

FY 2002 Regents' Teaching Excellence Award (Department/Program)
Department of Oral Rehabilitation, Medical College of Georgia School of Dentistry
December, 2001

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January 11, 2002

Dr. Dorothy Zinsmeister
Senior Associate for Academic Affairs
Board of Regents of the University System of Georgia
270 Washington Street, SW
Atlanta, GA 30334-1450

RE: Regents' Teaching Excellence Award
for Academic Departments

Dear Dr. Zinsmeister:

On behalf of the Medical College of Georgia, I am pleased to nominate the Department of Oral Rehabilitation of the MCG School of Dentistry for the 2002 Regents' Teaching Excellence Award for Departments. The department's exemplary teaching program deserves recognition as an outstanding and innovative educational program of the University System.

The Doctor of Dental Medicine curriculum at MCG is a complex educational undertaking for students. Admission is competitive, and students are generally scheduled in class, labs, or clinic for 32 to 40 hours per week over a four-year period. The curriculum is essentially prescribed with minimal elective opportunities. All students take the same curriculum with little or no variation, and all students take the series of required courses offered by each of the eight clinical and biomedical sciences departments. The complexities of dental education are more evident when one considers that dental education requires students to achieve a high level of competency in the cognitive, affective, and psycho-motor domains.

Of eight departments in the School of Dentistry, the Department of Oral Rehabilitation is responsible for the largest portion (38.5%) of the curriculum. Students enjoy superior success in learning; the average MCG class performance on National Dental Board Examination subjects taught by Oral Rehabilitation has ranged from first to twelfth nationally over the last 9 years. Over the last 3 years, 95% of all entering students have graduated within five years. The department has achieved this success through faculty preparation, innovations in teaching, and attention to the details of student learning.

Success by students in the Oral Rehabilitation curriculum is the direct result of focused efforts by the faculty to improve teaching. Of the 28 faculty in the department, 23 have advanced training beyond dental school in clinical specialties, research, or education. More faculty in Oral Rehabilitation – a total of 6 – have completed the MCG sponsored Faculty Development Institute, an on-campus continuation of the USG program to link teachers and technology, than any other department on campus. For the past 6 years, the

department has conducted comprehensive peer evaluations of faculty teaching and has used these evaluations to improve instructional delivery to students.

A unique challenge encountered in dental education relates to the teaching of procedures to be performed by the student within the oral cavity. For students to see the procedure demonstrated well, a small group must look over a faculty member's shoulder. To teach all the students in a class, the same faculty must perform the procedure repeatedly, or multiple faculty must perform simultaneous demonstrations for groups of students. To reduce the inefficiency of this model, the department led the effort to renovate one of the School's pre-clinical teaching labs to incorporate detailed video display of faculty demonstrations at each student's workstation. This pioneering use of technology for dental education has greatly improved student learning and has been adopted by other dental education institutions.

Another challenge faced by dental educators is the tremendous amount of material the students are expected to learn. With a curriculum that demands almost all of their time during the normal workday, students have limited opportunities to consult with faculty on a one-on-one basis for assistance with difficult concepts. To address this problem, the department produced CD-ROMs of the more complex courses in the department (such as PRO 5001, Introduction to Complete Dentures). Faculty in the department have also provided leadership roles in the development of nationally available dental education CDs on clinical diagnosis. Students use these materials for independent learning.

One important key to successful teaching and learning is effective faculty use of continuous assessment of student achievement. Formative evaluation, in the form of non-graded assessment of student performance, is a hallmark of the Oral Rehabilitation curriculum. Extensive non-graded assessment is built into each of the department's pre-clinical and clinical courses. In addition, students are required to practice self-assessment of their work in order to help themselves achieve and maintain quality in clinical care and treatment. An important example of formative evaluation is the department's creation of "mock board" evaluations where students practice taking the licensure examinations (referred to as "boards") as practice for the actual board exams. This experience prepares students for the stress of the licensure examinations and teaches them task management and examination protocols.

The remainder of this document expands on the accomplishments cited in this letter and further illustrates the significant commitment of the Department of Oral Rehabilitation to the success of students in the School of Dentistry. I am pleased to submit this portfolio to you for your consideration for the 2002 Regents' Teaching Excellence Award for Departments. If I can be of further service to you, please contact me.

Sincerely,

Barry D. Goldstein, Ph.D.
Senior Vice President for Academic Affairs

Statement of Philosophy and Goals

Philosophy & Goals

The Department of Oral Rehabilitation of the Medical College of Georgia School of Dentistry is committed to the academic excellence of its students, optimal oral health care for the public, growth of its faculty through scholarship and service, and meeting the needs of the widely dispersed and highly diverse population of Georgia, the region, and the nation.

As the largest department in the School of Dentistry, our department is comprised of the specialty areas in dentistry that restore compromised oral tissues to a healthy state. This restoration requires comprehensive diagnosis and treatment planning, a proper execution of the art and science of restorative dentistry, and the proper management of the total health care team.

Mission Statement

"To promote excellence in the art and science of restorative and prosthetic dentistry through teaching, research, and service."

Teaching- *To produce competent clinicians through innovative and effective teaching. To provide quality continuing education to Georgia's oral health care professionals.*

Our faculty constantly improve the didactic and clinical education of MCG dental students and residents. Our goal is to provide the most up-to-date educational experience at both the pre-doctoral and post-doctoral levels to produce the consummate dental health care provider for tomorrow's health care needs. The extensive background and expertise of our faculty also allows us to provide excellent continuing education courses to keep Georgia's dental practitioners at the forefront of advances in dentistry.

Research- *To discover new knowledge in the oral health sciences. To incorporate this knowledge into our pre-doctoral and post-doctoral curriculum and distribute it to the professional community.*

Our department blends a strong program of biomaterials research in the Dental Materials Division with outstanding clinical research programs in the Operative and Prosthodontics Divisions. Participation of our faculty in state-of-the art research enables our department to lead our school in innovation, technology, and education.

