Conference of Operative Dentistry Educators

(CODE)



REGIONAL REPORTS FOR FALL 2002

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

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Conference of Operative Dentistry Educators (CODE)

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

On February 21, 2002, CODE held its first National/International informal meeting during the annual meeting of the Academy of Operative Dentistry in Chicago with a signed attendance of 47. Thank you to the Academy of Operative Dentistry for providing the time slot and space for the meeting. Additional thanks to Drs. Kevin Frazier, Poonam Jain and Alan Ripps for acting as discussion moderators.

As a result of the attendance and interest, CODE has again scheduled a meeting for **Thursday, February 27, 2003 from 4:15 - 6:00 P.M., State Room, Fairmont Hotel, Chicago Illinois**. A review of the Fall 2002 CODE Regional Reports is planned with discussion of the information contained in the reports. It is hoped the discussion also will be the basis to formulate the CODE 2003 National Agenda. If time permits, the agenda will be open to permit discussion of CODE and it's objectives.

CODE looks forward to the **March meeting of ADEA in San Antonio, TX.** Dr. Deb Cobb has made arrangements for a meeting of CODE held in conjunction with the business meeting of the Operative Section from **11:00AM to 1:00PM on March 11, 2003** - possibly lunch included. The Operative Section and its Executive Council will need to discuss the term of National Director which expires in 2004.

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

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

I had the privilege to attend the Region IV meeting hosted by Dr. William Gray and the University of Western Ontario. Again a great meeting with good discussion and sharing of information.

The web site (<u>http://netserv.unmc.edu/code/codeframe/html</u>) continues to be the location of "all you wish to know and then some" for CODE. Please check that site for a listing of meetings, agendas, directors, members and so forth. NOTE: The menu now contains a posting of current positions available. Please access this site and utilize for posting per the directions. Thanks to Dr. William Johnson (UNMC-COD) for continuing to be the webmaster.

Thank you to all who make the organization what it is and what it accomplishes - the members, directors, meeting hosts, (Drs. Steve Eakle, Craig Passon, James Fitchie, William Gray, Richard Lichtenthal and Abby Brodie), the Operative Section and others.

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

Project ACORDE (A Consortium of Restorative Dentistry Education)

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

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

The Broad Goals and Functions of this committee were:

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

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

The preparation package entitled <u>Cavity Preparations for Amalgam and Tooth-colored Materials</u> 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 fo developers of other lessons.

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

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

The Early Years (1974-1977)

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

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. These 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

Robert B. Walcott (UCLA)	- 1974 - 1982
Thomas A Garmen (Georgia) - 1	982 - 1986
Frank Miranda (Okalhoma)	- 1986 - 1989
Marc Gale (Florida)	- 1989 - 1998
Larry Haisch (Nebraska)	- 1998 to present

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 to 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
- Attend the region's meeting
- See that meeting dates, host person and school are identified for the following year
- Do follow-up assist on dues "non-payment" by schools
- See that reports of regional meetings are submitted <u>within 30 days</u> of meeting conclusion to the national director
- See 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 02-18-03)

Reg	<u>gion</u>	Regional Director		<u>Term</u> (term - 3 years)
Ι	Pacific	Dr. Edmond R Hewlett UCLA Los Angeles, CA	310-325-7097 eddyhedent.ucla.edu	2003-2005
Π	Midwest	Dr. R. Scott Shaddy Creighton University Omaha, NE	402-280-5226 shaddyr@creighton.edu	2003-2005
II I	South Midwest	Dr. Alan H. Ripps LSU New Orleans, LA	540-619-8548 aripps@lsuhsc.edu	2001-2003
I V	Great Lakes	Dr. William Gray UWO London, Ontario, Canada	519-661-2111 william.gray@fmd.uwo.ca	2001-2003
V	Northeast	Dr. Richard Lichtenthal Columbia University New York, NY	212-305-9898 rml1@columbia.edu	2002-2004
V I	South	Dr. Kevin Frazier MCG Augusta, GA	706-721-2881 kfrazier@mail.mcg.edu	2002-2004
Π	At-Large	Poonam Jain SIU Alton, IL	618-474-7073 pjain@siu.edu	2002-2004
II	National Director	Dr. Larry D. Haisch National Director UNMC-COD Lincoln, NE	402-472-1290 lhaisch@unmc.edu	2002-2004
II	Web Master	Dr. Bill W. Johnson UNMC-COD Lincoln, NE	402-472-9406 wwjohnson@unmc.edu	

Regions and Schools

Region I (Pacific) -9 ✓ Alberta - Canada ✓ British Columbia - Canada ✓ Loma Linda ✓ Oregon ✓ Pacific ✓ UCLA ✓ UCSF ✓ USC ✓ Washington	Region II (Midwest) - 10 ✓ Colorado ✓ Creighton ✓ Iowa ✓ Manitoba - Canada ✓ Marquette ✓ Minnesota ✓ UMKC ✓ Nebraska ✓ Saskatchewan - Canada ✓ Southern Illinois
Regio III (South Midwest) - 7 ✓ Baylor ✓ Louisiana State ✓ Mississippi ✓ Oklahoma ✓ Tennessee ✓ UTHSC - San Antonio ✓ UTHSC - Houston	Region IV (Great Lakes) - 10✓Case Western✓Detroit Mercy✓Illinois✓Indiana✓Michigan✓Ohio State✓Pittsburg✓SUNY - Buffalo✓West Virginia✓Western Ontario - Canada
Region V (Northwest) - 18 ✓ Boston ✓ Columbia ✓ Dalhousie - Canada ✓ Dalhousie - Canada ✓ Harvard ✓ Howard Laval - Canada Laval - Canada ✓ Maryland ✓ McGill - Canada ✓ McGill - Canada Montreal - Canada New Jersey ✓ NYU ✓ Pennsylvania ✓ SUNY - Stony Brook ✓ Temple ✓ Toronto - Canada ✓ US Naval Dental School	Region VI (South) - 11 ✓ Alabama ✓ Florida ✓ Georgia ✓ Kentucky ✓ Louisville ✓ Meharry ✓ North Carolina ✓ Nova Southeastern ✓ Puerto Rico ✓ South Carolina ✓ Virginia

The National Agenda for 2002 was established after review of the reports of the 2001 Fall Regional meetings and National CODE Meetings. Thank you to the Regional CODE Directors and membership for making recommendations to establish the National Agenda.

Each Region is encouraged to also have a Regional Agenda.

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

It is strongly suggested that each Region select next year's meeting site, date or tentative date at the close of your Fall Regional CODE meeting if possible. This information is published in the Annual National Agenda Final Report. Early notification may permit additional participation from other member schools in your Region.

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

The required format and sequence will be:

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

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

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

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

2002 NATIONAL CODE AGENDA

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

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of Cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

What should be taught?

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

Is there a relationship to the Licensure Boards? Explain.

II. Composite Resin Restorations - Posterior

A. **DIRECT:**

Is your school teaching direct Class II Composite Resin Restoration in your pre-clinical curriculum?

Does your pre-clinical course include a practical examination for direct Class II Composite Resin restorations? Describe.

Are students placing Class II direct Composite Resin Restorations in clinics?

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct, and indirect?

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

Describe all the instrumentation utilized (burs, diamonds, air abrasion, laser, others).

What means are utilized to establish contour and contacts on the Class II Restorations? (circumferential, sectional matrixes, rings, wedge-wood, plastic, other).

What materials or combination of materials are utilized in the restoration. Identify all materials used. (filled sealant, flowable composite, composite-hybrid, microfill, glass ionomer - traditional, resin modified, other)

Describe the indications for the utilization of which material or material combinations.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

Do you have a Clinical "Competency" examination for direct Class II Composite Resin Restorations? Describe.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restorations in your pre-clinical curriculum?

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restorations. Describe examination.

Are students placing Class II indirect Composite Resin and/or Porcelain restorations in clinics?

Do you have clinical requirements/expectations for indirect Class II Composite Resin and/or Porcelain Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

Describe your most commonly used adhesive techniques for direct and indirect Restorative Dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc), thinning techniques, if any (air vs brush), curing protocols, etc.

III. Regional CODE Agenda

(Please report on responses from all participants).

IV. National CODE Meeting

The meeting will be held <u>Thursday, February 27, 2003 from 4:15 pm to 6:00 pm</u> in the State Room at the Fairmont Hotel in Chicago, Illinois. This is in conjunction with the annual

meeting of the Academy of Operative Dentistry. Please submit 1-2 items for consideration for the 'agenda' of the National Meeting. Suggestions as to how to make this brief meeting productive and efficient are needed.

V. Suggestions for CODE.

What can the organization do to improve its effectiveness?

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

Other suggestions?

REMINDERS:

National Directory of Operative Educators:

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

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

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

All update information will be forwarded to the Webmaster for inclusion on the Web site: <u>http://netserv.unmc.edu/code/codeframe.html</u>.

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

 Office:
 402-472-1290

 Fax:
 402-472-5290

CODE REGIONAL MEETING REPORT FORM

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LOCATION AND DATE OF MEETING:

CHAIRPERSON:

Name:	Phone #:
Address:	Fax #:
	E-mail :

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

Suggested Agenda Items for Next Year:

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name:	Phone #:	
Address:	Fax #:	
	E-mail :	
	Date:	
	Please return all completed enclosures to Dr. Larry D. Haisch, National Director, UNMC College of Dentistry;	
40 th and Holdrege Streets; Lincoln, NE 68583-0/50.		
	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 Regio	n	_ Attendees	Form
NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS

CODE REGIONAL MEETING REPORT FORM

Phone #:

REGION: I (Pacific)

LOCATION AND DATE OF MEETING:

UCSF School of Dentistry San Francisco, CA

November 7 - 8, 2002

CHAIRPERSON:

Name: Steve Eakle, D.D.S.	
---------------------------	--

Address: UCSF School of Dentistry

707 Parnassus Avenue, Box 0758, D 3230

 Fax #:
 (415) 476-0858

 E-mail:
 eakle@itsa.ucsf.edu

(415) 476-0863

San Francisco, CA 94143

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

Suggested Agenda Items for Next Year:

- Use of Kavo preparation scanning device for preclinical grading.
- Use of the Diagnodent for caries detection.
- Use of air abrasion.
- Caries risk/caries management/non-invasive treatment of carious lesions.

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: UCLA School of Dentistry	Phone #: (310) 825-7097
Address: 10833 Le Conte Avenue, Box 951668	Fax #: (310) 825-2536
Los Angeles, CA 90095-1668	E-mail: eddyh@dent.ucla.edu
Chairperson: Edmond R. Hewlett, D.D.S.	Date: October 16 - 17, 2003
Please return all completed enclosures to Dr. La Der 40 th and Holdrege Streets Deadline for return: Office: 402 472-1290 Fax: 402 4 Also send the information on a dis Please indicate the software program	rry D. Haisch, National Director, UNMC College of ntistry; s; Lincoln, NE 68583-0750. : <u>30 Days post-meeting</u> 472-5290 E-mail: lhaisch@unmc.edu sk and via e-mail with all attachments. m and version utilized for your reports.

2002 NATIONAL CODE AGENDA REGION I SUMMARY RESPONSES TO NATIONAL AGENDA

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain. What should be taught?

This topic generated extensive discussion related to the value of students performing laboratory work for clinical cases as well as the value of conservative cast gold procedures in the curriculum. Attendees generally agreed on the value of performing lab work insofar as this activity facilitates learning of appropriate preparation parameters, restoration contours and communications with dental laboratories. Nonetheless, all Region I schools reported reduced curriculum time devoted to laboratory fabrication of cast restorations, with some schools requiring no student lab work on clinical cases involving Operative Dentistry and Fixed Prosthodontics.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

Is there a relationship to the Licensure Boards? Explain.

Discussion also ensued on issues of determining competency in this area with respect to the licensing boards, particularly the use of human subjects vs. simulation and the frequency of conservative cast gold procedures being preformed in private practice. A representative from the Western Regional Examining Board (WREB) shared WREB's strong position that at least part of their examination must be patient based and cited surveys indicating the U.S. Dentists spend 3 - 5% of their practice time on cast gold restorations other than full crowns. It was suggested that WREB and other boards that include cast gold procedures on patients as a requirement or option consider broadening their criteria to permit the candidate to select other materials such as ceramic or lab-processed composite for an indirect restoration procedure.

Attendees uniformly agree that conservative cast gold belongs in today's predoctoral curriculum, but that it is equally important to also teach other treatment options as well. Many attendees predicted a possible increase in demand for gold inlays and onlays should the use of amalgam continue to decline. Onlays and partial veneer castings were generally regarded as worthy of being taught, but opinions varied on the value of teaching the gold inlay. Half of the Region I schools have clinical requirements/expectations in this area and the only relationship to licensing boards cited was the option of preforming a clinical cast gold procedure on the WREB exam.

II. <u>Composite Resin Restorations - Posterior</u>

1. DIRECT:

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

Are students placing Class II direct Composite Resin Restorations in clinics? Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others). What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

Describe the indications for the utilization of which material or material combinations. Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

Do you have a Clinical "Competency" examination for direct Class II Composite Resin Restorations? Describe.

All Region I schools responding (8 of 9) currently teach the direct Class II composite procedure. Two schools utilize preclinical practical examinations and all report that students are placing direct Class II composite in their clinics. None of the schools, however, currently have a clinical requirement/expectation for these procedures and only one currently administers a clinical competency examination. Case selection/exclusion criteria reported were uniformly conservative and many in attendance cited the textbook by Schwartz, Summit and Robbins (*Fundamentals of Operative Dentistry- A Contemporary Approach*, 2nd ed., Quintessence Co., Inc., 2001) as their reference for preparation design and other principles.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a

separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

Half of the respondents report teaching of these procedures at the preclinical level and three other schools introduce the procedure during the clinical years. None of the respondents currently employ clinical requirements/expectations or clinical competency examinations.

2002 NATIONAL CODE AGENDA REGION 1 RESPONSES

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **UA:** No response.
- **UBC:** There is still a place for these procedures, but a sense of diminishing utilization in general for this area of dentistry until the recent decrease of amalgam placements. Given limitations of composite for large restorations and cusp replacements, inlays and (especially) onlays may become more crucial in the next decade.
- **LLU:** The future of cast gold inlays and onlays is difficult to predict as tooth-colored restorations gain in popularity and become more dependable. Gold inlays and onlays are still taught at Loma Linda as part of the 3rd year Operative II course, which is followed by an Operative III course in porcelain onlays and veneers. There are currently no plans to remove the teaching of gold restorations, although the Restorative Department is looking at what should be in the curriculum 10 years from now. The consensus of the Restorative faculty is that gold onlays still have a place in the treatment plan when function as well as esthetics is considered.
- **OHSU:** At OHSU we believe that cast gold inlays and onlays continue to be an excellent treatment modality and should continue to be an integral part of the Operative Dentistry curriculum.
- **UCLA:** The future is better than ever! With the anticipated demise of amalgam and limitations of composite resin, cast gold offers an excellent option for many patients due to its long-term predictability. We feel strongly that our students must continue to receive this important educational experience.
- **USCF:** Future of cast gold inlays used infrequently in private practices. If amalgams are banned in the future, the demand might increase but only slightly. Onlays are still taught, but not inlays.
- **UOP:** Their routine use will continue to decrease as esthetic demands continue to escalate. However, selected areas (perhaps most notable the Tucker Study Club in Seattle) are convincingly able to demonstrate extremely outstanding long-term results using Type III gold and zinc phosphate cement. The more aged segments of

our patient population may continue to benefit from practitioners who can master partial coverage gold restorations.

Yes, they should be in the curriculum. It is extremely beneficial to demonstrate to students *how* we arrived at present technologies. This is certainly more critical with demonstrating G.V. Black preparations and restorations before attempting to proceed with minimally invasive preparations (especially Class II), but it is important with inlays/onlays as well. It is generally recognized that the occlusal divergence of tooth-colored inlays/onlays is considerably less conservative than that used with cast gold. Additionally, resin-bonded cement margins are wider than those achieved with traditional cements. Students should fully realize all of the *disadvantages* of the esthetic materials rather than macroscopically focusing only on color.

- **USC:** Both cast gold inlays and onlays should continue to be taught in the foreseeable future, inlay as an alternative to amalgam and composite and onlay as an intermediary restoration to more extensive restorations.
- **UW:** They should still be taught in the curriculum for skill development.
 - Amount of importance and time-decreased but not eliminated
 - Additional treatment options

What should be taught?

- **UA:** No response.
- **UBC:** Related bio-materials information and preparation should be taught, coupled with extensive training in recognition of laboratory and clinical errors, which result in compromised clinical results. We do not feel that one must know how to do lab work in order to know what are the parameters of success. This is the traditional approach, but it is an inefficient use of clinical educational time. UBC students haven't done their own lab work, either pre-clinically or clinically for nearly two decades. They work closely and in centralized supervision with designated faculty to ensure optimized laboratory communication and results in a context of understanding problem sources.
- **LLU:** Both gold and porcelain onlays should be in the Operative curriculum. Gold is still the material of choice where function is a prime consideration, particularly in restoring posterior teeth. The dentist of the future needs to have several options to choose from and he/she should feel comfortable with both materials.
- **OHSU:** Class II inlays and onlays should be taught in the pre-clinical curriculum and should be preformed clinically. Emphasis on case selection should be made particularly in lieu of the increasing use of composite (and its limitations) to restore Class II lesions.
- **UCLA:** At the pre-clinical level, students should learn all forms of cast gold restorations at the conceptual level, including inlays, onlays, pin-retained, 3/4, 7/8 and vented full crowns. Students should also fabricate and seat gold castings in the pre-clinical simulation lab. A clinical requirement/expectation is also appropriate.

- **USCF:** Onlay from preparation to impression to dies/waxing/casting to occlusal relations, finishing. Particularly important to teach conversion of large amalgam to onlay.
- **UOP:** Classic inlay and onlay preparation should continue to be taught; these can easily be extrapolated later to include the less conservative preparations for indirect composite resin and ceramics.
- **USC:** From conservative Class II inlays to cusp replacement and PVC to CVC. The laboratory fabrication fo the restoration is being de-emphasized.
- UW: Indications: para-functions, medium sized cavity preparations where esthetics not important, root canal treated teeth, insufficient isolation.
 <u>Limitations:</u> esthetics, cavity size-crack tooth syndrome, metal ion liberation. Case selection important.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **UA:** No response.
- **UBC:** No. These are included in the repertoire of clinical treatment, which students may plan and perform, but there are no requirements. Inlays are preformed very rarely.
- **LLU:** Currently, 4th year students at Loma Linda are required to pass a competency in a partial coverage gold restoration which may include inlays, onlays, 3/4 and 7/8 crowns and Class II, III, IV, V direct gold.
- **OHSU:** The final assessment of progress (third of three competency exams) occurs in the senior year and includes a cast gold inlay or onlay. To qualify for the exam the student must successfully complete two previous assessment exams (composite and amalgam) and must have completed 50 restorations that include at least three Class II gold inlay or onlay restorations.
- **UCLS:** Yes. Each student must complete a minimum of three cast gold non-full coverage restorations. These three may be any combination of inlays, onlays or partial veneer crowns.
- **USCF:** No requirements, but an expectation that the fundamentals of fabrication and delivery are demonstrated.
- **UOP:** We have no requirements/expectations for cast gold inlays/onlays.
- **USC**: No numerical clinical requirements, except for three required clinical exams.
- **UW:** Requirements: 3 cast restorations (inlays, onlays) in the 3rd year and 4 cast restorations in the 4th year. May be substituted by crowns.

Is there a relationship to the Licensure Boards? Explain.

- **UA:** No response.
- **UBC:** Not for us.
- **LLU:** As state and regional boards move away from the requirement of a partial coverage crown, it is possible that the need to teach gold inlays and onlays will diminish and will become more of an elective rather than a required course. However, the LLU Restorative faculty feel that the teaching of inlays/onlays should continue, independent of board exam requirements.
- **OHSU:** A WREB candidate may elect to do an indirect cast gold restoration.
- **UCLA:** No relationship. The value of cast gold in the curriculum stands on its own merit.
- **UCSF:** We would still teach onlay/partial veneer casting regardless of board exams.
- **UOP:** Until very recently, the answer would have been yes. However, we are now given to believe that the long-standing requirement of the WREB for an indirect cast restoration will be optional beginning with the 2003 graduating class. Graduates will be able to choose 2 of 3 possible restorations: Class II amalgam, Class II composite or cast gold inlay/onlay. When the two appointments required for castings, laboratory fees and perceived non-esthetic appearance of cast gold are taken into account, it would be expected that *very* few inlays/onlays will be performed.
- USC: No.
- **UW:** A cast restoration is required in the WREB.

II. <u>Composite Resin Restorations - Posterior</u>

A. DIRECT:

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

- **UA:** No response.
- UBC: Yes.
- **LLU:** The direct Class II composite is being taught at Loma Linda as part of the 1st year Operative I course. It is again reviewed during the 3rd year Operative II curriculum.
- **OHSU:** Class II composites are taught in the 2nd year pre-clinical curriculum.

- **UCLA:** Yes, in the pre-clinical Operative Dentistry course. Rationale for use, technique and other clinical issues are covered in lecture and students are required to satisfactorily complete one preparation and restoration in simulation lab.
- UCSF: Yes. D1 Class II slot; D2 surface Class II; D3 (Simlab) MO on molar.
- UOP: Yes.
- USC: Yes.
- **UW:** Yes. Students receive the relevant information (rationale for use and technique) in lecture first and then have to complete several projects (including 2 surface and 3 surface restorations) in the laboratory.

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

- **UA:** No response.
- **UBC:** Yes. Students must complete preparations and restorations of 17MO, 35MO and 24MOD and have signed off, self-, peer-, and instructor evaluations. <u>NOTE:</u> Students perform restorations of pre-prepared teeth prior to performing tooth preparations of at least one of each type of exercise. This inversion of traditional preparation-restoration sequencing has been extremely valuable for our fast-track clinical skills program.
- **LLU:** We are in the process of defining the criteria for a practical exam in the Class II composite. It is not currently part of the practical exam for the 1st year Operative I course, however, it will possibly be part of next year's course, following definition of the criteria and calibration of the faculty graders.
- **OHSU:** No pre-clinical testing for Class II composites occurs at this time.
- **UCLA:** No. Practical examinations for composite restorations are limited to Class III and Class V.
- UCSF: No.
- **UOP:** Not at this time.
- **USC**: We have two pre-clinical exams of the Class II composite restoration: a slot preparation and a simulated replacement of existing amalgam restoration.
- UW: No.

Are students placing Class II direct Composite Resin Restorations in clinics?

- **UA:** No response.
- **UBC:** Yes. Many. Probably *too many*, which we think is related, as much as anything, to the overconfidence (and/or delusions) of some part-time faculty who are overly optimistic regarding the indications for current posterior composites.
- LLU: Yes.
- **OHSU:** Students are placing Class II composite restorations in clinic after careful case selection.
- UCLA: Yes.
- UCSF: Yes.
- **UOP:** Yes. Historically, because of the technique sensitivity and attention required to detail for bonding posterior composites, all Class II composites were placed in a separate esthetics area, where staff to student ratios were increased. On the clinic floor, our concern was that there would be too many variances in suggested clinical technique from the large number of faculty who teach Restorative Dentistry. At present, more Class II composites are being placed in the main clinic; however, a current goal of the Restorative Department is to decide upon an agreed technique that will be taught and used continuously. A large department meeting is scheduled in the near future to initiate this process, and then all full-time and part-time faculty members will receive copies of the recommended procedure and materials.
- **USC:** Yes. For conservative restorations of proximal lesions on the bicuspids and other reasonable situations at the request of patients.
- UW: Yes.

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

- UA: No response.
- UBC: No.
- **LLU:** There are currently no clinical requirements in terms of numbers of Class II composites performed. However, should this become part of the competency

exams, a certain number will probably need to be accomplished prior to approval to take the competency.

- **OHSU:** Although no specific requirement for Class II composites exists, successful completion can count toward the 50 threshold clinical experiences needed prior to qualifying for the amalgam, cast gold and Class III composite competency exams.
- **UCLA:** No specific requirement/expectation for Class II. The requirement for direct composite restorations can be met with any combination of restorations from Classes I through V.
- UCSF: No requirement.
- **UOP:** Not at present.
- USC: No.
- **UW:** No. Students have requirements that involve any 140 surfaces. Included: build-ups, composite or amalgam restorations.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

- **UA:** No response.
- **UBC:** Our guidelines are consistent with those laid out in Tom Hilton's chapter of the Summit text on Operative Dentistry.
- **LLU:** A thin layer of flowable liner is placed on the dentin walls after the primer/adhesive is placed. Composite resin is then placed and cured in increments: a thin layer covering the gingival floor is placed and cured followed by alternating wedge-shaped increments in the box and occlusal preparations. All increments are cured for at least 40 seconds. Prior to finishing and following removal of the matrix band, both facial and lingual proximal surfaces are cured.
- **OHSU**: Indications for composites in posterior teeth:
 - Patients who are allergic or sensitive to metals
 - Pit and fissure sealing
 - Class V restorations
 - Preventive resin restorations
 - Initial Class I and Class II lesions
 - Small to moderate-sized Class I and Class II restorations

In all cases, the following guidelines must be adhered to:

- Patient is not allergic or sensitive to resin-based materials
- Patient demonstrates acceptable oral hygiene and home care¹

- Must be able to isolate tooth with rubber dam²
- All cavity margins must be in sound cement³
- Access occlusion preparation will be 1/3 or less of the intercuspal distance⁴
- Restorations limited to mesial of 1st molar and forward due to access/wear⁵
- Patient must not be a bruxer and teeth are not under heavy occlusal stress⁶
- Restorations must not replace cusps⁶

References:

- 1. Secondary caries is primary reason for failure of posterior composites. (Mjor, IA., Jokstaf, A.: *J Dent* 21:338-343, 1993)
- 2. Margins of Class II Composites placed w/o dam showed marginal leakage 4-6 weeks after placement in clinical study.(Abdulla and Davidson, *J Dent*, 21:158-162, 1993)
- 3. Gingival margins below DEJ cannot be sealed under ideal conditions. (Hilton, TJ, Schwartz, RS, Ferracane, JL. *Quint Int*, 28:135-144, 1997)
- 4. Wider cavities=higher failure rate and more marginal breakdown in clinical study of butt-joint vs. beveled margins. (Wilson et al., *Dent Mater*, 7:92-98, 1991)
- 5. Wear increases as restorations are placed more distally: molars>premolars. (Leinfelder, KF, *J Am Dent Assoc*, 127:7430748, 1996)
- 6. No data to support use of composites in these areas. (*J Am Dent Assoc*, 129:1627-1628, 1998)

UCLA: Indications:

(In these instances, composite would be considered preferable to amalgam.)

- Initial treatment of small Class I and II carious lesions that can be restored more conservatively with composite resin than with amalgam.
- Cusp tip erosions/caries (Class VI) and enamel fractures where preparation for amalgam would undermine enamel and lesion size does not yet dictate a cast restoration.

Limitations:

(These apply when amalgam is suitable but the patient strongly prefers a toothcolored material for appearance reasons, or when patient fears regarding mercury toxicity cannot be assuaged with education.)

Class I -

Buccolingual dimension $\leq \frac{1}{2}$ of the buccal-lingual intercuspal distance.

Class II:

Premolars or mesioocclusal of first molars only.

Buccolingual dimension $\leq \frac{1}{2}$ of the buccal-lingual intercuspal distance.

 General (These apply to <u>all</u> cases): All margins must end in sound enamel.

Ril margins must end in sound ename

Rubber dam isolation is mandatory.

Must obtain proper informed consent covering all benefits, risks, alternatives and costs.

Contraindications:

- Cavities with buccolingual dimension > ½ of the buccal-lingual intercuspal distance.
- Class II's with gingival margin located in cementum.
- Inadequate access for or patient refusal of isolation with rubber dam.
- High caries risk/rate.
- Weakened or undermined cusps.

- Cracked tooth syndrome.
- Parafunctional habits as evidenced by heavy wear or previous restorations/tooth fracture.

For teeth not meeting these posterior composite criteria in patients requesting/demanding non-amalgam materials, restorations with gold or bonded tooth-colored inlays and onlays will be offered as alternatives.

- **UCSF:** Direct Class I and II esthetics, minimal tooth reduction. Indirect composites - larger, deeper, more complex cavity.
- **UOP:** 1. Patient must be informed of range of possible treatment options.
 - B. Cases must be isolated with rubber dam.
 - C. Students and patients made aware that size and location of restorations markedly affect their life span. Smaller restorations in premolars will last much longer than larger restorations in molars. The more occlusion that remains on tooth structure, the better. Margins that are placed on enamel are greatly preferred to those on dentin or cementum. Larger composites, whether direct or indirect, are best avoided on the most distal tooth in the arch.
 - D. Composite restorations have absolutely no antimicrobial effect, and HEMA may well encourage bacterial growth.
- **USC:** Sealants, PRRs, small Class I and II. Almost exclusively direct.
- **UW:** Class I: -Primary carious lesions
 - 1. Conservative preparations
 - 2. Medium sized cavities with no increased risk of cracked tooth syndrome
 - 3. $\frac{1}{3}$ to $\frac{1}{2}$ intercuspal distance
 - 4. Good isolation
 - Class II: Same
 - Proximal box preferentially in enamel
 - If in dentin good isolation
 - Indirect: size > 50% intercuspal width
 - Patient demands for esthetics.
 - Improved physical properties
 - Isolation
 - Degree of cure

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- **UA:** No response.
- **UBC:** Many. Location of gingival margin, bulk of restoration (lesion must be small to medium only), occlusion, difficulty in obtaining proximal contact, retainer for RPD,

bruxism, caries susceptibility, patient understanding of the pros and cons of posterior composite restorations, cusp replacement requirement.

- **LLU:** Size of the lesion should be small to medium; the patient must not be a bruxer or have severely worn occlusal surfaces; the tooth must be isolated with a rubber dam; the patient must not be allergic to resin materials.
- **OHSU:** See response to previous question.
- **UCLA:** Initial lesion vs. restoration replacement; size of lesion; location of lesion; ability to isolate with rubber dam; caries risk; para-functional habits.
- **UCSF**: 1. Patient's esthetic demands
 - 2. Small size
 - 3. Enamel periphery for direct, Otherwise, indirect composites are indicated
 - 4. Not indicated for bruxers
- **UOP:** 1. Size and location of restorations(s).
 - 2. Oral hygiene
 - 3. Patient desires
- **USC:** Anticipated size of the preparation, location of tooth in arch, location of gingival margin, ability to isolate with the rubber dam, occlusal factors, caries potential, patient desire, etc.
- **UW:** Tooth structure preparation
 - Esthetics
 - Compatibility with old metallic restorations
 - Adhesion to tooth structure
 - Reparability
 - Isolation
 - No parafunction
 - Allergy/Systemic Check medical questionnaire

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

- **UA:** No response.
- **UBC:** Again, our guidelines are consistent with those laid out in Tom Hilton's chapter of the Summit text on Operative Dentistry. (Vertical margins **ALWAYS** bevel, occlusal margins **NEVER**, gingival margins **SOMETIMES**.)

- **LLU:** The preparation outline form is dictated by lesion removal as well as removal of unsupported enamel margins. Occlusal margins will not be beveled, it is recommended, however, that facial, lingual and gingival (on enamel) cavosurface margins of a box be beveled to expose the ends of the enamel rods. Cementum margins will not be beveled but rather be at right angles to the cavosurface.
 - Class I: Only infected pits and grooves need to be removed. Unaffected, but deep grooves should be sealed.
 - Class II: A slot or box type preparation is all that is necessary if the occlusal grooves are unaffected. A G.V. Black outline form is not required or recommended. Should the occlusal grooves also be infected, the box may be incorporated as part of the occlusal groove preparation. Facial and lingual grooves are not required if the box is small, however, should the facial and lingual walls of a box extend beyond the proximal line angles, then retentive grooves are recommended.
- **OHSU:** A conservative groove extension on the occlusal surface of Class II preparations is being taught (as illustrated in the Summit text). The remaining preparation design is dictated by caries and/or operator access. A rounded internal with added retentive features as needed is being taught. Emphasis is being placed on leaving as much sound dentin untouched as possible.

For Class II restorations:

Bevel occlusal - NEVER Bevel interproximal - ALWAYS Bevel gingival - SOMETIMES (depending on the depth of the gingival wall and the extent of remaining sound enamel.)

- **UCLA:** Depth and extensions for treatment of initial lesions are limited to removal of carious and decalcified tooth structure. Classic G.V. Black principles of outline and extensions are not applied. All cavosurface margins are finished to a 90-degree butt-joint (no bevels).
- **UCSF:** For initial cavities, PRR & Class II slots No occlusal bevel; bevels on Class II buccal and lingual proximal margins; Bevel gingival only if enamel thickness is adequate, use butt margins if enamel is thin or not present. Cass V- beveled enamel margins, gingival retention groove.
- **UOP**: Direct: Preparations are generally carries pulpally and axially just into the dentin where caries is present. Adjacent stained grooves are treated with sealant or flowable composite. Rounded internal line angles are used. Proximal boxes are opened for cavosurface clearance. Until students have significantly more clinical experience, most unsupported enamel is still removed. Enamel is marginated with extremely fine diamond burs to remove unsupported rods. Bevels are not generally placed. Margins on dentin are butt-joints.
- **USC:** <u>Direct:</u> Occlusal is dictated by caries and decalcification. Proximal outline is also dictated by caries and decalcification. No attempt is made to extend for access for proximal. Proximal enamel margins are beveled. No additional bevel is placed on occlusal margins because they usually end on occlusal slopes.

Indirect: Resembles cast gold inlay, tapered walls, access, proximal butt-joints, etc.

