in NC inside and outside in the school are similar with respect for caries removal under new restorations. UNC teaches and uses both pins and slots for auxiliary retention in complex amalgams. Both techniques have their distracters on the one hand but on the other some clinicians use pins and slots almost interchangeably. Pins and slots need to be placed as far from the pulp as possible. Generally they are placed about 0.5-1 mm inside the DEJ or 1-1.5 mm from the external tooth surface whichever is greater. Both are important factors in the indications for P&S.

- NOVA:** The Department of Prosthodontics requires all teeth that will receive full coverage to have crown buildups first. Existing restorations must be taken out and either amalgam or composite restorations placed. Pins may be used if necessary but other means of retention are encouraged. (Slots, grooves).
- UPR:** Preparation for full coverage is done and the interface of the previous restoration evaluated. If no caries is detected and all margins of the preparation are in sound tooth structure the crown is completed. If caries is detected, restoration is removed and any supplementary retention is considered to increase resistance (adhesive, pins, slots)
- MUSC:** Generally, we replace them if they are relatively large or questionable for any reason. Some may not be replaced on a case-by-case basis. If caries present, will replace. If restoration was done in the dental school, will not usually replace. If done on the outside, it depends on the type and extent of the restoration, radiographic appearance, clinical exam, etc. If pins are present, decision made on a case-by-case basis. May not be replaced unless there is a good reason to do so. All these mentioned criteria used to determine whether to replace or not.
- VCU:** Concerning existing restorations and full coverage placement, there is no written policy. This is usually a chair-side determination by the attending faculty. If caries is present most often the restoration is completely redone. If caries is not present, and the restoration is otherwise intact, then it is treat as is. Pins, proximity, age and economics all play a role and must be individually assessed case by case. For example, proximity to pulp may influence elective endodontics.

5. Teaching of INDIRECT composite/porcelain restorations- Who teaches these, what year in the curriculum, and do you have clinical requirements?

- UAB:** Following didactic lectures were offered by the Department of Comprehensive Dentistry:
- D2 Preclinical Fixed Prosthodontic course – CAD-CAM in Dentistry
 - D3 Operative Dentistry - Indirect Composite and Ceramic Inlays and Onlays
- These lectures review the indications and contraindications for conventional and CAD-CAM generated restorations. The stepwise technique for tooth preparation as well as computerized design and cementation is reviewed. Selected clinical cases and clinical research results are presented.
- During the 2006 summer clinic, the Department of Comprehensive Dentistry conducted several CAD-CAM training courses for our students and faculty:
1. Cerec CAD-CAM training course for D4 students – three 4 hour sessions
Lectures and a hands-on training course were given to D4 students.
 2. Cerec CAD-CAM training course for Comprehensive Dentistry faculty –one-day .
- A lectures and hand-on training course was given to the faculty.
- No clinical requirement for “Indirect Inlays and Onlays” at this time. But are considering having two units for D4 and two units for D3 students for YR 2007. Students receive a large number of productivity points in Operative Clinic. These correlate with the time spent in fabricating the restoration. At this time the restorations are manufactured indirectly via die in the laboratory to allow additional teaching time.
- UFL:** Indirect composite/porcelain restorations have been taught in our pre-clinic and clinical programs for several years now. Up until this year there was a pre-clinical exercise that included preparation of and cementation and finishing of a composite onlay.

- MCG:** Indirect composite/porcelain restorations are taught in the Esthetics as well as the Fixed prosthodontic courses. Esthetics is taught in the junior years. Fixed Pros courses are taught in the sophomore year.
- UKY:** Both indirect composites and indirect porcelain restorations are taught in the 3rd year curriculum by the operative section of the Division of Restorative Dentistry. We have no set clinical requirements (numbers) for any procedure including indirect composite/porcelain. If a student has a patient that the best restorative treatment is an indirect composite/porcelain, then the student can do that clinically (once the preclinical course is completed).
- ULVL:** All indirect procedures are taught by prosthodontics and these would be porcelain, not composite. We do not currently teach indirect composite.
- MMC:** Clinics and GPR Program
- UNC:** These are presented in Advanced Operative Dentistry in the 3rd year fall. There are no clinical requirements for them.
- NOVA:** At this point we are teaching Indirect composite/porcelain restorations in the clinic. The students are introduced to indirect porcelain restorations during the D2 Fixed Prosthodontics Course and then again in the D3 Cosmetic Dentistry Course. There are no clinical requirements for indirect porcelain restorations but they count towards the requirements for fixed prosthodontics.
- UPR:** Operative teaches the preparations for both (Porcelain and Composite) and the restoration for indirect composites; Fixed teaches porcelain restorations (sophomore year).
- MUSC:** Operative has taught indirect composite/porcelain restorations and we presently do not have a clinical requirement for them.
- VCU:** Indirect composite/porcelain restorations are not taught in the classroom at VCU. They are however taught in the clinic case by case. Indirect porcelain restorations are taught by the prosthodontic department.