Service- *To provide quality patient care and community service.*

Our department is committed to meeting Georgia's oral health care needs by preparing tomorrow's practitioners, by continuing to educate today's practitioners, and by treating patients ourselves.

Department of Oral Rehabilitation Fact Sheet

The Department of Oral Rehabilitation at the MCG School of Dentistry was formed in 1993 by the merger of the departments of Restorative Dentistry and Prosthodontics. The department is made up of 28 full-time faculty who are divided into the divisions of Operative Dentistry, Fixed Prosthodontics, Removable Prosthodontics, and Dental Materials. The department is responsible for the General Practice and Prosthodontic residency programs.

Department Faculty

- All 28 faculty have earned their dental doctoral degrees (DDS or DMD). 23 faculty have post-doctoral training including 19 postgraduate residencies, 3 Ph.D.s and 8 Master degrees.
- In the past 2 years, 7 faculty have been promoted and 2 awarded tenure.
- 1 faculty served on the Dental National Boards Test Construction Committee for 5 years.
- 2 faculty are clinical consultants for the Joint Commission on Dental Accreditation.
- 1 faculty is the Associate Editor for the Journal of Prosthetic Dentistry.
- 1 faculty is a section editor for the Journal of the Georgia Dental Association; another is newsletter editor for the American Academy of Fixed Prosthodontics.
- 10 faculty are members of editorial review boards for peer-reviewed international journals.
- MCG has more board-certified prosthodontic specialists (8) than any school in the Southeast.
- 6 faculty have been awarded the School of Dentistry's Outstanding Faculty Award.
- 13 faculty have been inducted into OKU, the national dental honor fraternity.
- 3 faculty have been awarded the American College of Dentists Professionalism Award.

Department Teaching

- The department directs 21 preclinical and 10 clinical courses, representing 92 semester hours or 38.5% of the dental curriculum.
- Departmental faculty average greater than 900 hours of direct student contact per year.
- In the past 2 years, the faculty have authored 102 publications and 92 abstracts in refereed journals. Data from many of these publications significantly impact clinical teaching.
- 6 faculty have completed the Board of Regents Faculty Development Workshop/Institute.
- Departmental courses have asynchronous teaching opportunities through the Internet, CD-ROM-based instruction and problem-based learning.
- A new clinical simulation laboratory, designed by a departmental faculty, has enhanced our teaching methods and curriculum content. Several other dental schools have adopted this model.
- Over the past 2 years, faculty have made 218 professional presentations to dental groups.
- In the past 10 years, 4 faculty have been selected by the school-wide faculty to receive the School of Dentistry's Teaching Excellence Award and 4 have been awarded the Judson C. Hickey Teaching Excellence Award by the graduating senior class.

Students

- Over the past 9 years, student scores on the Operative and Prosthodontics sections (disciplines taught solely by the department) of Part II of the National Dental Board Examination have ranked our students between first and twelfth nationally (out of 54 schools).
- The success rate of our students on the Southern Regional Testing Agency clinical licensing exam has been above the regional average.
- In the past 3 years 95% of all entering students graduated within 5 years and all graduates were licensed to practice dentistry within 1 year of graduation.
- Six students or residents mentored by faculty have won national research competitions.

Supporting Documentation

Introduction and Background

The education of dental students poses severe challenges for dental school faculty. Unlike medical students, most dental students will practice immediately upon graduation and relatively few will gain additional experience in residencies. Thus, the faculty must prepare a student to be independently competent to treat the public in just four years. Compounding this challenge are several unique aspects of dental education. Students must master the motor skills necessary to practice dentistry-- in addition to dental and medical knowledge and critical thinking skills. Dental procedures require a practitioner to perform micro-surgical procedures with an instrument rotating at over 300,000 rpm. These procedures demand tolerances less than 200 microns, and must be done with limited access on a conscious patient. Acquisition of such motor skills is a major part of dental education and must be taught to students who have no training in these skills when they matriculate. The teaching and evaluation of dental motor skills in an unbiased manner is a major challenge to faculty. Students must also acquire complex practice management skills to successfully manage a dental office because the vast majority of dental practices are small businesses run by the dentist. Students must learn to use dental auxiliaries effectively, communicate with dental laboratories, and deal with significant financial and regulatory issues. As with medicine, the pedagogy of dental students must accommodate an increasingly medically compromised patient population and rapidly evolving technologies and biomaterials for dental treatment. These rapid changes pose constant challenges to faculty to keep the curriculum and their own expertise current. The Department of Oral Rehabilitation in the School of Dentistry at the Medical College of Georgia shoulders a significant part of each of these educational challenges.

As with many professional schools, the curriculum in dental education is relatively rigid. Most students take the same courses together in the same order. Thus, our faculty do not need to be focused on helping students develop a program of courses. Nor do we need to focus on keeping our students in the dental program. All students have already made a significant time and financial commitment to dental school, and few will change programs. Rather, the challenges for our faculty are to support our students through the difficulties of professional training, instill within them the high personal standards required of a health professional, and keep them motivated and excited about learning and growing. Each of the faculty in the Department of Oral Rehabilitation accepts these responsibilities personally.

The Department of Oral Rehabilitation was formed in 1993 by merging the existing departments of Restorative Dentistry and Prosthodontics. The department consists of a chair, a vice-chair, and 26 full-time faculty who are divided among the divisions of Operative Dentistry, Fixed Prosthodontics, Removable Prosthodontics, and Dental Materials. The department directs courses that account for 38.5% of the dental curriculum and the average clinical faculty spends greater than 900 hours annually in direct contact with students. The departmental faculty are singularly dedicated to the education of quality dental practitioners for the citizens of the state of Georgia. The faculty accept the difficult challenges of dental education described in the previous paragraph. As described in the following paragraphs, we believe that our faculty excel in meeting these challenges.

The accomplishments of the departmental faculty are even more significant considering the loss of 9 of the 28 faculty members to retirement in the past 3 years, either scheduled or as part of the MCG early retirement program in 1999. This loss of experienced faculty (with 168 years of cumulative dental education experience) has required the department to recruit new, often relatively inexperienced faculty to the department. However, we have met this challenge and we believe that we have used these recruitments as an opportunity to reevaluate ourselves and improve our faculty and the quality of the education we provide.