- **UW:** Lesion oriented restoration
 - Preservation of undermined enamel
 - Finishing of the enamel margin with burs not bevel (smoothing slightly)
 - Dentin butt-joint cervical

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **UA:** No response.
- **UBC:** 007 fissurotomy diamond bur (Brasseler), 556D, round burs for caries removal.
- **LLU:** A 330 diamond or similar sized rounded-ended diamond is used to remove the lesion and unsupported enamel. A Premier 201.3 diamond is used to bevel facial and lingual enamel margins of a box. Slow-speed round burs and excavators are used to remove dentinal lesions. The tooth must be isolated with a rubber dam.
- **OHSU:** Rounded burs such as the 330 carbide; Brasseler composite finishing diamonds; 3M Soflex discs, Enhance polishing system or polishing pastes. Rebond with Fortify or other unfilled resin.
- **UCLA:** Small round burs (1/4, 1/2, 1, 2); 330 bur, Brasseler H274-016 (12-fluted flame-shaped carbide); Brasseler 8274-016 (flame-shaped fine (30µm diamond); Jiffy Polishers (Ultradent); Soflex Discs (3M)
- **UCSF:** Carbide burs (small round, pear-shaped, 56); thin, fine diamonds to open fissures. Operative diamonds for indirect preparations. Minimal use of air abrasion for Class I and Class V. No lasers.
- **UOP:** Preparations are generally performed with carbides and diamonds, although both air abrasion and laser are available for use in the esthetics clinic.
- **USC:** 329 and 330 for small preparations, switching to the 256 for larger preparations. Flame diamond for proximal bevels, GMT for gingival bevels.
- UW: Indirects- diamonds Directs - carbides or diamonds
 - Margin trimmers: Proximal boxes, inaccessible areas
 - Enamel chisels: Proximal boxes, inaccessible areas

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

UA: No response.

- **UBC:** Sectional matrix, BiTine rings (Palodent), clear wedges and strips, Tofflemire.
- **LLC:** Sectional matrices and Palodent separating rings are utilized. A wooden wedge, modified to fit the interproximal space, is placed to seal the gingival margin. The matrix is burnished against the adjacent tooth with a rubber dam burnisher or the back-end of a discoid excavator.
- **OHSU:** Pre-wedging with wooden wedges; Composi-Tight G ring sectional matrix retainer system (Garrison Dental Solutions 888-437-0032)
- **UCLA:** Pre-wedging, Palodent Sectional matrices and BiTine Rings.
- **UCSF:** 1. Circumferential: Tofflemire or Automatrix, wedged heavily and pressure on band w/instrument during polymerization
 - 2. Sectional: Sectional matrix, spring ring, wooden wedge. No use of clear matrices.
- **UOP:** Again, we are at work on developing a single, prescribed technique that will be taught by all instructors. At present, we are leaning toward use of the BiTine ring/sectional matrix technique.
- **USC:** Sectional matrixes, wooden wedges.
- **UW:** Palodent system: sectional matrixes, BiTine rings and wedges.

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

- UA: No response.
- **UBC:** Hybrids (Filtek 250, Heliomolar), light-cured glass ionomer (Fuji II LC), light-cured Ca(OH)2 prn (or "total etch" as indicated).
- LLC: 3M's Scotchbond MP or Ultradent's PQ1 adhesive system is used. Ultradent's Permaflow is used as the flowable liner: either Kerr's Herculite XRV or Caulk's Esthet-X is available as the composite resin. Ultradent's Permaseal is used as a surface-sealant following finishing and polishing of the surface. The Scotchbond MP is still used as it has proven to be a reliable system. The same is true with the Herculite XRV composite. Esthet-X is used only in situations where color matching is critical as the system has a broad range of colors available.
- OHSU: Glass ionomer Vitrebond Resin modified GI - Vitremer

Acid etch 3M Scotchbond Multi-purpose Primer on exposed dentin 3M Scotchbond Multi-purpose adhesive resin Hybrid composite - Herculite XRV Microfill composite - 3M Filtek, Silux, Z100 Other - Z250, Kerr Point 4 Unfilled resin for rebonding - Fortify

- **UCLA:** Glass ionomer base applied to all dentin surfaces (resin-modified and high strength traditional types are available). Phosphoric acid etch of enamel for 15 seconds. Single-component (primer + filled resin) adhesive. Hybrid Composite restorative. We do not currently utilize flowable or microfill materials in the posterior composite protocol. A flowable liner layer, while perhaps effective in reducing postoperative sensitivity, is perceived to have no advantage in this regard or in reducing overall technique sensitivity of the procedure as compared to the "sandwich" technique with a glass ionomer base.
- **UCSF:** Sealant, flowable, hybrid, micro-hybrid, hybrid ionomer.
- **UOP:** The materials used are essentially the same as used in our anterior composites: dentin adhesive system (Optibond Solo Plus) plus micro-hybrid composite (Esthet-X). Optibond Solo was chosen primarily for its uni-dose application system, which simplifies infection control procedures. Esthet-X was chosen because of its very wide selection of shades.

The addition of flowable composite, though universally touted, has very little scientific evidence to warrant its use as a first layer. "Packable" composites have not been shown to have any advantage over traditional micro-hybrids. To simplify our inventory, we have discontinued microfill composites at the school, although Heliomolar's success in Class II situations has been the longest demonstrated and is much easier to marginate and polish than the more highly filled microhybrids. When preparations are necessarily made deeper axially or pulpally than "ideal," **OR** when any margin is within 1.5mm of the CEJ, the use of a glass-ionomer or resin-modified glass ionomer is **STRONGLY** encouraged to replace dentin rather than bulk filling with composite. Generally, a "closed sandwich" technique is used for (gingivally) deep Class II restorations (Vitrebond, Fuji II or Ketac Bond).

- **USC:** (CaOH, if very deep, followed by GI liner.) Adhesive, flowable or chemical-cure for box, finish with hybrid, sealant is adjacent to deep grooves.
- UW: Hybrid and microhybrid composites; sometimes combined with a final layer of a microfill composite.
 Microfill composite.
 Multi-step dentin adhesive.

Flowable composites - for preventive resin restorations that are done in conjunction with a posterior composite restoration.

Glass lonomer cements as liners.

Describe the indications for the utilization of which material or material combinations.

- **UA:** No response.
- **UBC:** No response.
- **LLU:** See response to previous item.
- **OHSU:** Glass lonomer as a liner/base when needed.
 - Hybrid composite for Class II restorations and larger Class II or IV restorations that may be in occlusion.
 - Microfill for better esthetics (alone or in "sandwich" technique)
 - · Questionable gingival enamel Glass ionomer or resin-modified Glass Ionomer
- **UCLA:** Glass ionomer base is recommended for routine use in all but the shallowest posterior composites to reduce the incidence of postoperative sensitivity due to incomplete sealing of the dentin with resin adhesive. Glass ionomer base is also recommended as the gingival increment of the final restoration in Class II cavities with margins lacking enamel, based on literature citing improved resistance to microleakage on dentin margins as compared to composite resin. The choice of resin-modified vs. high strength traditional glass ionomer is left to the discretion of the attending instructor. Single-Component adhesive is used primarily due to the unit dose packaging and simplified application technique vs. multi-component adhesives in bottles.
- UCSF: PRR- sealant or flowable for uncut fissures, flowable + hybrid or micro-hybrid in preparation areas.
 Smaller composites hybrid and micro-hybrid.
 Larger composites Fuji II LC base + hybrid or microhybrids.
- **UOP:** Flowable composite is only used in those preparations which are deemed too large for a sealant and too small to place a filled composite. Compomers are not advised, as they combine the worst features of composite and glass ionomer.
- **USC:** Flowable for stress relief. Chemical-cure for faster build-up of the box.

UW: Hybrid: all cavities combined with thin layer of Microfill.Flowable: only for use in PRR.Glass lonomer cement: for deep cavities - close to the pulp; as a first gingival increment when the box extends beyond the CEJ.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- UA: No response.
- UBC: No.
- **LLU:** Currently, there are no clinical requirements or competency exams for direct Class II composite restorations prior to graduation. That, however, will change as the restoration is incorporated as part of the clinical competency exams required of the 3rd and 4th year students. It will be offered as an option to the Class II amalgam in this year's Senior Clinical Comprehensive Exam I in preparation for the Western Regional Board; criteria used will be that published by the WREB.
- **OHSU:** Although no specific requirement for Class II composites exists, successful completion of any composite restoration can count toward the 50 threshold clinical experiences needed prior to qualifying for the amalgam, cast gold and Class III composite competency exams. The Class III composite competency exam is offered near the end of the third quarter to 3rd year students upon successful qualification for the exam. The threshold for participation is a total of 30 completed restorations, 20 of which should be composite resins.
- **UCLA:** No specific requirement/expectation for Class II. The requirement for direct composite restorations can be fulfilled with any combination of restorations from Class I through Class V.
- **UCSF:** No clinical requirements.
- **UOP:** Not at present. It is felt that students who are able to prepare good amalgam preparations will have little difficulty progressing to composite preparation/restorations. There is adequate opportunity, however, to perform more than an adequate number of posterior composite restorations. At present, perhaps 20% of our students take the WREB, where Class II composites may now be placed and this area may receive additional attention in the near future.
- **USC:** No clinical requirements/expectations.
- UW:2nd year:pre-clinical3rd & 4th years:surfaces: 140Expectations:students need to know indications and contraindications, technique.

Do you have a Clinical "Competency" examination for direct Class II composite Resin Restorations? Describe.

- **UA**: No response.
- **UBC:** Not currently, but this will be included in one of the categories of an upcoming series of clinical competencies which we are planning, using a "commando group" approach for tightening the inter-rater reliability of these evaluations.

- **LLU:** Currently, there are no clinical requirements or competency exams for direct Class II composite restorations prior to graduating. That, however, will change as the restoration is incorporated as part of the clinical competency exams required of the 3rd and 4th year students. It will be offered as an option to the Class II amalgam in this year's Senior Clinical Comprehensive Exam I in preparation for the Western Regional Board; criteria used will be that published by the WREB.
- OHSU: No.
- UCLA: Not at this time.
- **UCSF:** D3: 2-surface Class II on a patient.
- **UOP:** Not at this time. See previous answer.
- USC: No.
- **UW:** Yes. The student chooses the case and it is accepted or rejected by the two faculty members that will be grading the procedure. Rubber dam application, outline form, internal features of the preparation, insertion of the restorative material and carving and finishing of the restoration are graded separately by the two instructors. The student does not receive any instruction or indications during the procedure, unless considered necessary, at which point the exam will end.

II. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

- **UA:** No response.
- UBC: No.
- **LLU:** We are currently covering indirect porcelain onlays and veneers as well as the indirect Class II composite in our 3rd year Operative III course. A selective course in advanced esthetic restorations is also offered for the 4th year students.
- **OHSU:** At this time indirect resin/porcelain technique is not being taught pre-clinically, except for brief mention in lecture. Porcelain onlays and veneers are being taught in an honors course offered to qualified senior students. The honors student has the opportunity to fabricate a porcelain onlay in lab.
- **UCLA:** Yes, in the preclinical Fixed Prosthodontics course. Rationale for use, technique and other clinical issues are covered in lecture and students are required to satisfactorily complete tooth preparation exercises in simulation lab.
- **UCSF:** No. Composite and porcelain indirect Class II procedure is presented in a D3 lecture course.
- **UOP:** Yes. Following the conclusion of the preclinical Operative course, one quarter is dedicated to more advanced concepts, including indirect tooth-colored preparation and restoration. An increase in faculty to student ratio is used during this course.
- **USC:** Yes. Same preparation for both.
- **UW:** Yes. In the past only lectures were given to students, but starting in the spring quarter of 2003, there will be a laboratory section too.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

- UA: No response.
- UBC: No.
- LLU: No.
- OHSU: No.
- UCLA: No.
- UCSF: No.
- **UOP:** Not at present. However, during the course described previously, all students must complete a number of typodont cases that would be considered clinically acceptable if placed *in vivo*.
- USC: No.
- **UW:** Planned in the future.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

- **UA:** No response.
- **UBC:** No. These are included in the permitted repertoire of clinical treatment which students may plan and perform with the support of ICC instructors, but there are no requirements. They are preformed very rarely.

- **LLU:** Students are allowed to place porcelain restorations in the clinic. However, there are no clinical requirements or competency exams for the indirect composite or porcelain restorations.
- **OHSU:** Very few indirect porcelain techniques are performed in our school clinic. No indirect composites are being done.
- **UCLA:** Yes. These procedures have become increasingly common as patients express desires for nonmetallic, tooth-colored replacement options for failed medium and large amalgam restorations. Virtually all of these restorations are ceramic (Empress), with occasional use of lab-fabricated composite resin inlays (Belleglass).
- **UCSF:** Indirect composite yes, with certain instructors. Porcelain - infrequently due to high failure rates seen 5-6 years out.
- **UOP:** Yes, quite a few are placed. At present, these are prepared and placed within a separate esthetics clinic, where faculty to student ratios are increased because of the large number of steps required with these restorations. Within the last year, an additional half-day per week and an additional faculty member have been added to the esthetic clinic sessions. Most of these cases are documented photographically in addition.
- **USC:** Yes, but not often. Mostly for cusp replacement situations.
- **UW:** Yes. Under close supervision and for 4th year students only.

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- UA: No response.
- UBC: No
- LLU: No
- OHSU: No
- **UCLA:** No specific requirement/expectation for these restorations. The requirement for indirect single unit restorations can be fulfilled with any combination of cast gold, ceramometal, or all-ceramic restorations.
- UCSF: No
- **UOP:** No, not at present.

USC: No

UW: Yes. <u>Minimum</u>: 2 restorations in 2nd year (pre-clinical). <u>Clinic</u>: as needed. Not required.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

UA:	No response
UBC:	No
LLU:	No
OHSU:	No
UCLA:	No
UCSF:	No
UOP:	No, not at present.
USC:	No

UW: No, not planned. It would be very complicated at this point and don't want to have students trying to get cases for this type of procedure.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

- **UA:** No response.
- **UBC:** We have products from Bisco, 3M, and Kerr in single and multi-bottle systems and advise following manufacturers' directions.
- LLU: 1. Etch enamel for 15 20 seconds and dentin for 10 seconds using Ultradent's 35% Ultra-etch.
 - 2. Wash throughly for about 30 seconds to remove all traces of the gel etch.
 - 3. Gently remove excess moisture from the preparation using the blotting technique or two or three short gentle bursts of air, leaving the surface visibly moist.

- 4. Apply 3M's Scotchbond MP or Ultradent's PQI according to each manufacturer's instructions.
- 5. Place a thin layer of a flowable (Ultradent's Permaflow) onto the dentin surfaces and light cure.
- 6. Place composite (Herculite XRV or Esthet-X) in incremental layers.
- **OHSU:** 1. Nexus 2 and Variolink 2 are the resin cements being used.
 - 2. Scotchbond Multi-purpose Plus (when dual cure is desired).
 - 3. Scotchbond Multi-purpose (when dual cure is not needed).
 - 4. 15 second minimum etch for enamel.
 - 5. 15 second maximum etch for dentin.
 - 6. 5 10 second rinse.
 - 7. Air dry do not desiccate.
 - 8. Separate Primer layer(s) as per Scotchbond instructions.
 - 9. Apply and brush-thin adhesive resin.
 - 10. Standard halogen 600-800mw irradiance for 40 seconds per 1-2mm increment.
 - 11. 60 second irradiance from multiple sites for indirect procedures.
- UCLA: Direct, light-cured composite restorations: 15 second total etch (or 15 second enamel etch if glass ionomer base has been applied to dentin). 5 second air/water spray rinse, vacuum excess water and blot dry preparations, apply singlecomponent filled resin adhesive with agitation for 10 seconds, evaporate solvent with light-force compressed air for 10 seconds, light cure for 20 seconds. Direct, self-cure buildup composite restorations: 15 second total etch, 5 second air/water spray rinse, vacuum excess water and blot dry preparation, apply multiplecomponent adhesive as per manufacturer's instructions (mix primer and apply 4 to 5 times, evaporate solvent, light cure 20 seconds, place resin, light cure 20 seconds). Indirect restoration with light-cures resin cement: 15 second total etch, 5 second air/water spray rinse, vacuum excess water and blot dry preparation, apply singlecomponent filled resin adhesive with agitation for 10 seconds, evaporate solvent with light-force compressed air for 10 seconds, simultaneously light-cure the adhesive and the resin cement after seating the restorations and removing excess cement. Indirect restoration with dual-cures resin cement: 15 second total etch, 5 second air/water spray rinse, vacuum excess water and blot dry preparation, apply multiplecomponent adhesive per manufacturer's instructions (mix primer and apply 4 to 5 times, evaporate solvent, light-cure for 20 seconds, place resin and leave uncured), simultaneously light-cure the adhesive and resin cement after seating the restorations and removing excess cement.

Cast or pre-fabricated post with self-cured resin cement (Panavia 21 or Panavia F): Follow manufacturers' instructions for entire procedure (primer application, mixing and placement of cement. seating of post).

- UCSF: <u>Direct & Indirect</u>:
 - Start to etch on enamel 10 seconds (20 seconds total) and etch dentin for 10 seconds with 37% phosphoric acid.
 - Rinse 5 seconds.

- Blow off excess water. Leave damp.
- Apply 1-step enamel/dentin adhesive (Optibond Solo Plus), rub gently for 10 seconds.
- Blow air to evaporate solvent and water 5 seconds.
- Light-cure for 20 seconds.

Direct:

- Apply composite in increments no more than 2mm thick. Cure each increment for 20 - 40 seconds.
- Finish contours. Check occlusion.
- Polish.
- Optimal post-cure 40 60 seconds

Indirect:

- Apply dual-cure resin cement to composite inlay/onlay.
- Seat and cure margins 5 seconds. Remove excess cement and cure for 40 seconds.
- Finish contours, adjust occlusion, polish.
- Optimal post-cure 40 60 seconds.
- **UOP:** <u>Direct technique</u>: Etch 15 seconds, rinse, leave preparation slightly moist. Apply Optibond Solo with light scrub, use moderate air to remove solvent without over-thinning, cure 20 seconds. Place Esthet-X in increments of not more than 2mm thick, cure at least 20 seconds per increment, more if light cannot be placed in close approximation to composite.

<u>Indirect technique:</u> At present, Targis and Empress (original formulation) are the most widely used materials. Air-abrade and silanate restoration intaglio, cement (generally) with materials in Variolink II kit, following manufacturers' instructions.

USC: <u>Direct:</u> Ultradent etching, 20 seconds etch for enamel, 5 - 10 seconds for dentin. Separate etch if possible. 10 seconds rinse, dry but not dessicate. Two coats of Optibond Solo Plus, slight air-thin, 20 seconds light-cure. Composite. <u>Indirect:</u> Nexus. Use enclosed instructions.

UW: Direct:

All Bond 2-

- Multi bottle system
- Etching: 15 30 seconds
- Rinsing: required, 15 20 seconds
- Drying: air to moist dentin
- Primer: 5 layers brush
- Thinning: air make sure no water coming out of syringe
- Curing: 20 seconds/adhesive, 40 seconds/composite

Indirects:

Etching-

- Tooth: 15 seconds
- Restoration: HF-Empress 60 120 seconds

Rinsing: at least 30 - 60 seconds

Silanization: one bottle: MonoBond S Vivadent

Bonding agent: unless ultrasonic insertion technique is used (Varolink Ultra - 2% increase in filler Content: ~85% filler)

Polymerization: 60 seconds/each surface/minute. 400mW/cm²

Polishing: diamonds 10µm, fine Soflex discs, Diamond paste - Ultra two (Shofu)

2002 NATIONAL CODE AGENDA REGION I SUMMARY RESPONSES TO REGIONAL AGENDA

Three institutions provided detailed responses to the regional agenda items.

These include data on which operative preparations are being taught and how many repetitions of each are completed in lab and/or simulation prior to clinic procedures on patients.

Use of web-based courses and availability of course materials on the web for student access was widely varied.

All respondents are either currently using competency-based curricula vs. requirements or are moving swiftly in that direction.

III. Regional CODE Agenda

What operative preparations and how many repetitions of each are completed in lab and/or simulation prior to clinic procedure on patients?

- UBC: See attached for a listing of preparations/restorations. A key feature of our PBL integrated fast-track clinical skills program is virtually no laboratory-based exercises. All clinical skills (both preparation and restoration) are learned in simulation and in a clinical operatory, using our headrest articulated manikins. Students are qualified for Class I, II and V amalgam and composite resin preparations and restorations, plus Class II amalgam preparations and restorations before beginning patient operative care. Class II composite resin direct preparations and restorations, including completion of simulation exercises follow about 3 weeks later for most students. Most complete these gateway requirements for this program approximately 17 curriculum weeks after first picking up a high-speed air turbine handpiece.
 NOTE: Students perform restorations of pre-prepared teeth prior to performing tooth preparations of at least one of each type of exercise. This inversion of traditional preparation-restoration sequencing has been extremely valuable for our fast-track clinical skills program.
- OHSU: Freshman year, spring term (2 lectures/2 labs per week) bench top 15 amalgams (Class I and II) 4 gold inlays (one taken to completion, i.e., wax, cast, cementation) 1 Class III composite; 1 PRR 1 Class V direct gold Midterm: 2 Class II amalgams Final: 1 amalgam, 1 inlay <u>Total: 26</u>

<u>Sophomore yr, fall term (1 lecture/2 labs per week)</u>–simulation clinic 9 amalgams (Class I, II and overlay cusps) 7 inlays/onlays (one inlay taken to completion) 5 composites (Class II, III and IV) + 2 sealants Midterm: 1 amalgam, 1 inlay Final: 1 amalgam, 1 inlay Total: 25

<u>Sophomore yr, spring term (1 lecture/1 lab per week)</u>-simulation clinic
<u>PROPOSED:</u>
7 amalgams (Class II, V and buildups)
2 gold (one onlay taken to completion)
6 composites (Class II, III, IV, V)
Practice with liner, base, temporary materials, and cements – to be determined Competency exams: anterior composite, amalgam, inlay
<u>Total: 18</u>

Restoration Type	# Completed Prior	# Completed after
Class I amalgam	4	0
Class II amalgam	9	0
Class II amalgam	2	0
Class V amalgam	2	0
Complex pin-retained amalgam	1	0
Class I composite	1	0
Class II composite	1	0
Class III composite	3	0
Class IV composite	1	0
Class V composite	3	0
Diastema closure w/ composite	1	0
Direct composite veneer	2	0
Root caries restoration w/glass ionomer cement	1	0
Pit & fissure sealant	1	0
Preventive resin restoration	1	0
Porcelain veneer (preparation only)	2	0
Cast gold inlay	0	1
(prep/impression/models/provisional) Cast gold onlay (prep/impression/models/provisional)	0	2
Ceramic inlay (preparation only)	0	1
Ceramic onlay (preparation only)	0	1

What operative preparations and restorations are completed in lab or simulation after students have begun operative procedures on patients?

- **UBC:** Complex restorations. Class IV resin restorations and direct composite resin veneers are in this category. Qualified practice and competency examinations for these procedures follow, for most students, about two or three months after they have begun basic level operative treatment in the clinic.
- **OHSU:** Other than the senior honors course in Operative Dentistry (porcelain onlays), all operative techniques are taught in pre-clinic.
- **UCLA:** See table above in response to previous question.

Which schools are using web-based courses or putting course materials on the web for student access? What are the advantages and drawbacks? What help is available from your school in putting teaching materials on the web?

UBC: At UBC we are making extensive use of WebCT curriculum materials for operative teaching, including 3-D VR images which students can manipulate to visualize tooth anatomy, preparations and relationships (as reported at the ADEA meeting). This seems to be very helpful for the graphic visual learners. Text information must generally be made available as hard copy also, to best serve the needs of students

of certain other learning modes. Students have the graphic and text information available at all clinic operatory work areas and directly in all general clinic operatories.

- **OHSU:** Select operative lectures (PowerPoint) are posted on the class web site. Moves are being made toward formalizing web-based portions of the operative course material.
- **UCLA:** Currently being done at the discretion of individual course chairs. Typically consists of PowerPoint presentations made available for viewing/downloading on the School website. The School's Media Center is available to provide detailed expert help, with costs recharged to the course's department.

Which schools are using competency vs. requirements in the clinics? How closely does the clinic follow the pre-clinical training?

- **UBC:** UBC does not include patient-based competency testing presently. We determine competency principally through attendance and participation in integrated clinical sessions, with a system of quantifying patient care activity called Clinical Procedure Values (CPVs). Students must demonstrate a minimal level of overall clinical experience based on a total number of CVPs. Operative Dentistry is clinically integrated with Prosthodontics, Periodontics, Patient Assessment, Treatment Planning and Endodontics. Certain disciplines insist on a minimal number of clinical procedures (e.g., 1 free-end RPD in Prosthodontics) to ensure that students obtain that particular clinical experience. Operative Dentistry states a "suggested" minimal experience in this discipline based on surfaces of teeth restored, but this is not a hard-and-fast "requirement." Students are also advised to obtain one patient experience in the medical management of caries. Last year, all students achieved the caries management experience.
- **OHSU:** OHSU has recently moved toward clinical competency vs. requirements in the clinics. With the newly installed Simulation Clinic, the pre-clinical curriculum can more closely align with clinic protocol (Example: all Simulation Clinic projects are done with a rubber dam in place).
- **UCLA:** We use a combination numerical requirements for various types of procedures plus clinical competency examinations. Minor variations occur between techniques taught preclinically and those performed in clinic as a result of variations in the preferences and experience of attending faculty.

When should gold castings be stopped - for board testing purposes?

- **UBC:** In Canada we no longer have board testing of castings at any level. It's validity (if not reliability) seems especially elusive as a single-encounter evaluation.
- **OHSU:** It is our feeling that gold castings should not be discontinued for board testing purposes. Consistent with what will continue to be taught in the dental school

curriculum, a patient should continue to have the option to obtain a superior restoration that has proven itself over time. As discussed at the 2002 Regional CODE meeting, if a portion of the board examination is designed to test indirect technique, then the board might consider offering a candidate the option of choosing between gold or some other indirect restorative material.

UCLA: The gold casting procedure is as good as any for the purposes of testing indirect restoration competency. However, for boards which require completion of cast restorations on patients, a choice of an alternative indirect material would seem to be a reasonable option.

IV. National CODE Meeting

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

It would be nice to have increased recognition from larger organized groups such as the AGD and ADA.

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

Other suggestions?

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

- Use of Kavo preparation scanning device for preclinical grading.
- Use of the Diagnodent for caries detection.
- Use of air abrasion.
- Caries risk/caries management/non-invasive treatment of carious lesions.

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CODE REGIONAL MEETING REPORT FORM

REGION: II (Midwest)

LOCATION AND DATE OF MEETING:

University of Colorado School of Dentistry,

Denver CO

September 22 - 24, 2002

CHAIRPERSON:

Name: Craig Passon	Phone #: (303) 315-8507
Address: UCHSC School of Dentistry	Fax #: (303) 315-0346
4200 E Ninth Avenue C284	E-mail: craig.passon@uchsc.edu
Denver, CO 80262	

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

Suggested Agenda Items for Next Year:

- 1. How much lab work are students expected to perform now?
- 2. Is the lab work done by internal or external technicians?
- 3. What is the current status for pit and fissure sealants palced over dental decay?
- 4. How much of the fissure of an occlusal surface do we cut?
- 5. What are the various caries control programs in the schools?
- 6. Are there effective risk assessment programs?
- 7. Has there been any impact by the community out-reach programs on your educational goals?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Craig Phair	Phone #: (612) 625-7945
Address: University of Minnesota School of Dentistry	Fax #: (612) 625-7440
4-215 Moos Tower, 515 Delaware St SE.	E-mail : phair001@umn.edu
Minneapolis, MN 55455	Date: September 22 - 23, 2003

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: <u>30 Days post-meeting</u> 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.

2002 NATIONAL CODE AGENDA REGION II SUMMARY RESPONSES TO NATIONAL AGENDA

The Region II attendees only discussed issues related to the schools' relationship with Central Regional Dental Testing Services, Inc. (CRDTS).

Main areas of discussion were expectations of the test and inconsistencies in examination requirements and contemporary dental education. Information was provided by and to local CRDTS faculty representative.

2002 NATIONAL CODE AGENDA REGION II RESPONSES

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of Cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **COLO:** There are two main concepts of tooth restorations: direct and indirect, The concept of indirect restoration should be taught whether cast gold inlays are the outcome or not. The question is whether there is an indication for indirect (excluding full coverage) restorations. If a direct restoration is not indicated then the treatment choice is full crown. There is no in-between restoration choice.
- **CRE:** Always a good restoration. The department is discussing what to do with it in the curriculum. It has been dropped from the Senior Mock Board examination.
- **IOWA:** With the advances in adhesive dentistry, esthetic inlays and onlays are more popular. Inclusion in the curriculum requires extensive time and the restorations are often difficult to market to the patients. Often these restorations are often taught to prepare students for board examinations. One way to continue these procedures would be to make optional courses available to those students who have to or want to learn these procedures.
- MARQ: Yes, they should be taught as an alternative to direct restorations.
- **MINN:** There is still a place for the cast gold onlay (probably not the inlay) as a patient treatment option and as a student learning exercise. The cast gold onlay offers strength to retain weakened cusps (vs. amalgam), conservation of tooth structure (vs. full coverage crowns), less wear of opposing enamel (vs. porcelain), and excellent occlusal wear properties (vs. composite resin). In addition, it can be used when saliva control is not optimal. During the pre-clinic years when students are learning restorative procedures, a lack of precision is not easily detected when restoring plastic teeth with amalgam or composite resin. However, students will readily appreciate the importance of attention to detail when restoring plastic teeth with a cast gold onlay.
- **UNMC:** At present, utilization of these restorations is minimal in student clinics and by local practitioners. Fashions change, however, as cast gold restorations are said to be on the upsurge in some European countries, owing to concerns about mercury in amalgams and estrogen-mimicking resins present in composite resin. For this reason, and because understanding on intracoronal castings is foundational knowledge for other indirect restorations, they remain in our preclinical curriculum and are available for selected cases in clinic.

- **SASK:** Yes, because they are less invasive than full coverage restorations and, when well done, are clinically superior to direct composite resins with a clinical evidence base over many years.
- **SIU:** They should be retained as long as they are included in clinical board exams. They also have merit in teaching students basic preparations design principles.
- **UMKC:** They still have a future; very good restoration for the onlay; inlay is questionable now that a direct resin is available. Principles are necessary to teach. We teach them in the lab and for seniors who are taking the Western Boards. In the pre-clinic lab, we teach the students to prepare a MOD composite preparation, then turn it into a MOD composite inlay preparation, then into a MOD inlay gold preparation and then an onlay gold preparation.

What should be taught?

- **COLO:** This question may be based on the curriculum time available. Given a finite amount of time, cast gold inlays and onlays may be too "expensive" to teach when one considers the other needs. However, the concept of indirect restorations should be taught. The amount of time devoted to inlays and onlays is the question.
- **CRE:** It is being reviewed at this time.
- **IOWA:** Inlays require a great discipline in teaching and are not considered a practical restoration for the contemporary dental practice. Gold onlays however, have many clinical indications and thus should be considered for inclusion in the curriculum.
- MARQ: No response.
- MINN: See answer to previous question.
- **UNMC:** A balanced view of all indirect restorations and restorative materials.
- **SASK:** That is the million-dollar question. How much can we include in an already congested curriculum?
- SIU: No response.
- **UMKC:** The principles of indirect restorations, the casting process and soldering contact.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **COLO:** There are no requirements for cast gold inlays/onlays. Students are expected to treat the tooth properly and if an inlay or onlay is indicated then they should plan that service. It is incumbent on the faculty to be comfortable with these procedures and to encourage students and patients to plan the proper treatment. Cast gold inlay and onlay restorations are provided at Colorado but to a limited amount.
- **CRE:** Yes, 3 or 4 castings each clinical year.
- **IOWA:** Students in the 3rd year of the curriculum have the option of doing esthetic or cast gold inlays or onlays. They are required to perform a certain number of indirect restorations and these could be cast gold or esthetic materials.
- MARQ: Yes, we have expectations, they need to be competent.
- **MINN:** No, but students must complete 8 cast gold restorations (inlay, onlay, or full coverage crown). This is unfortunate because students may take a cast gold onlay practical without having any clinical experience with this restoration.
- **UNMC:** A required number of indirect restorations, including gold, but no separate requirement for partial-coverage gold castings.
- SASK: No.
- SIU: No.
- **UMKC**: No clinical requirements. We give a seminar to seniors who are taking the Western Boards.

Is there a relationship to the Licensure Boards? Explain.

- **COLO:** As always, the Licensure Boards should determine what it is that they need to know about the candidate to determine if they are competent to practice dentistry. If they believe that the candidate must demonstrate certain skills in the indirect method of tooth restorations, then that can be their choice.
- **CRE:** There is a relationship. Now that the WREB accepts all CRDTS states, we are dropping the casting from the Senior Mock Board examination.
- **IOWA:** Until recently cast inlays and onlays have been a requirement for dental boards and therefore required as a part of the teaching curricular time.
- **MARQ:** No relationship to Licensure. For Licensure, we have a special course for those students.

- MINN: No.
- **UNMC:** Some of our graduates must take WREB, on which a casting has been required, but we would not change the curriculum if this casting were dropped.
- **SASK:** No response.
- **SIU:** Yes they should be taught to prepare students for board exams.
- **UMKC:** Yes, if the Boards require them, we teach them.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

- **COLO:** Yes. We teach to major conceptual areas direct and indirect restorations. Students learn the treatment of teeth with direct materials. Amalgam and composite are taught concurrently.
- **CRE:** Yes. There are slot preparations and 2-surface preparations taught as well as prepped and restored in the sophomore Operative course.
- **IOWA:** Yes, students complete DO, MOD preparations/restorations and MO slot preparations/restoration in the D1 pre-clinical course.
- **MARQ:** We are teaching posterior composite restoration in the pre-clinical setting.
- MINN: Yes.
- UNMC: Yes.
- **SASK:** Yes. Students will place at least 5 Class II composites in both extracted teeth and dentoform teeth including 2 three-surface Class II.
- **SIU:** Yes sophomore year.
- **UMKC:** Yes. We have two 4 hour lab periods and 2 hours of lecture. In the pre-clinic lab we teach the students to prepare a MOD composite preparation and then turn it into a MOD composite inlay preparation and then into a MOD inlay gold preparation and finally into an onlay gold preparation.

Does your pre-clinical course include a practical examination for direct Class II Composite Resin restorations? Describe.

- **COLO:** Yes, however, we only grade the restoration. We have not yet determined how to grade the Class II composite preparation on dentoform teeth.
- CRE: No.
- **IOWA:** No, but they have to satisfy clinical parameters of care for the preparation and restoration to have the daily assignments pass.
- MARQ: There are no summative examinations.
- MINN: No.
- **UNMC:** Yes. Students prepare two maxillary pre-molars, restore the lesser of the two preparations and receive a grade on the unrestored preparation. A 'C' grade on the preparation must be attained in two attempts or less to receive credit for the course and therefore receive clinical privileges.
- **SASK:** Yes. One Class II composite prepared restoration is included in the preclinical competency test series of 14 amalgam and composite preparations.
- **SIU:** No criteria for preparation are too nonspecific.
- **UMKC:** Yes. Students prepare a 2-surface preparation and restore a maxillary first premolar.