Do your students learn and perform CEREC restorations for their patients?

- UAB:** Yes. CEREC restorations are performed by our D3 and D4 students on the selected patients and under the guidance and supervision of faculty.
- UFL:** This year we are adding a CEREC exercise to this program. This is our second year to have CEREC available in the student clinic. We now have four proficient faculty members, and others that have received classroom training and are progressing clinically. We also have four senior students that are proficient and serve as teaching assistants. We schedule at least three cases a week. Presently there is no requirement for these restorations; however the student demand for the scheduled appointments is overwhelming.
- MCG:** We have several of the CEREC II machines donated to the school but they are seldom use by faculty and students. Several faculty have been trained to perform CEREC restorations.

- UKY:** Students learn basic concepts of CEREC restorations and complete 3 restorations in preclinical lab (inlay, onlay, and crown). Again CEREC restorations have been available for their clinical patients; however there is no set requirement.
- ULVL:** Second year, with review in the senior year.
- MMC:** 4th and No.
- UNC:** No response noted.
- NOVA:** The concept of CAD/CAM generated porcelain restorations is introduced in the 3rd year Cosmetic Dentistry Course by the Department of Prosthodontics. Our students do not learn or perform CEREC restorations for their patients nor do they do any other types of CAD/CAM generated restorations.
- UPR:** No
- MUSC:** They are exposed to CEREC, but presently do not do it on patients. This may change.
- VCU:** CEREC is not taught, nor are other indirect methods.

What other types are used instead of, or in addition to CEREC?

- UAB:** In the D4 Comprehensive Care Clinic, Sculpture inlay, Empress, and Empress Eris inlays Have been used in selected patients by Dr. Liu.
- UFL:** We also do lab processed onlays and ceramic veneers. These are represented as superior to full coverage for esthetics, conservation of tooth structure, conservation of vital pulp, and lack of periodontal irritation.
- MCG:** Other options- Empress and Procera.
- UKY:** Our school-based dental laboratory also offers pressed ceramic restorations (we have the OPC system). Students may use this all porcelain system for inlays, onlays, single unit crowns, and occasionally veneers. In addition, there is a mechanism whereby students can send laboratory work to outside labs. Using this system, a student could also complete a Procera crown or other all-porcelain crown (however this mechanism of using an outside lab is rarely used).
- ULVL:** No response noted.
- MMC:** GPR Program CEREC II
- UNC:** These are also presented in AOD but students do not perform them.
- NOVA:** These restorations are being taught as equal to full coverage crowns for single units to maintain tooth structure when indicated (enabled by contemporary dental adhesives).
- UPR:** NA
- MUSC:** Taught within the parameters of minimum intervention dentistry, but our students generally do not fo ceramic inlays/onlays.

VCU: See answer to previous question.

Are these restorations being taught or represented as equal to or superior to full coverage crowns for single units in order to maintain tooth structure (enabled by contemporary dental adhesives)?

UAB: Yes. Since 1988, the School of Dentistry has been involved in Cerec technology with a strong foundation being established. UAB have conducted extensive research, and many CE courses were given in the School of Dentistry. Clinical research results are presented to students and Indirect Inlay and Onlays are introduced as a “minimal invasive dentistry”.

UFL: No responses noted.

MCG: No requirements exist at this time.

UKY: Indirect composite/porcelain restorations are taught as part of the armamentarium of operative dentistry. Each has its own indications and contraindications. When indicated, we teach that these restorations are equal or superior to other options in operative dentistry. However for many of these preparations their clinical indication is not to maintain tooth structure as many of these preparation designs actually remove much more tooth structure than the less esthetic techniques.