The following paragraphs describe the teaching accomplishments of our faculty, organized by criteria stated in the award guidelines.

Faculty Efforts to Improve Teaching and Student Learning

A dental education adequately prepares graduates for the clinical practice of dentistry, but it merely introduces them to academic aspects, namely teaching and research. Therefore, most dental educators enter academic careers with little formal education in teaching or research. Fortunately, 23 of the 28 faculty members of our department have pursued post-doctoral training in clinical specialties, research or education. Our faculty's commitment to teaching quality and student learning is evidenced by the development of a peer evaluation program, participation in teaching-enhancing programs, customizing courses to better enhance learning, development of in-course remediation for students, identification of "at risk" students, encouraging student self-assessment, assisting in the development of a "state of the art" pre-clinical simulation laboratory, and improving courses with innovative and effective forms of pedagogy. Each of these are subsequently described in detail.

Peer evaluation of lectures. All of our department's pre-clinical courses are taught by teams of 5-6 faculty. The format of these courses is one hour of lecture followed by a three-hour simulation laboratory where the clinical techniques described in lecture are practiced on a manikin. Greater than 95% of all lectures in the department are evaluated by other members of the team teaching the course. All course faculty are required to attend the lectures and complete anonymous peer evaluations. Typically 2-5 faculty evaluate each lecture. The evaluations are returned to a staff member who consolidates the scores and comments and provides feedback to the lecturer, within one week. The results of the peer evaluations are also provided to the course director and to the department chair so that they can stay abreast of course progress and faculty performance. Thus, the lecturer, course director, and chair have ongoing feedback with which they can improve teaching. The feedback is also used to revise course content (see *Ongoing Review and Revision of Curriculum: Peer evaluation of lectures*)

Faculty presentations are rated from 1 (worst) to 5 (best) in a Likert scale in the following categories: knowledge of subject, clarity and organization of the lecture, encouragement of questions, relating the material presented to clinic and career, appropriate use of audiovisual aids and overall presentation. An important element of the evaluation is a section to offer specific recommendations to promote improvement in the faculty member's classroom teaching abilities or lecture content. Suggestions may range from something as simple as improving the colors of a slide that was difficult to read, to identifying confusing subject matter. A similar peer evaluation system has been developed for the laboratory portion of the pre-clinical courses. In the laboratory, each course faculty member is rated by the other course faculty on the following: knowledge of subject, availability, providing constructive criticism, treating students equally,

demonstrating procedures clearly, providing appropriate guidance, and adhering to departmental teaching philosophy. Suggestions for improvement are requested for the laboratory portion as well. Laboratory peer evaluation occurs at the midpoint and end of the course.

Because each faculty knows that he or she will eventually be evaluated, the evaluation process is taken very seriously and comments are generally constructive. Furthermore, the performance on these evaluations is taken into consideration for merit raises and promotion and tenure evaluations (see *Links Between Rewards and Good Teaching: Promotion and merit raises*). But most of all, faculty are compelled to provide up-to-date and accurate lectures because they know that fellow faculty will be listening and evaluating them.

This system has been an extremely valuable tool. Since it was implemented approximately 6 years ago, there has been a remarkable improvement in both didactic and laboratory course quality and content. For example, completely new slides series were fabricated for the Complete and Removable Partial Denture courses, the course in Dental Anatomy and Occlusion has been completely reorganized with new preclinical exercises, and many lectures in the Dental Materials course have been revised and updated. Initially, the recommendations by faculty (who often are in the same course from year-to-year) were broad ranging, indicating major changes were needed. Today, comments are now narrowly focused. Thus, significant course improvements have been made, and continue to be made (see *Ongoing Review and Revision of Curriculum: Peer evaluation of lectures*).

Faculty development workshop. Several years ago the Board of Regents initiated an intense, two-week Faculty Development Workshop to connect teachers and new teaching technology. Two faculty were selected from each of the universities in Georgia. In 1997 the program was decentralized with each institution responsible for its individual program. The Medical College of Georgia developed the MCG Faculty Development Institute (MCG-FDI) to provide faculty with new technological tools to enhance teaching effectiveness and student learning. The program promotes expanded learning communities, asynchronous learning opportunities and interdisciplinary collaboration. Participants are trained in the use of tools such as Web CT, listservs, Web conferencing and multimedia, and course content is customized to the needs of each participant to some degree. This program is administered to 4-6 MCG faculty members per year on a competitive application basis. Applicants must state their needs and uses for training and develop a project during the program. Course participants are expected to disseminate their new computer skills to other faculty in their departments (see *Collaborative Faculty Efforts in Teaching: Faculty Development Institute*).

Our department has been fortunate to have six members^{8,14,16, 21, 22, 28} of its faculty selected for the Faculty Development Workshop/Institute. One of the Co-directors of the MCG-FDI has been and is a departmental faculty member⁸. Our department has had more MCG-FDI "graduates" than any other department on the MCG campus. These faculty are in all divisions of the department and are therefore well-positioned to aid and train other department faculty in computer skills. All of these faculty have served as mentors for other faculty in the department. These faculty have significantly enhanced the educational process with computer techniques. However, the collaborative spirit created by these faculty has been perhaps the most valuable consequence of their training. The improved educational presentations by these faculty members have created a curiosity and desire by other faculty in the department to learn and use these techniques in their own lectures and courses.