Are students placing Class II direct Composite Resin Restorations in clinics?

- COLO: Yes.
- **CRE:** Yes. The Class II composite is being used more frequently, if enamel margins are present.
- **IOWA:** Students are routinely placing Class II direct composite resin restoration in the D2 and D3 Operative Department clinics.
- **MARQ:** Yes, they are placing posterior composite restorations clinically.
- MINN: Yes.
- UNMC: Yes.
- SASK: Yes.

- SIU: Yes, some.
- **UMKC:** Yes. They are encouraged to do preventive resin restorations and small Class II restorations when all the margins are on enamel. About 5 10% of our posterior restorations are composite resin.

Do you have a clinical requirement/expectation for Class II direct Composite Resin Restorations?

- **COLO:** We have no clinical requirements for any procedures. Students are taught to treat the patient appropriately with the appropriate material. Consequently, they place direct Class II composite restorations as determined to be appropriate. How many they place in individuals is based on patient needs.
- **CRE:** Yes, 2 or 3 Class II composites in both the Junior and Senior year.
- **IOWA:** Yes at both the D2 and D3 level. There are no Operative Dentistry requirements for the D4 year.
- **MARQ:** No, there are no clinical requirements.
- MINN: Yes 8.
- **UNMC:** There are requirements for Class II restorations in the third and fourth years, toward which resins count, but no separate requirement.
- **SASK:** No. We have overall numeric requirements for composite and amalgam restorations. Students are expected to place Class II amalgam and composite in the mix.
- SIU: No.
- **UMKC:** Yes. They have to do a Class II preparation and restore it on a manikin or a patient in the winter semester of their 3rd year.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct, and indirect?

COLO: At this school the lesion or defect is treated with minimal invasion. Once the lesion is removed, a determination is made as to the proper restorative material to use. Generally, the preparation would be made unnecessarily larger to accommodate a particular material then it is not used. Students are expected to provide the least amount of tooth preparation that will solve the problem. Composite resin becomes our "default" restorative material until the use of amalgam (and changes to the preparation design) can be justified.

A very simplified criteria system would be:

Small to moderate size lesions or defects are treated with composite. Moderate to large lesions or defects are treated with amalgam or composite.

We have not fully determined the criteria for when we would use an indirect composite restoration instead of a direct composite restoration.

CRE: Class I composites have few restrictions, since we recommend intracoronal placement.

Class II composites must have a gingival seat in enamel. The composite inlay is not done clinically, but it is touched on in the curriculum.

- **IOWA:** Desire Basic principle of cavity design:
 - Rounded internal form no sharp internal line angles.
 - Convenience form proper visualization for decay removal and material insertion.
 - Butt-joint proximal and occlusal margins (may be beveled for better shade blending on highly visible surfaces).
 - Primary retention sources: acid etched enamel.
 - Box Cavity design not necessary unless already present from previous restoration (amalgam replacements).
 - Mechanical undercuts usually not necessary.
 - Axial wall of Class II can be shallower (0.2mm into dentin, any shallower that this and we should not be intervening) as retention grooves will not be placed (axial wall shallower) as there is no concern about undermining enamel when placing buccal and lingual retention grooves in proximal box as in Class II amalgam preparation.
 - Dentin bonding.
 - Utilize all dentin possible.
 - □ Use of dentinal bonding systems favors having no liner/base (with possible exception of areas within 0.5mm of the pulp).
- MARQ: If they cannot be isolated, they should not be placed.
- **MINN:** See response below.
- **UNMC:** Rubber dam isolation is required for all of the above types of restoration. The general indication for direct composite resins is the initial restoration of a surface with minimal caries that is coronal to the CEJ. A secondary indication would be patient preference for tooth-colored restorations. In cases of larger Class II restorations, indirect composite resin restorations cemented with a resin-modified glass ionomer would be recommended to lessen polymerization stresses on margins and for improved restoration of proximal contour.
- **SASK:** Documentation below may be reproduced if you wish.

POSTERIOR COMPOSITES: CLASS I AND CLASS II RESTORATIONS GUIDELINES -- 2002

While amalgam and indirect materials like gold and porcelain inlays provide durable and proven long term clinically acceptable results, there is no doubt that posterior composites are an ever increasing part of a general practitioner caseload. Amalgam, regardless of its many excellent properties and clinical success is unlikely to rebound from concerns over its toxicity and the environmental concerns over mercury contamination from the dental office. Many young patients with little caries experience ask for tooth coloured restorations and often provide an opportunity to place small conservative and ideal composites. The older patient with old large multi surface amalgam restorations provide the biggest challenge because large amalgam preparations provide far from ideal composite preparations often with heavy occlusal loading. Each case is different and a thorough discussion of materials and techniques must take place with patients during the diagnostic work up, and we are obligated to be sensitive to the wishes of the patient <u>after</u> they have been thoroughly informed.

The removal of quadrants of asymptomatic clinically acceptable amalgam restorations is unethical and a disservice to the patient. In the event that you are requested by a patient to do this, <u>you have the right to</u> refuse to proceed. Far better, you educate the patient about the limitations of direct composites and the advantages of other materials including gold castings. Sometimes you can compromise and replace a defective restoration with composite resin so that the patient can become familiar with the technique and you can slowly replace restorations with care and attention to detail while the clinically acceptable amalgams stay in place. Most reasonable patients when educated <u>by you</u> will accept your recommendations particularly if it will save them the inconvenience of failed restorations in the future and a waste of their money.

INDICATIONS FOR DIRECT PLACEMENT RESIN IN CLASS I AND II SITUATIONS

- a. <u>Primary indication</u>: for small occlusal preparations involving 1/4 to 1/3 intercuspal distance, slot preparations for initial lesions and preventive resin restorations.
- b. <u>Secondary indication</u>: for larger restorations both Class I and II including cuspal coverage and larger areas of destruction. Adhesive composite can be used to strengthen weakened cusps in certain situations.
- c. <u>Infrequent indication</u>: Patients with known allergies to amalgam or persons desiring to avoid metals.
- <u>Note</u>: In cases of large composite restorations patient must be advised of the limitations of the technique and potential for premature failure. However, on the "upside" both you and your patients will probably be pleasantly surprised by the durability and success of well placed larger composites restorations. DO NOT FEAR CAREFULLY AND THOUGHTFULLY PLACING LARGE RESTORATIONS -- Avoid the temptation to do quick quadrant dentistry, IT WILL NOT SUCCEED.

Contra-indications

- a. Bruxers clenchers with heavy occlusal tooth contact on restoration.
- b. Extensive occlusal destruction requiring resin margins in direct contact with opposing occlusion.

TECHNIQUE GUIDELINES

<u>Class I</u>

Have an instructor approve your choice of procedure.

- a. use a slurry of fine pumice powder and water to clean plaque and stain from the tooth. Mark centric stops with copalite and occlusal indicator paper.
- b. Isolate with rubber dam after anesthesia.
- c. Extension for prevention, occlusal dovetails are not needed. Extend to the extent of the lesion or to remove previous unsatisfactory restoration and associated caries. Flat pulpal floors and parallel walls and not indicated.
- d. Bur selection: 169, 170 fissure burs are excellent for removing old restorations and opening fissures. Slot preparations and occlusal lesions can be easily created with small inverted pear burs 330 or 245, that allow rounded internal angles.
- e. Complete caries removal and remove any unsupported enamel with rotary and hand instruments.
- f. Using 3M Single Bond, etch, prime and bond dentin by the hybridization process ensuring that dentin is moist but not wet.
- g. Apply composite in increments if required until final contours achieved.
 - <u>Note:</u> occlusal index technique for restoring occlusal form -- see appended references.
- h. Remember each step should be thoroughly light cured for minimum 30 secs with a clean fibreoptic tip. Test your light periodically for maximum performance.
- i. As with preventive resins, you may elect to place fissure sealant or a lightly filled resin such as FORTIFY (Bisco) to seal your restoration after any adjustments and polishing -- etch for 15 secs, apply resin to adjusted composite and tease into any unsealed fissures, light cure for 20 secs.

<u>Class II</u>

Have an instructor approve your choice of procedure.

- a. Anesthetize.
- b. Clean tooth with slurry of fine pumice powder and water to remove plaque. Mark centric stops with copalite and occlusal indicator paper and apply rubber dam.
- c. <u>Pre-wedge</u> interproximally to provide initial separation.
- d. Where possible do slot preparations for initial lesions. Avoid placing cavo-surface margins at a centric-stop" location. Retain interproximal contacts between teeth in tooth structure where possible.
- e. Avoid destroying gingival enamel seat, enamel is best tissue to bond with adhesive systems. Dental caries tends to extend farther on the gingival wall in dentin than enamel. The total ablation of the caries towards the gingiva and the planing of the enamel to the same level can significantly reduce the thickness of enamel. Keep as much enamel as you can.
- f. use 330 or 245 burs to provide rounded internal walls to both box form and occlusal preparations. Flat floors and walls and extension for prevention are not indicated. Likewise it is not essential for proximal walls to break contact with adjacent teeth. *Preparation should only extend:
 - i. Extent of lesion
 - ii. Convenience form
 - *<u>Note</u>: When using sectional matrix bands such as the Composi-tight, or the micromachined matrix, conservative breaking of the contact is required. Good prewedging is very important.**
 - **Note: When interproximal contacts can be retained, enamel to enamel good wedging will allow regular Tofflemire or Ivory bands to be placed as the

contacts will be restored following matrix removal. This minimal intervention is optimal.

- g. Remove unsupported enamel with rotary and hand instruments after caries removal.
- h. Do not place any bevels on the cavo surface margins. A butt-joint is the strongest feature for both composite and amalgam preparation.
- i. <u>Matrix selection</u>

Where possible use metallic bands such as a thin precontoured soft or dead-soft stainless steel matrix:

- 1. <u>Ivory matrix</u>. Advantage:- allows restoration of one proximal box without having to place matrix material around the complete circumference of the tooth.
- 2. <u>Micromachined matrix</u>. These special matrix bands fit the Tofflemire retainer. They have a central very thin spot 0.0005" in thickness (by comparison HO bands are 0.001" and regular Tofflemire bands 0.002" in thickness.
- 3. Palodent or composi-tight sectional matrix systems.
- 4. Custom made compound supported matrix (Sturdevant, p. 464).
- 5. Tofflemire with pre-contoured matrix as with amalgam -- Essential with large Class II preparations; multisurface composites.
- 6. Mylar matrix materials: Premier and other companies offer mylar matrix for placement in Tofflemire retainers and for custom compound supported matrix applications.

Problem:- Much thicker than stainless steel (usually 0.002" or greater).

Gives poor contact unless well wedged.

Advantage:- You can light-cure buccal and lingual proximal walls immediately and more easily than with steel matrix.

Premier also manufactures plastic wedges with a light-guide to carry light interproximally during curing.

- j. Make sure wedges and contour of matrix are optimal before placing composite. burnish steel matrix to maximise contact.
- k. Hybridize dentin and prepare enamel by 3M Single Bond with etch, prime and adhesive steps.
- 1. <u>Composite placement</u>. A good contact in critical and is a major problem with posterior composites. The following tips will help:
 - i. Use a good matrix system such as the Composi-tight or micromachinal matrix.
 - ii. Good pre-wedging, matrix application, burnishing and contouring will ensure good contact most of the time. In large preparations with deep gingival seats, application of a flowable composite resin such as DYRACT flow (which is a compomer and releases fluoride) or Filtec flow -- will help to seal the gingival seat. Use the "Contact Pro-2" device to compress this layer of material and light cure through the device (refer to attached "Contact Pro-2" instruction sheet). You can also use the Belvedere contact forming device from American Eagle Company.
 - iii. Building increments of your hybrid composite i.e. Filtec Z250 to build up the box form. Increments against one proximal wall, then the opposing wall, then build up the centre. Thoroughly cure each stage for a minimum 30 secs.
 - iv. <u>Premade composite inserts</u>

You can make spheres or rods of cured composite and insert into the box form, cured and hard to provide a firm contact.

[Quartz inserts can also be used. Perfect system Beta quartz from Hager Worldwide distributors. These quartz inserts are difficult to handle and finish. However, they may be useful in certain circumstances. You should be aware of them and explore their use on an occasional basis.]

- v. Restore box form and occlusal segments in the usual manner, make sure marginal ridge is at correct height, rounded and ideal -- it is easier to do it right than to try and finish it, afterwards. Attention to detail here will save time later.
- m. <u>Composite finishing</u>. Shape and finish restoration with the "Raptor", pyramidal diamonds (you have the Brasseler equivalent diamonds), 12 bladed finishing burs and Soflex Discs. Do as much as you can with rubber dam in place. You can also try the Enhance finishing and polishing system (Dentsply). You might find that the sectional matrix bands are hard to remove. A haemostat is a useful instrument for this purpose.
- n. <u>Surface sealing</u>. When the restoration is completed and the occlusion adjusted and final finishing done it is marked by the instructor. Then isolate with a cotton roll etch the occlusal surface and the cavosurface margin with 37% phosphoric acid for 10 15 secs. Wash dry and then apply "Fortify" -- surface sealant in a thin layer with a brush. Light cure for 20 secs.

D.W. Tyler. September, 2002

- SIU: All margins in enamel, conservative isthmus width, occlusal contacts on tooth structure, good isolation.
- **UMKC:** Size should be small, not deep, margins in enamel, use rubber dam for moisture control. Keep margins off of occlusion.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- **COLO:** Primarily size and esthetics. As above, the "default" restorative material is composite resin.
- **CRE:** Caries risk assessment. Oral history of patient. For simple Class I pits, the PRR is favored.

IOWA: <u>Indications:</u>

- Class II Cavities that can be isolated with centric holding contact(s) on tooth structure.
- Small initial carious lesion
- Small existing restoration requiring replacement
- Margins on enamel (including gingival seat)
- Restoration of a weakened tooth that can be strengthened by a bonded restoration (duration?)

Contraindications:

- Operating site cannot be appropriately isolated
- All occlusal contacts will be on composite material
- Heavy occlusal stresses or bruxism
- Deep subgingival extension areas that are difficult to prepare or restore (preparation, insertion and bonding may be compromised)

MARQ: Factors that come into consideration in placement are:

- 1. Size
- 2. Contact
- 3. Isolation
- 4. Occlusion
- **MINN:** Direct composite resin is the first choice for the newly-cavitated Class I or II cavity. Inability to achieve isolation is the only universally accepted contraindication by our faculty. Patient considerations are economics and esthetics. Risk for failure increases with increased occlusal forces (first molar vs. first premolar and bruxism) and absence of enamel on the gingival seat. Skill level of the operator also can be a factor in restorative material selection.
- **UNMC:** See previous answer.
- SASK: See previous answer.
- **SIU:** See previous answer.
- **UMKC:** Occlusion should be favorable, depth of gingival margin is not too deep, able to get on a rubber dam and esthetics is of a high priority.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

- **COLO:** There are three goals to proper tooth preparation:
 - 1) Completely remove the lesion or defect.
 - 2) Establish sound preparation margins.
 - 3) Establish proper retention and resistance form consistent with the restorative material selected.

When these goals are accomplished, then the preparation is correct. For composite, the preparation outline is dictated by the lesion. Extension is made until sound tooth structure is achieved. Unsupported enamel may or may not be removed. Accessible enamel margins will be beveled only if a butt-joint exists. Nonenamel surfaces are not beveled. Long bevels and champhers are sometimes done for esthetic reasons.

- **CRE:** Class I lesion specific, and if not a PRR, may resemble a modified SA preparation. Class II may only be a slot preparation with an occlusal PFS. No bevel is placed in either preparation, instead, the cavosurface is finished to leave no ragged, jagged enamel margins.
- **IOWA:** Bevels are not placed on buccal and lingual wall of proximal box. Gingival bevel placement is with hand instrumentation. An optional bevel may be placed on occlusal portion of outline form depending upon the cuspal angulations.
- MARQ: Preparation characteristics are as follows:
 - 1. Conservatism
 - 2. Solid margins
 - 3. No bevels
- **MINN:** Preparation design for all classes of direct composite resin is the same. The design is lesion-specific with minimal access which will allow cavity inspection, decay removal, and restorative material insertion. Bevels are only placed on accessible enamel margins of Class III, IV and V. Friable enamel which is judged to be subject to fracture during composite resin polymerization is also removed.
- **UNMC:** <u>Direct:</u> Preparation limited to removal of caries and enamel and dentin affected to the degree that attaining adhesion is of concern. Except for occlusal surfaces, enamel cavosurface angles are altered if necessary to greater than 90 degrees. Dentin margins generally prepared or maintained at approximately 90 degrees.

<u>Indirect:</u> Preparation must be large enough for impression-making and fabrication of restoration. Minimum divergence/convergence of 20 degrees, 90 degree cavosurface angles. Resin-modified glass ionomer luting cement used when preparation presents resistance form, otherwise a composite resin luting cement.

- **SASK:** See answer to previous question.
- SIU: Defect specific preparation, bevels placed when needed and possible.

Ch. 2 Pg. 15

UMKC: Indirect restoration has 90 degree margins, if no occlusion on margin, okay to bevel enamel especially if preparation on occlusal surface is wide. Bevel all other non-occluding enamel margins to remove high fluoride content enamel for better bonding. Use butt-joint for non-enameled surface locations.

Describe all the instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **COLO:** We only utilize conventional rotary and hand instrumentation for all preparations.
- **CRE:** A 330 bur is recommended. Air abrasion less commonly for shallow caries (decalcification). Diamonds, discs, rubber wheels for finishing and contouring.
- **IOWA:** Use of carbide #330 bur as a depth gauge and for rounded internal line angles.¹/₄ round burs are used for enameloplasty or stain plug removal from suspect fissures prior to sealant or preventive resin restoration on occlusal surface. Although air abrasion and a hard tissue laser are available, they are not typically used in undergraduate clinic.
- **MARQ**: Preparation is done with carbide or diamond burs.
- **MINN:** Instrumentation is accomplished using burs.
- **UNMC:** Burs, diamonds.
- **SASK:** See answer to previous question.
- **SIU:** Carbide and diamond burs.
- **UMKC:** Use a 245 bur for preparation to keep rounded internal line angles. Use diamond chamfer bur for bevels. Use 56 for flattening gingival walls.

What means are utilized to establish contour and contacts on the Class II Restorations? (circumferential, sectional matrixes, rings, wedge-wood, plastic, other).

COLO: The sectional matrix is our "default" matrix. We use the Composi-Tight system with wooden wedges. We find this system provides very nice contours and contacts. Universal (Tofflemire) matrices are not used because the mechanics of the system operates counter to the contour and contact goals.

- **CRE:** Class II restorations employ the Palodent ring system, and less frequently, a HO band in a Tofflemier retainer.
- **IOWA:** Palodent or Garrison Dental Solutions sectional matrices with GDS's "G-rings" are typically recommended with wooden wedges to seal the gingival. HO bands are also available as circumferential matrices.
- **MARQ:** Establishment of contour and contact. Utilization of circumferential and sectional matrices with wedging.
- **MINN**: Class II proximal contacts are achieved with a sectional matrix with a ring and wedge or a Tofflemire matrix with pre-wedging and pre-contoured HO band.
- **UNMC**: In addition to standard wooden wedges and Tofflemire matrices, we have a sectional matrix/separating ring system available and flexible plastic wedges.
- **SASK:** See answer to previous question.
- **SIU:** HO bands and sectional matrix.
- **UMKC:** Composite sectional matrix, Palodent matrix, thin mylar strips and wedges. Use wooden wedges.

What materials or combination of materials are utilized in the restoration. Identify all materials used. (filled sealant, flowable composite, composite-hybrid, microfill, glass ionomer - traditional, resin modified, other).

- **COLO**: We use all of the composite restorative materials except the "Compomers".
- **CRE:** A liner is not routinely used. When deep, Fuji II LC is placed on the pulpal or axial wall. Single bond and Z250 is the recommended material for restoration when the preparation extends into the dentin. If there was only decalcification in the grooves, a flowable composite is used to restore.
- **IOWA:** All of the above materials are utilized.
- MARQ: Material: flowable and composite hybrid resins.
- **MINN:** Hybrid composite resin and Single Bond.
- **UNMC:** Fourth -generation adhesive (Scotchbond Multipurpose), hybrid composite resin (Z250) and occasional use of RMGI lining material (Vitrabond) and a filled sealant.
- **SASK:** See answer to previous question.

- **SIU:** Hybrid and flowable composites along with resin-modified glass ionomer.
- **UMKC:** Will use resin-modified glass ionomers for deep dentin (Vitrebond), use dentin bonding agent (Prime and Bond NT) and hybrid composite (TPH). Do not use flowable or glass ionomers. Use Dyract on root surfaces.

Describe the indications for the utilization of which material or material combinations.

COLO: Filled sealants on pits and fissures when they are at risk but cavitation is not likely. Flowable composites in PRR type preparations, Usually an "exploratory" operative in which the pits and fissures are opened slightly to determine caries and, when sound, are filled with this material. Some Class V restorations.
Universal composite for all anterior and many posterior restorations.
Packable, shapeable composite is used in most posterior non-cervical

Packable, shapeable composite is used in most posterior non-cervical restorations. Multilayered composite for cosmetic use only. Indirect lab resins for large preparations involving most of the occlusal surface and cusps.

- **CRE:** We don't recommend a flowable composite on the gingival seat. The entire preparation is restored with Z250.
- **IOWA:** Filled sealants are used for bonded sealants on the occlusal portion of the restoration. Flowable composites with high radiopacity are used for bonded sealant or preventive resin restorations or direct access approximal preparations. Flowables are also used as the initial increment for some direct restorations or as block-out material with indirect preparations. RMGI's are used as bases (Vitrebond) or for open-sandwich technique (Fuji II LC) where the gingival seat is on dentin/cementum. Traditional glass ionomer (Fuji IX) is used for phased caries removal and as an interim restoration for high caries risk/activity patients.
- **MARQ:** Flowable for the gingival and pulpal walls; hybrid for the final restoration.
- **MINN:** We only place direct composite and use Z250 with Single Bond.
- **UNMC:** Sealant only for unprepared or minimally-prepared occlusal surfaces. RMGI only for very deep preparations.
- **SASK:** See answer to previous question.
- **SIU:** Hybrid or flowable depending on the depth of the preparation. Resin-modified glass ionomer sometimes as a base.
- **UMKC:** Use same manufactures if possible.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **COLO:** We have no clinical requirements. See answer to similar earlier question.
- **CRE:** Yes, 2 or 3 Class II composites in both the Junior and Senior year.
- IOWA: 1 Class II composite for 2nd year.
 2 Class II composites for 3rd year.
 There are no Operative requirements for the 4th year.
- **MARQ:** Clinical expectations: 3rd and 4th year students, with no requirement.
- **MINN:** Yes 8 during two years of clinical experience.
- **UNMC:** There are requirements for Class II restorations in the 3rd and 4th years, toward which resins count, but no separate requirement.
- **SASK:** Not specifically for Class II resins. Students in 3rd year 12 composites; Students in 4th year 20 composites are minimum requirements.
- SIU: No.
- **UMKC:** They have to do 1 composite resin posterior direct on a manikin or a patient in the winter semester of the 3rd year. They have to pass a written proficiency exam covering the principles of Operative and Biomaterials.

Do you have a Clinical "Competency" examination for direct Class II Composite Resin Restorations? Describe.

- **COLO**: Students may select a Class composite as one or more of their 7 clinical competency examinations. However, they are not required to perform one. Of the 7 examinations, they must perform 2 Class III composite and 2 Class II amalgam restorations. The remaining 3 are selected from a list of procedures.
- CRE: No.
- **IOWA:** Yes, it utilizes the same criteria that are used on the daily assignment sheet.
- MARQ: No.
- **MINN:** Yes. For the purposes of the competency exam, the following criteria must be met: all cavosurface margins in enamel, absolute isolation feasible, preparation includes a proximal contact. The preparation and restoration are

evaluated by 3 examiners and 2 must agree that the preparation and restoration are both passing for the student to pass the exam.

- UNMC: No.
- **SASK:** Not at this time. We are moving toward a blend of numerical requirements and "clinical competency" tests.
- SIU: No.
- **UMKC:** Yes. They do it 3rd year, winter semester on a manikin or a patient.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restorations in your pre-clinical curriculum?

- COLO: Yes.
- **CRE:** We touch on both the composite and porcelain inlay. We have had the CEREC company demonstrate the CEREC 3 to the senior class.
- **IOWA:** Yes, this will be introduced didactically in Freshman Operative Course this year, then students will have lectures, demonstrations and hands-on preparation, design and cementation of a CEREC onlay in Sophomore Esthetic course.
- **MARQ:** We do not teach resin restorations, only gold and porcelain restorations. Preclinically we teach the porcelain preparations. Summatively, the student prepares an onlay. Porcelain restorations are done by 3rd and 4th year students.
- MINN: Yes, cast porcelain.
- UNMC: Yes.
- **SASK:** Briefly, in lecture format/case presentation.
- SIU: No 3rd year .
- **UMKC:** Taught in second year in one 4-hour lab period.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restorations. Describe examination.

COLO: No.

- CRE: No.
- **IOWA:** The practical evaluation on the required exercise will be done in the Sophomore Esthetic course but not a formal examination.
- MARQ: No.
- MINN: No.
- UNMC: No.
- SASK: No.
- SIU: No.
- UMKC: No.

Are students placing Class II indirect Composite Resin and/or Porcelain restorations in clinics?

- **COLO:** Yes, but on a <u>very</u> limited basis.
- CRE: No.
- **IOWA:** Students are doing these on a very limited basis in Junior and Senior year.
- **MARQ:** Porcelain restorations are done by our 3rd and 4th year students.
- MINN: Yes, cast porcelain.
- **UNMC:** Very infrequently, mostly due to the demography of our patients.
- SASK: Rarely.
- SIU: A few.
- **UMKC:** No indirect composite resin but a few porcelain restorations in Esthetic Dentistry Course.

Do you have clinical requirements/expectations for indirect Class II Composite Resin and/or Porcelain Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

COLO: No.

- CRE: No.
- **IOWA:** There is no clinical requirement, only a manikin exercise including preparation, fabrication and cementation of a resin onlay, Junior year.
- MARQ: No.
- MINN: No.
- **UNMC:** A required number of indirect restorations in the 3rd and 4th year, but no separate requirement for tooth-colored restorations.
- **SASK:** No, except when clinically indicated and desirable.
- SIU: No.
- UMKC: No.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

- COLO: No.
- CRE: No.
- IOWA: No.
- MARQ: No.
- MINN: No.
- UNMC: No.
- SASK: No.
- SIU: No.
- UMKC: No.

Describe your most commonly used adhesive techniques for direct and indirect Restorative Dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc), thinning techniques, if any (air vs. brush), curing protocols, etc. **COLO:** We have three systems but will be adding more very soon. We have Optibond Fl for most adhesive dentistry; Optibond Solo Plus for lining amalgam preparations; AmalgamBond for bonding large amalgam foundation restorations; and Nexus for cementation. We follow the manufacturers' directions for all products.

CRE: • Rubber dam, rubber dam, rubber dam.

- Etching dentin 10-15 seconds maximum with Ultradent single use 37% phosphoric acid. Rinse 10-15 seconds, Blot dry and leave moist.
- Single Bond (3M) is applied in 2 coats, thinned with the air syringe and polymerized for 10 seconds. Z250 (3M) is placed in increments and each increment is polymerized for 30-40 seconds.

IOWA: • Single Bond (3M) is a total etch, two-step primer/adhesive.

- Optibond (Kerr) is a total etch, three-step adhesive.
- Both adhesives are used for amalgam and direct composite restorations, Optibond is used for indirect restorations.
- After cavity preparation, these bonding systems are used in the following manner: **Single Bond Instructions:**

Apply H_3PO_4 to enamel then dentin for 15 seconds, rinse throughly. Remove moisture from rubber dam with high-speed suction, then from cavity preparation with a damp cotton pellet. Single Bond prefers moist dentin-enamel.

Dispense one drop of Single Bond primer/adhesive. Keeping the brush tip fully saturated, apply 5-6 coats to the entire preparation.

Use the high-speed suction to remove excess adhesive from the preparation. Gently air-dry the cavity preparation to completely evaporate the solvent (aggressive air drying may remove the adhesive). This should result in a shiny surface.

Light-cure for 10 seconds.

Incrementally place resin composite, amalgam or proceed with seating the indirect restoration.

Optibond Instructions:

Apply H_3PO_4 to enamel then dentin for 15 seconds, rinse throughly. Remove moisture from rubber dam with high-speed suction, then from cavity preparation with a damp cotton pellet.

Apply Prime (#1) for 30 seconds with continuous scrubbing motion. Replenish as needed. Air-dry primer, gently initially and finish with moderate air pressure to remove all solvents, but leaving shiny, evenly primed surfaces.

Apply Adhesive (#2) in a thin, even layer. Do not use air syringe to disperse adhesive; use an applicator brush or pledget.

Light-cure for 30 seconds.

Condense amalgam into preparation.

MARQ: Technique - Standard technique, etch casting with hydroflouric acid (5 minutes), silane (1 minute); adhesive. Tooth - etch (15 seconds), primer (15 seconds), adhesive (10 seconds).

Cement - dual cure composite resin.

Material - Variolink
MINN: Direct and indirect restorations both follow the following five steps:

- 1. Etch enamel and dentin with 35% phosphoric acid gel, 15 seconds.
- 2. Rinse with air-water syringe at least 15 seconds.
- 3. Absorb excess water with a damp cotton pellet.
- 4. Apply Single Bond in 2 consecutive coats without drying between coats and evaporate gently with air.
- 5. Light-cure for 10 seconds.

Porcelain restorations (assuming restoration has been etched by the lab):

- A. Apply silane to internal surfaces of porcelain and dry for 5 seconds.
- B. Apply a single coat of Single Bond to internal surfaces of porcelain and air-dry but don't light-cure.
- C. Mix Rely X ARC and apply in thin layer to preparation.
- D. Insert restoration and remove excess material from margins.
- E. Light-cure each surface for 40 seconds.
- F. Remove rubber dam, check and adjust occlusion.
- **UNMC:** Fourth-generation adhesive (Scotchbond Multipurpose) for direct resins. Fifthgeneration adhesive (Optibond Solo) mixed for dual-curing for indirect restorations, both manipulated according to manufacturers instructions. (This results from having 3M resins but a Kerr luting cement, as we are against combining different manufacturers' products). Fast halogen curing light preferred for indirect restorations. We have avoided the 3M fifth-generation adhesive Single Bond for direct restorations due to poor results in a clinical adhesion study conducted by our faculty,

(Brackett, MG., Dib, A., Brackett, WW., Estrada, BE., and Reyes, AA. : One-year clinical performance of a resin-modified glass ionomer and a resin composite restoration material in unprepared class V restorations. Oper Dent 27:112-116, March/April 2002)

but as favorable evidence now appears to be mounting, anticipate shortly changing to a self-etching adhesive (Prompt L-Pop) for direct restorations.

- SASK: No response.
- SIU: Solo-+ for direct composites Nexus for indirect composites
- UMKC: Direct use Prime and Bond NT with TPH. Single bottle adhesive acetone based. Etch with 35% phosphoric acid for no more than 15 seconds on dentin and 30 seconds on enamel, rinse 5 seconds. Adhesive is applied according to manufacturers' directions. Brush- thin and cure for 20 seconds for bonding agent and 40 seconds for each increment of composite resin. Do incremental layering technique in preparation with first increment ~1.0mm or less followed by as many increments as practical to reduce polymerization shrinkage. Place increments in a favorable c-factor technique. If very deep, use Vitrebond as liner.

II. <u>Regional CODE Agenda</u>

(Please report on responses from all participants)

The Region II attendees only discussed issues related to the schools' relationship with Central Regional Dental Testing Services, Inc. (CRDTS).

Main areas of discussion were expectations of the test and inconsistencies in examination requirements and contemporary dental education. Information was provided by and to local CRDTS faculty representative.

IV. <u>National CODE Meeting</u>

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

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

A contact roster that is much more current than the printed directory.

Other suggestions?

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

- 1. How much lab work are students expected to perform now?
- 2. Is the lab work done by internal or external technicians?
- 3. What is the current status for pit and fissure sealants palced over dental decay?
- 4. How much of the fissure of an occlusal surface do we cut?
- 5. What are the various caries control programs in the schools?
- 6. Are there effective risk assessment programs?
- 7. Has there been any impact by the community out-reach programs on your educational goals?

CODE Region ____ II ____ Attendees Form

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
William Johnson	University of Nebraska	(402) 472-9406	(402) 472-5290	wwjohnson@unmc.edu
Hugh Murdoch	Marquette University	(414) 288-3682		hugh.murdoch@marquett e.edu
John Purk	University of Missouri - KC	(816) 235-2168	(816) 235-2157	purkj@umkc.edu
Gerald Denehy	University of Iowa	(319) 335-7209	(319) 335-7267	gerald- denehy@uiowa.edu

Deb Cobb	University of Iowa	(319) 335-7214	(319) 335-7267	deborah- cobb@uiowa.edu
Craig Phair	University of Minnesota	(612) 625-7945		phair001@umn.edu
Kyle Hagen	Southern Illinois University	(618) 474-7052	(618) 474-7150	khagen@siu.edu
Marl Belcher	Southern Illinois University	(618) 474-7063	(618) 474-7150	mbelch@siu.edu
Larry Haisch	University of Nebraska	(402) 472-1290	(402) 472-5290	lhaisch@unmc.edu
R. Scott Shaddy	Creighton	(402) 280-5226	(402) 338-2522	shaddyr@creighton.edu
Nicole Kimmes	Creighton	(402) 280-2865	(402) 445-4972	trentandnici@netzero.net
Royce Hatch	University of Colorado	(303) 315-6376	(303) 315-0346	royce.hatch@uchsc.edu
Bill Brackett	University of Nebraska	(402) 47209846	(402) 472-5290	wbracket@unmc.edu
Henry St. Germain	University of Nebraska	(402) 472-1278	(402) 472-5290	hstgerma@unmc.edu

REGION: III - South Midwest

LOCATION AND DATE OF MEETING:

University of Mississippi Medical Center School of Dentistry

2500 North State Street

Jackson, MS 39216-4505

CHAIRPERSON:

Name: Dr. James G. Fitchie	Phone #: (601) 984-6030		
Address: UMC- School of Dentistry	Fax #: (601) 984-6039		
2500 North State Street	E-mail: jfitchie@sod.umsmed.edu		
Jackson, MS 39216-4505			

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. Marvin Hirsch	Phone #: (214) 828-8281	
Address: Baylor T.A.M.U.S.	Fax #: (214) 874-4544	
Dept of Restorative Sciences, P O Box 660677	E-mail: mhirsch@tambcd.edu	
Dallas, TX 75266-0677	Date: October 30 - 31, 2003	

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: <u>30 Days post-meeting</u> 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.