ULVL: No requirements for indirect composite/porcelain.

MMC: Equal according to the GPR Director.

UNC: No.

NOVA: The Prosthodontic Department is exploring using the CEREC IV units as an elective course for D4s using the typodont as a model. Those students who perform well and complete the course would be able to perform those services for patients. The units would count towards their fixed prosthodontics requirements.

UPR: No.

MUSC: We are presently having discussions as to whether ceramic restorations will be taught by operative or fixed prosthodontics.

VCU: Whether to use porcelain veneers or not as opposed to full coverage, is again, on a case by case basis.

6. Is your college administration planning for, or do you currently have in-place, a "generalist" "comprehensive" or multi-disciplinary clinical curriculum? How is this affecting the teaching of Operative Dentistry? Has there been any effect on the continuity between pre-clinic and clinic? Successes/failures, advantages/disadvantages of some kind of a comprehensive care program at your school, whether it be a 2-2 (Jr & Sr yr) or 3-1 (Sr yr only) program.

UAB: We have established a Comprehensive Care Clinic since 1997. D4 students provided multi-disciplinary dental care to their patients in the Comprehensive Care Clinic. Types of procedures included: Operative Dentistry, Fixed Prosthodontics, Removable Prosthodontics, Periodontics, and Oral Surgery. Operative Dentistry is a major component in the Comp Care teaching. The number of clinic hours are divided among various disciplines including OP. The didactic courses have not changed and the hours remain the same. Eventually, our program is focusing

more on the combination of procedures (when possible) to maximize patient care and time in clinic. Our faculty are available for consult and to follow cases every clinic period. We are embracing the concept that OP is part of the Comp Care program and eventually, the grading system may change as well. PCD faculty members are assigned in the clinic D1 students are exposed to clinics earlier in the curriculum; new Introduction to Comprehensive Care course presented in second quarter and D1 students are starting their clinical rotation in second quarter. D2 students are involved in the SOD recall program during the third quarter of their Intro to Comp Care course. Successes/failures, advantages/disadvantages of some kind of a comprehensive care program at your school, whether it be a 2-2 (Jr & Sr yr) or 3-1 (Sr yr only) program. UAB Comprehensive Care program is successful. The greatest advantage is to offer didactic and clinical teaching programs to closely simulate a private practice environment. UAB SOD "Curriculum Innovation Task Force" is establishing a plan to implementing a "vertically-integrated treatment team" concept in the Comprehensive Care Program (CCP). Dental Students in the CCP are assigned into a vertically integrated treatment team (D4 - D3 - D2 - D1) which consist of 10 students in each class. In this vertical treatment team, students are introduced to patient care over the four-year curriculum, with a gradual increase in the time allocated to clinic and the sophistication of the care provided. The D4 and D3 students are responsible for majority of the patient treatment. D2 and D1 students are responsible for supporting role and will function as Hygienists (D2) and Dental Assistants (D1).

- UFL:** There was an attempt to institute a multi-disciplinary clinical curriculum last year that was abandoned due to lack of faculty support. We are presently in the process of planning a multi-disciplinary Treatment Planning Clinic (to begin October 2006). We have a new Associate Dean for Clinical Affairs who favors the multi-disciplinary concept, so this will most probably be revisited.
- MCG:** MCG has just instituted a comprehensive" or multi-disciplinary clinical curriculum for the senior students in August of 2006. Half of the faculty and the team leaders are recruited from our division so continuity between pre-clinic and clinic is not a problem at this time. It is too early to rate the program at this point but we do have our growing pains. The major impact is the loss of faculty to handle preclinical courses. One effective measure that is working is to recruit outstanding senior students who are very advanced in their training to help in our preclinical courses as tutors.
- UKY:** We have had a comprehensive patient care clinical curriculum for many years and have made no significant changes to it. While students are placed in clinical teams with a faculty "Team Leader" responsible for assigning and helping students manage their patients, the individual disciplines provide the clinical teaching. This has provided excellent continuity between preclinical and clinical teaching as the same section teaches both areas. Our students are in a diagonal curriculum entering clinic at the beginning of their second year.
- ULVL:** We have had a comprehensive clinic system since 1999. We have entertained the thought of discipline-specific clinics for the junior students but have not seriously planned for it. We do not believe that Operative is being taught as well on the clinic floor, probably due more to limited numbers of "qualified/calibrated" faculty rather than the system. Income went up when the system was initiated, but that has leveled off.