Career Development Program. From 1993-1996 the American Association of Dental Schools sponsored a Career Development Program for Innovative Dental Educators. Participants represented 26 of the 54 dental schools in any given year. During the intense, one week program, leaders in dental education discussed problems and possible solutions to the unique obstacles facing dental education. Two^{8,16} of the three faculty members selected to attend from MCG are Oral Rehabilitation faculty. Participants were exposed to problem-based learning (PBL) concepts and methods to promote growth in intellectual maturity and improve learning and motivation of students. Leadership skills, effective communication, and methods to institute change were also addressed. As a direct result of this program, PBL sessions and “Practice Practicals” have been added to Prosthodontic courses in our department. In the PBL sessions, students are encouraged to manage their own time and collaborate with other students in a problem-solving format. Students also participate in “Practice Practical” examinations before the actual examinations of students' motor skills (commonly called "practical examinations"). The “Practice Practicals” are graded in the same manner (anonymously) as the final exams to provide feedback to the student. However the “Practice Practical” grades are not counted in the course grade. These "Practice Practicals" also provide the course faculty with valuable feedback on the students' abilities throughout the course.

Non-graded assessments of students. Over the past 2 years, the department has restructured its curriculum to be competency-based (see *Global Curriculum Review and Revision: Competency-based curriculum*) This restructuring is ongoing and has been partly motivated by new accreditation requirements of the American Dental Association. One significant teaching consequence of the competency-based curriculum is that a great deal of non-graded student assessment occurs in preparation for competency exams. Thus, non-graded faculty assessment of student work is ubiquitous in both the pre-clinical (laboratory) courses and in the clinic.

In the preclinical courses, the students are required to complete exercises in preparation for a competency examination (often called a "practical" examination). For example, students in Restorative Dentistry do many daily exercises in cavity preparation of teeth with a handpiece (drill). These exercises receive no grade per se, but are evaluated by faculty in the course on a day-to-day basis. The student is given advice about strengths and weaknesses of their work, and is given opportunities to improve weaknesses and have the work re-evaluated multiple times. Then 4-6 times during the course, the competency exams are given, each testing a different skill or knowledge level. The competencies are graded anonymously. The non-graded exercises prepare the student for the test, but also promote one-on-one interactions between faculty and students. Moreover, the faculty develop a keen awareness of the needs and strengths of each student. Many life-long professional friendships develop from these interactions. Faculty rotate among students on a prescribed schedule to ensure that each student is exposed to the learning styles of multiple faculty. Faculty meet formally (within the course and at divisional or departmental meetings) and informally to discuss the special needs of students, strategies to improve the course, and strategies to improve their teaching.

In the clinics, faculty provide support and help as needed while the student treats a patient. In each session, the faculty provides the student with feedback about technical issues, management of the patient, and knowledge in the area. Written critiques are also provided to the student after each clinical experience. One appointment with a patient may take 3 or 4 hours and a faculty member may interact with the student and patient 6-10 times during that period. As in the preclinic, these interactions are largely ungraded and prepare the student for competency

examinations when the student will work independently and be formally graded by several faculty. Also as in the preclinic, these interactions foster faculty-student respect, improvement in teaching strategies, identification of students with problems, and professional friendships.

Student self-assessment. In dentistry, it is essential that the clinician be able to self-evaluate work to ensure that patients receive the best care possible. Therefore, beginning in the pre-clinical courses and extending through the clinical courses, students are taught self-appraisal skills. Most departmental courses have a student self-evaluation component in their grading model. The student's evaluation is done using the same criteria the faculty use to grade their work, and the accuracy of the self-evaluation counts as part of the student's grade on the project. Using this data, the student's individual needs are identified and their experiences modified accordingly.

Identification of "at-risk" students. In addition to teaching self-appraisal skills, departmental faculty identify students "at-risk" of failing courses or not graduating in a timely manner. In the pre-clinical courses, faculty supervise students in the simulation lab in the evenings. These extra sessions give student more faculty contact time, but also allow faculty to identify students who are having problems. Students "at-risk" are also identified through the previously mentioned (this section) "Practice Practical" examinations. If a student fails a practical examination in a course they are provided with "competency" projects to ensure that their skill level is improved prior to re-testing. In the clinical arena, "at risk" students are assigned volunteer mentors from within the departmental faculty and a customized plan is developed for the individual student. The success of this program is evidenced by the 100% on-time graduation rate for last year's (2001) senior class.

Innovative and Effective Forms of Pedagogy and Technology

Interactive patient simulation. One example of the department's effort to improve teaching at a national level was a faculty's⁶ three-year involvement in the development of an interactive patient simulation authoring program. This interactive program directs the student through problems of clinical diagnosis in a virtual environment. The project was sponsored by the Dental Interactive Simulation Committee (DISC), which is sponsored by 13 prestigious national dental organizations. In addition to consulting on the program's development, this department member was the primary author of the first CD-ROM produced using this program. "Diagnostic Bytes" (as it was titled) was a finalist for the Time, Inc. 2000 International Health and Medical Competition (see Appendix). The technology developed for this project will be used for the Dental Hygiene National Board Examinations.

Asynchronous learning. Many departmental courses have asynchronous learning opportunities through the Internet, CD-ROM-based instruction and the previously mentioned PBL experiences (see *Faculty Efforts to Improve Teaching and Student Learning: Career development program*). Currently, twelve departmental courses have a Web-CT component requiring the efforts of many departmental faculty.^{1,7,8,13, 14, 16, 21-23} Examples of information that faculty have placed on course Web sites include course syllabi, lecture and laboratory presentations, video clips and examinations. In addition, students can access the Web sites for information regarding their grades and completion of assignments.

Last year the Complete Denture faculty^{8,14,24} developed several CD-ROMs containing all course materials including voiced-over lecture presentations (see Appendix). These projects were

particularly well-received by dental students as they allow students increased flexibility in time management. A computerized student feedback program has been initiated by the Removable Division which will soon be implemented department-wide. Faculty are able to provide student feedback while in the clinics. The faculty may print out the feedback form for the student in clinic or e-mail comments on student performance to the student. The data base created by this program will also be used for determining student grades.