2002 NATIONAL CODE AGENDA

REGION III SUMMARY RESPONSES TO NATIONAL AGENDA

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

The consensus of most schools is that the cast gold onlay has a better chance of surviving in the curriculum than the onlay. Most schools feel that the gold onlay remains an excellent restoration with very few contraindications with one exception, the esthetic concerns of the patient. The place in the curriculum varies with some schools teaching them in Fixed Prosthodontics along with gold crowns and some schools teaching them in the Operative sections. Most schools envision an increase in posterior indirect resin or porcelain restorations as they become more popular than the gold onlay; however the track record of cast gold onlays is irrefutable because of all the advantages of gold. Most schools feel that the cast gold onlay definitely has a place in the curriculum, however, the exact area where is should be taught is up to the individual school.

What should be taught?

The consensus of most school is that the indications, contraindications, preparations, design and laboratory techniques from start to finish should be taught. Some level of didactic material must be included for the student to understand the similarities and differences between indirect gold versus indirect porcelain or resin. Some schools overlap the laboratory technique with other Fixed Prosthodontic procedures.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

The requirements for these cast restorations vary greatly among the schools. Most schools have requirements for 3 or 4 inlays or onlays to graduate; however, some schools allow indirect porcelain or indirect composite resin to substitute for some of these gold castings. One school did not have a clinical requirement, however, it was required as a typodont exercise in preparation for regional board.

Is there a relationship to the Licensure Boards? Explain.

The responses varied among the schools. The SRTA board definitely influenced the schools in that region. The WREB had given the candidates the option of substituting an extra direct Class II composite for the casting.

The schools in the WREB region probably will reduce their requirements for gold inlays if the WREB continues to de-emphasize the gold inlay. Schools that are not in a regional board are sensitive to the states in close proximity that require a casting on their board examinations.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

All schools are teaching direct Class II Composite resins in the pre-clinical curriculum.

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

Some schools in the region have practical exams included in their pre-clinical courses for direct Class II resin restorations. Some schools have not yet included a practical for their courses. The future trend will be for all schools to have some sort of practical exam in the preclinical curriculum for Class II composite resin. The type of practical examination consists usually of a typodont exercise including the preparation and restoration of a Class II posterior composite resin.

Are students placing Class II direct Composite Resin Restorations in clinics?

All schools in the region are placing Class II direct composite restorations in their clinics. A few schools are placing them on a limited basis, however, the trend seems to be that their placement is going to be expanded in the future as the technique gets perfected.

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

The requirements/expectations for these procedures vary greatly among the schools. Some schools require a specific minimum number of these procedures whereas a few schools do not have a specific number required. Schools that do not require them at the present anticipate that they will require them in the future.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

The responses to this questions varied greatly among the schools with many feeling that the next questions would probably encompass the response to this questions as well.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

The following is a summary of responses from the various schools on the considerations or factors that come into play when recommending posterior composite resins.

- 1. Medical and dental history of patient (oral hygiene, caries activity)
- 2. Ability to isolate tooth (rubber dam)
- 3. Esthetic concerns of the patient
- 4. Amount of enamel present to place margins especially the gingival margin
- 5. Lack of para-functional habits (lack of excessive grinding, clenching or bruxing)
- 6. Primary occlusal contacts not on restoration
- 7. Small to moderate size restorations less than $\frac{1}{3}$ intercuspal width

8. Minimal extension onto root structure (lack of enamel for bonding)

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

Direct:

With the varied responses from all the schools in this region, there can be no consensus as to direct composite resin preparations. Every school has a slightly different set of preparation criteria.

Indirect:

For Class II indirect composite onlays or indirect porcelain onlays the following is a summary of preparation designs:

- 2mm minimum occlusal clearance
- Shoulder or heavy chamfer margins, 90[°]
- Isthmus width a minimum of 2mm
- More divergence of walls compared to gold onlay preparations
- Rounded internal line angles
- Axial reductions of 1.5 to 2.0mm width

Not all schools in the region are teaching indirect composite onlays in the Operative area.

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

The instrumentation utilized for these preparations varied widely among the schools. Most all school utilized carbide and diamond burs in various shapes and sizes. No schools were using lasers. Only one school was using air abrasion for preparation. Finishing instrumentation included carbide 12 and 30 fluted finishing burs, Soflex discs, Enhance system and the Astropol system.

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

A summary of the means to establish contour and contacts in a Class II composite include the following:

- 1. Circumferential bands
 - Omnimatrix .001" ultra-thin metal band
 - Tofflemire with dead soft or ultra-thin metal band
 - Automatrix with dead soft metal matrix
- 2. Sectional matrices
 - Palodent system with Bitine Ring
 - Composi-Tight matrix system

All of the above were generally used with pre-wedging with various sizes of contoured wood wedges.

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

Due to the wide variety of materials used there is no way to summarize everything that can be utilized to restore teeth with composite resin. See individual school responses for specific materials used.

Describe the indications for the utilization of which material or material combinations.

All schools used similar materials for each specific clinical indication. The specific manufacturers varied greatly among the different schools. See individual school responses for various company names.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

Most schools that have a requirement-based or expectation-based curriculum have requirements for a certain number of direct Class II composite resins. These procedures are usually required by the end of the 3rd or 4th years. Not all schools, at the present time, have definite requirements for posterior Class II composites, however, this will probably change in the future for some of these schools. The requirements or expectations vary greatly among the schools.

Do you have a Clinical "Competency" examination for direct Class II Composite Resin Restorations? Describe.

Some schools in the region have clinical competency examinations for Class II direct resin restorations. A few schools that do not have a competency examination at the present time anticipate planning one in the future.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

Three schools are not teaching indirect composite or porcelain restorations in the pre-clinical curriculum. Four schools are either teaching indirect porcelain restorations or indirect composite restorations pre-clinically. Two schools are teaching the CEREC system for porcelain indirect restorations pre-clinically.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

Only two schools in the region had practical exams pre-clinically for indirect porcelain or indirect composite restorations.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

Most schools have students placing indirect composite resin or porcelain restorations in their clinics. The total number of these restorations placed may be somewhat limited because of the need for close faculty supervision to successfully complete these procedures.

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

Most of the schools do not have specific individual requirements for indirect Class II composite resin and/or porcelain restorations. Some of the schools allow these restorations to substitute for other restorations to achieve a total number of indirect procedures. Usually if required, these restorations are done in the 3rd or 4th years.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

Only one school in the region had a clinical competency exam for either indirect porcelain/composite resin restorations. This clinical practical examination could be an indirect composite resin restoration or an indirect gold casting.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

All schools used a variety of bonding systems for direct and indirect situations. All schools used single or multiple bottle systems or had both available for the students. No schools were using a self-etching system. All schools used these systems according to the manufacturer's directions.

2002 NATIONAL CODE AGENDA REGION 3 RESPONSES

(Please cite the evidence were applicable)

I. <u>Cast Gold Inlays and Onlays</u>

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **Tenn:** Gold inlays and onlays are excellent restorations that are losing ground to more "esthetic" restorations. A number of years ago, they were moved from the Operative curriculum to the Fixed Prosthodontics lecture and lab. Along with that change, the requirements for these restorations were virtually eliminated. It is the opinion of the Operative department that these are still excellent and viable restorations and should remain in the curriculum.
- **OK:** Cast gold inlays and onlays are taught by our Fixed Prosthodontics department. They indicated that they feel that the cast gold <u>inlay</u> does not need to be in our curriculum. The cast gold <u>onlay</u> should remain in our curriculum because it is a conservative and excellent restoration for teeth in need of cuspal coverage.
- UT-H: These restorations will play a diminished role in the Operative Dentistry curriculum following Licensure Board requirements and private practice patterns (in terms of the types of procedures performed).
 As with basic amalgam preparations and restorations, gold procedures assist in the development of hand skills and structural understanding (critical thinking) of tooth preparations and restoration. The model and laboratory work associated with gold preparations and the fabrication and placement of these restorations teaches good foundational concepts and techniques. It brings the student to a level of skill that will enable them to progress along with the evolution of dental materials and procedures.
- **UT-SA:** The future of gold inlays and onlays can be compared to the historic decrease in the use of direct gold restorations. The reasons for the decrease in the teaching and placement of all types of gold restorations have less to do with clinical application and success than for the esthetic demands of the patient. Large cuspal coverage gold onlays are still considered one of the longest lasting and durable restorations that dentistry has to offer, but patients increasingly prefer an esthetic bonded onlay or esthetic full coverage crown.

For smaller restorations, the gold inlay is generally more expensive and takes multiple appointments as compared to the direct placement of resin composite or amalgam, Even if the patient does not object to the higher cost and multiple appointments for a conservative indirect intracoronal restoration, a bonded esthetic restoration (porcelain or composite) seems to be preferred by most patients.

Baylor: Gold inlays and onlays will continue to be the restoration of choice for many patients and therefore will have a place in Operative Dentistry in the future. Today with the

emphasis on esthetics, many patients opt for resin or porcelain restoration rather than conservative gold restorations. There are many times, however, when a conservative gold inlay or onlay can be esthetic as well. In addition, gold restorations have proven to be durable, biocompatible and inert over time. They are also easier to fit and adjust in the mouth than many other esthetic restorations.

Ref: CT Smith, "Gold as a Historic Standard and It's Role for the Future," Operative Dentistry, Aug 2001 supplement

Cast gold inlays and onlays most definitely should continue to be taught in the dental curriculum. Not only are these restorations the treatment of choice in properly selected cases, but also in the hands of a dental student, treatment results are more predictable. Additionally, a student learning to prepare conservative inlay and onlay preparations acquires necessary hand skills and having mastered these preparations should be able to complete porcelain inlay/onlay preparations with little problem. Our students also learn to wax and cast restorations and are required to fabricate cast restorations for their patients. This exercise teaches them to pay attention to detail when preparing and impressing margins since the end product or restoration can only be as good as the preparation and impression themselves. These exercises help students develop skills needed to perform more technique sensitive procedures such as fitting, adjusting and cementing porcelain veneers, inlays and onlays.

- **LSU:** There should be a future for cast gold restorations in Operative Dentistry. Indirect esthetic restorations are dependent on isolation of the tooth, as they rely on bonding. Whether or not a rubber dam is used, moisture needs to be controlled and often it can't, so another technique is needed. Where the curriculum is taught is another question. If a technique is infrequently utilized, it should not take a prominent role in the curriculum. A separate course as a senior elective, where the desire of the student and the ability of the student, can meet the sensitivity of the technique would be more appropriate.
- **MISS:** Gold onlays are taught in the Operative section. The future of cast metal onlays is better than for inlays whether taught in Operative or Fixed Prosthodontics. Occasionally, the onlays treatment planned turn into a full gold crown or full crown with boxes. Many patients select a PFM crown due to esthetic concerns, however, in some cases in the mandibular first molar or any second molar region, an onlay is barely visible when smiling. We feel onlays should definitely be in the curriculum but it seems to be the area often cut for time. Our onlay course in the second year, spring quarter, is a logical progression that builds on the basic psychomotor skills the students learn in their Caries I and II courses. Cast gold restorations, properly placed, remain the only tooth replacement that wears in a similar manner to enamel and does not wear opposing enamel aggressively.

Dr. Christensen states that for longevity reasons the cast gold restoration may be preferable over the PFM when esthetics is not a major concern. He also states that the esthetic dentistry pendulum may have swung too far and if patients were well educated on the advantages of cast gold, they may select gold more often. *(JADA, 132: 809-811, June 2001).*

UT-SA: Cast gold onlays, because they do provide such a good, conservative restoration, should be a part of the curriculum. They could be taught on an elective basis in either the third or fourth year of the dental student's clinical education, in order for

the student to add these procedures to their treatment options for patients who might request them or have specific indications for them. These restorations should be included at some level in didactic material, lecture and/or required reading in order for the student to understand the clinical indications for cast gold restorations and their similarities and differences in relation to indirect porcelain or composite bonded restorations.

What should be taught?

- **Tenn:** Indications, preparation and restoration techniques. The lab aspects could be included in the Fixed Prosthodontics in terms of waxing, investing casting, etc. Some exposure to lab techniques from start to finish should be included somewhere in the curriculum irrespective of the department that takes on the responsibility for teaching this material.
- **OK:** Cast gold onlays
- **UT-H:** Amalgam and gold procedures and techniques (inlay and onlay) should be taught along with an increased emphasis on direct posterior composite restorations (preclinical and clinical).
- **UT-SA:** With the increasing demand by patients and the practicing dentist for esthetic restorations, tooth colored inlays and onlays fabricated in resin composite and ceramic materials must be given a greater emphasis in dental educations. Graduating dentists are, in many cases, joining practices where the placement of these restorations is expected by patients and other dentists in the practice. It is the dental school's responsibility to provide an evidence-based curriculum that prepares the student to plan treatment and place these restorations, as opposed to being trained by a partner or peer, or worse, a manufacturer's representative.
- Baylor: Students should be taught that when esthetics will not be compromised, conservative gold restorations with their durability are the restorations of choice as long as the patient is not insistent upon porcelain. Students should also be taught to explain the pros and cons of gold vs. porcelain to patients. Often, an educated patient will opt for gold when initially they requested porcelain. The rule of thumb that a tooth preparation requiring an isthmus width of, or greater than, 1/3 the occlusal table width should be restored with a gold onlay rather than a gold inlay still holds true. When restoring a tooth with an indirect esthetic restoration, remaining tooth structure weakened by caries, trauma and/or preparation can be strengthened by adhesive bonding.
- **LSU:** This can be divided into groups. Obviously, the preparations, impression techniques, tissue management, and materials must be included. How much lab training is controversial. Some feel the experience of what it takes to successfully make the restoration will aid in the designing of the preparation and seating of the casting. Finishing the restoration must also be taught.

MISS: The Operative section teaches preparation design, indications and contraindications for inlays and onlays. We also reinforce the full gold crown laboratory procedures introduced in the Fixed Prosthodontics course including model and die work, waxing, investing, casting, finishing, margination, and soldering contact. The Operative section is the only area that teaches investing and casting for gold alloys. The students prepare a gold inlay on an extracted tooth mounted in the dentoform, then convert it to an onlay for demonstration of the two preparations. Three different preparation designs are taught. We also cement the onlays on extracted teeth in the dentoform.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **Tenn:** The requirements are 4 inlays or onlays as part of the Fixed Prosthodontics clinical expectations. Within the past year, primarily due to state board examinations, the requirement of 4 inlays or onlays has been reinforced. Recently, we have incorporated a clinical competency exam for these restorations to assist in board preparation.
- **OK:** The students are expected to meet a minimum number of clinical experiences with cast gold inlays or onlays. These consist of 3 inlays and/or onlays. One of these is a portion of our Mock Board.
- **UT-H:** 3rd year students:
 - 1. 1 cast gold prerequisite (one cast gold minimum)
 - 2. 3 indirect restorations (one cast gold, one indirect composite resin and one of their choosing, either cast gold or indirect composite resin)
 - 4th year students:
 - one gold or indirect composite resin as a competency examination
- **UT-SA:** There are no clinical requirements for cast gold inlays or onlays. The cast gold onlay is taught in a pre-clinical sophomore laboratory exercise. The inlay is taught to senior students (typodont exercise) to prepare them for the Western Regional Examining Board's requirement of a cast gold inlay or onlay.
- **Baylor:** Third year students must complete essential clinical experience before continuing on to their senior year. They must complete a minimum of 3 gold inlays, onlays or partial veneer cast gold restoration on patients. Additionally, new third year students take a typodont progress exam at the beginning of the summer session during which they prepare and restore a tooth with a two-surface inlay and another tooth with a MOD onlay. During the spring quarter of the third year, the students complete another typodont progress exam in which they again prepare and restore one tooth with a two-surface onlay and another tooth with a MOD onlay. Fourth year students do not have a set number of essential clinical experiences. On

average, each students do not have a set number of essential clinical experiences. On average, each student completes at least 40 units of cast restorations during the combined third and fourth years. These cast restorations include full crowns, partial veneer crowns, inlays and onlays. Additionally, new fourth year students take a typodont progress exam at the beginning of the summer session during which they prepare and restore a tooth with a two-surface inlay and another tooth with a MOD onlay.

These essential experiences may be altered in number and/or scope as the licensure examination requirements change.

- **LSU:** Yes. The juniors must do at least 2 and up to 4. The sophomores may do 1 (if they choose not to do a resin inlay or porcelain onlay).
- **MISS:** Yes, approximately 3 clinical inlays/onlays are required for the senior year, one dentoform onlay is required the junior year. Many times senior students substitute full gold crowns completed in the Operative clinic for the onlays. The overall Fixed Prosthodontic requirement for gold castings is a minimum of 4 restorations the senior year.

Is there a relationship to the Licensure Boards? Explain.

- **TENN:** SRTA requires a clinical casting. Part of their testing requirements states that the restoration must be the most conservative possible for the tooth. Due to this requirement and the limited experience of students with inlays/onlays, candidates have previously opted for crown preparations. This has resulted in students making poor patient selections for the board. Generally a tooth requiring full coverage has an existing restoration, which, per SRTA's requirements, must be fully removed and replaced during the course of the exam. As a result, candidates run out of time or have to deal with pulp exposures, pulp caps, etc. History of SRTA demonstrates fewer failures when inlays or onlays are preformed compared to full coverage crowns. As a result, we have increased emphasis on these types of restorations and are meeting with better results on SRTA.
- **OK:** Yes. If the WREB exam drops the cast gold inlay, we will probably drop it from our curriculum.
- **UT-H:** Yes. Licensure Board requirements have a direct effect on the nature and quantity of Operative procedures included within the curriculum (emphasis is placed on licensure requirements).
- **UT-SA:** Spring, 2003, will be the first time that new graduates form our dental school will have the option of not doing a cast gold inlay or onlay for the Western Region Examining Board. Examinees will be able to do any two of three types of Class II restoration: amalgam, resin composite or cast gold. It is probable that no candidate will elect to do a cast gold restoration for the board exam. With this in mind, the General Dentistry department, which is responsible for teaching fourth-year students, is evaluating the need for any formalized courses with cast gold restorations as a component.
- **Baylor:** Yes, there is a relationship to the licensure boards. Our number of essential clinical experiences with gold onlays had remained fairly constant over time. When the WREB examining board expressed concern that they were not seeing many inlay

procedures performed during the exam, we placed more emphasis on inlay procedures beginning with second year pre-clinical Operative and continuing into the third and fourth year programs. As the WREB changes the board requirements, our essential clinical experiences in the third and fourth years will probably evolve somewhat as well.

- **LSU:** No, since our state board has no clinical exam for indirect gold restorations. However, there is a tabletop exam on typodont that requires students to prepare a tooth for a gold onlay or inlay.
- **MISS:** No relationship to the Mississippi State Board, however we are sensitive to the surrounding regional boards requiring some type of casting. In addition to the need for some of our graduates to take surrounding boards, these procedures are important for reinforcing and expanding basic Operative Dentistry principles.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

- **TENN:** As of this year, we have incorporated a course in esthetic dentistry which includes a laboratory component. Direct Class II composite resin restorations are part of this course.
- OK: Yes
- UT-H: Yes
- UT-SA: Yes
- Baylor: Yes
- **LSU:** Yes. Class I, II and V restorations. Only minimal basics to these restorations are presented; not really much time compared to amalgam restorations.
- **MISS:** Yes, in the second year caries/operative course soon to be changed to the esthetics course. Includes an ivorine and a natural tooth exercise.

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

- **TENN:** Not at this time.
- **OK:** Not at this time. We are discussing implementing one.

- **UT-H:** Yes. We have two semesters of Operative Dentistry. Both the first (first year students) and the second (second year students) Operative courses require 1 Class II direct composite resin practical examination (preparation and restorations).
- UT-SA: No
- **Baylor:** Not at this time, but this will change in 2003.
- **LSU:** Yes. One Class II restoration, a DO on a maxillary bicuspid is done in a typodont tooth.
- **MISS:** We have a laboratory exercise in the dentoform that is graded, however the only difference between this and a practical is the anonymous grading of the practical (blind grading), the same criteria are used for both

Are students placing Class II direct Composite Resin Restorations in clinics?

- **Tenn:** On a very limited basis with close faculty supervision.
- OK: Yes.
- UT-H: Yes
- UT-SA: Yes
- Baylor: Yes
- **LSU:** Yes. In the third year, the students are required to place 7 Class II restorations. The Fixed Prosthodontic department also requires that we restore the teeth that will be crowned, with composite resin. We require that these teeth maintain proper proximal contacts and defined anatomy. They are treated as if they will be the final restoration.
- **MISS:** Yes, students are placing even more direct Class II resins than in the past. Most likely they are overtaking amalgams for some students patient profiles.

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

TENN: No, but it is anticipated that this will change over the next 1 - 2 years.

- **OK:** There is not an expectation specifically for Class II direct resin composite restorations. The students are expected to meet a minimum number of clinical experiences using resin composites, these can be Class I, II, III, IV or V restorations.
- UT-H: Yes.
- UT-SA: No.
- Baylor: Third year students must complete a minimum of 5 Class II direct restorations. At least 2 of these must be amalgam while the other 3 may be either amalgam or composite.
 In the combined third and fourth year programs, on average, each student restores approximately 10 teeth with posterior composites. Additionally, in the senior year, beginning this year, students will complete an exercise in which they prepare and restore 2 teeth with Class II composites on the typodont in the simulation lab. Beginning in 2003, the WREB will allow candidates for licensure to restore teeth with Class II direct composites in lieu of cast gold inlay or onlay restorations.
- **LSU:** There is no requirement in our second year clinical course for Class II posterior restorations. In the third year the students are required to place a minimum of 7 Class II composite restorations.
- **MISS:** The senior guideline/requirement for Class II direct resins is approximately 4 combined with Class I directs, however students probably do more than the minimum to substitute for their Class II amalgam requirement/guideline.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

- **TENN:** Placement recommendations include incremental placement and curing, use of the Bitine Ring and sectional matrix system for Class II restorations, and placement of a surface sealant. We do not use an indirect composite system.
- **OK:** The use of posterior resin composites is mainly restricted by its physical properties and the prognosis for an adequate bond.
- **UT-H:** Advantages of the placement of a posterior composite resin is that these restorations conserve tooth structure (caries directed preparation), their adhesion to tooth structure and their esthetics.
- UT-SA: Direct Class I and Class II restorations when esthetics is important.
- **Baylor:** With respect to Class I and Class II direct posterior composite restorations, the indications for placement are outlined in the following statement. Use of Class I and Class II indirect composite restorations are nor taught or preformed in our clinics

during the third year. The option of placing indirect composite restorations is available in the fourth year at the discretion of the faculty.

LSU: If there is a desire for an esthetic restoration, we will usually give the student their starting check.

MISS: Class I & II directs

- Small to moderate size restorations $\frac{1}{3}$ to $\frac{1}{2}$ intercuspal width.
- Premolars and some first molars when patient has increased esthetic awareness.
- Restoration is not providing most of the occlusal load.
- No para-functional habits of heavy bruxing.
- Good oral hygiene with minimal gingival inflammation especially for Class II.
- Rubber dam isolation is a must.
- Indirect Class II indicated when width is ½ or greater, cusps need reinforcing, wide interproximals difficult to contour by direct means.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- **TENN:** Patient desire; size of the preparation (less than ¹/₃ intercuspal distance); no cuspal involvement; ability to isolate with rubber dam; no signs of excessive wear due to grinding or clenching habits.
- **OK:** Size of the restoration
 - Amount of enamel available at cavosurface margins for etching
 - Para-functional occlusal habits (bruxing or clenching)
 - Position of tooth in the arch (further distal in arch = more functional stress)
 - Ability to effectively isolate the field of operation
 - Importance of esthetics in the area
- UT-H: <u>Clinical Considerations:</u>
 - The medical and the dental history of the patient (oral hygiene, caries activity)
 - The location of the gingival cavosurface margin(s) (should be located on intact enamel, if possible)
 - The location of centric, occlusal stops (should be located primarily on tooth structure)
 - Any signs of excessive wear from clenching or grinding (bruxism) would be considered
 - The size of the restoration (surface area), its location within the arch, and the occlusal load placed on the restoration.
 - The ability to obtain good isolation (rubber dam)
 - Technique sensitivity (individual student ability)
 - The desires of the patient

Material Considerations (concerns):

- Polymerization shrinkage
- The possibility of secondary caries (possibly due to marginal gap formation)

- · Possibility of postoperative sensitivity
- Decreased physical properties compared to amalgam
- Adhesive bond stability as it ages (over time)
- The long term durability
- **UT-SA:** Primarily the need, due to patient desires, for an esthetic restoration
- **Baylor:** Indications for Class I and Class II direct composite restorations include:
 - Small or moderate restorations, preferably with enamel margins
 - Restorations or premolars or first molars where an esthetic restoration is critical and treatment with a porcelain restoration is too aggressive.
 - A restoration where occlusal contacts are primarily tooth borne rather than restoration borne.
 - Restoration of a tooth without heavy occlusal stresses.
 - Restoration of a tooth whose lesion can be properly isolated during the restorative procedure.
 - Some large restorations that are used to strengthen remaining weakened tooth structure for economic reasons or interim use.
- **LSU:** Probably the biggest consideration in placing a posterior composite restoration is the ability to isolate the tooth. If the bonding process is compromised, we are reluctant to let the student start these restorations. Other considerations that we must deal with are caries activity and caries risk indices, and occlusion. These conditions are treated with an indirect ceramic restoration.
- **MISS:** Same as previous question, in addition, ability to maintain a dry field, margins mostly on enamel, very minimal extension onto root surface for Class II directs.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

Tenn: Direct:

- Gingival floor in enamel if at all possible
- Bevel gingival margin if in enamel
- Bevel proximal cavosurface margin
- No bevel on occlusal cavosurface margin
- Rounded internal line angles
- As conservative a preparation as possible
- Isolated lesions should be treated individually and not connected
- Isthmus as narrow as possible
- Occlusal stops on intact enamel surfaces

Indirect:

- Smooth finish lines with rounded and soft internal line angles
- 10 15 degree taper to axial walls
- Butt joints or shoulder margins
- Supragingival margins
- Cuspal coverage of 1.5 to 2.5mm

- Occlusal margins should not coincide with occlusal contact site
- Isthmus width 1.5 to 2.0mm in premolars and 2.5 to 3.9mm in molars
- All margins on sound enamel

OK: Class I **Direc**t resin composite restoration:

- Depth limited to removal of caries/decalcification. (sealant, PRR, or MicroHybrid)
- Rounded internal angles
- No bevels on enamel surfaces

Class II **Direct** resin composite restoration:

- Similar to Class II amalgam prep with rounded internal angles
- No retention grooves
- No bevel on cavosurface margins
- Prefer not to use composite if any cavosurface margin is not in enamel
- Prefer to restrict use of resin composite to preparations less than 1/2 of the width of the occlusal table to the tooth.

Indirect posterior resin composite restorations:

- We do not utilize indirect posterior resin composite restorations routinely. This has been done occasionally on a case-by-case basis.
- **UT-H: Direct composite resin** In pre-clinic, (basically) an amalgam preparation is taught, not emphasizing a reverse curve on the facial of Class II restorations. In clinic, these preparations are more caries directed. The students incorporate flexibility within the procedure, not having to follow the strict rules and guidelines of amalgam placement. They consider the nature of the overall clinical situation, the extent of the spread of caries, and the nature of the restorative material(s) to develop the appropriate course of treatment.

<u>Pre-clinically</u>, enamel bevels (\approx 0.5MM) are placed on the facial and lingual proximal cavosurface margins (box). Gingival enamel bevels are discussed (indications and contraindications), but not placed. Usually these are placed with a gingival margin trimmer (a hand instrument). Occlusal bevels are not placed.

<u>Clinically</u>, placing proximal bevels (facial and lingual) is an optional procedure (situation driven), Non-enamel surfaces are not beveled.

Indirect composite resin -In pre-clinic and clinic, (basically) a gold inlay preparation is taught, without bevels, with enhanced divergence of the internal walls (compared to the gold inlay preparation), and with defined depth, width and extension requirements.

UT-SA: Preparations for Class I resin composite restorations -

Simple removal of carious dentin and overlying unsupported enamel, placement of the resin composite to fill the cavity, and sealing of remaining fissures with a resin fissure sealant. These is no beveling of the occlusal preparations.

Preparations for Class II resin composite restorations -

Access through the marginal ridge, removal of carious dentin and unsupported occlusal enamel. The facial and lingual proximal margins may be beveled and the gingival margin may be beveled if there is plenty of enamel. If there is unsupported enamel at the gingival margin, and its removal would leave minimal or no enamel,

the unsupported enamel is left in place (internal bevel). No retention grooves or points are placed, and there are no occlusal bevels. This provides, basically, a "slot" preparation; any non-carious occlusal fissures are sealed with a resin fissure sealant.

Baylor: Class I direct composite preparation:

<u>Pre-clinically</u>, students are taught to follow all primary anatomy, which tends to be carious and fissured. This is primarily because of ivorine teeth, there is no distinction between carious and non-carious grooves. Students are taught that clinically, only carious grooves are prepared to include darkened, fissured grooves. Other grooves are traced through with a #1/4 round bur and sealed rather than prepared and restored. A #329 or #330 bur is used to prepare the tooth to a depth of 1.5mm. The internal line angles are rounded. The isthmus width is generally 1.0mm or less. Isthmus walls are convergent and dovetails are generally small with divergence at the facial aspect and on mesial and distal walls while paralleling the direction of the marginal ridges. Occlusal margins are no beveled.

<u>Clinically</u>, decay is removed by extending the preparation only for access and decay removal. Fissures may be traced through with a small round bur or fissurotomy bur and sealed. The preparation has rounded internal line angles. There is no extension for prevention in the classical sense. Occlusal margins are not beveled.

Class II direct composite preparation:

<u>Clinically</u>, occlusal contacts should be marked so that these areas can be avoided if possible in the preparation design. The presence of heavy occlusal contacts will not necessarily negate the use of composite in a Class II situation, but may indicate that wear is more of a consideration requiring more frequent recall for restoration assessment and possible replacement. After rubber dam placement, pre-operative wedging of the tooth on the proximal surfaces to be restored is advised so that a good proximal contact(s) can be achieved in the final restoration.

Pre-clinically, the students are taught to follow all primary anatomy, which tends to be carious and fissured. Again, this is primarily because of ivorine teeth, there is no distinction between carious and non-carious grooves. Students are also told that in the clinical setting, only carious grooves are prepared to include darkened, fissured grooves. Other grooves are sealed rather then prepared and restored. A #329 or #330 bur is used to prepare the occlusal portion of the Class II preparation as described above. The proximal box is prepared with a #169L bur with facial and lingual box walls of 90° or greater to the external surface. Students are instructed that clinically, proximal box walls may be left in contact with an adjacent tooth if decay and decalcification are removed. The gingival floor width is such that the axial wall is placed just into the dentin (usually 1.0mm for a premolar and 1.25mm for a molar). Occlusal bevels are not placed. No bevels are placed on the proximal box walls or at the gingival margin. Unsupported enamel rods should be removed from the gingival cavosurface margin using a gingival margin trimmer. Students are instructed that when the gingival margin terminates on cementum, the gingival floor should be 90° to the external surface and the width of the gingival floor should be approximately 1.0mm.

<u>Clinically</u>, Class II preparations may be shallower depending on the extent of the caries and the amount of occlusal forces that will be restoration borne. The isthmus is as narrow as access for any decay removal will allow. This minimizes the amount of occlusal contact on the restoration and thus reduces wear. All internal line angles are rounded. Again, there is no extension for prevention or for resistance form, as this does not make the restoration more resistant to fracture.

Ref: ASDC Journal of Dentistry for Children, 62:395-400, 1995. Quintessence Int., 29:5-11, 1998 Journal of Clinical Dentistry fo North America, 34:27-44, 1990

Clinically, slot preparations are acceptable. There are no standard posterior composite preparations; each tooth is treated as conservatively as possible to include decay and friable tooth structure. Margins on enamel are most desirable; this is especially true of the gingival margin. There is no occlusal bevel. A 0.5mm bevel oriented at 45° to the facial and lingual interproximal margins is placed with a small flame shaped diamond or #7901 finishing bur. Whether or not a gingival margin is beveled, requires a level of judgement. If there is sufficient enamel, a bevel can be placed; if, however, the gingival floor approaches the CEJ (less than or equal to 1.0mm from the CEJ), no bevel is placed and the gingival floor is placed 90° to the external tooth surface. This insures maximum bond strength at the gingival margin. A groove in the gingival floor has been demonstrated to reduce microleakage if the gingival margin is below the CEJ.

LSU: Preparations are kept to a minimal size. Only defective part of tooth must be removed.

<u>Class I restorations</u>: These will start with minimal lesions that can be "explored" with a small round bur. As the lesion progresses in size only the defective tooth structure is removed, 'does not have to extend into dentin or a specific depth'. No bevel is required and converging walls are not a necessity as no mechanical retention is required.

<u>Class V restorations:</u> If the lesion is non-carious, only cleaning with pumice is needed for these preparations. Only the carious portion is removed if caries is present. We do not establish axial walls with internal line angles. No retention grooves are placed. Beveling of the enamel is optional to establish a 'blending' of shades with the composite-tooth interface. This practice of bevels is not necessary to reduce leakage.

<u>Class II restorations</u>: The proximal box is only large enough to remove the defective portion of the proximal wall. Breaking of proximal contact is not an automatic procedure. The margins must be clean, if this is determined without breaking contact, then they don't have to be extended. We also use slot preparation if no occlusal grooves are involved. If this marginal ridge is under heavy occlusion then retention slots are placed as with amalgam slot preparation.

Margins are approximately at 90[°] to surface. No bevels are placed on occlusal surfaces. No mechanical retention is placed to hold restoration within the tooth. As with gold restorations, margins should not be in function with opposing teeth.

<u>Indirect composite or ceramic restoration is approached in the same manner with the following exceptions:</u> These are usually larger restoration, 2mm isthmus width or more, and are supportive of the patient's occlusion. If no occlusion involved, then composite can be utilized. If occlusion is involved, then ceramic is used. There must be a 2.0mm reduction for thickness of porcelain and composite resin.

We require a much greater divergence of the walls in these indirect preparations. This is around 20° compared to the 5° required for gold. These restorations have more rounded line angles also.

All margins are 90[°], no chamfers or bevels are used. Enamel margins are good, but if the gingival floor is below the CEJ, we finish the same way. If there is no enamel then we bond to dentin.