- MMC:** Yes. Comprehensive. The only true affect has been reluctance, by students to embrace the concept. They fear a loss of “points” needed to graduate. The major disadvantage has been appointment failure by patients and student graduation, before completing treatment.
- UNC:** Didactically, there is no generalist curriculum. Clinically, all operative procedures are performed in our comprehensive care clinic. It does not get the attention clinically that it once received when more FT faculty participated in clinic more frequently and fewer grad students and PT faculty were utilized. Absolutely. Most of the clinical faculty have not participated in the pre-clinical course in years, if at all, in the case of some PT faculty. They is sometimes a noticeable disconnect between pre-clinical and clinical OD. I am not opposed to a CC approach to clinic, but clinical OD lost some of its edge when our departmental clinic was taken away by a former dean and melded into a CC clinic.
- NOVA:** Our clinical program started out 7 years ago with a “generalist” curriculum but has since changed to a multi-disciplinary comprehensive care program. We changed to improve the quality of teaching that was being offered to students in the clinic. We found that it was too difficult to find faculty that were highly knowledgeable in all disciplines. This multi-disciplinary approach allows for more standardization from pre-clinic to clinic within a specific department. The comprehensive care allows for students to follow their patients and assess their outcomes. The didactic component in the pre-doctoral program includes an interdisciplinary treatment planning course series which provides the students with a comprehensive care approach.
- UPR:** YES the 4th Year (called Integral Clinic for complete and comprehensive patient care)..How is this affecting the teaching of Operative Dentistry? Time was reduced. Has there been any effect on the continuity between pre-clinic and clinic? There is a gap of six months between the completion of the preclinical course and the Junior Clinic in Operative. Fixed Prosthodontics preclinical course begins in the 2nd Year and finishes in December of the 3rd Year. The problem is that the Junior Clinic is based on a year discipline rotations and the student only have the second semester to work with Fixed. Advantage: Students are delivering comprehensive and complete dental treatment. Disadvantage: Students are having problems with competency exams in Operative (lack of ideal patients for exams).
- MUSC:** We employ a multi-disciplinary clinical curriculum. Operative is done in the Operative Clinic by operative faculty but as part of a comprehensive treatment plan. No, the same faculty who teach pre-clinical operative also teach in the Operative Clinic. Haven't tried it since the early 1980's.
- VCU:** We are in the process of establishing a D-4 year based entirely on the generalist approach. In this clinic students will treat all phases of dental procedures that are taught in all of the specialty areas. It is really too early to make any critical judgments. However, the GP department is surely overworked and undermanned. Other aspects can be more readily discussed at the panel meeting.

- 7. Do you have a formal Caries Risk Assessment Program in place at your school? (Something that all patients would be screened for as a routine procedure) How long has your system been in place? Briefly, how is it administered? What department(s) is involved? Do you have evidence to show that it works? What type of outcomes assessment is used to support its continued use?**