A departmental faculty member²⁴ is significantly involved in the development of three CD-ROM projects for the School of Dentistry that provide asynchronous contact opportunities for students, prospective students, counselors, and potential collaborators. The recently completed “Student Recruitment and Admissions” CD-ROM (prepared in collaboration with the Associate Dean for Admissions and Student Affairs) is targeted to two audiences, potential dental students and guidance counselors across the State of Georgia. It is hoped that this project will increase diversity in the student population in the Dental School. This tool, in conjunction with an on-line application process and other Web-based materials, begins to address the Strategic Enrollment Management initiative identified as a priority by Central Administration.. The “Infection Control for Dental Technicians” CD-ROM is a self-paced interactive program with a test to provide continuing education for dental technicians. The “Leadership Georgia” CD-ROM with interactive video was developed to showcase the School of Dentistry to potential partners in government and industry, thus increasing the chances of future collaborations.

Dental simulation laboratory. In 1995, with partial funding provided by the state lottery program, a “state of the art” pre-clinical simulation laboratory was developed in the School of Dentistry. Several departmental faculty^{14,19,29} (in consultation with a dental manufacturer) were instrumental in the design and development of the 1.2 million dollar facility that has revolutionized our pre-clinical teaching of dentistry. Each student station in the laboratory contains a manikin with rubber cheeks and the same dental equipment found in the dental clinics. These stations provide a more realistic pre-clinical experience to the student. The student stations are also equipped with computer monitors that receive information from a centrally located teaching station. The teaching station is equipped with a computer, two video recorder/players, a document camera, a ceiling-mounted camera, a flexible camera, two slide projectors, a laser disc player and a drawing tablet. In addition, the teaching station has the same manikin and dental equipment found at the student stations, allowing the teacher to demonstrate a technique to all students simultaneously. Thus, a single instructor may provide individual instruction to the entire class at the same time. The technology in the laboratory allows the other course faculty more time to work one-to-one with individual students and to more closely monitor student progress. The simulation laboratory was renovated with updated computer equipment in 2001. It is also used for continuing education courses. The simulation laboratory designed by our faculty has been modeled by other U.S. and Canadian schools, including University of Florida, University of Alabama at Birmingham, Nova Southeastern University, University of Louisville, University of Detroit Mercy, University of the Pacific and University of Alberta.

Department multi-media teaching center. In 2001 our department dedicated non-state departmental funds to the development of a state-of-the-art teaching center housed within the department. The center contains laptop computers, LCD projectors, digital and intraoral cameras and image and video retrieval and manipulation technology. The close proximity of the center to faculty offices allows easy access to the center and the assistance of nearby faculty if needed. Significant faculty collaboration and mentoring occur in this area. Thus, faculty are able to

produce and enhance teaching materials for use in both lecture rooms and the dental simulation laboratory.

Global Curriculum Review and Revision

The review and revision of the curriculum as a whole is vital to our departmental teaching mission. In the past 5 years, our department has had three opportunities to revise the curriculum on a global scale: the conversion of the curriculum from quarter to semesters, the use of the Southern Regional Testing Agency for clinical licensure examinations, and the mandate by the American Dental Association to implement a competency-based curriculum. Several major departmental curricular changes have resulted from these revisions. For example, students were not comfortable developing treatment plans for patients with complex restorative needs. The procedures for treatment planning and sequencing of patients was streamlined. Forms were developed to lead the student through the process step-by-step. The student brings the completed forms to a special appointment, at which time one faculty member helps treatment plan and sequence the treatment. This one-on-one format has improved patient care and student feedback has been positive. The curriculum revisions have also helped our department provide students with new treatment opportunities. For example, prior to this formalized sequencing process, patients with complex restorative needs, including those requiring dental implants, were not treated in the pre-doctoral program. Two years ago, no patients requiring implants were treated in the pre-doctoral program. This year, twelve dental implant patients were treated.

Semester conversion. Prior to semester conversion in 1997 the sequence of course offerings had remained the same since the School of Dentistry was founded in 1969. Students had difficulty grasping the concepts presented in the some of the courses because of their experience level. New materials and procedures in esthetic dentistry, such as bleaching and veneers, were evolving that did not fit in the traditional preclinic or clinical courses. Many other inadequacies had been identified. When the Board of Regents required the School of Dentistry to convert from quarters to semesters in 1997, the department used the conversion as an opportunity to address as many of these inadequacies as possible. For example, prior to the semester conversion, 20% of students failed the Complete Denture course. This course was subsequently moved from the Freshman to the Sophomore year and the number of students who fail this course has significantly decreased to less than 3 per year. An existing departmental preclinical course in the junior year was modified in 1995 to introduce new esthetic procedures and a corresponding esthetic dentistry clinic was established in 1997 with a reduced student to faculty ratio from 6:1 to 3:1. The low ratio is essential as these procedures require closer supervision to ensure clinical success. Several schools in the region, including the University of Kentucky and the Medical University of South Carolina have modeled similar courses at their institution after the one at MCG.

Southern Regional Testing Agency (SRTA). Another example of global curricular change occurred within our department when the state of Georgia contracted with SRTA to administer the dental clinical licensure exam (commonly called "boards"). Previously, the State of Georgia offered its own dental licensure exam. The department modified its competency exams and organized two "Mock Board" exams to better prepare the graduating seniors to take the SRTA exam. The "Mock Boards" include clinical and laboratory components. As a result, MCG's SRTA pass rate is continually in the top half of schools in the Southern Region.

Competency-based curriculum. In 2004 the MCG School of Dentistry will once again be considered for accreditation by the American Dental Association (ADA). Accreditation must occur every 7 years. The ADA has mandated the dental schools convert from a requirement-driven curriculum to a competency-based curriculum. Traditionally, student progress has been measured by the completion of a certain number of different types of restorative procedures. The ADA mandate requires that the focus be shifted from the number of procedures completed to the competency of the student in performing those procedures. This mandate requires a major change in the curriculum and the way we assess student progress. The department has already begun implementing these changes and will be in full compliance by the summer of 2002. Grades will no longer be based solely on the number and quality of procedures. Rather, after completing a number of clinical experiences, students will be eligible for various competency examinations. Examples of competency examinations include making impressions of teeth, preparation of teeth for various restorations, administration of local anesthesia, and selection of tooth shapes and shades. Performance on these competency exams will comprise the majority of the student's grade. The student's self-evaluation and the faculty subjective evaluation will also be included.