MISS: Class I Direct -

- Conservative as possible, limited to removal of caries and width to facilitate insertion of restorative material
- Rounded internally shape of 330 bur
- No occlusal bevels
- Restore with UltrasealXT, flowable composite, hybrid or flowable compomer

Class II Direct -

- Similar to amalgam Class II Preparation with depth limited to removal of caries
- Width less than ¹/₃ intercuspal to slightly wider than 330 bur
- No occlusal bevels
- No intentional beveling of proximal, may be slightly flared more than the amalgam preparation
- Depth limited to removal of caries
- Contact cleared proximally to facilitate placement of matrix band.
- No tunnel preparations
- Slot preparations are acceptable

Class II Indirect -

- 2.0mm occlusal clearance
- Minimum 2.0mm isthmus width, probably more like 3.0mm
- Shoulder or heavy chamfer margins
- Proximal contact cleared by minimum 0.5mm
- Axial reduction minimum 1.5mm to 2.0mm width
- Rounded axiopulpal line angle

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **TENN:** Carbide burs and diamonds primarily utilized. No laser or air abrasion. Selection of bur or diamond based on size of preparation. Microprep diamonds are used in very small conservative lesions. Otherwise small round burs or pear shaped burs are used for preparation. Polishing is done with diamond or carbide finishing burs followed by molded abrasive polishing system (Pogo, Enhance, or Astropol).
- OK: Resin composite preparation: high speed Carbide burs; low speed round carbide burs for caries removal Indirect round end diamonds
- **UT-H:** Preparation instrumentation includes carbide burs 1170, 1171, 170, and 169. Air abrasion is discussed and is available.

- **UT-SA:** #329 bur for preparations, #7901 or hand instruments for bevels. If the fissure is heavily stained or if demineralized enamel is evident within the fissure, it is cleaned or slightly opened with a #1/16 bur or air abrasion prior to sealing.
- **Baylor:** For the Class I preparation and the occlusal portion of the Class II preparation, a #329 or a #330 bur is used. For the proximal box portion of the Class II preparation, a #169L bur is used pre-clinically although a #245 bur is often used clinically. Flame shaped diamonds or a #7901 finishing bur can be used to place proximal and gingival bevels. A #1/4 round bur is used to trace through grooves to be sealed rather than prepared and restored.
- **LSU:** Preparations are prepared in the same manner as other restorations. Diamonds can be utilized; they offer better shapes than the carbides. KR825, KR845, KR845 are diamonds used in **indirect** restorations. We don't use lasers, We've played with air abrasion and it's a mess. It cuts minimally but not worth the trouble.
- **MISS:** 330 and 56 carbide burs for direct preparations.
 - 4, 6, 8 round burs caries removal
 - Tapered diamonds, 170 tapered fissure bur for indirect preparations
 - No air abrasion or laser
 - Football and flame finishing burs 12 and 30 fluted (Brasseler USA)
 - Soflex discs and Enhance points

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

- **TENN:** Sectional matrix systems generally used (Palodent Matrix System and Bitine Ring)
 - Occasionally use circumferential system (Automatrix with mylar band)
 - · Wooden wedges used with sectional matrix
 - Plastic or wooden matrix used with Automatrix system
- **OK:** We generally use one of two systems:
 - Palodent sectional contoured stainless steel matrix band and Bitine Ring with wooden wedge
 - Tofflemire with a dead soft 0.001 inch stainless steel matrix band and prewedging with a wooden wedge
- **UT-H:** Means utilized include pre-wedging, burnished Tofflemire matrix bands and Composi-Tight and Palodent sectional matrix bands. Mylar bands are also available, but are considered too thick for many situations.
- **UT-SA:** Several methods are used. One is the use of pre-wedging, frequently reinforced during the procedure, then the use of a segmental metal matrix without wraparound, to allow the light to penetrate from facial to lingual aspects, as well as the occlusal aspect. Embrasures are contoured with an IPC instrument before curing. Another

method is the use of the Composi-Tight system, with sectional matrix that does wrap around the facial and lingual line angles of the tooth.

- Baylor: First, after rubber dam placement, the gingival embrasures of the proximal surfaces of the tooth to be restored are pre-operatively wedged. This begins the separation of teeth so that establishment of proximal contacts later will be facilitated. The Composi-Tight[™] matrix system is used with wedges to establish proper contours and contacts on the Class II composite restorations.
- **LSU:** We utilized the sectional matrix band with a clamp 99% of the time for these Class II composite restorations. This has reduced our incident of open contacts greatly. The Composi-Tight system is our matrix system of choice. Wooded wedges are utilized with these systems. We also have available the Contact Pro 2 system.
- **MISS:** Palodent system with Bitine Ring sectional
 - Omnimatrix (Ultradent) 0.001" ultra-thin circumferential (orange handle)
 - Automatrix with "dead soft" ultra-thin band
 - Tofflemire with ultra-thin band
 - Wedges wood wedges contoured assorted sizes color-coded

What materials or combinations of materials are utilized in the restoration. Identify all materials used.)Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

TENN: Materials used:

- Bonding agent: Optibond Solo Plus
- Composite: Sure-Fil
- Glass Ionomer: Fuji II LC or Vitrebond (used with gingival margins not in enamel)
- Permaseal: surface sealant
- **OK:** All-bond 2 dentin bonding agent
 - Micro-hybrid resin composite (Esthet-X- Caulk)
 - Resin modified glass ionomer (Fuji II LC)
 - Surface sealer (Fortify Bisco)
 - Filled sealant/flowable resin (Ultra-seal XT Ultradent)
- **UT-H:** Sealants & Flowable Composite:
 - UltraSeal XT Plus
 - PermoFlo
 - Dyract Dyract Flow

Composite:

- Filtek Z250
- Vitalessence
- TPH Sprectum
- Tetric Ceram HB

- Heliomolar
- SureFil

Composite Surface Sealant:

• Permaseal

Bonding Systems:

- Scotchbond Multi-purpose
- All Bond 2
- Prime & Bond NY
- Optibond Solo Plus
- Excite

Build-up Materials:

- Luxacore
- Vitremer Core

Resin-modified Glass Ionomer:

- Vitrebond
- Fuji II LC
- **UT-SA:** Bonding systems available are Scotchbond Multipurpose, Optibond Solo and Amaglambond, any of which may be used with any of the resin composite available. The resin composites available for Class I and Class II restorations are Heliomolar (a micro-filled composite) and Z100 (a unimodal small particle composite). Flowable composites are used only for sealing fissures; the one available is Ultraseal XT. Resin-modified glass-ionomer liners are used only in deeper preparations. In a patient with a high caries risk, a resin-modified glass-ionomer (Fuji II LC) may be used for the proximal portion of the restoration (approximately up to the interproximal contact area).
- **Baylor:** After completing decay removal in a Class I or Class II preparation, a glass ionomer liner and/or base may be placed in any areas where the pupal wall is within 0.5mm of the pulp. Hybrid composites are generally used for these restorations and filled pit and fissure sealants are used to seal any unprepared grooves remaining on the occlusal surfaces: we generally use UltraSeal XTTM for this purpose. Finally, the composite restoration is etched then sealed with a filled composite sealant; we are currently using OptiGuard[™] in our clinics.
- LSU: All or our posterior composites are bonding using the fourth generation bonding agents. At our school we are using Scotchbond Multipurpose Plus as directed in their instructions. The exception is when curing the adhesive in proximal boxes. The deeper the gingival floor, the longer we cure. Usually 40 seconds since the floor is further from the light source than other areas. In our clinic, we use Z2250 for Class I and II restorations. In Class V restorations we use A110. All composite restorations are re-bonded using Fortify. We do not use flowable composites except for some small preventive resin restorations. If a lesion is very deep or in direct and indirect pulp capping, a layer of modified glass ionomer is placed. We use Vitrobond or even Fuji II LC. In areas of high caries activity we will use a modified glass ionomer, Fuji II LC either alone or in a sandwich technique.
- MISS: Ultraseal XT sealant, Synergy flow and Dyract flowable composite/compomers
 - HerculiteXRV hybrid, Synergy hybrid
 - GC liner LC P/L system, Fuji IX auto cure glass ionomer

- Dyract AP compomer
- Bonding Systems primarily Prime & Bond NT, All Bond 2. Faculty request

Describe the indications for the utilization of which material or material combinations.

- **TENN:** Sure-Fil is used primarily in posterior direct restorations due to its wear resistance. When used in Class II situation, with appropriate matrix adaptation, it holds a contact well. If margins are all in enamel, this is the only material used. In the event a margin is in the dentin, glass ionomer is placed on the gingival floor followed by Sure-Fil. If rubber dam isolation isn't possible, direct composites are not utilized.
- **OK:** Materials used to:
 - Restore conservative preventive resin restorations Micro-hybrid resin composite (Esthet-X Caulk) followed by a filled sealant (Ultraseal XT- Ultradent)
 - Restore posterior resin restorations Micro-hybrid resin composite (Esthet-X Caulk) followed by surface sealant (Fortify Bisco)
 - Class II resin composite restoration in tooth with a gingival cavosurface margin in cementum/dentin place a resin modified glass ionomer restorative material (Fuji II LC) in the gingival portion of the box followed by a micro-hybrid resin composite (Esthet-X Caulk). We also apply a surface sealer (Fortify Bisco) after a posterior Class I or Class II resin restoration is placed.
- **UT-H:** All indications and decisions are situation driven.
- **UT-SA:** Scotchbond Multipurpose is used in well over 90% of the restorations. If it is felt a chemically curing bonding resin is needed, the Alamgambond may be used. The micro-filled resin composite is preferred for posterior restorations which involve the occlusal surface, but either the micro-filled material or the small particle material may be used. It is worked out between the covering faculty member and the student.
- **Baylor:** In the small, conservative Class I or Class II restoration, we generally use hybrid composites as the material of choice. In moderately large to large restorations we use highly filled posterior composites and, if necessary for esthetics, we will veneer these restorations with a hybrid composite. Our use of flowable composite is very limited and used at the discretion of the attending faculty member on a case-by-case basis.
- LSU: Function dictates which material we use. Hybrid restorations are used in areas of occlusion and proximal contacts. Z250 is the hybrid material we use in our clinic. High caries activity requires a modified glass ionomer material as Fuji II LC.
- **MISS:** For sealing and preventive resin restorations Ultraseal XT, Synergy flow and Dyract Flow.
 - Class II resin with minimal occlusion on restoration Synergy duo shade or HerculiteXRV.
 - Class II resin with more occlusal involvement or larger restorations- HerculiteXRV
 - Deep cavity line or base with GC liner LC

- Large root surface or large Class V lesion with recurrent decay possibilities Fuji IX glass ionomer.
- Small Class V or abfractions Dyract AP, Synergy, HerculiteXRV.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **TENN:** Not at this present time.
- **OK:** Not at this time. We are contemplating initiating some minimum clinical experiences for posterior resin composite restorations.
- **UT-H:** Yes, but none for second year students. Third year students a minimum of 7 Class II composite restorations (posterior). Fourth year students a minimum of 10 Class II composite restorations (posterior).
- **UT-SA:** There is no specific requirement for Class II resin composite restorations in the junior or senior clinic. Students are required to address the needs of their family of patients. Patient assignment is designed to give students an appropriate mix of clinical experiences.
- Baylor: Our per-clinical Operative Dentistry course begins in the spring semester of the first year and is completed in the fall semester of the second year.
 First year students prepare and restore 2 Class II composite restorations.
 Second year students prepare and restore 5 Class II composite restorations.
 Third year students are required to place a minimum of 5 direct Class II restorations, at least 3 Class II restorations must be amalgam; the other 3 restorations may be either amalgam or composite.
 Fourth year students have no requirements or essential clinical experiences for direct Class II composites.
- **LSU:** There is no requirement in the 2nd year clinical course. They can do either a cast gold restoration or a ceramic only or a composite inlay in this year. In the 3rd year clinical course they must place at least 7 Class II composite restorations.
- **MISS:** Yes, the guideline expectation is a 3rd or 4th year total of a minimum of 4 Class I and Class II posterior composite resins, however most students do at least 4 Class II's and they do more Class I resins if they can't obtain their total Class I amalgam points.

Do you have a Clinical "Competency" examination for direct Class II composite Resin Restorations? Describe.

TENN: Not at this present time.

- **OK:** Not at this time. We are contemplating including a competency examination for Class II resin composite restorations (Probably in the senior year).
- **UT-H:** Yes. Third and fourth year students have a requirement of 1 Class II composite resin. These examinations replicate the Licensure Board examination (WREB) including a starting check and grading based on written WREB criteria.
- **UT-SA:** Students have a choice on one of their skill assessment examinations to choose either a Class II direct resin composite restoration or a Class II amalgam restoration to treat an initial lesion. They also have a choice to choose a Class II, III or IV resin composite or a Class II amalgam restoration which may be a replacement restoration.
- **Baylor:** No, but this will probably change in the near future.
- **LSU:** The student must prepare and place a Class II composite restoration. The tooth must have occlusal contact and proximal contact to be accepted. If the student fails this exam, they must repeat it until they successfully achieve this restoration. If they cannot complete any one of our competencies before the end of the course, they will fail the course.
- **MISS:** At the present time we do not have a Class II resin competency. However, we have 2 clinical Class II amalgam competencies, 1 in the junior year and 1 in the senior year.

B. <u>INDIRECT:</u>

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

- **TENN:** Students are exposed to the CEREC system as part of the third year course in esthetic dentistry. Additionally, they fabricate one ceramic inlay as part of the pre-clinical laboratory associated with this course.
- OK: No.
- UT-H: Yes. Indirect Class II composite resins are taught (Targis System).
- UT-SA: No.
- Baylor: No.
- **LSU:** In the first weeks of their 2nd year, we have an esthetics course. They must prepare an inlay preparation, MO on tooth #4, and an onlay replacing all four cusps on tooth #30. We provide an ideal preparation on a typodont tooth for each of these exercises. They are also furnished finished restoration to be bonded to these typodont teeth. They learn the proper method of bonding these restorations.
- **MISS:** Yes, in pre-clinical. In the 2nd year we lecture on indirect resin materials and preparation designs as well as fabrication of an indirect composite inlay on an extracted premolar.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

TENN:	No
OK:	No
UT-HI:	Yes. The 2 nd year Operative course includes a practical examination for an indirect Class II composite resin.
UT-SA:	No
Baylor:	No
LSU:	After they complete these exercises, they are given a competency exam on the bonding technique for both restorations
MISS:	No practical or competency exam for an indirect resin or porcelain inlay at this present time.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

- **TENN:** Porcelain, on an extremely limited basis. It is anticipated that this will expand greatly over the next few years.
- **OK:** Indirect resin composite restorations are placed very rarely by our students. Porcelain inlay/onlay are never placed by our students.
- UT-H: Yes
- UT-SA: Very few
- **Baylor:** Indirect composite and/or porcelain restorations are placed on a case-by-case basis and generally limited to the fourth year. When indicated fourth year students work closely with faculty to complete these procedures.
- **LSU:** Yes. In the 2nd year clinical course they have the option of placing 1 indirect restoration. In the 3rd year clinical course, they must complete 4 indirect restorations: 2 must be gold, the other 2 may be composite inlays or ceramic onlays.
- **MISS:** Students are placing Class II indirect resins using the Belleglass system on a limited basis with close faculty supervision. We are still in the process of getting faculty familiar with the system and hoping to do more in the future.

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

TENN:	Not at the present time.
OK:	No
UT-H:	Yes, but none for 2 nd year students. 3 rd year students - 1 indirect composite resin (minimum). 4 th year students - 1 indirect composite resin (minimum).
UT-SA:	No
Baylor:	No
LSU:	There is no clinical requirement in either the 2 nd of 3 rd year for these restorations. They are optional, but will count toward the indirect requirement.
MISS:	Students may do these indirect resins in place of their gold onlay requirements/guidelines.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

TENN:	No
OK:	No
UT-H:	Yes. 3 rd and 4 th year students are required to complete 1 gold and 1 Class II indirect composite resin, then they have the option of either procedure for their clinical examination (clinical practical).
UT-SA:	No
Baylor:	No
LSU:	No
MISS:	No clinical competency at the present time.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

TENN: Direct:

Optibond Solo Plus: 15 seconds etch with 37.5% phosphoric acid. Rinse throughly (no specific time - ensure all etchant is removed), dry with suction and blot with a cotton pellet, do not dessicate. Shake bottle prior to dispensing. Apply the Optibond Solo Plus to enamel and dentin for 15 seconds with a brush. Air thin for 3 seconds, light cure for 20 seconds, place composite.

Indirect:

Apply Optibond Solo Plus as per above instructions. Utilize appropriate resin cement (i.e., Nexus 2-Kerr), mix base and catalyst for 20 - 30 seconds, place into restorations. Seat restoration, remove excess cement, light cure for 10 seconds each side, remove excess cement, light cure all surfaces 40 seconds per surface. Polish margins.

OK: Direct Restoration Adhesive:

- A. Allbond 2 dentin bonding agent (4th generation bonding agent)
- B. Multi-bottle system
- C. Steps in using Allbond 2 with resin composite restorations:
 - 1. Clean tooth
 - 2. The application of flour of pumice mixed with chlorhexidine acts to both clean and disinfect the tooth
 - 3. Acid etch preparation
 - 4. Etchant used is Uni-Etch (Bisco), 32% phosphoric acid with benzalkonium chloride (BAC)
 - 5. Applied for 15 seconds (start with enamel apply to dentin last)
 - 6. Rinse well and dry surface to check if enamel is effectively etched.
 - 7. Re-moisten with Tubulicid (dentin should appear moist with no pooled liquid)
 - 8. Apply at least 5 coats of Primer A and B (applied for at least 20 seconds)
 - 9. Gently air dry to volatilize solvents and remove excess moisture
 - 10. Apply Dentin/Enamel Bond resin in a thin layer (remove excess with a dry brush) and cure again for 20 seconds.

Indirect resin or porcelain - techniques are not taught

- UT-H: <u>Direct :</u> adhesive systems include Scotchbond Multi-purpose (3M), All Bond 2 (Bisco) , Prime & Bond NT (Caulk Dentsply) and Optibond Solo Plus (Kerr). All procedures follow the respective manufacturer's directions. <u>Indirect</u> - Targis indirect composite resin restorations are cemented using Excite adhesive and Variolink II composite resin cement. All procedures follow the manufacturer's directions (Ivolcar Vivadent)
- **UT-SA:** We are using AmalgamBond Plus for bonding amalgams, Scotchbond Multi-purpose and unit-dosed Optibond Solo for direct resin composites. Scotchbond Multi-purpose is a three step bonding system with a separate primer and adhesive agent. Optibond Solo is a two-step system in which the primer and adhesive have been combined. We urge the students to follow the manufacturer's instructions, which we provide for them in their pre-clinical manuals and at the clinic dispensary. The only exception to manufacturers' instructions is that we ask students not to air-dry the adhesive component but rather to apply and then thin it with a blotted brush or applicator.

REF: (Hilton, TJ, Schwartz, RS. The effect of air thinning on dentin adhesive bond strength. Oper Dent 20:133-137, 1995)

Baylor: Adhesion

The Etching Process

Etch: After the application of any indicated liners or bases, etch both the enamel and dentin surfaces of the preparation. Use 33 - 37% phosphoric acid gel etchant for 15 seconds on enamel and 10 seconds on dentin. This is accomplished by placing the etchant on the enamel first and then on the dentin for 10 seconds.

<u>Rinse</u>: After the etchant has been on the dentin for 10 seconds, rinse throughly with water for at least 10 seconds. Remove excess moisture. Air dry the enamel (keep the dentin moist) to confirm adequate enamel etch (should be frosty looking). If necessary, re-etch enamel only and rinse again. Blot dentin with a moist cotton pellet or mini-sponge (do not rub) to remove excess moisture. Dentin should be blotted until there is no pooling of water and the surface is left moist and glistening, but not desiccated and dull.

A. Multiple Solutions Primer and Adhesive Systems

- 1. All-Bond 2 Adhesive System
 - a. <u>Primer:</u>
 - 1. Dispense 1 drop of Primer A to 1 drop of Primer B into a well and mix with a brush. Recap bottles immediately. Use mixed solution immediately to avoid evaporation of the acetone solvent.
 - 2. With a brush, apply at least 5 consecutive coats of the mixed primer to the enamel and dentin. Do not dry between coats. Air-dry all surfaces for 5 to 6 seconds. A properly primed surface will appear glossy when coverage is sufficient. If the surface is not glossy, repeat the mixed primer application.
 - 3. Light cure for 20 seconds.
 - b. Adhesive:
 - 1. Dispense 1 to 2 drops of Dentin/Enamel (D/E) Bond Resin into a clean well. Recap bottles immediately. Use dispensed solution immediately to avoid evaporation of the acetone solvent.
 - 2. Brush a layer of the D/E resin over the enamel and dentin. Carefully thin with a dry second brush to avoid pooling.
 - 3. Light cure for 20 seconds.
 - c. <u>Restoration</u>: Restore with composite and finish. Etch the composite and 1mm of the tooth margins; rinse and air-dry throughly; re-bond with thin layer of OptiGuard, cure.

Bonding Amalgam or Ti-Core Buildups with All-Bond 2

Etch and prime as instructed above. To create the adhesive, dispense 1 drop of D/E Resin to 1 drop of Pre-Bond Resin into a clean well and mix with a brush. Recap bottles. (The Pre-Bond resin is an initiator, which makes the bonding resin dual cure.) Use mixed solution immediately. Brush a layer onto the entire cavity surface. Carefully thin with a dry second brush to avoid pooling.

For an amalgam buildup, restore immediately (light curing not necessary), carve and finish. For a Ti-Core buildup, light cure the bonding resin (adhesive) for 20 seconds, then restore.

2. ProBond Primer and ProBond Adhesive (for use with Prisma TPH)

- a. <u>Primer:</u> Dispense 2 3 drops of ProBond Primer into a clean dispensing well. Apply the primer with a brush to throughly wet the exposed dentin without rubbing the surface and leave undisturbed for 30 seconds. Do not rinse the dentin primer from the surface of the dentin. Dry the cavity for 5 to 10 seconds. Attempt to confine the dentin surfaces; however, any primer on enamel will not hurt adhesion.
- b. <u>Adhesive:</u> Dispense 1 drop of ProBond adhesive into a clean dappan dish or onto a paper pad and replace cap immediately. With a small, clean brush, apply a uniform layer of adhesive to the primed dentin and etched enamel. Remove excess with a gentle stream of air. Avoid excess thinning of the adhesive. Light cure for 10 seconds.
- c. <u>Restoration:</u> Restore with Prisma TPH and finish.
- 3. XR-Primer and XR-Bond (for use with Herculite XRV)
 - a. <u>Primer:</u> Dispense XR-Primer. Apply with a brush on the enamel and dentin moving the brush for 30 seconds. Air dry. Light cure for 10 seconds
 - b. <u>Adhesive:</u> Dispense and apply XR-Bond uniformly with a brush, creating a thin coating. Light cure for 20 seconds.
 - c. <u>Restoration:</u> Restore with Herculite XRV and finish.
- 4. Syntac Primer and Syntac Adhesive and Heliobond (for use with Heliomolar)
 - a. <u>Primer:</u> Dispense the primer and apply with a brush. If the cavity form permits, it can be rubbed gently onto the surface. The primer requires a contact time of 15 seconds. Remove the excess and air dry.
 - b. <u>Adhesive:</u> Apply Syntac adhesive and dry with the air syringe. Apply Heliobond and carefully thin with a gentle stream of air. Light cure for 20 seconds.
 - c. <u>Restoration</u>: Restore with Heliomolar.

B. Single Solution Primer and Adhesive Systems

First, etch the cavity surfaces as previously indicated.

- 1. Single Bond (single solution primer and adhesive for any composite or sealing before restoration with amalgam)
 - a. <u>Primer/adhesive:</u> Using a fully saturated brush tip for each coat, apply 2 consecutive coats of Single Bond adhesive to etched enamel and dentin. Dry with a gentle stream of air for 2 to 5 seconds, Light cure for 10 seconds.
 - b. <u>Restoration:</u> Restore immediately and finish.
- 2. Prime & Bond NT (single solution primer and adhesive for any composite or sealing before restoring with amalgam)
 - <u>Primer/adhesive:</u> Carefully tip the bottle of Prime & Bond NT until 2 3 drops are dispensed into a clean dispensing well and securely replace the cap immediately. With a brush, immediately apply generous amounts of Prime & Bond NT to throughly wet the exposed dentin and enamel surface. These surfaces should remain wet for 20 second, which may necessitate applying additional adhesive. Gently dry with air for 5 seconds. The surface should have a uniform glossy appearance. If not, repeat first two steps. Light cure the Prime & Bond NT for 10 seconds.
 - b. Restoration: restore immediately over the Prime & Bond NT and finish.

NOTE: To avoid confusion, we recommend that students learn to use the All-Bond 2 System before trying any of the other systems. It is a dependable system when used correctly.

Bonding Porcelain and Resin Inlays, Onlays and Crowns

- C. Nexus 2 System
 - 1. Try-In
 - a. Remove temporary
 - b. Clean tooth with pumice and prophy cup, rinse, lightly dry
 - c. Try-in restoration for fit
 - d. Place thin layer of appropriate try-in paste into restorations, seat restoration, evaluate shade
 - e. Remove restoration, wash out try-in paste with a strong water spray for 15 seconds (this timing is essential), air dry.
 - f. Apply Kerr Gel etchant with applicator brush in scrubbing motion to the inside of the restoration for 10 seconds to remove any residual paste. Rinse with water for 5 seconds, air dry.
 - g. Apply Kerr Silane to inside of the restoration, lightly air thin, place restoration in light-proof box to await the bonding procedure.
 - 2. Tooth Preparation
 - a. Etch enamel and dentin for 15 seconds
 - b. Rinse and lightly air dry but do not dessicate
 - c. Place 1 drop of OptiBond Solo Plus and 1 drop of OptiBond Solo Plus Activator into mixing well and mix for 3 seconds.
 - d. Apply mixture to tooth for 15 seconds using light brushing motion.
 - e. Air thin for 3 seconds to avoid pooling.
 - 3. Luting
 - a. Light cure for 20 seconds
 - b. Select appropriate shade of base and viscosity of catalyst. Mix for 10 20 seconds. Place into restoration.
 - c. Gently seat restoration.
 - d. Remove excess cement.
 - e. Light cure all surfaces a minimum of 40 seconds per surface.
 - f. Polish margins with appropriate materials.
- D. VariolinkR II System
 - 1. Try-In
 - a. Remove temporary restoration
 - b. Remove residue of the temporary luting agent from the preparation
 - c. Rinse throughly
 - d. Try-in restoration using Variolink II try-in paste
 - e. To avoid fracture of the restoration, do not check occlusion at this time. If necessary, make corrections with a fine diamond at medium speed and with slight pressure. Polish ground surfaces.
 - f. Pre-treat the restoration according to the instructions of the manufacturer.
 - 2. Tooth Preparation
 - a. Isolate with rubber dam if possible.
 - b. Rinse off the restoration to remove try-in paste or debris with water and dry the restoration

- c. Throughly clean cavity/preparation with water spray and dry
- d. Acid etch preparation for 15 seconds
- e. Throughly wash preparation for a minimum of 5 seconds.
- f. Dry preparation for 1 2 seconds with high volume evacuation tip directly over the preparation or blot with a clean applicator. Moist preparation surfaces should be apparent.
- g. Saturate enamel and dentin with a generous amount of Excite using a Vivadent Applicator or comparable aid. Gently agitate the adhesive onto all prepared surfaces for at least 10 seconds. Air thin to avoid pooling and check for uniform glossy surface appearance.
- h. Cure Excite for 20 seconds
- 3. Luting
 - a. Mix desired shades of base paste and catalyst paste in a 1:1 ratio on a mixing pad for 10 seconds. Since Variolink II is a light-dual curing material and thus sensitive to ambient light, mix material immediately before application and avoid intensive light during application.
 - b. Low-viscosity catalyst paste is recommended for placement of crowns and partial veneer crowns. The high-viscosity paste is recommended for inlays, onlays and veneers.
 - c. Apply mixed Variolink II with a brush to the cavity and/or into the inner surface of the restoration
 - d. Place restoration in situ with slight pressure and remove excess with a brush or other suitable instrument
 - e. Increase pressure on restoration and maintain for several seconds
 - f. Remove excess Variolink II with a clean brush
 - g. Maintain pressure and tack the restoration on an isolated surface area with light polymerization for 10 20 seconds.
 - h. After tacking, remove any additional marginal excess making sure not to remove material out of the margins
 - i. Polymerize the restoration step by step for at least 40 seconds per segment beginning with the proximal margins.
 - j. Remove polymerized excess with fine finishing diamonds and flexible discs. Use finishing and polishing strips in the proximal areas.
 - k. Check occlusion and make corrections as necessary.
- LSU: Direct composite resins are bonded with Scotchbond Multipurpose Plus in accordance with their directions.
 Indirect porcelain restorations are bonded with RelyX-ARC using single bond adhesive following the company's directions.
- MISS: <u>Direct:</u> Following manufacturers' instructions: Etch 15 seconds with 34% Caulk tooth conditioner gel - total etch technique Rinse throughly 5 to 10 seconds
 Dry gently with air (trying to not dessicate)
 Apply Prime & Bond NY uni-dose adhesive with Kwik tip
 Wetting tooth for 20 seconds, then air evaporate for 5 seconds
 If not glossy, repeat Prime & Bond NT and air evaporate for 5 seconds.
Light cure 10 seconds

Insert composite incrementally then light cure appropriate times with Optilux 401 conventional halogen light

Indirect:

After try-in, rinse restoration throughly with water spray and air dry

Apply silane coupler to bonding surfaces

Tooth Surfaces:

Apply conditioner 34% phosphoric acid to enamel and dentin for 15 seconds Rinse for 10 seconds, gently air or blot dry

Mix Prime & Bond NT with self cur activator, apply mixture to tooth for 20 seconds

Air dry mixture for 5 seconds (Repeat above if not glossy)

Light cure dual cure layer for 10 seconds

Restoration:

Apply Prime & Bond NT dual cure to bonding surfaces, air dry 5 seconds Mix Calibra base and catalyst for 10 seconds

Apply cement mixture to bonding surfaces

Seat restoration slowly, remove excess cement with explorer or brush

Pre-cure for 10 seconds with halogen light, clean excess around margins

Light cure all margins for 20 seconds: buccal, lingual and occlusal.

Finish and polish margins

III.	<u>Regional CODE Agenda</u>
	(Please report on responses from all participants)

IV. <u>National CODE Meeting</u>

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

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

Other suggestions?

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

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CODE REGIONAL MEETING REPORT FORM

REGION: IV (Great Lakes)

LOCATION AND DATE OF MEETING:

Dental Sciences Building, School of Dentistry, University of Western Ontario

London, Ontario, Canada	October 24 - 25, 2002

CHAIRPERSON:

Name: Dr. Robert Rashid	Phone #: (614) 292-3071
Address: Ohio State University	Fax #: (614) 292-9422
College of Dentistry Postle Hall 305 W 12 th Ave	E-mail: Rashid.1@osu.edu
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List of Attendees: Please complete the CODE Regional Attendees Form (enclosed at end of Agenda)

Suggested Agenda Items for Next Year:

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name:	Phone #:	
Address:	Fax #:	
	E-mail :	
	Date: 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: <u>30 Days post-meeting</u> 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.

2002 NATIONAL CODE AGENDA REGION IV RESPONSES

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **UDM:** The use of gold inlays and onlays has declined rapidly, however, they remain an excellent treatment choice in areas that are not esthetically prominent and for patients who desire (and can afford) a long-lasting restoration. They should remain in the curriculum, but the amount of time spent teaching them will most likely be limited as other restorative options develop and as the content of dental curricula expands. Application of principles of cavity design for cast gold intracoronal restorations helps students to understand how material requirements affect cavity design. Also, many of the principles that apply to gold restorations also apply to porcelain and composite inlays and onlays.
- **WV:** Gold castings are still the best restorations for teeth where a large portion of the tooth is lost. They are more conservative than crowns and better for the adjacent periodontal tissue.
- **CWRU:** Limited. Yes, basic knowledge for any indirect restoration.
- **UWO:** Until such times as something better comes along, there will be a place for cast gold inlays and onlays. Yes, they definitely should be in the curriculum. They are by far the most durable of the dental materials we have.
- **SUNYB:** The future looks dim, because part-time faculty and some full-time faculty do not do them. We do not have the faculty expertise or interest in treatment planning of onlays. We think they should remain in the curriculum.
- **OSU:** Working toward using porcelain as the restorative material for onlays. Less emphasis on bonded inlay procedures. Currently teach the gold along with porcelain. However, we are placing fewer gold onlays in our clinics.

What should be taught?

UDM: Preparations with an emphasis on principles and their application for gold with comparison to other materials should be taught. Also, the benefits and drawbacks of cast gold restorations as a treatment option should be taught. Students should, ideally, have the opportunity to prepare gold inlay and onlay preparations in a simulation environment, and possibly in the clinic, if patient needs indicate. Given our patient population at UDM, they should not be a clinical requirement.

WV: Gold onlays and crowns. Inlays?

- **CWRU:** Discussed at CWRU basic information re: Sturdevant inlays and onlays (2nd year BPRD at our school)
- **UWO:** Inlays and onlays and gold crowns. Lectures, pre-clinical preparations (no castings), tested on inlay/onlay dentoform preparations.
- **SUNYB:** The inlay as a precursor to the onlay.
- **OSU:** Onlays need to continue to be taught. Restorative material may change to include composite and porcelain.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **UDM:** No clinical requirement for cast gold inlays/onlays.
- **WV:** Presently, Junior and Senior class have a minimum experience of 6 castings. The future of the gold inlay is questionable.
- **CWRU:** Yes one competency inlay/onlay. Typodont or patient.
- **UWO:** Yes, we would like students to do at least 2 of each. However, due to the cost factor, not many in our patient population can afford gold restorations. Current fees are about 70% of those recommended by the Ontario Dental Association. The lab work is now sent out from the dental school. Students also do ³/₄ crowns.
- SUNYB: No.
- **OSU:** No. Clinically, there has been a decrease due to decreased emphasis on teaching and requirements (less examination on the onlay preparation). We will be changing that this year for the D2 students requiring the onlay as part of the end-of-year competency examination. Castings are done by our in-house lab for the clinical students.

Is there a relationship to the Licensure Boards? Explain.