- UAB:** No formal Caries Risk Assessment but this form (distributed) is being developed and will be implemented fall 2007. It is being developed by faculty in Pediatric Dentistry, Pros, and Comprehensive Dentistry (3 faculty).
- UFL:** For nearly a decade we have had a Caries Risk Assessment Program in place. This starts with a "Cariogenic Profile" document that is administered during the patient's Treatment Planning Appointment. The patient's caries risk is determined as to High, Moderate or Low by clinical exam, history and/or salivary culture. Predisposing factors are identified, and a Phase I (Disease Control) Treatment Plan is formulated. This process is taught in the pre-clinical course "Introduction to Clinical Diagnosis and Treatment Planning" given by our department, and is administered in "Treatment Planning Clinic" – currently a clinic manned and administered by the Operative Department. After all Phase I caries treatments (retention site elimination, fluorides, dietary counseling, oral hygiene instruction, etc.) are completed in the Operative Clinic the patient receives a Post Treatment Evaluation where a Chlorhexidine prescription is given and a three month follow-up appointment is made in our Oral Health Maintenance Clinic for examination and salivary culture. Students are given one-on-one competency oral examinations with a faculty member in both the Junior and Senior year covering this process. This is the way it is supposed to work, however for various reasons it has not been effective as evidenced by the lack of follow-up cultures being done. This could be attributed to the fact that student grade credit and patient billing was tied to surgical "treatments" and therefore medical management was less valued by patients and students. In addition, total faculty buy-in and reinforcement was not obtained. Under the new system of Multi-disciplinary Treatment Planning (October 2006), Caries Risk Assessment will be part of a Multi-disciplinary Risk assessment Document, administered in the MDTP Clinic, that measures Medical Risk and Periodontal Disease Risk as well. Those patients that score High or Moderate for caries risk will be given the "Cariogenic Profile" when they reach the Operative Clinic. It is anticipated that faculty will recommend fluoride varnish, home fluoride, oral hygiene instruction, xylitol gum, MI Paste, and dietary counseling in the Operative Clinic. These materials will be stocked for dispensing in the clinic. Student and patient buy-in will be encouraged by billing (\$18) the proper CDT code (D0170) and assigning credit for grades (2 points).
- MCG:** We do not have a formal Caries Risk Assessment Program in place at our school. Efforts are being made at this time to install a school-wide program. The two major departments that are involved are Oral Diagnosis and Oral Rehabilitation. As a division, we believe in the philosophy of Caries Risk Assessment Program. There is ample literature to support its implementation.
- UKY:** There is no formal Caries Risk Assessment Program at the school. A task force has been set up to establish such a program. Clinical implementation of prevention and risk assessment will belong to oral diagnosis during treatment planning appointments and to the clinical team leaders during recall appointments. A clinical protocol will be developed with conceptual models (such as a decision tree format) to aid students in developing a goal with a plan for evaluation and follow-through. Case-based presentations of the treatment planning process will be developed by each student to be used as a skill assessment/competency for this area of instruction.
- ULVL:** Our Patient Care Committee just voted (in August) to initiate an assessment procedure.
- MMC:** YES, The Department of Public Health

6 years

Dr. Torres and his staff provide this service during initial patient registration. It involves eating habits, diet and family history of caries. Data is collected on a questionnaire. Also counseling in conjunction with Oral Diagnostic Sciences (Dr. Christensen)

Department of Public Health and ODS

Yes

- 1) Recall appointments and Clinical assessment
- 2) Compliance with Oral Hygiene Program
- 3) Reevaluate recurrent caries and over all patient improvement.

UNC: Probably Operative, CC and TP. A CRA committee is currently meeting to design and implement a formal CRA and caries management in the student clinics.

NOVA: Our Caries Risk Assessment Program based on CaMBRA has been in place for about a year and a half. All patients are screened using our Caries Risk Assessment form (distributed). From this assessment they are classified into high, moderate or low caries risk categories. The back side of the form is a list of recommendations to go over with the patient. (CRA attached). The Department of Cariology and Restorative Dentistry administers the program. Students can not get their formal treatment plans signed off until the CRA is complete with recommendations. We have put into place a Re-Care Clinic on Wednesday mornings with its primary purpose to assess the outcomes of the work performed here at Nova Southeastern University. Patients needing prophys are scheduled for a re-care appointment through the patient care co-ordination team. D2 students are scheduled for rotations in this clinic. Members of the Department of Cariology and Restorative Dentistry perform thorough exams assessing the outcomes of any work completed here at the college in addition to any new problems the patients may have. Since our program is at an early stage we do not have significant data yet as to its success. Diagnodent is used as a monitoring tool and as criteria for restorative treatment.

UPR: Not a formal Program. Oral Diagnosis Section is performing the initial screening of patients. Recently we have contracted two new faculties (PhD in microbiology and a PhD in Cariology with a goal in clinical research and oral diagnosis of caries (trans-illumination, FOTI, Diagnodent, and others ways to diagnose caries and to control it) In addition, the School has a recall system for active patients where treatment provided is assessed.

MUSC: Ours is very limited. Some screening is done in Treatment Planning Clinic. Approximately 2 years. Identified patients referred to the Caries Prevention Clinic for management with preventive diagnosis and education and possible caries control restorations. Students are scheduled in this clinic on a rotating basis. The Caries Prevention Clinic is conducted by the Division of Operative Dentistry which is part of the Department of Restorative Dentistry. Some success indicated by follow-up of patients that have been compliant.