Links Between Rewards and Good Teaching

Good teaching has been rewarded in our department with both individual honors and professional success.

Promotion and merit raises: During the annual chair-faculty review process, department members are required to submit an outline of their goals and accomplishments from the previous year. In combination with other supporting documentation, such as peer reviews of teaching and letters of support, an appropriate merit raise is determined for that individual. This process is viewed with confidence by the Dean of the School of Dentistry, who generally concurs with the Chairman's salary decision. Additionally, departmental faculty have progressed well in their professional academic life. In the past nine years, every faculty that has been presented to the University for promotion or tenure from our department has been successful. In the past two years, seven faculty^{4,8,9,10,16,21,28} have been promoted and two^{10,28} awarded tenure.

Teaching awards: The School of Dentistry's faculty, students and alumni, as well as the dentists of Georgia, have recognized the quality of our departmental faculty. The School of Dentistry has awarded the Outstanding Faculty Award to five current department members^{6,14,16,27,28} and the School's Teaching Excellence Award to four^{8,16,19,27}. Since the department was formed in 1993, the senior class has honored four faculty^{1,22,23,29} with the Judson C. Hickey Teaching Excellence Award. This award is given to the one faculty that is selected by the class as having contributed the most to their education. Externally, the School of Dentistry's Alumni Association has honored two departmental faculty who are MCG alumni^{13,17}, with their organization's Distinguished Alumnus Award. On a statewide level, the Georgia Chapter of the American College of Dentists has presented three departmental faculty^{10,14,19} their organization's Professionalism Award.

Discretionary departmental funds. Each year, the chair of the department⁶ uses about 50% of a \$60,000 non-state Foundation fund to reward and promote good teaching practices. These funds are given at the discretion of the chair to provide opportunities for selected faculty to travel to educational or research meetings, buy equipment to improve teaching (such as purchase of

equipment to improve technology), or any other activity that might improve or promote teaching in the department.

Collaborative Faculty Efforts in Teaching and Research

Team teaching. The departmental curriculum fosters faculty collaboration by its very nature. Greater than 90% of our courses are team taught, with 3-6 faculty members per course. Team teaching provides the low student:faculty ratio necessary for quality instruction of motor skills and provides the diverse faculty expertise needed to cover most dental topics. In a course, each faculty member typically contributes 3-4 lectures to the didactic portion of a course and all then work together in the laboratory or clinic. All members of the course team are expected to attend all didactic lectures and clinics. This mandatory attendance allows peer evaluation of the lectures (see *Faculty Efforts to Improve Teaching and Student Learning: Peer evaluation*). Grading of motor skills examinations (done anonymously) is also done by the course team 4-5 times per term. Team teaching constantly integrates the faculty. Free exchange of ideas occurs in every course session. The lecture content is constantly critiqued and updated (see *Ongoing Review and Revision of Curriculum: Team teaching*). The faculty develop new ideas for presentation, grading, course management, and organization because they teach the courses together.

Teaching outside of the department. Our faculty have collaborated in many courses outside of the department to add their expertise and contribute to the overall educational and clinical missions of the school. Faculty are participants in courses in Biochemistry²⁸, Bioclinical Seminars^{7, 27, 28}, Medical/Dental Ethics^{1, 4, 10}, Cariology^{7, 10}, Periodontics¹⁶ and Implantology^{11, 21, 25}. The true value of these outside collaborations is that faculty meet and interact with other faculty and bring new teaching ideas and techniques back to the Department. For example, the participation of one faculty member²⁸ in a Bioclinical Seminar on tooth-restoration bonding caused him to adjust his lecture content in the departmental course in Operative Dentistry.

Test development. The construction of quality examinations is an art form and is critical to the appropriate assessment of didactic, laboratory, and clinical skills. Because of the team teaching nature of most courses (see section above), most written examinations consist of questions from all team members, and all questions are distributed to all course members for review prior to the examination. This collaboration provides all faculty members a chance to see the style and content of questions from other faculty members as well as receive constructive criticism about their own questions. Thus, the quality of the examinations is constantly improving, and the abilities of the faculty to construct better examinations improves concurrently. For laboratory and clinical examinations, faculty in some courses take the examinations themselves to ensure that they are appropriate. Our department also is fortunate to have 2 faculty^{6, 11} with formal training and extensive experience in test construction, one of which⁶ served a five year appointment on the Dental National Board Test Construction Committee. These faculty are available to all faculty, but especially to new faculty, to aid in improving the quality of examinations. The help is inclusive, covering everything from the development of an unambiguous test question, to consistent techniques in grading motor skills examinations, to analysis of the statistical results after the test is given.

Faculty Development Institute. Our department has had more Faculty Development Institute 'graduates' than any other department on the MCG campus (see *Faculty Efforts to Improve*

Teaching and Student Learning: Faculty development workshop). The mentorship provided by this program has significantly improved collaborative efforts by faculty in lecture content and presentation, particularly the use of new technology in lectures and labs (see *Innovative and Effective Forms of pedagogy and Technology: Departmental multi-media teaching center*).

Research collaborations. Faculty in our department are active in collaborative research. In 2000/2001 alone, our faculty published 56 articles in peer reviewed journals and 50 abstracts that were presented at national and international scientific sessions. These are outstanding numbers considering that only three of the faculty^{17, 27, 28} have formal research training and 8 faculty^{2, 3, 5, 12, 15, 18, 20, 26} have been at MCG less than 2 years. However, the collaborative nature of this research is the most valuable aspect of the research effort. In 2000/2001 48% of the peer-reviewed publications were collaboratively coauthored within the department and an additional 16% were collaboratively coauthored with dental school faculty outside of the department. For the abstracts, 42 of the 50 abstracts (84%) were collaboratively coauthored (64% within the department). Grant applications are also commonly coauthored. This extensive collaborative effort in research has made a significant contribution to the quality of teaching, since nearly all of the department's research is applied science pertaining to dental materials and the clinical techniques to use those materials in treating dental disease. Thus, departmental faculty not only have first-hand exposure to the most current knowledge, but work together to generate this knowledge. The new knowledge is continually used to update the curriculum (see *Ongoing Review and Revision of the Curriculum: Addition of research knowledge*).