- **UDM:** There is not direct relationship to the Licensure Boards, except by omission. Most likely, we would require cast gold inlays/onlays if the Board required them.
- **WV:** Our students take WREB, North Carolina and SRTA and several of these boards require a casting. For this reason, the inlay in particular is of importance in our teaching.
- **CWRU:** Current philosophy is to give/present enough information to take most Licensure boards.

- **UWO:** No relationship in Ontario.
- SUNYB: No.
- **OSU:** Because the NERB does not require an onlay, it is not part of "mock boards"; with no other emphasis it has decreased in importance. We have seen a significant drop in number of procedures done.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

- **UDM:** Yes. Students are taught that conservative 2-surface restorations in areas of esthetic prominence are the best indication for direct Class II resin composite restorations. However, students also have the opportunity to prepare and restore a 3-surface direct Class II resin composite in order to gain an appreciation of the difficulty of this type of restoration.
- WV: Yes.
- **CWRU:** Yes BBRD (2nd year) introduces 3rd year Operative course, 3rd year esthetic.
- UWO: Yes.
- SUNYB: Yes the project is an MO on #5.
- **OSU:** Yes.

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

- UDM: No.
- **WV:** They place a composite resin restoration in a previously prepared tooth.
- **CWRU:** No response.
- **UWO:** Yes preparation of 3-surface (MOD) and restorative.
- **SUNYB:** It is an option as the practical for the resin portion of the course.
- **OSU:** Yes. Students are tested in the 2nd year on Class II composite and onlay preparations.

Are students placing Class II direct Composite Resin Restorations in clinics?

- **UDM:** Yes. Conservative 2-surface restoration in areas of esthetic prominence.
- **WV:** Only a few at this time but they are encouraged to do more. Most of our students place multiple Class II composite restorations during their six-week rural site rotation with private practitioners.
- CWRU: Yes.
- **UWO:** Yes, about 30% of the restorations placed on Class II composite resin.
- SUNYB: Yes, as a matter of fact, more resins than amalgams have been placed this semester.
- OSU: Not required, but allowed. Not a lot done. The numbers are as follows: Class I w/ B pits 139 Class II w/ OL 111 Class II 3-surface 18 Class II 4-surface 7 General guidelines suggest placement in areas with minimal occlusion. Larger areas require patient consent and review by faculty.

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

- UDM: No.
 WV: Not at this time. Consider adding one.
 CWRU: Yes, competency.
 UWO: No actual clinical requirement, but student will not graduate without being competent in this area. Most have no difficulty in doing 10-15 of these restorations.
- SUNYB: No.
- OSU: No.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

UDM: 1. Indications for direct Class I and II resin composite restorations as described in JADA (*Statement of Posterior Resin-Based Composites, JADA, 129:1627-1628, 1988*) are taught.

- 2. Students are taught that "posterior composite is not, at this time, a total replacement for amalgam as a restorative material," (*Nash, et.al. JADA, 132:1099-1104, 2001*)
- 3. Class I direct restorations can range from PRR to occlusal preparations not greater than ¹/₂ the intercuspal distance. A glass ionomer liner is recommended for most Class I composite restorations to minimize postoperative sensitivity.
- 4. Class II direct restorations should be limited to areas of esthetic prominence with conservative preparations, preferably supragingival.
- 5. Indirect Class II composite restorations are indicated in situations where a direct composite would be indicated, and also for larger Class II intracoronal restorations.
- WV: We do not place very many Class I restorations. Mainly PRR. Class II recommendations are for maxillary pre-molars, mandibular pre-molars and restorations where the gingival margin would still be on enamel and the occlusal stops are mainly on intact tooth. We place few to none of the indirect restorations. We lost our in-house laboratory and their ability to fabricate indirect restorations. Students are taught that indirect restorations are the esthetic restoration of choice if the gingival margin is on dentin/cementum.
- **CWRU:** Sturdevant.
- **UWO:** Recommend indirect over direct. Direct minimal surfaces not large restorations.
- **SUNYB:** Esthetics.
- **OSU:** We follow the procedures as outlined in the Sturdevant text.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- **UDM:** Patients' caries rate, esthetics, size of lesion, location of lesion, ability to isolate with rubber dam. Limitations of the material (polymerization shrinkage, wear resistance, technique sensitivity).
- WV: No response.
- **CWRU:** Sturdevant
- **UWO:** Age (old patients more likely to have amalgam). Occlusion is good. Isolation possible? Demands of patients are somewhat involved.
- **SUNYB:** Must be an esthetic consideration; all margins must be in enamel; no centric occlusal stops on the restoration.
- **OSU:** Occlusion, remaining teeth, finances, patient desire, adjacent teeth, ability to isolate.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

- **UDM:** For both direct and indirect: rounded internal line angles, no bevel at occlusal margins, all non-enamel margins are 90° to external tooth surfaces.
 - For direct, convergence of buccal and lingual walls is not emphasized, however, preparations should have a distinct internal outline form.
 - For indirect, axial walls should be slightly divergent (6 10°) and the pulpal floor should be relatively flat and perpendicular to the long axis of the tooth.
 - Conservative preparation for caries excavation is taught for preventive resin restorations.
- WV: All interproximal margins are beveled (not the gingival usuals).
- **CWRU:** Clinical Preparation directed by lesion typodont preparation directed by lesion criteria.
- **UWO:** Conservative, minimal clearance on proximal leveled enamel, except on occlusal margins. If on root surface, reverse level at A-P line angle. used for some retention.
- **SUNYB:** Basically an amalgam preparation without sharp internal line angles.
- **OSU:** Standard Class I amalgam (retentive walls, minimal width, no bevel). Class II similar.

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **UDM:** Carbide burs (#256, 330, 245) are typically used. Students are introduced to air abrasion and laser as other modalities in lecture only.
- **WV:** We are considering switching to diamond burs from carbide for the most conservative lesions. We have, and students are allowed to use, air abrasion but this modality is not recommended for cutting preparations.
- **CWRU:** Burs and diamonds.
- **UWO:** Burs (169/170) finishing bur/for gingival bevel. No air abrasion or laser used at UWO. Finish Soflex system white stone, round burs (slow speed) used for contouring/finishing.
- **SUNYB:** Primarily the 330 bur for internal aspects; diamonds and/or carbides for beveling; small round burs for fissure inclusion.
- **OSU:** 330 bur, 245 for proximal area, achieved rounded internal line angles; ¹/₄ round as necessary.

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

- **UDM:** Students are introduced to sectional matrices, rings, plastic bands and wedges in the simulation laboratory. Tofflemire retainers and matrices (both conventional and "dead soft") are utilized in clinic.
- **WV:** The Palodent (Dentsply/Caulk) system with the metal sectional matrix.
- **CWRU:** Circumferential, sectional matrices, rings, wedge-wood and composite.
- **UWO:** Good pre-wedging is used, contoured circumferential bands are used mainly, but some sectional (Palodent/BiTine rings) wedges are anatomical wooden ones no solid plastic. We do not use clear bonds.
- **SUNYB:** Circumferential matrix with dead-soft matrix material. BiTine matrices are available (faulty preference).
- **OSU:** Wedges, Tofflemire matrix; now starting to recommend rings for matrix. Usually, clear bands are not used.

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

- **UDM:** Progression for posterior restorations:
 - Sealant: Filled sealant or flowable composite (Premaflow)
 - PRR: depending on extent flowable, hybrid composite (Prodigy), resinmodified glass ionomer liner (Vitrebond) may be used, filled sealant (for unprepared fissures)
 - Class I and Class II: hybrid composite, resin-modified glass ionomer liner.
 - Cores: core material (Luxacore) with resin-modified glass ionomer liner, as indicated.
- WV: For the posterior composite, we use TPH Spectrum. Students are taught to use a flowable composite as a first layer if the restoration is very large. However, we do not place very large Class II restorations in our clinic.
- **CWRU:** Composite hybrid glass ionomer traditional, TPH and surface packable available.
- **UWO:** Acid-etch, bond resin (one-step), thin layer of flowable on gingival floor, followed by 2 or 3 increments of hybrid resin. 'Over' is used after contouring and finishing. Glass ionomer used in deep preparations as a liner.
- **SUNYB:** For posteriors, a microfill is used. Flowable used by some faculty.

OSU: Glass ionomer - Ketac Fill, Fuji II LC, Optibond Solo. Composite - Prodigy

Describe the indications for the utilization of which material or material combinations.

- **UDM:** See above. Please note we do not recommend flowable composite as a liner, base or first gingival increment for Class II resin composite restorations.
- WV: No response.
- **CWRU:** Preceptor driven with input from Restorative Department.
- **UWO:** Deep preparations have LC glass ionomer liner placed then acid-etch, bond resin. Shallow preparations (0.5 - 1.0mm from DEJ) are just acid-etch (no liner).
- **SUNYB:** Faculty preference.
- **OSU:** Glass ionomer is used as a base when in close proximity to the pulp.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **UDM:** There are no clinical requirements for Class II resin composite restorations.
- WV: No response.
- **CWRU:** Students to have several experiences before taking competency.
- **UWO:** Expectation 10-15. However, students are advised they are not allowed to place large MOD plus direct CR but if the patient will pay for an indirect, they may place one. All are encouraged to look for suitable cases. These are done in the 3rd and 4th years (clinical years).
- SUNYB: No.
- OSU: No.

Do you have a Clinical "Competency" examination for direct Class II composite Resin Restorations? Describe.

UDM: There is no clinical requirement for a Clinical "Competency" examination for Class II resin composite restorations.

WV: No response.

CWRU: No response.

UWO: No - just daily evaluation of work.

SUNYB: No.

OSU: No.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

- **UDM:** Students are presented with introductory information in lecture, but there are no simulation exercises.
- WV: Yes.
- **CWRU:** 2nd Year No. 3rd Year - Yes - lecture/didactic.
- **UWO:** Only to the extent they are discussed and their advantages/disadvantages noted, comparison to direct CR and gold are made.
- **SUNYB:** Yes see attached handout.
- **OSU:** Dent 536 taught by Dr. Robert Seghi.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

UDM:	No.
WV:	No.
CWRU:	No.
UWO:	No.
SUNYB:	No.
OSU:	No.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

- **UDM:** Sometimes, isolated cases.
- WV: Very few to none.
- **CWRU:** Yes, limited.
- **UWO:** Yes, when there is a suitable and willing patient. Not all students have the opportunity.
- SUNYB: Yes.
- **OSU:** Yes, but just a few, currently.

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

UDM:	No.
WV:	No response.
CWRU:	No response.
UWO:	No requirements, expect students to do 2 - 3, but not all have the opportunity.
SUNYB:	No.

OSU: No.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

- UDM: No.
- WV: No.
- CWRU: No.

UWO:	No.
SUNYB:	No.
OSU:	No.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

UDM: Direct:

OptiBond Solo Plus: single unit dose system, 15 second etch, 30 second rinse, lightly rub adhesive for15 seconds, air-thin for 3 seconds, cure for 20 seconds. Indirect:

Calibra is used for cementation of porcelain veneers and all porcelain restorations.

- WV: No response.
- **CWRU:** Prime Bond NT Calibra system
- UWO: Adhesive used: PQI (Ultradent) (single) Etching times: 15 seconds dentin, 30 seconds enamel Adhesive application: we follow manufacturers' recommendation (scrub); we air-thin, cure 20 seconds for bond, 40 seconds for composite resin. In bonding we bond to "damp" dentin. Fitting cement for indicated in 3M Rely K ARD (dual cure) with indirect, we air-cure both tooth and restoration, rinse, apply bond resin to both preparation and restoration, air-dry but don't let cure, place cement on restorations, seat, rework, access, maintain pressure and light-cure.
- **SUNYB:** No response.

OSU: Indirect = Nexus system and follow directions therein. Very few are done. Direct = Apply etchant - 15 seconds Rinse throughly - 15 seconds Air-dry - 3-5 seconds (do not dessicate) Apply bonding agent Lightly air-thin Light-cure - 10 seconds Place composite in 1-2mm increments. 37% phosphoric acid OptiBond Solo (single use) Prodigy - Kerr Instructions available in dispensary. III. <u>Regional CODE Agenda</u>

(Please report on responses from all participants)

IV. National CODE Meeting

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

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

Other suggestions?

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

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CODE REGIONAL MEETING REPORT FORM

REGION: V - Northeast

LOCATION AND DATE OF MEETING:

New York University

New York, New York

October 17 - October 18, 2002

CHAIRPERSON:

Name: Dr. Richard Lichtenthal	Phone #: 212-305-9898
Address: Columbia University	Fax #: 212-305-8493
603 W 168 th 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:	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: <u>30 Days post-meeting</u> 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.

2002 NATIONAL CODE AGENDA

REGION V SUMMARY RESPONSES TO NATIONAL AGENDA

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

Consensus of opinion is that the future is unknown. Some schools feel that cast gold should be included as an alternative to other restorations and include the teaching of this in their curriculum. The others feel that cast gold has no place in Operative Dentistry.

What should be taught?

Procedures dealing with gold, porcelain and composites need to be taught. These procedures deal with restorations. Various means of instruction such as photos, lectures and actual laboratory experience are utilized.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

The majority of schools responding do not have clinical requirements/experiences. Boston has 9 specific clinical requirements in their curriculum.

Is there a relationship to the Licensure Boards? Explain.

Only when required by NERB.

II. <u>Composite Resin Restorations - Posterior</u>

A. DIRECT:

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

All the schools responding are teaching direct Class II Composite Resin Restorations in the preclinical curriculum.

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

Of the 10 schools responding, 5 do include a practical examination; 1 is incorporating it into the curriculum and 3 do not have a practical exam.

Are students placing Class II direct Composite Resin Restorations in clinics?

All schools responding indicate that the students are placing these restorations.

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

Of the 11 schools responding, 7 indicate no requirements or expectations. The other schools vary from 1 to 6 minimum experiences prior to test cases. Only Boston requires 12-15 restorations prior to competency.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

Details are found in the following pages, however, the general consensus includes: isolation under rubber dam, esthetic concerns of the patient, good occlusal relationships, conservative preparations, minimal invasive techniques, enamel margins.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

Details are found in the following pages, however, the general consensus includes: ability to isolate field, oral history, enamel margins, esthetics, finances.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

Details are found in the following pages. Procedures too numerous to summarize.

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

Carbide burs, diamonds for bevels, hand instruments such as margin trimmers, silicone points, other miscellaneous equipment.

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

Sectional matrices, wood wedges, Palodent system with BiTine Rings, ComposiTight, Toffelmire retainers, Ultradent caulk.

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

Details are found on the following pages, however the consensus indicates: glass ionomer liners, Optibond Solo Plus, flowable composites.

Describe the indications for the utilization of which material or material combinations.

9 schools had no responses. The other schools utilize glass ionomers, and either flowable or hybrid composite materials.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

Of the 10 schools responding, 5 have no clinical requirements/expectations; the other schools vary from 1 experience to 4 experiences. Only 2 identified competency exams.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

Of the 10 schools responding, 2 are not teaching; 8 are teaching indirect restorations.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

Only 1 school, Tufts, indicated that their pre-clinic course included a practical.

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

Responses varied from none to rarely to infrequently.

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

All schools responding indicated no.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

All schools responding indicated no.

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

Too many details to summarize. Please see following pages for individual responses.

2002 NATIONAL CODE AGENDA REGION V RESPONSES

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **Colum:** We don't know what the future is. Inlays are not included in our Operative curriculum but onlays are.
- **Howard:** The future of cast gold is limited. We do not include inlays/onlays in our Operative curriculum.
- **McGill:** We feel that there is a future for these in Operative. Currently these disciplines are taught in our Operative lab.
- **Temple:** We will stop teaching cast gold in Operative in the Spring of 2002. We believe that inlays are not part of the curriculum but onlays are.
- **NYU:** There is no future for cast gold inlays/onlays. We do not include either of these in our Operative curriculum.
- **UCONN:** The future is not bright. We believe that these should be included rarely in the curriculum.
- **UMARY:** We will continue to utilize cast gold inlays/onlays in our curriculum.
- **UPENN:** We will continue to utilize cast gold onlays/inlays in our curriculum
- **Stony:** We believe that cast gold inlays/onlays have no future in Operative Dentistry and do not include them in the Operative curriculum.
- **UTOR:** The future is declining. However we believe that inlays/onlays should be included in the Operative curriculum.
- **Boston:** We feel that there is a future for cast gold onlays/inlays however, we rarely include these in our Operative curriculum.
- **Tufts:** There is a future for cast gold inlays/onlays and we include them in our Operative lab curriculum.

What should be taught?

- **Colum:** We feel that procedures dealing with gold, porcelain and composite inlays/onlays should be taught.
- **Howard:** These procedures need to be taught for dexterity and past documented success in the Operative field. It is necessary to also teach alternatives to cast gold.
- **McGill:** The cast gold procedure needs to be covered historically and as a basis for current methods of restoration.
- **Temple:** Cast gold has become the standard for all alternative methods of restoration.
- **NYU:** Gold casting is taught by our Prosthodontic department.
- **UCONN:** We teach gold castings as partial coverage. Students prepare inlays and restore with composite.
- **UMARY:** We will continue to utilize gold onlays for occlusal function and 2nd molar choice.
- **UPENN:** We will continue to utilize cast gold onlays/inlays in our curriculum due to cited literature as to indications for gold as a restorative.
- **Stony:** We teach cast gold inlays/onlays through lectures and photos. We are moving toward porcelain and composite rather than cast gold for restorations.
- **UTOR:** We feel that cast gold is a valid treatment option and will continue to keep it at the pre-clinical level.
- **Boston:** We teach cusp reduction, wall, boxes as well as retention and finish lines.
- **Tufts:** Cast gold is an important restoration tool. It should be kept in teaching for, i.e. Bruxers.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **Colum:** We have no specific clinical requirements.
- Howard: We have no specific clinical requirements.
- **McGill:** We have no specific clinical requirements.

Temple: These are taught at the pre-clinical level.

- **NYU:** We have no specific clinical requirements.
- **UCONN:** We have no specific clinical requirements. Most of our patients prefer tooth-colored restorations.
- UMARY: We have no specific clinical requirements.
- **UPENN:** We have no specific clinical requirements.
- **Stony:** We have no specific clinical requirements.
- **UTOR:** We have no specific clinical requirements.
- **Boston:** We have 9 clinical requirements to graduate.
- Tufts: We have no specific clinical requirements.

Is there a relationship to the Licensure Boards? Explain.

- Colum: No response.
- Howard: No.
- McGill: No.
- Temple: No.
- NYU: No.
- UCONN: Yes, when NERB requires it.
- UMARY: Yes, when NERB requires it.
- UPENN: No.
- Stony: No.
- UTOR: No.
- Boston: No response.
- Tufts: Yes. No explanation.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration in your preclinical curriculum?

Colum:	No response
Howard:	Yes
McGill:	Yes
Temple:	Yes
NYU:	Yes
UCONN:	Yes
UMARY:	Yes
UPENN:	Yes
Stony:	Yes
UTOR:	Yes
Boston:	Yes
Tufts:	Yes

Does your pre-clinical course include a practical examination for direct Class II Composite resin Restorations? Describe.

Colum:	No response
Howard:	No
McGill:	No
Temple:	No
NYU:	Yes

UCONN: Yes, pre-preparation of tooth

UMARY:	No response
UPENN:	Being incorporated into our curriculum
Stony:	No
UTOR:	Yes

- Boston: Yes
- Tufts: Yes

Are students placing Class II direct Composite Resin Restorations in clinics?

Colum:	No response
Howard:	Yes
McGill:	Yes
Temple:	Yes
NYU:	Yes
UCONN:	Yes
UMARY:	Yes
UPENN:	Yes
Stony:	Yes
UTOR:	Yes
Boston:	Yes
Tufts:	Yes

Do you have a Clinical requirement/expectation for Class II direct Composite Resin Restorations?

Howard:	No
McGill:	One
Temple:	Four
NYU:	No
UCONN:	No, but 6 minimum prior to test case
UMARY:	No
UPENN:	No
Stony:	No
UTOR:	No, requirements replaced with minimum core experiences
Boston:	Yes. Require 2 summatives, 12-15 restorations required prior to summative.
Tufts:	Either amalgam or composite.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct or indirect?

- **Colum:** Enamel cavosurface margins necessary.
- **Howard:** Small cavity preparations, can be isolated under rubber dam. Indirect composite for large restorations. Must have posterior occlusal stop natural or metallic.
- **McGill:** Aesthetic considerations of the patient, when insufficient tooth remains for adequate amalgam, retention.
- Temple:
 Direct Class I and II: small pit and fissures, unrestored tooth, isolation, good occlusal relationship, esthetics.

 Indirect Class I and II:
 larger preparations, removal of existing amalgam, patients' request for esthetics.
- **NYU:** Developing protocols. Very deep preparations with CaOH₂.
- **UCONN:** Glass ionomer placed on pulpal axial and gingival walls, reduces postoperative sensitivity, open sandwich technique of preparation ends on root.

- **UMARY:** <u>Direct:</u> Rubber dam isolation, ¹/₄ ¹/₃ intercuspal distance, sized preparations, no severe occlusal para-function.
 - Indirect: Occlusion supported by natural tooth, isolation to exclude blood and saliva.
- UPENN:
 Direct:
 Isolation, small lesions, conservative tooth preparations, esthetics, non-occluding area, preservation of centric stops.

 Indirect:
 Conservation of tooth structure is warranted, esthetic areas with large defects.
- **Stony:** $< \frac{1}{3}$ buccal-lingual width between cusp tips, pre-wedge for contact.
- **UTOR:** Conservative Class I and II restorations
- **Boston:** Class I any tooth, isolated, not in occlusion Class II - bicuspids, mesial of first molars
- **Tufts:** Conservative preparation, isolation, minimally invasive.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- Colum: No response.
- Howard: Size, oral history, ability to isolate, margins supragingival and in enamel.
- **McGill:** Patients' informed choice, when finances are an issue, tooth is compromised and full crown is not viable.
- **Temple:** Isolation, esthetics, occlusal relationship, operator ability, below CEJ not suitable.
- **NYU:** Patient request, environmental considerations.
- **UCONN:** Location, premolars, mesial 1st molar, small occlusal restorations, narrow isthmus widths ¹/₃, no occlusal contact, enamel margins, isolation.
- **UMARY:** Patients' desire for tooth-colored restorations, Follows preparation guidelines and isolation.
- **UPENN**: Width of restoration, occlusion, caries risk, isolation, para-functional habits, oral hygiene, gingival extent of preparation.
- **Stony:** No abusive occlusion, isolation, all margins on enamel, minimal preparation.

UTOR: No response.

Boston: Size of preparation, occlusion, cleansibility, oral hygiene of the patient.

Tufts: Extension of decay, isolation, mainly size of lesion.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

- **Colum:** No response
- **Howard:** 90° cavosurface margins for posterior composite direct and indirect restorations; not done in non-enameled areas; rounded internal line angles.
- **McGill:** Class II Direct Composite Preparation:
 - Outline form determined as for Class I

 (determined by caries/existing restoration to be replaced, depth is minimum 1½ mm {adequate bulk for compressive strength}, pulpal floor not necessarily flattened, no beveling of occlusal cavosurface margins, rounded internal line angles).
 - 2. Buccal and lingual walls just beneath contact with adjacent tooth.
 - 3. Gingival floor of proximal box 90° to cavosurface.
 - 4. No enamel overhangs greater than 1mm.
 - 5. Decay removal with excavation with judicious use of #4 or #6 slow speed bur.
- **Temple:** <u>Direct -</u> Conservative, conventional, no bevels in general.
 - Indirect Conventional, may have bevel .5mm at 45°.
- **NYU:** No response
- UCONN: <u>Direct</u> Initial caries caries dictates preparation shape; no extension to break contact or depth requirement pulp floor can be in enamel. Can replace existing amalgam depending on size and occlusion. Occlusal involvement only to extent of caries. Butt-joints on occlusal enamel and on proximal if contact not broken. If contact broken, then bevel proximal margins. Bevel on enamel for buccal restorations. Retention of unsupported enamel where not friable and where not subject to functional forces or where not likely to be subject to polymerization shrinkage fracture. Depth and extension of cavity limited by extent fo caries, not by materials.
 - <u>Indirect -</u> Rounded angles except cavosurface: divergence greater than for cast gold; all enamel margins, no bevels or secondary flares butt-joints uniform thickness 1.5 to 2.0mm occlusal: Glass ionomer liner on pulpal, axial, and gingival walls; no finishing line at occlusal contact preparation around cusp using long chamfer is exception to rule.

UMARY: Class I:

<u>PRR</u> - minimal preparation removing caries only

<u>Routine Class I</u> prep ½mm into dentin extending only into caries pits and fissures; for amalgam replacement, preparation only removes defective restoration; occlusal cavosurfaces are at right angles to the uncut enamel.

Class II:

<u>Initial caries</u> preparation extended only into carious areas -preparation can be a proximal box only (with sealant on occlusal) or preparation can have a facial approach maintaining marginal ridge, occlusal margins at right angles to the cavosurface.

Amalgam Replacement:

Mimics amalgam preparation design

- **UPENN: Direct** In comparison with amalgam, preparations shallower, narrower in outline form. More rounded internal line angles, normally do not need secondary retentive features, 90° margin needed if extends onto root surface, bevel not recommended on posterior composite resins, definitely not at root surface.
 - **Indirect-** Preparations for adequate thickness of restorative material (minimum 1.5 2.0mm reduction), preparation for passive insertion pattern (rounded internal line angles, well-defined margins), margins have 90° butt-joint at cavosurface angle.
- **Stony:** Remove caries, remove unsupported enamel, do not break contact if not needed.
- UTOR: No response
- Boston: No response
- **Tufts:** Enamel bevels, butt-joint for non-enamel areas, extension and depth determined by caries.

Describe all instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **Colum:** No response
- Howard: Direct carbide burs, use diamonds for bevels Indirect - round end diamonds
- **McGill:** Rotary instrumentation is either carbide or diamond burs for enamel removal/outline form and caries removal with spoon excavators.
- **Temple:** For conservative PRR use fissurotomy burs, small carbide. For indirect - conventional burs 245, 330, etc.

UCONN: Burs and hand instruments such as margin trimmers.

- **UMARY:** Burs 330, 245, finishing burs, Al203 silicone points (Enhance), gingival margin -Bard Parker 12 blade. Etch and reseal.
- **UPENN:** Carbide, diamond, finishing. Currently not air abrasive or laser.
- Stony: Burs, hand instruments, air abrasion only in small occlusals.
- Boston: 245, spoon, offset hatchet and dye prophy.
- **Tufts:** 1556 or 556, 33¹/₂ carbides.

What means are utilized to establish contour and contacts on the Class II Restorations? (Circumferential, sectional matrices, rings, wedge-wood, plastic, other).

- **Colum:** No response
- **Howard:** Sectional matrices, rings or wedge-wood are used; Palodent system using the BiTine Rings, pre-wedging is also done with periodic wedge replacement.
- **McGill:** Pre-wedging during preparation
 - Wedging and ComposiTight or Palodent sectional matrices
 - If both mesial and distal contacts are to be restored, one side is done first (with removal of the other wedge) then the remaining side.
- **Temple:** Use ultra-thin matrix, .001".
 - Tofflemire type retainer okay
 - Preformed matrix, ex: BiTine Ring, ComposiTight, Palodent
- **NYU:** No response
- **UCONN:** Palodent sectional matrix, wood wedges and BiTine ring.
- **UMARY:** Use of HO band with a Tofflemire matrix,
 - Use of a sectional matrix band with separation ring: Palodent matrix with BiTine Ring,
 - Pre-wedge teeth before preparation with pre-contoured wooden wedge.
- **UPENN:** Circumferential, sectional matrix, wooden wedges.
- **Stony:** Circumferential matrix wood wedges
 - Palodent, Ultradent, automatrix if available.

UTOR: No Response

- **Boston:** Sectional matrix cut down wedge
 - BiTine Ring/Palodent

Tufts: Conventional matrix with plastic or wooden wedge (or Omni-Matrix - Ultradent).

What materials or combinations of materials are utilized in the restoration. Identify all materials used. (Filled sealant, flowable composite, composite hybrid, microfill, glass ionomer - traditional, resin modified, other).

Colum: No response.

Howard: Hercuilte XRV - we don't order anymore. Using the remaining product. Used for anterior and posterior restorations.
<u>TPH</u> - hybrid used in anterior and posterior where teeth are more opaque.
<u>Sure-fil</u> - high density (condensable) used in posterior composite
<u>Dyract AP</u> - compomer/restorative used in abfraction lesions.
<u>Dyract Flo</u> - flowable compomer used as the initial portion of the box of a posterior composite or a minimally invasive preparation (abfractions/base/liner).
<u>Fuji IX</u> - resin reinforced glass ionomer as a base or long-term temporary, or build-up material if supported by 60% tooth structure, or pre-endodontic buildup.
<u>EsthetX</u> - micromatrix used anteriorly and posteriorly particularly in anterior where esthetics is paramount; where enamel is translucent.
<u>Permoflo</u> - flowable composite used as the initial portion of the box of a posterior composite or a minimally invasive preparation.
<u>Ultraseal XT Plus</u> - pit and fissure sealant.
<u>Permaseal</u> - composite sealer.

McGill:	Liners-	(A) if beyond 1mm from pulp, CaOH ₂ sealed with glass ionomer; (B) if beyond ideal depth or approaching 1mm to pulp, glass ionomer liner.
	Etch-	Classic etch H3PO4 followed by H20 rinse.
Primer/	'Bond -	Optibond Solo Plus - 20 second light cure.
Flow	ables -	Used only if condensable composite used, then as liner.
Com	posite -	choice is hybrid, condensables no longer in favor; Point4 (Kerr) of Z250 (3M).
Glass lonomers - used p boxes		used primarily as sealer/liner as indicated above or in deep proximal boxes where cavosurface walls in dentin (anti-caries considerations)
Temple:	Glass ior Calcium	nomer liners - Vitrebond, 3M, Fuji CC) Hydroxide - Dycal

Flowable Composite - Class II proximal box, small Class I PR only

- **UCONN:** Glass ionomer liners or base for Class II or large occlusal. Etch and bonding agents are next. If a packable composite is used, a layer of flowable is placed over the bonding agent to improve adaptation to the cavity surfaces. If hybrid resin is used, flowable is not necessary.
- UMARY: For moderate and deep depth preparations; use of resin modified glass ionomer liners.
 For PRR flowable composite resin.
 For Class I routine size: either hybrid, micromatrix hybrid or packable (no flowable).
 For Class II either hybrid, micromatrix hybrid or packable. When using a packable in the proximal box, a flowable placed first.
- **UPENN:** For posterior composite resin, utilizing hybrid or packable (Surefil). Flowable or glass ionomer (resin modified) may be used on gingival floor box, proximally. Some use sealants around the margins for post operative sensitivity. Resin-modified glass ionomer may be used for Class V in elderly patients.
- Stony: Deep lesions CaOh and/or Vitrebond Scotchbond P60 Multipurpose
- UTOR: No response
- Boston: Seal : Tetric Flow Flowable :Tetric Flow Hybrid : Point 4 and EsthetX Micro : None Glass ionomer
- Tufts:Shallow sealant or flowableModerate-composite hybridDeep -glass ionomer or flowable, composite hybrid

Describe the indications for the utilization of which material or material combinations.

Nine schools had no response.

- **Temple:** Glass ionomer Vitrebond base, liner Calcium Hydroxide - direct pulp cap Flowable - Class I, proximal box Class II
- **UCONN:** Glass ionomer is used on root portion of Class II due to polymerization shrinkage of composite and resulting open margin. The stiff packables do not adapt well to corners, so flowable is placed first to enhance adaptation. If small particle anterior/posterior hybrid composites are used, flowable is not needed. All dentin surfaces are lined with glass ionomer reduces post operative sensitivity. In deep

cavity preparation, will reduce thickness of composite - less shrinkage. Dentin bonding agent PrimeBond NT is used after glass ionomer placement.

UMARY: Class I and II preparations - hybrid, micromatrix hybrid or packables are used interchangeably.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **Colum:** No response.
- Howard: We have no requirements nor competency required from the students.
- **McGill:** Our requirements/expectations are 1 experience in the 4th year.
- Temple: We have 4 requirements/expectations but no competency requirements.
- NYU: No response.
- **UCONN:** We require 6 experiences prior to the test case competency.
- **UMARY:** We have no requirements/experiences.
- **UPENN:** We have no requirements/experiences.
- **Stony:** We require 2-4 experiences per student but have no competency exam.
- **UTOR:** No requirements. No competency, per se, however, students are verified in amalgam/resin.
- Boston: We require total clinical competency for direct Class II composites.
- **Tufts:** We have no requirements/experiences.

B. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restoration in your preclinical curriculum?

Colum: No response

Howard:	Yes
McGill:	No
Temple:	Yes
NYU:	No response
UCONN:	Class II composite
UMARY:	No
UPENN:	3 rd year
Stony:	Yes
UTOR:	Yes
Boston:	3 rd year
Tufts:	Yes

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restoration? Describe examination.

Colum:	No response
Howard:	No
McGill:	No
Temple:	No
NYU:	No response
UCONN:	No
UMARY:	No
UPENN:	No
Stony:	No
UTOR:	No
February 11, 2003	
Boston: No

Tufts: Yes

Are students placing Class II indirect Composite Resin and/or Porcelain Restorations in clinics?

- Colum: No response
- Howard: Yes
- McGill: Yes
- Temple: Yes
- **NYU:** No response
- **UCONN:** Infrequently
- UMARY: A few
- UPENN: Yes
- Stony: A few
- UTOR: Rarely
- Boston: A few
- Tufts: Rarely

Do you have clinical requirements/expectations for indirect Class II Composite resin Restorations? If so, it is for 2nd, 3rd, or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **Colum:** No response
- Howard: No
- McGill: No
- Temple: No

NYU:	No response
UCONN:	No
UMARY:	No
UPENN:	No
Stony:	No
UTOR:	No
Boston:	No
Tufts:	No

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

Colum:No responseHoward:NoMcGill:NoTemple:NoNYU:No responseUCONN:NoURARY:NoUPENN:NoStony:NoUTOR:NoInterseNo

Describe your most commonly used adhesive techniques for direct and indirect restorative dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc.), thinning techniques, if any (air vs. brush), curing protocols, etc.

Colum: No response

Howard: Prime and Bond NT uni-dose bottle (one bottle)

- Etch 15 seconds for enamel and dentin
- Rinse 10 seconds, blot dry
- Leave dentin moist for total etch (Do not etch if using compomer)
- Apply Prime and Bond NT to preparations and saturate all surfaces for at least 20 seconds
- Remove excess by gently air drying for 5 seconds. Dentin should look glossy
- Light cure for 10 seconds

Calibra resin cement is used for cementing indirect composite and porcelain restorations.