VCU: We do have a formal caries risk assessment program (protocol distributed). It has been in place 12+ years. It is administered via the formal Cariology course and the entire general practice department is involved, at least at the clinical level. Each student must perform a minimum of two caries risk assessments in the third and fourth years. The evidence is anecdotal and relies upon patient compliance. Part of the process for outcomes assessment is the six month recall.

CODE Region VI Attendees Form

| NAME | UNIVERSITY | PHONE # | FAX # | E-MAIL ADDRESS |
|-------------------|----------------|--------------------|--------------|-----------------------------------|
| Belinda Waldo | Alabama | 205-975-1095 | 205-945-2883 | belindawaldo@uab.edu |
| Paul Blaser | Florida | 352-273-5850 | 352-846-1643 | pblaser@dental.ufl.edu |
| Mark Davis | Florida | 352-273-5844 | 352-846-1643 | medavis@dental.ufl.edu |
| Marc Ottenga | Florida | 352-273-5854 | 352-846-1643 | mottenga@dental.ufl.edu |
| Henry "Mac" Young | Florida | 352-273-5859 | 352-846-1643 | hyoung@dental.ufl.edu |
| Daniel Chan | MCG | 706-721-2881 | 706-721-8349 | dchan@mcg.edu |
| Kevin Frazier | MCG | 706-721-2881 | 706-721-8349 | kfrazier@mcg.edu |
| Amer Abu-Hanna | Florida | 352-273-5850 | 352-846-1643 | aabuhanna@dental.ufl.edu |
| Jane Casada | Louisville | 502-852-1247 | 502-852-1220 | jpcasa01@louisville.edu |
| Gary Crim | Louisville | 502-852-1303 | 502-852-3364 | gacrim01@louisvill.edu |
| Marta Brackett | Georgia | 706-721-2881 | 706-721-8349 | mbrackett@mail.mcg.edu |
| R. Gary Holmes | Georgia | 706-721-2881 | 706-721-8349 | rholmes@mail.ncg.edu |
| Roosevelt Smith | Meharry | 615-237-6719 | 615-327-6207 | rstroma@earthlink.net |
| Michael Yacko | Meharry | 615-327-5321 | 615-231-6339 | myacko@vamed.gov |
| Robert Kovarik | Kentucky | 859-257-3029 | 859-323-9136 | rekova2@email.uky.edu |
| David Gore | Kentucky | 859-323-5996 | 859-257-1847 | dr gore@email.uky.edu |
| Andre Ritter | North Carolina | 919-843-6356 | 919-966-5660 | rittera@dentistry.unc.edu |
| Audrey Galka | Nova | 954-262-1757 | 954-262-1782 | agalka@nsu.nova.edu |
| Phyllis Filker | Nova | 954-262-1628 | 954-262-1782 | filker@nova.edu |
| Juan Agosto | Puerto Rico | 787-758-2525 x1150 | 787-751-9551 | jagosto@rcm.upr.edu |
| Jose Matos | Puerto Rico | 787-758-2525 x2201 | 787-751-9551 | jamtos@rem.upr.edu |
| Jachelle Garrett | South Carolina | 843-792-3765 | 843-792-2847 | garrett@musc.edu |
| James S. Knight | South Carolina | 843-792-3763 | 843-792-2847 | knightjs@musc.edu |
| Vincent Sawicki | VCU | 804-828-2977 | 804-828-3159 | sawickiva@vcu.edu |
| Frank Robertello | VCU | 804-828-3418 | 804-828-3159 | fjrobert@vcu.edu |
| Ed Swift | North Carolina | 919-966-2773 | 919-966-5660 | Ed.Swift@dentistry.unc.edu |
| Ken May | North Carolina | 919-966-2731 | 919-966-5660 | Ken.May@dentistry.unc.edu |
| Bill Murdock | North Carolina | 919-966-7575 | 919-966-5660 | William.Murdock@dentistry.unc.edu |
| Lee Boushell | North Carolina | 919-966-2776 | 919-966-5660 | Boushelle@dentistry.unc.edu |
| Harald Heymann | North Carolina | 919-966-8422 | 919-966-5660 | Harald.Heymann@dentistry.unc.edu |
| Jim Bader | North Carolina | 919-966-5727 | 919-966-5660 | Jim.Bader@unc.edu |
| Rick Walter | North Carolina | 919-966-5237 | 919-966-5660 | Rick.Walter@dentistry.unc.edu |