Ongoing Review and Revision of Curriculum

Team teaching. Because over 90% of departmental courses are team taught (see *Collaborative Faculty Efforts in Teaching: Team teaching*), revisions to the curriculum are ongoing. The constant contact and interaction between faculty members fosters discussion about course organization, content, lecture style, examinations, and faculty cooperation. These interactions occur more formally in end-of-year assessments, faculty retreats, department meetings, and from peer evaluation of lectures (see paragraphs below). However, it is the constant contact between faculty that serves as the most potent catalyst for curriculum review. Faculty know one another because they see each other routinely, and they gain mutual respect and trust that allows them to question each other about the curriculum, lecture presentations, and examinations. There are disagreements, to be sure, but these too are often beneficial because they force the faculty to defend and support their educational approaches.

Team grading sessions. The team grading of motor skill examinations is perhaps one of the most contentious and productive areas for curriculum development. Students typically must perform some exercise, such as the construction of a denture or preparation of a tooth for a crown. These projects are collected and graded in a 3-4 hour session by all course faculty. The projects are coded so that grading is done anonymously. In the grading sessions, faculty must standardize their grading of the students' work in each other's presence. There is also constant cross-inquiry about how to grade a given project fairly. These discussions not only provide the faculty with feedback about student performance and the effectiveness of the course, but also address questions about what the desired standards for student performance are and how to achieve them. Many curricular improvements come from these discussions.

Peer review evaluation of lectures. The department's lecture peer review system (see *Faculty Efforts to Improve Teaching and Student Learning: Peer evaluation*) is invaluable to all faculty in revising the structure, content, style, and audiovisual media of their lectures. The results of the evaluations are also provided to the course director and the department chair so that each can stay abreast of the courses progress and faculty performance. Thus, the lecturer, course director, and chair all have ongoing feedback with which they can update the course. Because every faculty is evaluated, the evaluation is taken very seriously. Furthermore, the performance on these evaluations are taken into serious consideration for merit raises and promotion and tenure evaluations (see *Links Between Rewards and Good Teaching: Promotion and merit raises*). But most of all, the faculty is compelled to provide an up-to-date and accurate lecture because she/he knows that fellow faculty will be listening and evaluating the lecture.

Departmental and division meetings. The department meets at least 4-5 times per term and division meetings occur nearly monthly. These meetings are used to disseminate all types of information and policy, but they are also commonly used to discuss educational problems and situations. The discussions provide a chance for faculty to interact across divisional lines, and often new ideas for curriculum development occur. On occasion, a faculty member will present a short review topic to the department that ensures that all departmental members stay up-to-date in the area. These interactions help ensure consistency in the dissemination of didactic and clinical information from all departmental members. For example, the teaching of occlusion (the way the teeth bite together) is a complex and controversial area. The departmental meetings have been used to arrive at a consensus so that all faculty are teaching this topic consistently throughout the department curriculum.

Addition of research knowledge to the curriculum. Because departmental research is applied research and deals directly with clinical materials and techniques, new knowledge generated through departmental research is continually being incorporated into the curriculum. This renewal is enhanced by the collaborative research and teaching efforts (see *Collaborative Faculty Efforts in Teaching: Research collaborations*). For example, the research efforts of several faculty^{6, 9, 27} on using visible light to set dental restorative materials in the mouth have caused the entire department to alter the way we teach these techniques. The research efforts of faculty^{4, 6, 10, 13, 19} on bleaching of teeth have allow MCG to incorporate bleaching techniques into the undergraduate curriculum far earlier than most dental schools. Furthermore, our faculty runs⁴ and participates in^{2, 3, 5, 7, 9, 10, 12, 13, 15, 19, 26} the school's clinical research program where dental restorative materials and techniques are clinically evaluated. The results of these research projects directly and continually affect the topics and techniques we teach and the way we teach them. For example, we have avoided certain brands of filling materials and restorative techniques because they have not performed well in the clinical studies. Because faculty collaborate in teaching and in research within the department, the transfer of new research knowledge into the curriculum is faster and occurs routinely.

The knowledge generated by the departmental research effort is also constantly incorporated into the continuing education courses given by departmental faculty to dentists, hygienists, and laboratory technologist throughout Georgia, the U.S., and abroad. Our faculty have given 218 of these courses over the past 2 years. Our faculty are attractive as speakers for these courses because they have developed an expertise that is a direct result of the departmental research efforts.

Our department is fortunate to have several faculty who are international experts in their research fields. Because of this expertise, these individuals are often asked to write review articles on clinical dental materials and techniques. These review articles are then used as a resource for students and faculty at MCG in the development of course materials and curriculum. In the past several years, papers such as this have appeared on bleaching^{6, 10, 13}, sleep apnea and dentistry¹⁴, mercury toxicity of dental amalgam¹⁷, light curing of composite restorations^{6, 27}, dental casting alloys²⁸, and biocompatibility issues in dentistry.²⁸ These faculty also collaborate with other faculty (at MCG and outside) to bring in significant new information into our departmental curriculum. The expertise of the departmental faculty is reflected by the fact that 30% of the faculty have appointments to editorial review boards of peer-reviewed journals.^{4, 5, 8, 10, 13, 14, 16, 17, 21, 27, 28}

Student Advising and Co-Curricular Student Learning

Advising. Because of the prescribed nature of the dental curriculum (see *Introduction*), students do not need advise about which courses to take. However, a great deal of student advising is done by faculty. From the first day of class, students are encouraged to seek advise from faculty, and faculty in the department are expected to make time for these interactions. Since the Department of Oral Rehabilitation teaches many 'major' courses in the dental curriculum, many students seek Oral Rehabilitation faculty for advise. Two departmental faculty^{10, 28} are formally part of the student advising team of the Student Affairs Committee, but all faculty participate to various degrees in advising. In the first years, students often seek advise about academic performance, adjustments to the demanding schedule of school, or fears about failing. In latter years, advise is more often sought about problems in the clinic or post-graduation opportunities. Family or personal problems are often topics at any point in the curriculum. The curriculum demands of dental school are formidable, and most students require someone to talk to at some point. Our department strives to provide that support, although it is difficult to quantify its occurrence or effectiveness with statistics.