We tested PQ1 and Z100 as the control against the composites and bonding agents at the school. The best results were achieved with the compatible materials. Kerr's Optibond is used with Herculite.

- McGill: Direct : 37% H3PO4 15 seconds
 - * 30 second H20 air/rinse
 - 2 second air jet to remove visible surface water
 - Optibond Solo Plus applied 5 seconds with microbrush
 - 2 second air disperse to eliminate pooling of bonding agent
 - Application of composite in 2mm increments
 - 40 second light cure

Indirect : Etch and bond as above

* cementation with dual-cure composite adhesive

Temple:Direct:Adhesive system - Single Bond 3MPrime and Bond NT - Dentsply caulk (unidose)Excite- Ivoclar (unidose)

Indirect: Z-250 - student processed Laboratory - Dodd Dental

- Etchant Ultra-etch 35%
 - 15 seconds lightly agitate
 - Rinse 5 seconds

Porcelain - Etch - Ultradent

NYU: No response

- **UCONN:** Prime and Bond NT single bottle adhesive. Follow manufacturer's directions. Prior to placement of the DBA, the dentin is etched with 37% phosphoric acid gel for no more than 15 seconds and the enamel for at least 15 seconds. The gel is rinsed with water for at least 10 seconds. Gross water is suctioned, and the cavity surface is blotted with a damp cotton. Damp cotton is cotton that has been wet and then dried by squeezing between cotton gauze. Un-instrumented enamel should be pumiced and rinsed prior to etching. This bonding agent is based in an acetone solvent. As determined by Jon Meiers, there is a need to redistribute the contents by shaking before each use. This bonding agent is applied with a Kerr applicator, agitating for 20 seconds, and is followed by a gentle 5 second application of compressed air. A second coat is applied and followed by a gentle 5 second compressed air dry. The surface should appear to be glossy. A 20 second light cure is then applied.
- **UMARY:** Direct: Optibond Solo Plus (unit dose single component system- with separate phosphoric etch).
 - Indirect: Composite or porcelain Scotchbond MP (multi-bottle systems with separate phosphoric etch). Use of Scotchbond MP as a dual cure adhesive mixing adhesive with a self cure catalyst.

Recommendations:

- Direct placement: Etch enamel: 15-30 seconds Etch dentin: 10-15 seconds Scrub dentin with primer/adhesive Gently air dry Light cure: 20 seconds Place composite resin
- Indirect placement: Etch enamel: 15-30 seconds Etch dentin: 10-15 seconds Scrub dentin with primer Gently air dry Place mixed adhesive and catalyst Place cement on restoration and within cavity preparation Place composite resin or porcelain inlay/onlay into preparation
- **UPENN:** Direct: Prepare operating site (pumice slurry)
 - * shade selection
 - * anesthetize
 - * rubber dam
 - * pre-operative wedging
 - * prepare tooth
 - * place matrix
 - * stabilize matrix with wedge
 - * etch enamel and dentin for 15-20 seconds
 - (35-37% phosphoric acid)
 - * rinse 10 seconds
 - * dry tooth, but clinically have a thin coat of water in place
 - * do not dessicate

* place bonding agent (Optibond Solo Plus: unidose or Prime and Bond NT pre-clinically-single step system)

Leinfelder KE 2001 - lightly rub the surface of preparation for 15-20 seconds

- gently disperse after several seconds
- surface should remain highly reflective of light
- light cure 20 seconds

* insert composite resin increments no greater than 2mm, light cure 20-40 seconds.

- * slightly overfill the preparation
- * finish with Sof-lex discs, finishing burs, fine diamonds
- * gingival excess #12 blade
- * polish with Sof-lex discs, polishing strips, polishing paste

Indirect: Pumice

- * shade selection
- * rubber dam
- * remove existing restoration and/or caries

* restore walls to more ideal form (may need to use glass ionomer or composite resin)

- * reduce 1.5 2.0mm to ensure adequate thickness of restorative material
- * be certain passive insertion pattern and margins 90° butt-joint cavosurface angles
- * design so no centric contacts are directly on margins
- * impress/temporary
- Try-in and Cementation:
 - * use rubber dam
 - * remove temporary
 - * place inlay/onlay into preparation to evaluate fit
 - * adjust until well-seated
 - * wedge clear strips interproximally and recheck fit
 - * for composite, may sandblast internal surface
 - * for porcelain, treat with hydrofluoric acid
 - * silane
 - * Panavia
 - Mix primer A + B, place on tooth 60 seconds, air dry, mix cement
 - Place cement into preparation and onto restoration
 - Seat onlay (pumice for 60 seconds0
 - Remove excess with brush or rubber tip
 - Put on oxyguard, wait 3 minutes
 - Rinse oxyguard
 - Remove wedges and strips
 - Verify set
 - Finish and polish
- Stony: 3M multipurpose Etch 10-20 seconds

Rinse 5 seconds Dry, leave moist Prime saturate surface Air dry Paint bonding - thin layer with brush Cure 20 seconds

- UTOR: Etching time enamel 30-45 seconds (45 preferred); dentin 10-15 seconds with Ultradent 37% phosphoric acid. 5 seconds minimum Rinsing time -Primer -3M Scotchbond Multipurpose - 2 coats - one coat (disposable brush applicator) ensuring thorough application, air dry; second coat with gentle but thorough drying. Adhesive -3M Scotchbond Multipurpose - one thin coat evenly applied (separate disposable brushes, 10 second curing) Curing Protocols proximal box first increment 30 seconds, successive increments 20 seconds minimum or 30 seconds for deeper preparations and/or darker shades.
- **Boston:** Prime and Bond NT, unit dose
- Tufts: 35% phosphoric acid Ultradent 15 seconds Rinsing completely, no dessication PQ1 single use Scrubbing until glossy surface Brush and air Curing 40 seconds twice or more

III. <u>Regional CODE Agenda</u>

(Please report on responses from all participants)

Is Operative Dentistry more than drilling and filling: How are we educating students to manage caries?

What is your school doing regarding mercury waste at the individual cubicles, preclinic, etc. What is the school doing in general regarding mercury? Are there outside agencies checking waste, including waste water, leaving the school?

- **Howard:** Students must carry amalgam waste in the amalgam well to the teacher's station and empty it into a glycerin-filled container. The waste management team collects it. No outside agencies that we know of are testing the waste water.
- **Temple:** Containers specifically set-up containing fixer and water. These are collected by Environmental Safety department. There is a trap for waste water leaving the building.
- **UMARY:** Mercury waste disposed of in pre-clinical labs and clinic in identified containers. These containers are turned into the Hazardous Materials division on campus for proper disposal. Waste water is not checked.
- **UPENN:** Centralized air tight container in main bays for collection. Waste is collected by facilities and picked up by Environmental Health and Safety division at UPENN. Not currently checking waste water.

Should all Class I Restorations be done using composite?

- **Howard:** Amalgam has a place in Dentistry. I hesitate to say something should be done all the time.
- **UMARY:** No, isolation is an important criteria for a successful posterior restoration, especially with a dental student working without a dental assistant. Maxillary first and second molars and mandibular first and second molars can be problematic for isolation with the multiple step procedure.

IV. National CODE Meeting

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

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

Other suggestions?

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

NAME	UNIVERSITY	PHONE #	FAX #	E-MAIL ADDRESS
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	Columbia Dentoform Company			
	Ultradent Corporation			

CODE REGIONAL MEETING REPORT FORM

REGION: VI (Southeast)

LOCATION AND DATE OF MEETING:

Nova Southeastern University College of Dental Medicine Ft. Lauderdale, FL

October 31 - November 2, 2002

CHAIRPERSON:

Name: Dr. Abby Brodie	Phone #:	(954) 262-7343
Address: NOVA SE College of Dental Medicine	Fax #: (954) 262	2-1782
3200 S University Drive	E-mail:	abrodie@nova.edu
Ft. Lauderdale, FL		

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

Suggested Agenda Items for Next Year:

- I. What is the remediation mechanism for your preclinical Operative course? Please specify for both lecture and laboratory.
- II. What is the remediation mechanism for Operative Dentistry in clinic? Is the need for remediation based on Clinical Competency Exams, periodic clinic grades, or a combination?
- III. How does the curriculum in your school relate biomedical sciences to preclinical Operative Dentistry?

LOCATION & DATE OF NEXT REGIONAL MEETING:

Name: Dr. Paul Blaser	Phone #: (352) 392-4341
Address: University of Florida College of Dentistry	Fax #: (352) 846-1643
1600 SW Archer Road	E-mail: pblaser@dentla.ufl.edu
Gainsville, FL 32610-0415	Date: TBA
Gainsville, FL 32610-0415	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: <u>30 Days post-meeting</u> 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.

2002 NATIONAL CODE AGENDA REGION VI SUMMARY RESPONSES TO NATIONAL AGENDA

The Nova College of Dental Medicine hosted the 2002 CODE Region VI Meeting on October 31- November 2, 2002 in Ft. Lauderdale, Florida. Alabama (UAB) and North Carolina (UNC) were not able to send representatives this year but we did have two members of the Southeast Regional Testing Agency (SRTA)in attendance.

Next year's regional meeting will take place at The University of Florida College of Dentistry in Gainesville, Florida and we would welcome representatives of schools from other regions to join us.

I. Cast Gold Inlays and Onlays

What is their future in Operative Dentistry? Should they be in the curriculum?

There was a general agreement that the use of cast gold is diminishing because of esthetics, however, it should be kept in the curriculum because it provides a very cost effective treatment option for patients due to its longevity. It is useful in training dental students in basic principles of indirect restorative dentistry; it is still an optional clinical procedure for several licensing boards, and it will be the only conservative alternative to tooth-colored materials for posterior teeth if amalgam ceases to be a treatment option.

What should be taught?

Most schools agree that the basic principles and techniques for conservative cast gold should be taught either in a casting course or as part of an integrated inlay course along with composite or ceramic. Much of this instruction occurs in prosthodontics.

Does your school have clinical requirements/expectations for cast gold inlays/onlays?

Four schools do, four schools do not, and one school requires an inlay; the material selection being variable depending on the patient's needs.

Is there a relationship to the Licensure Boards?

The answer depends on geography. Most of our schools are in the SRTA Region and because cast inlays/onlays are a clinical option along with crowns, the answer is yes. For the three non-SRTA schools (UF, Nova, & UPR), the answer is no.

II. <u>Composite Resin Restorations - Posterior</u>

A. <u>DIRECT:</u>

Is your school teaching direct Class II Composite Resin Restoration pre-clinically?

Yes, every school does.

Does your pre-clinical course include a practical exam for direct Class II Composite?

Yes, in five schools; one school offers it as an optional practical that may be required soon. The practical exams are mostly 2 or 3 surface conservative restorations on premolars. UF and Nova also include a complex cusp replacement resin due to the Florida Board Exam.

Are students placing direct Class II Composite Resin Restorations in clinics?

Yes, for every school.

Clinical requirement/expectation for direct Class II Composite Resin Restorations?

Yes, for six out of nine schools. These range from two to five during the third and fourth years. Other schools expect that posterior resins will be placed during the normal course of comprehensive treatment although no expectations exist.

Recommendations/Indications for posterior composite resin restorations?

Details are found in the following pages, however the general consensus includes: Ability to isolate, Enamel margins, Conservative preparations, Esthetic considerations, Premolars over Molars, Occlusion favorable, Low caries index, Potential to strengthen tooth structure with bonding, Confirmed mercury allergy.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enamel surface locations.

Details are found in the following pages, however the general consensus includes: <u>Direct-</u> minimal intervention concepts for outline and depth, rounded line angles, margins are rarely beveled except for esthetics.

Indirect- rarely done, but similar to gold except no bevels and rounded internally.

Describe instrumentation, matrices, materials used for posterior composites.

Lots of details for the various schools are included in the following pages.

Do you have a Clinical Competency Exam for direct Class II Composite Resin Restorations?

Yes, for six of the nine schools. Typically: senior year, double-graded, conservative lesions.

B. <u>INDIRECT:</u>

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restorations in your pre-clinical curriculum?

Yes for most schools, usually an advanced restorative course in the third or fourth year.

Does your pre-clinical course include a practical exam for an indirect restoration?

Yes, for one school only (NSU).

Are students placing indirect Class II Composite or Porcelain Restorations in clinic?

Yes, rarely, limited cases, sometimes in the Prosthodontic clinic.

Do you have clinical requirements/expectations for indirect Composite or Porcelain? Competency Exam?

One school (UPR) has an indirect composite (inlay) requirement in the senior year. No schools have a competency exam for indirect tooth-colored restorations.

Describe your most commonly used adhesive techniques.

Too many details submitted for a summary statement. Please see following pages for details.

2002 NATIONAL CODE AGENDA REGION VI RESPONSES

(Please cite the evidence were applicable)

I. Cast Gold Inlays and Onlays

What is the future of Cast gold inlays and onlays in Operative Dentistry? Should they be in the curriculum? Explain.

- **UF:** Bleak, less and less are being done. They should be in the curriculum. They are still the best available long-term restorations.
- MCG: Their use is diminishing because of lack of education regarding their value as a costeffective restoration when longevity is considered. We have assigned the teaching of cast gold inlays and onlays to the Fixed Prosthodontic curriculum. The sophomore students are instructed in both clinical and laboratory procedures for the fabrication of cast gold inlays/onlays and crowns (RES5002). This course serves as a continuation of Operative Dentistry (RES5001), and builds on what the students learn in psychomotor skills and cavity prep designs and principles. Several years ago we stopped teaching the gold inlay, but because of the SRTA Licensing Exam we put it back in the curriculum. When we teach them, we emphasize the differences and similarities between inlays and onlays for gold vs. tooth-colored restorations. Should SRTA change their exam, we will teach only tooth-colored inlays but will continue to teach onlays for both gold and tooth-colored restorations. In addition to instruction in the sophomore year, the seniors get a short review course (lecture and lab) in the fall (MB 5901), in which they prepare mounted natural teeth for gold inlays and onlays.
- **UKY:** This question will obviously garner highly opinionated responses, but for us the clinical practice of dentistry in Kentucky has gone away from cast inlays & onlays. Weak justification for significant curriculum involvement in our state based on clinical procedures actually accomplished.
- **UofL:** If the literature is considered, gold inlays and onlays remain the standards against which all other restorations are compared. If amalgam is removed from the armamentarium of the dentist in the near future, there must be an acceptable alternative for posterior restorations. Although composite resin performs well when carefully placed, it has not been a proven long-term restoration in heavy stress-bearing areas. Cast gold might be the best option, especially in the hands of practitioners who refuse to use rubber dam isolation nor take the time that is necessary to place the technique-sensitive composite resin restoration. Cast gold inlays and onlays should be in the curriculum. Continued teaching of cast restorations will help in providing the dentist with the necessary skill sets and

appreciation for detail that is necessary to successfully place posterior composite resin restorations.

- Ref:1. Studer SP; Wettstein F; Lehner C; Zullo TG; Scharer P, Long-term survival estimates of cast gold inlays and onlays with their analysis of failures. J Oral Rehabil 2000 Jun;27(6):461-72
 - 2. Willershausen B; Kottgen C; Ernst CP, The influence of restorative materials on marginal gingiva. Eur J Med Res 2001 Oct 29;6(10):433-9
 - 3. Wirz J; Jaeger K, Modern alternatives to amalgam: cementable restorations and inlays. Quintessence Int 1999 Aug;30(8):551-6
 - 4. Trushkowsky RD; Burgess JO, Complex single-tooth restorations. Dent Clin North Am 2002 Apr;46(2):341-65
- **MMC:** Good, if longevity or restored teeth is an issue. The literature supports the longevity of cast restorations when properly placed. They should be in the curriculum because "If dental schools do not teach the proper technique and placement, then who will?" as one distinguished dentist recently commented.
- **USC:** Very limited future. Largely replaced by more esthetic restorations. Cast gold inlays/onlays represent an "art form" much like direct gold with very limited to no patient demand for them. They could be included in the core curriculum if time allows, but more likely should be offered as an elective, since curriculum time is limited.
- **NSU:** Gold has been established as the standard against which all other restorative materials are measured. Unlike so many other restorative materials, it has withstood the test of time over and over again. The well-placed and carefully prepared cast restorations can be esthetic as well as serve its primary function longevity.
- **UPR:** There is no restorative material yet that can provide a durable and lasting restoration as gold does. However, trends in dentistry are oriented to deliver more esthetical procedures. Inlays and onlays should remain in the curriculum because they are still a very valuable option for patient treatment design.
- VCU: The future is dim for cast gold inlays/onlays yet bright for indirect ceramics. Cast gold inlays and onlays should be included in the curriculum since SRTA board has option of inlay vs. gold crown.

What should be taught?

- **UF:** The students should be taught the cast gold inlay and onlay techniques in pre-clinic courses and should do these techniques in the clinic if treatment planned.
- **MCG:** Basic principles and techniques used in the preparation of teeth and subsequent fabrication and delivery of different gold castings and provisional restorations, Cupsproducing castings should always be taught.
- **UKY:** Full coverage restorations, direct/indirect restorative procedures with esthetic materials, and/or amalgam when appropriate.

- **UofL:** All types of cast restorations should remain in the curriculum for the reasons given above.
- **MMC:** Criteria for selecting cases, cavity preparation, wax-ups, casting, and final placement that should include F&P and occlusal analysis. The student should be proficient in the above before selecting their cases to be sent to an outside laboratory.
- **MUSC:** A basic knowledge of cast gold preparation design and manipulation of the cast gold material as taught in Fixed Prosthodontics should be sufficient. For teaching an inlay course or segment, concepts, preparations and cast gold adjustment and cementation.
- **NSU:** Cast gold inlays and onlays are taught in Fixed Prosthodontics courses at NSU-CDM. Cast gold inlays and onlays should continue to be an integral part of any curriculum in restorative dentistry.
- **UPR:** We are teaching inlays and onlays in an integrated fashion. Inlays and onlays cavities are prepared and restored either with gold, composite or ceramic.
- VCU: Inlay and onlay preparation designs and casting techniques should be covered in Fixed Prosthodontics. In addition, indirect tooth colored restorative materials should be introduced.

Does your school have clinical requirements/expectations for cast gold inlays/onlays? What are they?

- **UF:** No; however, these procedures are done if treatment planned.
- **MCG:** We have a cast gold restorations group competency exam for seniors in the fall. They are expected to complete 16 single units of indirect restorations before they graduate. These can be full or partial coverage.
- **UKY:** Students accomplish these castings in pre-clinical courses and also for mock board preparation course.
- **UofL:** Yes, we have very minimal requirements. Students are required to place one cast gold inlay or onlay during junior or senior year.
- **NMC:** Yes 3 gold inlays/onlays in junior year and 3 gold inlays/onlays in senior year. Procedures can be performed on a manikin or live patient. The clinical competency exam for seniors also requires a Class II gold restoration.
- MUSC: No
- **NSU:** Our school continues to have clinical requirements that call for meticulous attention to detail in tooth preparation, casting and finishing on conservative gold restorations.

A gold onlay competency examination requirement is mandatory for all junior and senior dental students.

- **UPR:** We require on3 inlay or onlay during the junior year and the material selections will depend on the indications, patient's expectations and needs.
- VCU: No clinical requirements nor expectations. Students may elect to do inlay on Mock Board Exam (which are a part of their senior operative grade). Students may include cast gold inlay/onlay to patients' treatment plan however, this is done rarely.

Is there a relationship to the Licensure Boards? Explain.

- **UF:** No. These procedures are not required by the Florida Licensing Board.
- **MCG:** As long as the boards require cast gold restorations, we will devote curriculum time to the teaching of cast gold inlays and onlays, along with crowns. Besides the obvious board tie-in, these procedures are useful for reinforcing and expanding on basic Operative Dentistry principles to include such contemporary procedures as tooth-colored inlays and onlays.
- **UKY:** In our opinion, most definitely. If inlays/onlays weren't an option for Southern Regional Boards, these procedures would virtually disappear from student clinic work accomplished.
- **UofL:** Yes. The SRTA requires a cast restoration and the students see the inlay as more viable then placing a core restorations and a crown on the board exam.
- **MMC:** No response
- **MUSC:** Yes. The Licensure boards, by including the inlay/onlay option for cast gold, are dictating the curriculum for the dental schools.
- **NSU:** Not directly. Students must understand engineering principles of tooth preparation design, principles of waxing, investing, casting and finishing a complete gold crown inlay or onlay. This knowledge is relevant to any crown preparation and Prosthodontic exam required by the Florida Board.
- **UPR:** There is no relationship or requirements for the State Licensure Boards.
- VCU: Yes. SRTA has option of preforming an inlay. No great emphasis is placed on them other that lecture exposure and prep of one tooth. A lecture review is given prior to boards for those students considering inlay on the boards.

Composite Resin Restorations - Posterior П.

DIRECT: Α.

Is your school teaching direct Class II Composite Resin Restoration in your pre-clinical curriculum?

UF:	Yes
MCG:	Yes
UKY:	Yes
UofL:	Yes
MMC:	Yes
MUSC:	Yes
NSU:	Yes
UPR:	Yes. We are teaching direct Class II composite in pre-clinical opera
VCU:	Yes. Both freshman and sophomore pre-clinical operative courses.

Does your pre-clinical course include a practical examination for direct Class II Composite Resin restorations? Describe.

UF: Yes. Students are given an exam for a conservative Class II composite resin restoration. An exam is also given for a Complex Class II composite resin restoration with cusp replacement. This exam is dental license board related.

direct Class II composite in pre-clinical operative.

- MCG: No
- UKY: Yes. Our pre-clinical first year composite course has a dentoform exercise accomplishing Class II composites, followed by a practical examination challenge on a dentoform.
- UofL: Not currently. We are considering this addition.
- MMC: No
- MUSC: Only as an optional practical, but it will probably be required beginning next semester.

NSU: Yes.

D-1 typodont exam, 2 or 3 surface, generally a premolar

D-2 typodont exam, 2 or 3 surface, generally a premolar

D-3 typodont exam, 2 or 3 surface with cusp replacement

D-4 typodont Mock Board exam, with cusp replacement

- **UPR:** Yes. The following criteria are evaluated: Rubber dam placement, internal and external cavity preparation outline (Class II MO or DO in premolars), and restoration.
- **VCU:** Yes, preparation and restorations of MO or DO premolar.

Are students placing Class II direct Composite Resin Restorations in clinics?

- UF: Yes
- **MCG:** Yes. An individual Class II composite resin restoration competency exam occurs in the senior year. The students are encouraged to have at least 5 experiences in Class II composite resin before they attempt the competency.
- **UKY:** Yes, definitely.
- **UofL:** Yes, in selected cases. Amalgam remains our preferred direct posterior restorative material. One reason is the difficulty in obtaining consistently good contacts and the adequacy fo the gingival margin.
- MUSC: Yes. REF: Opdam NJ; Roeters FJ; Feilzer AJ; Smale I, A radiographic and scanning electron microscopic study of approximal margins of Class II resin composite restorations placed in vivo. J Dent 1998 May;26(4):319-27
- MMC: Yes
- NSU: Yes
- UPR: Yes
- VCU: Yes

Do you have a clinical requirement/expectation for Class II direct Composite Resin Restorations?

UF: Yes. There is a clinical requirement for the students to demonstrate competency in the preparation fan restoration of a Class II composite.

- MCG: See answer above.
- **UKY:** We expect students to place Class II resins when appropriate to the clinical application in all clinical years . . . 2nd through 4th.
- **UofL:** No. If the pre-clinic course changes its emphasis, the clinic will follow.
- MMC: No
- MUSC: Yes
- NSU: Yes
- **UPR:** Yes, at least two different composites for the junior year. Senior year students are required to complete the necessary treatment of all assigned patients at the Integral Clinic (Complete Patient Care) including composite restorations.
- VCU: Not directly. It is inconceivable a student would not have provided Class II direct composite resin restorations on numerous patients. Both junior and senior operative students have a clinical productivity element (based on point value per procedure) which factors in their grade.

What recommendations are taught for the placement of posterior composite resin restorations: Class I, Class II, direct, and indirect?

- **UF:** Class I, Class II, Direct:
 - Proper isolation
 - Small conservative preparation
 - Esthetically important areas
 - Restoring teeth that can be strengthened by a bonded restoration
 - Repair and/or refurbishing of existing restorations

Indirect:

- Proper isolation when cementing
- Conservation of tooth structure
- Esthetically important areas
- Restoring teeth that can be strengthened by a bonded restoration
- Better control of anatomy and proximal contours and contacts
- Better control of shrinkage
- Need for harder, stronger material

Following finishing, re-etch margins and apply sealing resin

MCG: Class I, Class II, Direct:

- 1. Cavity Preparation:
 - Follow ADA guidelines for posterior composites:

Rubber dam isolation, minimal invasive preparation; isthmus width should be narrow, prefer all margins on enamel.

- Remove decay only; do not include non-carious fissures in preparation.
- Adhesive preparation concept (Lutz, 1996).
- 2. Restorative procedure:
 - Total etch concept (Nakabayashi and Pashley, 1998); acid etch entire surface of preparations/rinse.
 - Use ultra-thin metal matrix with traditional Tofflemire matrix band holder or a segmental band for small Class II. Easier clinical placement than transparent matrix systems (Smith et. al., 1997: Van Dijken, Horstedt and Waern, 1998).
 - Elastic layering concept is used. We subscribe to the stress breaker concept however, we prefer to use thicker filled bonding layers on internal walls of preparations instead of flowable resins. Bases and liners are used judiously. Previous clinical study reported high percentage of fractured composite resin with glass-ionomer bases (Ernst et al, 2001; Van Dijken, 1994).
 - Use titanium nitride-coated instruments for handling composites.
 - Use incremental curing (~2.0mm) safer to reduce stress on enamel walls from polymerization shrinkage. Some manufacturers recommend bulk curing up to 5.0 or 6.0mm in depth because the ceramic fibers are claimed to conduct light. Our research shows that most materials should not be cured at depths greater that 2.5 to 3.0mm.
 - Slightly over-fill beyond cavosurface margins and use a burnisher to create occlusal anatomy. Finish and polish using the same procedures and instruments as for anterior resin composites.
- **UKY:** Considerations relative to prep size, arch location , occlusion and caries activity.
- **UofL:** The "ideal" teeth to consider for these restorations are the premolars and the mesial of the first molar.
 - The preparation should be as conservative as possible, preferably with tooth-totooth contact with the opposing tooth.
 - Proximal contacts should remain tooth-to-tooth when possible.
 - When the gingival floor is deep (very little remaining enamel), place an extended resin-modified glass ionomer base, not flowable resin.
 - No beveling of the occlusal margins.
 - Incremental fill.

REF:

- 1. Andersson-Wenckert IE; van Dijken JW; Horstedt P, Modified Class II open sandwich restorations: evaluation of interfacial adaptation and influence of different restorative techniques. Eur J Oral Sci 2002 Jun;110(3):270-5
- 2. Bijella MF; Bijella MF; da Silva SM, In vitro quantitative evaluation of marginal microleakage in Class II restorations confected with a glass ionomer cement and two composite resins. Pesqui Odontol Bras 2001 Oct-Dec;15(4):277-82
- 3. Hagge MS; Lindemuth JS; Mason JF; Simon JF, Effect of four intermediate layer treatments on microleakage of Class II composite restorations. Gen Dent 2001 Sep-Oct;49(5):489-95
- 4. Loguercio AD; Alessandra R; Mazzocco KC; Dias AL; Busato AL; Singer Jda M; Rosa P, Microleakage in Class II composite resin restorations: total bonding and open sandwich technique [In Process Citation] J Adhes Dent 2002 Summer;4(2):137-44

MMC: 1. Isolation with rubber dam

- 2. Medium to small lesions
- 3. Minimum occlusal load or stress areas
- 4. Pre-wedging (Class II)
- 5. Build-up of composite in 2mm stages.

No indirect composite restorations are placed in the Operative clinics

MUSC: Indications:

Esthetics is an overriding consideration.

Occlusion can be maintained mainly by natural tooth structure and the restoration can be kept small (direct).

Certain instances when strengthening of remaining tooth structure supercedes other considerations.

Low caries index and good oral hygiene.

The patient strongly refuses silver amalgam.

Allergy to mercury has been confirmed (rare).

Contraindications:

Maximum durability is desired.

Presence of high caries index and/or poor oral hygiene.

Margins cannot be maintained on enamel (particularly gingival margin).

Occlusion will be maintained mainly by the restoration.

Field isolation is impossible or compromised.

Placement recommendations:

Must have good isolation of the operative field.

Pre-wedge during preparation.

Incremental placement of composite.

Flowable composite of gingival margin.

Anatomic placement of composite as much as possible.

NSU: Direct Class I and Class II composite resin:

- 1. Treatment planning considerations: esthetics, caries index, oral hygiene, patient preference, ability to isolate with rubber dam, non-stress-bearing areas of occlusion.
- 2. Conservative tooth preparation removal of diseased tissue, bevels placed only if esthetically indicated.
- 3. Total etch and wet bonding.
- 4. Flowable composite at gingival margin, incremental placement of composite resin.

Indirect Class I and Class II composite resin:

Same indications and contraindications as for indirect porcelain inlays and onlays. Differences include: cost, esthetic results, kinder to opposing occlusion. These restorations are not being done at this time in the pre-doctoral clinic, but are taught in the D-3 Cosmetic Dentistry pre-clinical course.

- **UPR:** Shade selection prior to rubber dam placement
 - Rubber dam isolation
 - Pre-wedging for Class II cavity
 - Total etch technique
 - The use of liner (ionomer hybrid or flowable composite) for medium to deep cavities
 - Incremental placement of composite
 - Light-cured of each increment for 40 seconds
- **VCU:** 1. Narrow occlusal width no more than $\frac{1}{3}$ the intercuspal width.
 - 2. Enamel based gingival floor (of boxes) for Class II.
 - 3. No onlays.
 - 4. Composite resin not for indirect placement clinically, however, pre-clinical exercise does include indirect Class II composite resin with cementation.

What factors, considerations come into place when making the recommendation to place posterior composite resin restorations?

- **UF:** Conservation of tooth structure, occlusion, ability to isolate, esthetics, cost, marginal integrity, reinforcement of tooth.
- **MCG:** Esthetics, occlusion, cavity size, ability to isolate, margins, (enamel), and patient desires.
- **UKY:** Small to moderate preparation size preferably with all-enamel margins when possible, more anteriorly in the arches, without heavy occlusal forces being generated including bruxism, and low caries rate preferred.
- **UofL:** Para-functional activity on the restoration (bruxing), location (premolar, molar), size of the restoration, (ideally, the width should not exceed 1/3 of the intercuspal width of the tooth), location of the gingival margin, cannot maintain adequate isolation (rubber dam is ideal), oral hygiene of patient, skill level of the student, desire of the patient.
- **NMC:** Esthetics, patient preferences, skill level of the student.
- **MUSC:** Occlusion, esthetics, extent of lesion, ability of the operator, ability to adequately isolate the operative field, a patient's oral hygiene, future treatment options for the tooth, cost.
- **NSU:** Treatment planning options, esthetics, ability to isolate, size of lesion, occlusion, patient preference, oral hygiene, caries index, allergy.
- **UPR:** Patient consent, oral hygiene, caries index, age, economic, esthetic demands, stable occlusion (no traumatic occlusion or heavy broad contact), patient with positive patch test to any of the amalgam components, indirect restoration when replacing a

cusp or capping a cusp and when the proximal cavity extends widely bucco-lingually and gingivally.

VCU: Conservative preparation design, no onlay of cusps, enamel margins.

Describe the preparation for each class (direct or indirect). Discuss margination for enamel and non-enameled surface locations.

- UF: Direct convenience form for removal of carious materials and thin unsupported enamel. Rounded internal form, butt joints on proximal and occlusal margins, bevel enamel margins except on Class I and Class II restorations (beveling of occlusal margins for better shade blending on highly visible surfaces may be considered).
 Indirect divergent walls, rounded internal line angles, minimum of 1.5mm occlusal clearance, flat pulpal and gingival floors, 60° 90° cavosurface margins, inlays butt margins and no bevels, onlays deep chamfer (shoulder type) finish lines on buccal and lingual allowing a minimum of 1.0mm of restorative material, extensions similar to cast gold inlays, onlays, undercuts do not have to be eliminated (can be blocked with resin ionomer or hybrid composite).
- **MSG:** Minimal intervention concepts are used. Preparation is dictated by convenience for caries removal and restoration placement. No occlusal bevels for direct composites. Accessible interproximal margins may be beveled for esthetics and to enhance bonding. Indirect composite preps (rarely done) have occlusal chamfered margins, Interproximal cavosurface angles are 110 1209 degrees.
- **UKY:** Conservative preparation designs with caries extent determining outline form. Nonbeveled preparations utilized generally both in enamel and non-enameled surfaces except where esthetic bonding in cosmetically apparent areas (but not occlusally) are a consideration wherein scalloped bevels would be recommended in enamel. We are not placing indirects currently.
- **UofL:** Mark the occlusal contacts
 - Attempt to maintain tooth-to-tooth contact with opposing tooth.
 - Attempt to maintain tooth-to-tooth contact with adjacent tooth.
 - Approximately parallel walls.
 - Rounded internal line angles.
 - Minimal depth of pulpal floor (1.5mm, not necessarily in dentin).
 - Maintain margins in enamel, if possible.
 - No retention grooves.
 - No beveling of any margin.
- **MMC:** Discuss margination for enamel and non-enameled surfaces locations. Direct margins are placed on sound, supported enamel, with no CSA bevel when possible. This includes Class I and Class II lesions. If the cementum is involved, a flowable is used, with mechanical retention if necessary.
- **MUSC:** The outline form for the Class II cavity preparation should be <u>as conservative as</u> <u>possible</u>. Access should be gained with small, round-ended fissure diamonds. The

occlusal isthmus should be narrow and extend to a depth of 1.5mm where noncoalesced pits and fissures are present. Extension into dentin is not necessary on the occlusal surface except to excavate caries. Facial and lingual walls should be parallel or slightly convergent and uninvolved proximal walls (when present) should not be undermined. The occlusal outline should flow into a box form which extends facially and lingually until contact is just broken. An explorer tip should be able to pass between the margin and the proximal tooth. The gingival wall should be extended until contact is minimally broken with the adjacent tooth. Care should be taken to maintain the gingival margin in enamel. Occlusal, facial and lingual cavosurface margins of the box should be slightly obtuse so as to involve a greater area of the ends of enamel rods for etching and ensure no unsupported enamel rods. Heavy beveling of the occlusal, facial, lingual and gingival walls of the box is not advocated. The gingival margin should be planed with a gingival margin trimmer to assure no unsupported enamel rods remain. Occlusal margins are usually not beveled, especially where occlusal contact from opposing teeth is expected. Thin composite over bevels will not endure if it is function. A slightly obtuse cavosurface angle, created with a diamond, is the preferred marginal design. Slightly rounded internal line angles as well as a rounded axiopulpal line angle are suggested.