Student research. Although no formal classes exist in the curriculum for undergraduate student research, the Department of Oral Rehabilitation provides out-of-class opportunities for dental students to become involved in dental research. A number of faculty^{4, 7, 22, 27, 28} have mentored students on research projects, and one faculty⁷ is the faculty director of the Student Research Group for the school and has served as national director as well. Students may spend as little as 5-6 weeks or as much as 3 years on a project. Faculty help the student develop the project, direct the student in completing the project, and help the student in the presentation of the project at the annual Student Research Day in February or at various national meetings. These interactions help students get to know faculty in an academic view not visible from the classroom or clinic, and help faculty see more of the talents of their students. Several students have published papers in peer-reviewed journals and have received grants or other awards for their research (see *Successes of the Department's Students: Research mentorship*).

Other co-curricular activities. Faculty in the department are involved in service activities that provide out-of-class interactions between faculty and students. The Student Health Service is administered by one faculty¹⁰ and several other departmental faculty^{2, 5, 12, 15} participate. In this evening clinic, faculty provide dental work to students across the MCG campus, and dental students (approximately 3 per year) serve as dental assistants or receptionists. These interactions provide students with an opportunity to see dental health care delivery first hand and provide a

chance for faculty to get to know students on a personal level. MCG also sponsors a Community Health Fair annually in which departmental faculty and dental students work side-by-side to provide free dental screenings to the public. Finally, the dental school holds an annual Sports Day in which many departmental faculty^{2,4,5,6,8,11,12,14,18,21,22,24,25,26} take vacation time to golf with students for one afternoon. All of these activities help our faculty see students in a broader dimension and help our students see our faculty as people.

Successes of the Department's Students

The achievements of the dental students can be measured internally by their success in negotiating our curriculum and externally by their performance on the clinical (SRTA Clinical Exam) and didactic (National Boards) standardized examinations.

Graduation rates. The School of Dentistry has excelled in graduating its students in a timely manner. Within 5 years of admission, greater than 95% of entering students earn their Doctor of Dental Medicine Degree. In last year's graduating class, 98.5% completed the curriculum in 4 years (one student withdrew from school). This high degree of success speaks well of our students, but also the dedication of the entire faculty.

National board scores. By looking at the external measures, the department's accomplishments can be distinguished from those of the entire school. The National Dental Board is scored separately within each dental discipline, and the performance of MCG's students in the two sections taught solely by our department (Operative Dentistry and Prosthodontics) has routinely been in the top quintile nationally. In the past 9 years, the students' composite score in these sections of the exam have ranked between 1st and 12th nationally (out of 54 schools).

Clinical licensure. Another external measure of our department's teaching effectiveness is the student's performance on the clinical licensure exam administered by Southern Regional Testing Agency (SRTA). Sixty percent of this exam tests clinical skills and knowledge taught by our department. Over the past five years, the pass rate of MCG Dental Students on this exam has always been above the regional average. In fact, many of the criteria evaluation forms used by SRTA in their exam are modeled after departmental evaluation forms.

Research mentorship. Since a significant mission of the Medical College of Georgia is research, it is also a mission of our department. Not only have faculty members excelled in research, but many have been outstanding research mentors to the dental school's students and residents. Faculty-directed students have been awarded the American Association of Dental Research's Student Research Fellowship²⁷ and the Ralph W. Phillips Memorial Student Research Award^{4,28} sponsored by the Academy of Operative Dentistry. On three occasions Prosthodontic residents have been finalists^{27,29}, winning the award once, for the American Academy of Fixed Prosthodontics' Tillman Research Award. Additionally, two departmental faculty^{20,21}, while in the Prosthodontic Residency Program themselves won *The Journal of Prosthetic Dentistry's* Judson C. Hickey Scientific Writing Award for their reporting of research mentored by other departmental faculty^{21,28}.

References (Departmental Faculty)

1. Philip S. Baker, DDS
2. John S. Blalock, DMD
3. Martin K. Bodden, DMD, PhD
4. William D. Browning, DDS, MS
5. Richard S. Callan, DMD
6. W. Franklin Caughman, DMD, MEd
7. Daniel C. N. Chan, DDS, MS
8. Roman M. Cibirka, DDS, MS
9. Mark D. Dlugokinski, DDS
10. Kevin B. Frazier, DMD
11. F. Michael Gardner, DDS, MA
12. Steven T. Hackman, DDS
13. Van B. Haywood, DMD
14. John R. Ivanhoe, DDS
15. Cindy T. Jones, DDS
16. Carol A. Lefebvre, DDS, MS
17. J. Rodway Mackert, Jr., DMD, PhD
18. Samuel J. Mumpower, DMD
19. Michael L. Myers, DMD
20. Max Nahon, DDS
21. Steven K. Nelson, DMD
22. M. Harry Parker, DDS, MS
23. Gregory R. Parr, DDS, MS
24. Kevin D. Plummer, DDS
25. Michael E. Pruett, DDS
26. Randall M. Pohjola, DDS
27. Frederick A. Rueggeberg, DDS, MS
28. John C. Wataha, DMD, PhD
29. Retired Faculty

Appendix

- 1. Diagnostic Bytes CD-ROM.** This interactive program directs the student through the problems of clinical diagnosis in a virtual environment.
- 2. PRO5001, Preclinical Complete Dentures CD-ROMs (2-disc set).** These CD-ROMs contain all course materials for the complete denture course (PRO5001) including the course manual, clinical guide and all voiced-over lecture presentations.