- NSU:Direct Class IRemoval of diseased tissue and/or existing restorative material,
rounded internal line angles.Direct Class IIRemoval of diseased tissue and/or existing restorative material,
breaking of contacts minimal, bevels in areas of esthetic
consideration, rounded internal line angles.Indirect Class IDivergent walls, rounded line angles, 1.5 -
2.0mm
occlusal reduction (for onlays), butt joint finish line.
- UPR: The preparation for <u>direct posterior composite</u> is defined by the extension of the caries or the cavity extension when replacing previous restorations. Undercuts are blocked out with hybrid ionomer to conserve sound tooth structure, axial and pulpal walls are covered with a liner in medium to deep cavity to control postoperative sensitivity, enamel is beveled when available, proximal gingival walls are finished butt-joint.
 <u>Indirect composite preparation</u> with divergent walls, shoulder chamfer, finishing line when capping cusps and butt-joint margins at proximal gingival seats, undercuts are blocked out and exposed dentin covered by a liner.
- VCU: Similar to amalgam preparation (utilizing 330 bur), retention grooves optional, bevel flares 0.5mm.

Describe all the instrumentation utilized (burs, diamonds, air abrasion, laser, others).

- **UF:** Burs, diamonds, assortment of polishing points, cups, polishing discs.
- MCG: The burs used for direct composite preparation are the same for amalgam. We have the ET Esthetic Trimming Diamond kit (30 micron/fine and 15 micron/extra fine) for finishing composites along with Prisma Gloss Polishing Paste. In clinic, we have several chair-side air abrasion units (Danville Engineering, Micro Prep) that students can check out if their use is indicated. We have other high tech

air abrasion units (Midwest Airtouch) for demonstration purposes and for use by faculty members. Currently, we do not teach or use lasers for cavity preparation.

- **UKY:** Conservative preparation designs with caries extent determining outline form. Nonbeveled preparations utilized both in enamel and non-enameled surfaces except where esthetic blending in cosmetically apparent areas (but not occlusally) are a consideration wherein scalloped bevels would be recommended in enamel. We are not placing indirects currently.
- **UofL:** Burs: 329, 330, 245; finishing burs: 7006, 7901, 7406; Enhance points/cups; Soflex discs; Bard Parker 12.

MMC:Brasseler USA856-012, 856-018, 856-016, 855-014, 862-012,Diamonds8862-12, 368-016, 6368-023, 6885-012, 10839-016.

MUSC: Small round-ended fissure diamonds primarily.

NSU: Burs: 329, 300, small round, 7901, ETR burs, assorted (Brasseler, Enhance, Sofu, Ultradent) points, cups, discs, brushes, fine and extra-fine diamond mesh finishing strips.
 Indirect restorations: round-ended tapered diamond, end-cutting diamond, other diamonds, finishing and polishing burs and materials.

- UPR:
 Direct:
 245/330/ET Burs/rubber points and wheels/strips/Cosmedent Finishing Kit.

 Indirect:
 169/inlay preparation kit - Brasseler/diamond points/Soflex Disks/rubber points and wheels.
- **VCU:** High, medium and low speed utilizing the following burs: 330, 169L, 7901, 56, ¹/₄ round for retention grooves and #2 6 for caries removal.

What means are utilized to establish contour and contacts on the Class II Restorations? (circumferential, sectional matrixes, rings, wedge-wood, plastic, other).

- **UF:** Contact matrices with rings, thin circumferential matrices with Tofflemire retainer, sectional matrices, wood wedging as needed.
- **MCG:** We teach all available techniques to achieve good contacts in Class II composites. We have the ComposiTight sectional matrix. We do not use plastic wedges.
- **UKY:** Tofflemire matrices and/or sectional matrices utilized with traditional wedging with wooden, contoured wedges in conjunction with ComposiTight Rings.
- **UofL:** Pre-wedging, sectional matrix is available, Toffelmire is available, wood wedges.
- **MMC**: 1. Pre-wedge before starting operation
 - 2. Burnished metal matrix strip

- 3. Wood wedges
- **MUSC:** Any means available! Pre-wedging (we use wood), sectional matrix, HO Band, prepolymerized bead, internal burnishing of matrix.
- **NSU:** Sectional matrix and spring-action ring (Bitine). Dead soft matrix in Toffelmire or conventional matrix band in Toffelmire retainer. Burnished contact area of band. Wooden or plastic wedge.
- **UPR**: Pre-wedging (wedge-wood), burnished conventional metal band.
- **VCU:** All of the above are available and encouraged.

What materials or combination of materials are utilized in the restoration. Identify all materials used. (filled sealant, flowable composite, composite-hybrid, microfill, glass ionomer - traditional, resin modified, other).

- UF: Delton Sealants

 Heliomolar Flow repairs and small, shallow restorations, lining of gingival area of Class II preparations prior to placing composite resin restoration
 Z 250 Class I, Class II
 Durafill Class V, veneers, Class III
 Fuji II LC Class V
 Ketac Fil Class V, Temporaries
 Ketac Silver Class V, Temporaries
- MCG: Filled Sealant Ultraseal XT Flowable Composite - None in student clinic. Hybrid Composite - Prodigy, Point 4, Esthet-X Microfill Composite - Durafill Glass Ionomer - Vitrebond, Fuji II LC, Fuji IX
- **UKY:** Phosphoric acid etching (total etch), primarily Optibond FI bonding agent, with a small particle composite such as Herculite XRV or Esthet-X most often. For large anterior restorations such as Class IVs or diastema closures, a core of small particle composite is overlayed with a microfilled veneer such as Durafill. A microfill might be considered for a veneer. GC Lining LC is available as an optional liner if the supervising faculty deem it appropriate for the clinical presentation.
- **UofL:** Calcium hydroxide
 - Fuji II LC
 - Optibond Solo Plus
 - Esthet-X
 - Flowable resin never
- **MMC:** Flowable composite
 - Hybrid composites

- Ca(OH)₂ and/or glass ionomer in deep lesions
- Microfill on anterior teeth
- **MUSC:** Flowable composite (Revolution), Hybrid or Microhybrid composite (Prodigy and Point 4), Filled sealant (Fortify).
- NSU: Pit and Fissure sealant Natural Elegance (Henry Schein) Etch – Etch-Rite (PulpDent) 38% phosphoric acid Adhesive bonding system – Prime and Bond NT Flowable composite resin – DyractFlow - gingival margins, shallow occlusal pits and fissures Hybrid composite resin - Esthet-X Ca (OH)₂. Light cured Dycal – indirect pulp capping Glass ionomer liner – Vitrebond Fermit-N - temporaries
- **UPR:** Direct composite: Liner for medium or deep cavities; etching with 35% phosphoric acid (30 seconds), adhesive (Single bond-3M or Prime & Bond NT-Denstply), flowable composite (Filtex Flow-3M) or hybrid ionomer (Vitrebond-3M) or compomer (Dyract Flow-Dentsply), followed by composite resin hybrid (Z100-3M, or TPH Spect-Dentsply), followed by sealing any remaining deep fissure (Denton-Kerr or Ultraseal-Ultradent).
- **VCU:** 1. Composite resins: Z100, Esthet-x for Class IV and veneers
 - 2. ScotchBond Multipurpose bonding system
 - 3. Revolution for liner and repairs Flowables not used occlusally
 - 4. RMGI (Fuji II LC) for root caries and temporary restorations for rampant decay cases.
 - 5. Vitrebond
 - 6. Dycal

Describe the indications for the utilization of which material or material combinations.

- р
- UF: See above.
- MCG: Filled Sealant Sealant only or with composites in PRR.
 Flowable Composite None in student clinics.
 Hybrid Composite All-purpose anterior and posterior.
 Microfilled Composite Anterior, low stress restorations.
 Glass Ionomer Liners and bases, block out for indirects, Class V
- **UKY:** Small particle hybrids in posterior regions or stress-bearing anterior areas. Microfills can be used in non stress-bearing esthetic areas most often as a veneer or over a small particle composite resin 'core'.

- **UofL:** Calcium hydroxide only to spot line an exposure or near exposure; covered with Fuji II LC
 - Fuji II LC when a base is needed; as an extended base in a deep Class II box
 - Optibond Solo Plus always
 - Esthet-X
 - Flowable resin never
- **MMC:** Microfill on anterior and Class V, with flexing
 - Hybrid on posterior teeth flowable in proximal/cervical
 - Glass ionomer in high caries areas
- **MUSC:** Flowable Gingival margin and as a thin liner.
 - Hybrid or microhybrid composite placed incrementally to form the body of the restoration.
 - Filled sealant placed after finish/polish to seal margins.
- **NSU:** See above.
- **UPR:** The protocol described above.
- **VCU:** This is an all-inclusive question with multiple permutations; for brief description, see above.

Do you have clinical requirements/expectations for direct Class II Composite Resin Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

- **UF:** Number of and procedure type competencies per semester.
- **MCG:** We expect students to do at least 5 direct Class II composite restorations (total) for experience prior to attempting the competency exam in the senior year.
- **UKY:** Our expectations are for all students in the clinic to use posterior composites when consistent with the patient's diagnosis and treatment plan. We have no clinical "requirements".
- **UofL:** No requirements.
- **MMC:** No. The students perform Class II composites as a "selective case" that meets the criteria of composite placement.
- **MUSC:** Yes, for the total clinical experiences. Actual number will vary based on student competency.

- **UPR:** Yes, at least 2 direct composites for the junior year (3rd). Senior year (4th) students are required to complete the necessary treatment of all assigned patients at the Integral Clinic (Complete Patient Care) including composite restorations.
- **NYC:** Yes. 3rd and 4th year students have requirements. 4th year students also have clinical competency examinations for Class II composite resin restorations.
- VCU: No specific requirements or number of Class II composite resin restorations are expected of 3rd or 4th year students. Again, it is inconceivable a student would not have performed this restoration on several patients.

Do you have a Clinical "Competency" examination for direct Class II Composite Resin Restorations? Describe.

- **UF:** Yes. It is mandatory that students show competency in doing a Class II composite resin restoration.
- MCG: Yes, an individual competency exam is required in the senior year.
- **UKY:** Yes, we will have our first clinical competency for Class II Composites beginning in the spring of 2003. A student will "declare" to covering faculty that a competency will be taken. Faculty will review the case as to appropriateness of care, then evaluate at specific steps to assess care rendered and assure patient's welfare is not compromised. No feedback during the procedure by Faculty will be given unless patient care is at risk. Completed restoration will be "graded" as meeting competency or not. Failure to demonstrate competency will require another procedure be accomplished until competency met.
- **UofL:** No competency exam.
- MMC: No.
- **MUSC:** Yes. Student is evaluated by two clinical faculty during the procedure. Evaluation based on specific written criteria which are available to the student prior to the exam.
- **NSU:** Yes. 3rd year students typodont examination. 4th year students - Clinic competency exam. Mock Board typodont exam.
- **UPR:** Yes, starting this year, 4th year students are required to bring a patient for a competency exam in Class II posterior composite. Proximal lesions with radiographic evidence in dentin (medium deep or less MO or DO) in premolar and molars. Tooth need opposing and proximal dentition to be accepted for exam.
- **VCU:** No, however 3rd year students undergo case-based clinical simulations in which they may elect to prepare and restore with a composite resin. Justification for restorative material selection is an essential element of exercise as well as skill competency.

Β. INDIRECT:

Is your school teaching indirect Class II Composite Resin and/or Porcelain Restorations in your pre-clinical curriculum?

- UF: Yes, we teach these procedures in an advanced pre-clinical course between the 3rd and 4th years.
- MCG: Yes, in the esthetic dentistry course in the fall of the junior year.
- UKY: Didactically only.
- UofL: Not pre-clinic. It is taught in a fall semester, senior course.
- MMC: No.
- MUSC: Yes.
- NSU: Yes.
- UPR: Yes.
- VCU: Yes, lecture and one simulation of preparation, fabrication and cementation of Class Il indirect composite resin.

Does your pre-clinical course include a practical examination for an indirect Class II Resin and/or Porcelain Restorations. Describe examination.

- UF: No MCG: No UKY: No UofL: N/A MMC: No MUSC: No. A laboratory exercise involving tooth preparation and laboratory fabrication of an indirect Class II resin restoration is done by each pre-clinical student. NSU: Yes. There is a laboratory exercise in preparation and fabrication of an indirect MOL in resin restoration and practical lab examination in preparation porcelain crown. UPR:
 - No, but students are evaluated for gold cavity preparation and restoration including cementation.

VCU: No.

Are students placing Class II indirect Composite Resin and/or Porcelain restorations in clinics?

UF: Yes.

- **MCG:** We have done a limited number of cases for Class II indirect composite resin and/or ceramics using standard hybrid composites or Empress II. We have just acquired two CEREC 2 machines for use in our Esthetics course. Several faculty have participated in training sessions and have been certified. It is anticipated that these machines will be used in the upcoming semester for selected cases.
- UKY: Very rarely.
- **UofL:** Not generally. If they are done, it is with a specific faculty member in Prosthodontics.
- **MMC:** They place porcelain veneers composite veneers are done at the chairside.
- **MUSC:** Yes during senior year in Esthetic Clinic. Experience depends on the needs of the student's assigned patients.
- **NSU:** Yes, optional and on a limited basis: porcelain veneers and porcelain onlays. Indirect porcelain restorations are placed only with designated faculty.
- UPR: Yes.
- **VCU:** Yes, but on a limited basis.

Do you have clinical requirements/expectations for indirect Class II Composite Resin and/or Porcelain Restorations? If so, it is for 2nd, 3rd or 4th year or for the total clinical experiences. What are the requirements/expectations?

UF: No.
MCG: No.
UKY: No.
UofL: No requirements.
MMC: No.
MUSC: No.
NSU: No.

UPR: Yes, at least one indirect composite inlay is expected from the senior year students.

VCU: Not directly. Students may elect to provide these treatments if patient meets criteria and can afford treatment.

Do you have a Clinical "Competency" examination for indirect Class II Composite Resin and/or Porcelain Restorations? Describe.

UF:	No.
MCG:	No.
UKY:	No.
UofL:	No competency exam.
MMC:	No.
MUSC:	No.
NSU:	No.
UPR:	No.
VCU:	No.

Describe your most commonly used adhesive techniques for direct and indirect Restorative Dentistry. Include products used, specify single or multi bottle systems, etching times (if a separate step), rinsing times if appropriate, primer/adhesive application (scrubbing times, etc), thinning techniques, if any (air vs brush), curing protocols, etc.

- **UF:** Direct: Durafill, Z-250, Adhesive techniques are done according to manufacturer's recommendations.
 - Indirect: Sinfony, IPS Empress, Artglass, Targis Vectris, BelleGlass HP, Resin cements, Variolink II (Ivoclar-Vivadent), Rely X (3M/ESPE), Adhesive techniques are done according to manufacturer's recommendations.
- **MCG:** We are currently using two-bottle Optibond FL primer and adhesive in our student clinics according to the manufacturer's instructions. Prime and Bond NT was introduced in the freshman Operative course last year as the first step in changing to a single bottle, unit dose system. All adhesives are used as directed.
- **UKY:** Direct : Total etch (dentin 10-15 seconds, enamel 15-45 seconds)
 - Optibond FL applied as per manufacturer's recommendations.

- Resin placed incrementally and generally cured from occlusal direction in posterior restorations, however, didactically present the idea of curing 'toward the margins' of boxes.
- **UofL:** Etch 15 seconds
 - Wash 15 seconds
 - Blot dry or gentle air dry
 - Optibond Solo Plus 15 second application with light scrubbing
 - Cure 15 seconds
 - Ref: 1. Miyazaki M; Tsubota K; Onose H; Hinoura K, Influence of adhesive application duration on dentin bond strength of single-application bonding systems. Oper Dent 2002 May-Jun; 27(3):278-83
 - 2. Mathew M; Parameswaran Nair EK; Krishnan K, Bonding agent is a decisive factor in determining the marginal leakage of dental composites subjected to thermal cycling: an in vitro study. Oral Rehabil 2001 Jan;28(1):68-77
 - 3. Johnston CD; Burden DJ; Hussey DL; Mitchell CA, Bonding to molars--the effect of etch time (an in vitro study). Eur J Orthod 1998 Apr; 20(2):195-9
 - 4. Gardner A; Hobson R, Variations in acid-etch patterns with different acids and etch times. Am J Orthod Dentofacial Orthop 2001 Jul;120(1):64-7
 - 5. Dorfer CE; Staehle HJ; Wurst MW; Duschner H; Pioch T, The nanoleakage phenomenon: influence of different dentin bonding agents, thermocycling and etching time. Eur J Oral Sci 2000 Aug;108(4):346-51
 - 6. Osorio R; Toledano M; Garcia-Godoy F, Bracket bonding with 15- or 60-second etching and adhesive remaining on enamel after debonding. Angle Orthod 1999 Feb;69(1):45-8
 - 7. Pioch T; Stotz S; Buff E; Duschner H; Staehle HJ, Influence of different etching times on hybrid layer formation and tensile bond strength. Am J Dent 1998 Oct;11(5):202-6
- **MMC:** 1. Optibond Solo Plus Kerr, 15% filled fluoride, single bottle
 - 2. Prime and Bond NT Caulk, single bottle
 - 3. Clearfil SE Bond Kuraray America, 2 bottle system
 - 4. Etching time 15 seconds for systems that require acid etch.
 - 5. Rinse for 30 seconds or as specified by product.
 - Students are instructed to "scrub" solution into dentin and then with air (gentle flow) - Cure for 10- 15 seconds - for bond material.
 - Composite material is applied in 2-3mm increments and cured for 20 seconds each increment.
- MUSC: <u>Direct posterior composites:</u> Clearfil SE Bond.

Other considerations when using Clearfil SE Bond:

Use Primer and Bond within 3 minutes of dispensing.

Protect both Primer and Bond from light. P&B polymerize under invisible light, especially UV light components. Soft tissue contacted by Primer may turn white. This is due to protein coagulation and will disappear in a couple of days. Primer alone does not sufficiently condition uncut enamel. If bonding to uncut enamel is desired, must acidetch the uncut enamel for 10-15 seconds with phosphoric acid.

Indirect Restorations:

Adhesive technique varies depending on preferences of supervising faculty. Generally we use Optibond Solo Self-Etch/dual cure.

NSU: <u>Direct Restorations:</u>

Total etch - 38% phosphoric acid - 15 seconds; water rinse - 20 seconds; blot dry technique.

Prime and Bond NT - according to manufacturer's specifications.

Indirect Restorations:

instructions.

Total etch - 38% phosphoric acid; water rinse - 20 seconds; blot dry technique. Prime and Bond NT - according to manufacturer's specifications. Calibra Resin Cement - according to manufacturer's specifications.

UPR: Cavity preparation, total etch (30 seconds) with 35% phosphoric acid, rinse with water (5 seconds), blot dry (5 seconds), Single bottle adhesive: Single bond-3M or Prime&Bond NY-Dentsply (application 10 seconds), air-thinning (3 seconds), light-cured (20 seconds), Liner for medium to deep cavities: flowable composite (Filtrex Flow-3M) or hybrid ionomer (Vitrebond-3M) or compomer (Dyract Flow-Dentsply). Composite resin: Z100-3M, TPH Spectrum-Dentsply(incremental placement of 2mm and each increment light-cured for 40 seconds) Indirect Restorations: Concept System resin for inlays-Williams or Z100-3M or TPH Spectrum-Dentsply, Composite Resin Cement: Enforce or Calibra-Dentsply, RelyX ARC-3M (dual cured cements). Ceramic or metal restorations are adhesively cemented according to manufacturer's

VCU:

- 1. ScotchBond Multipurpose manufacturer's specifications.
 - 2. Nexus 2- manufacturer's specifications for indirect and veneers.

2002 NATIONAL CODE AGENDA REGION VI SUMMARY RESPONSES TO REGIONAL AGENDA

The Regional Agenda Questions were submitted by The University of Florida and Nova Southeastern University.

Are repairs and/or refurbishing of restorations taught in the operative curriculum? Are these procedures also taught on the clinic floor?

There was no consensus on teaching this subject. Most at least present the factors to be considered in deciding to repair or replace a restoration. Clinical activities to support this are variable and up to the individual faculty.

Is the pin technique as a retentive/resistant feature in placing complex amalgam restorations taught in the preclinical operative curriculum?

Yes, unanimously along with other forms of mechanical retention.

Is amalgam bonding technique being taught in the operative preclinical curriculum? What guidelines are taught for use of amalgam bonding?

All but one school (UPR) teaches this subject. Amalgam bonding is done when adequate isolation is present and it is used as supplemental retention and for sealing.

Are indirect and direct pulp capping procedures taught in the operative curriculum? What materials? One or two-step procedure for indirect pulp capping?

All schools teach pulp capping in operative (some with endodontics). Calcium Hydroxide followed by a Glass Ionomer base are standard materials. One or two-step procedures are variable.

Who is using DIAGNOdent® for caries diagnosis?

Half do and half do not. One school (VCU) routinely uses it in treatment planning and operative clinics.

Is the Medical Management of Caries (non-surgical) taught? How is it monitored?

Most schools do teach it. Two schools do Caries Risk Assessment on every patient. Others do selective risk assessment. Monitoring is by faculty and students. One school has a related competency exam.

What protocol is taught for diagnosing secondary caries (apart from radiographs)?

Visual, Tactile, Trans-illumination, Patient History, Indicator Dyes.
How much time is designated in your curriculum for operative dentistry, direct restorations? Where is it placed in your curriculum?

The average answer was 1-2 semesters in the Freshman and occasionally into the Sophomore year. The time allotted as 1-3 half days per week, variable. Some schools have an additional course- Advanced Operative or Esthetics in the Junior year.

Do you have a clinical competency exam in Cl III / other anterior composite resin?

All schools do (Class III or IV), mostly in the Junior year.

Does your patient pool provide the students with sufficient virgin Class II lesions?

No or minimally adequate supply.

Has there been a shift in the number of live patient examinations vs. typodont exams in your program?

Most have not added more typodont exams.

III. Regional CODE Agenda

Are repairs and/or refurbishing of restorations taught in the operative curriculum? Are these procedures also taught on the clinic floor?

- **UF:** Yes. Repairs and/or refurbishing of restorations are taught in the Operative course and also taught and emphasized on the clinic floor.
- **MCG:** Repairs are taught only in theory in the lecture portion of our pre-clinical Operative Dentistry course. Finishing and polishing for all direct restorations is taught and preformed in the pre-clinical lab which includes the basic principles for "refurbishing". When identified in the oral medicine clinic during work-ups, these procedures are listed as "margination" in the treatment plans. Repairs are done clinically when indicated although this is up to the individual clinical faculty. We probably repair restorations done at MCG more frequently than those of unknown origin.
- **UKY:** Repairs/refurbishing of restorations are not taught specifically as a lecture, but are mentioned as an option to consider without real technique specifics. The techniques are however utilized on the clinic floor when felt appropriate by supervising faculty and taught chairside one-on-one.
- **UofL:** Repairs/refurbishing of restorations is taught in the pre-clinic Operative course. Whether they are done in the clinic is up to the discretion of the faculty. They are not "taught' on the clinic floor, per se.
- **MUSC:** Yes. Procedures are taught on the clinic floor even more than in pre-clinic.
- **NSU:** Repairs to existing restorations are taught in the pre-clinical curriculum with regard to composite resin more so than to amalgam. Clinical application of repairing restorations is done very selectively in the pre-doctoral clinic.
- **UPR:** Not formally. Special situations.
- VCU: No (teaching), but it may be discussed in appropriate lectures.
 Yes (procedures), more so composite than amalgam. Close contacts, small carious lesions at margin of extensive restoration, etc.

Is the pin technique as a retentive/resistant feature in placing complex amalgam restorations taught in the preclinical operative curriculum?

- **UF:** Yes. Other retentive/resistant features such as slots, grooves, locks and amalgam bonding are also taught. Placement exercises are required in our pre-clinical Operative course.
- MCG: Yes, along with slots, grooves, locks and adhesives (Amalgambond).

- **UKY:** Yes, threaded pins are taught as a retentive/resistance feature pre-clinically in lecture and in pre-clinical laboratory.
- **UofL:** Yes. Pins are taught and there is a placement exercise. Pins are presented in the same lecture as posts and slots for additional retention. Pins are not automatically placed in the clinic.
- **MUSC:** Yes, lecture and with hands-on experience.
- **NSU**: Yes. The pin technique is included in the pre-clinical course with the other retentive/resistant techniques.
- UPR: Yes.
- **VCU:** Yes, pins are utilized in the sophomore Operative course.

Is amalgam bonding technique being taught in the operative preclinical curriculum? What guidelines are taught for use of amalgam bonding?

- **UF:** Yes. Amalgam bonding is taught as a supplemental technique for additional retention. It is not taught as the only means of retaining an amalgam restoration.
- **MCG:** Yes. Amalgam bonding is always used as a supplemental form of retention along with more significant forms such as pins or slots. It is not intended to be the main form of retention for core-build ups or even definitive restorations. It is used when normal retention form is compromised by missing tooth structure.
- **UKY:** The technique of amalgam bonding is taught pre-clinically. On the clinic floor, we generally use only Optibond FL. It's function is primarily as a dentin sealing agent and possibly to gain some small bond strength from the air-inhibited layer of the resin, according to manufacturing claims. We do not rely on this weak bond, if indeed there is any, to retain restorations without other retention devices/techniques.
- **UofL:** We teach placing a bonding agent in <u>all</u> preparations where we can achieve adequate isolation. We teach this for sealing of the tubules, not to retain a restoration.
- **MUSC:** Yes, lecture and lab. We use Bisco Primers A&B + a filled autopolymerizing bonding resin (Resinomer). We do not do many of these clinically.
- **NSU:** Amalgam bonding has been included, but not emphasized. We are planning on incorporating more into the pre-clinical curriculum and clinical application.
- UPR: No.
- VCU: Yes, in D-2 Operative. Extensive restorations, core buildups, endodontically treated teeth.

Are indirect pulp capping and direct pulp capping procedures taught in the operative curriculum? What materials are recommended? Is the one or two-step procedure taught for indirect pulp capping?

- **UF:** Both procedures are taught. The majority of faculty encourages and emphasizes the one-step procedure. Standard materials for the one-step procedure are placement of calcium hydroxide followed by a glass ionomer base.
- MCG: These procedures are taught in Operative Dentistry and Endodontics. The standard material used in all pulp capping procedures is calcium hydroxide (Dycal).
 In a one-step procedure, Dycal is placed on the near (0.5mm from the pulp) or small exposure (<1mm) followed by a glass ionomer base (Vitrebond). The tooth is then restored with amalgam or composite as the definitive restoration.</p>
 In a two-step procedure, Dycal is placed on the near or small exposure followed by IRM or a glass ionomer material as a provisional until the tooth is re-entered later for complete caries excavation or a definitive restoration. The average provisional period is from 3-4 months.
- **UKY:** Both IDPT and DPT are taught. IDPT - chlorhexidine rinses, then Ketac Fil x 12-16 weeks. DPT - Dycal, GC lining LC, and restorative.
- **UofL:** Both indirect and direct procedures are taught.

Indirect: Application of calcium hydroxide over questionable dentin that is left approximating the pulp, cover with resin-modified glass ionomer (Fuji II LC) and restore. Which technique (one or two step) is done in the clinic is left to the faculty's discretion. We don't mandate either one. Literature would probably support both methods.

<u>Direct:</u> Spot application of calcium hydroxide over the exposure or near exposure, cover with Fuji II LC, and restore. We don't re-enter at a later date.

MUSC: Indirect/direct pulp capping procedures are taught. For small direct exposures when caries is likely eliminated, we use (in the following order):

A cavity cleaner/disinfectant,

Calcium hydroxide (Dycal),

Vitrebond over and beyond the Dycal.

For larger exposures and/or exposures where caries remains, we do endo or extract. For indirect pulp caps (caries remains but exposure imminent, age being a factor with pulp repairability):

Remove as much as caries as possible without exposing,

A cavity cleaner/disinfectant,

Calcium hydroxide over all caries,

ZOE provisional for minimum of 3 months (4-6 months preferable)

NSU: Indirect pulp capping is taught primarily in the Endodontic course, but is also included in the Operative course and Dental Materials course. Direct pulp capping is not advocated by the Endodontic Department at this time.

- UPR: Yes. Ca(OH)₂ for direct pulp capping and Vitrebond or a glass ionomer hybrid (Fuji II LC).
 Both but one-step is preferred.
- **VCU:** Yes, Dycal covered with Vitrebond, one-step, etc.

Who is using DIAGNOdent® for caries diagnosis?

- **UF:** We are using two units for caries diagnosis. One in treatment planning and one in the Operative clinic.
- **MCG:** We have one unit. We have not used it routinely for caries diagnosis in student clinics although it has been our experience that it has an extremely high sensitivity for detecting pit and fissure lesions.
- **UKY:** Not using.
- UofL: Not using.
- MUSC: Not using.
- **NSU:** We have one unit and plan to incorporate it further into the pre-clinic and clinic curriculum.
- UPR: Not using.
- **VCU:** Occasional use in undergraduate clinic. Helpful in treatment planning.

Is the medical management of caries (non-surgical) taught in the curriculum? If so, how is it monitored?

- **UF:** Yes. It is taught and strongly emphasized throughout the students' curriculum. A Cariogenic Profile is required in every patient chart and is completed during treatment planning. All steps and procedures involved in the caries management of patients are included as part of the overall treatment plan, caries management competency is required during the student's junior and senior years.
- **MCG:** Medical management of caries is taught in lecture format in both the pre-clinical Operative Dentistry course and in the multi-disciplinary Cariology course. Selected cases are monitored by individual faculty along with students providing the comprehensive care for those patients.
- **UKY:** Didactic presentation of model, but poorly reinforced on the clinic floor.

- **UofL:** Yes, if caries has penetrated less than half way through the enamel., Monitored by visual exam/radiographs at scheduled 6-month recalls. Active patients also have 6-month recall exams.
- **MUSC:** We are now beginning to incorporate the medical model of caries management into our curriculum. We teach it pre-clinically now and are switching to this clinically.
- **NSU:** This is taught in the Cariology, Operative Dentistry and Treatment Planning courses. It is monitored by the clinic group leader and student doctor.
- UPR: No.
- VCU: Yes, philosophy is reinforced in Cariology and implemented in clinic with the use of CRA for all patients. Preventive measures are included on treatment plans and must be utilized in order to complete oral disease control therapy.

What protocol is taught for diagnosing secondary caries (apart from radiographs)?

- **UF:** Visual and tactile along with patient's history of caries.
- **MSG:** Visual, tactile and transillumination are the common diagnostic methods used to determine if secondary caries is present in a restored tooth. The patient's personal caries experience is used to aid in the decision to replace restorations along with clinical signs.
- **UKY:** Primarily transillumination with a fiberoptic.
- **UofL:** Visual exam if the restoration is accessible.
- MUSC: Tactile, visual, operators "best shot".
- **NSU:** Visual, tactile, transillumination, previous history of caries.
- **UPR:** Transillumination.
- VCU: Transillumination, visualization, clinical exam, caries indicator dyes and stain present at the DEJ.

How much time is designated in your curriculum for operative dentistry, direct restorations? Where is it placed in your curriculum?

UF: January of Freshman year to December of Sophomore year. Classes meet 2 halfdays per week except for 6 weeks when classes meet for 3 half-days per week. An advanced Operative Dentistry course covering indirect esthetic inlays and onlays is taught in the summer between the students' junior and senior years. It involves 20 hours of lecture and laboratory instruction.

- **MCG:** Freshman year ½ of fall semester (½ day/week) and all of Spring semester (two ½ days/week). Thirty-eight 4 hour sessions in total. Advanced operative procedures are taught in a Junior Esthetics course, Fall semester, ½ day/week.
- UofL: Freshman year- ½ of Fall semester and all of Spring semester, 8 hours a week (This would be two 4-hour sessions per week with the first hour for lecture and a 3-hour lab).
 Junior year 1-hour lecture for 9 weeks to review techniques and new materials in the clinics.
- **MUSC:** Two semesters in the Sophomore year.
- **NSU:** One semester Freshman year, second semester.

Do you have a clinical competency examination in Class III composite resin or other anterior composite restorations?

- **UF:** Yes. Clinical competencies are given for Class III, IV and V anterior composite restorations.
- MCG: Junior year 1 Class III or IV composite.
- **UofL:** Junior year 2 Class II, III or IV composite resins Senior year - 2 Class II, III or IV composite resins
- MUSC: Yes, Class II, III and IV.
- NSU: D-3 Class III or IV patient, CCE D-3 & D-4 - Class IV typodont exam

Does your patient pool provide the students with sufficient virgin Class II lesions?

- **UF:** No. Replacement restorations are allowed on Mock Board exams.
- MCG: Just enough so far.
- **UofL:** Minimally adequate.
- MUSC: No.
- **NSU:** We have allowed students to use replacement restorations as well as virgin lesions for clinic requirements, prerequisites, and CCE's in order or increase the available Class II patients.

Has there been a shift in the number of live patient examinations vs. typodont examinations in your program?

UF:	Not yet.
MCG:	We have added more live patient exams.
UofL:	No. We use typodont for Mock Board, live for everything else.
MUSC:	In clinical procedures for credit in the junior and Senior years, we use live patients only.
NSU:	Yes. We have added more typodont examinations.

February 11, 2003

IV. National CODE Meeting

V. <u>Suggestions for CODE</u>

What can the organization do to improve its effectiveness?

- Discuss what schools are doing to protect time allocated for teaching preclinical Operative Dentistry and what is being done to have enough time to teach important new and improved procedures?
- Interactions between regions.
- Discuss the role of Licensure boards in curriculum planning. (proper or improper?)
- Have a formal mechanism of communication with Licensure boards.

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

Looks good! Easy to use.

Other suggestions?

CODE must live forever!

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

- What is the remediation mechanism for your preclinical Operative course? Please specify for both lecture and laboratory.
- What is the remediation mechanism for Operative Dentistry in clinic? Is the need for remediation based on Clinical Competency Exams, periodic clinic grades, or a combination?
- How does the curriculum in your school relate biomedical sciences to preclinical Operative Dentistry?

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