

**University of North Carolina at Chapel Hill
School of Dentistry**

**Master of Science Programs
SELF-STUDY REPORTS**

**Dental Hygiene Education
Endodontics
Operative Dentistry
Oral and Maxillofacial Pathology
Oral and Maxillofacial Radiology**

**Orthodontics
Pediatric Dentistry
Periodontology
Prosthodontics**



**Graduate School Review Site Visit
September 8-10, 2015**



University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
DENTAL HYGIENE EDUCATION



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DENTAL HYGIENE EDUCATION

A. Program Overview

The Master of Science Degree Program in Dental Hygiene Education at the University of North Carolina-Chapel Hill began in 1979. At the time only six programs existed in the country. Today there are sixteen programs that culminate in a master's degree in either Dental Hygiene or Dental Hygiene Education. Ten of the programs are housed in a School of Dentistry. The UNC MS program has successfully graduated numerous dental hygienists who have leadership roles in academia, industry and research.

All other MS graduate programs in the SOD extend for 33 to 36 months while our program is 21 months. Therefore, the deadlines for DHED students are on an accelerated schedule. We conform to the same set of strict guidelines for progress reports for research projects as the other graduate students in the SOD. In addition, most of our students defend their thesis during the last semester in residence and submit a manuscript for publication prior to graduation in May in year two. The majority of our students graduate after 21 months unless their thesis project is more extensive or family issues delay graduation.

1. Program Mission, Goals, and Objectives

The School of Dentistry at the University of North Carolina at Chapel Hill offers a graduate program in Dental Hygiene Education leading to a Master of Science degree conferred by the Graduate School. The primary goal of the Master of Science degree program is to prepare exceptional educators for allied dental education programs. Objectives of the graduate program are to provide the student with advanced knowledge in dental hygiene education to assume positions in teaching, administration, research, and management.

The curriculum emphasizes advanced knowledge and skill development in several areas including education, leadership, administration, and research related to allied dental education and practice. The curriculum is interdisciplinary in that courses are taken in the schools of Dentistry, Public Health, and Education.

Objectives of the graduate program are to provide the student with the:

- Competencies and skills necessary for effective vision and leadership in teaching, administration, research, and management in Dental Hygiene Education.
- Knowledge and skills to assume teaching and leadership positions in Clinical Education, Management/Administration, Oral Pathology, or Biological Sciences.
- Knowledge and ability to organize and deliver scientific presentations and educational lectures using evidence-based practices.
- Ability to communicate and teach in a clinical setting.
- Vision, knowledge and skills to apply new technologies and information systems to dental hygiene education and practice.
- Knowledge and application of the scientific method and of research design in problem solving.
- Understanding and ability to influence the dental healthcare environment for the provision of culturally competent care to underserved populations and to reflect national trends in dental hygiene utilization.

Mechanisms for Assessing Program Mission

See General Program Overview

2. Demand/Need for Program

Currently there is a national shortage of dental hygiene educators. Reports indicate that almost half of full-time faculty members are nearing retirement age which may create large voids in the numbers of qualified dental hygiene faculty. (Carr et al. J Dent Hyg 2010) Many educational settings require full-time faculty to hold at least a master's degree. (Collins et al. J Dent Educ 2007) There are currently 16 Master of Science degree programs in Dental Hygiene or Dental Hygiene Education in the United States. While the number of masters programs has grown in dental hygiene education in recent years and produced increasing numbers of graduates, there is still a need for many more in the future. These graduates need to have acquired skills and knowledge that will help prepare dental hygienists for future roles in intra and interprofessional health care. In addition, the numbers of undergraduate dental hygiene students is expected to grow 33.3% by 2022 which means that the existing and new programs will need qualified faculty with advanced degrees. (<http://www.bls.gov/ooh/healthcare/dental-hygienists.htm>).

Our program has a history of attracting dedicated and motivated students. The philosophy of the SOD is that all graduate students will attend as full-time students. We are also limited to 3-4 students per year due to restrictions with tuition remission and stipends. Although the number is small in comparison to a few other programs around the country, it is comparable to the other graduate programs within the School of Dentistry. Perhaps our applicant pool would be larger if we had the flexibility to offer a part-time curriculum.

Our MS program is the only one in the United States that is 100% onsite. Being the only onsite program, we are able to appeal to and recruit students with a goal of becoming leaders and future academicians in dental hygiene education. All of the DHED graduate students participate in intra and interdisciplinary original research with world renowned experts in their fields. This experience could not be provided through a distance education program. In addition, all of our graduate students participate as Graduate Teaching Assistants and obtain an abundance of teaching experience in didactic, laboratory and clinical teaching. They teach a variety of students including undergraduate dental hygiene and dental assisting students as well as predoctoral dental students and receive feedback from faculty and students on their teaching.

The feedback we receive from employers of our graduates is outstanding. Due to the level of teaching and research experience the students receive while in the program, they are fully prepared to function in a full-time teaching position upon graduation. Many of our graduates also obtain tenure track positions due to the level of research they conduct in graduate school. We also have a very high publication rate as all students are required to submit a paper for publication upon graduation. The attraction to our program is the high quality of the university and the School of Dentistry and the reputation of the graduate program. We attract students who are interested in completing a graduate program at an onsite program in a School of Dentistry and not through distance education.

3. Interdisciplinary activities

DHED graduate students who select the minor in Biological Sciences or Pathology participate in coursework with the predoctoral dental students. In addition, all of the DHED graduate students teach predoctoral dental students in their preclinical scaling course. Another way that DHED graduate students participate in interdisciplinary activities is through their thesis projects. Several students have conducted projects with faculty in other departments in the School of Dentistry (Operative Dentistry, Prosthodontics, Diagnostic Sciences, Periodontology, and Pediatric Dentistry) as well as faculty in other schools in the university (UNC Gillings School of Global Public Health, UNC and DUKE University Schools of Medicine) and in research units such as the General Oral Health Center and the Sleep Medicine clinic in the School of Dentistry.

In addition, the DHED graduate students are given the opportunity to provide volunteer services for the North Carolina Mission of Mercy (MOM) clinics and the Student Health Action Coalition (SHAC) clinic. These clinics involve general dentistry volunteers as well as volunteers from many dental specialty areas.

4. Interinstitutional Perspective (see Demand/Need)

The UNC DHED program is the only DHED program in North Carolina and one of 16 programs in the United States. Direct comparison of the quality of the UNC program to that of other programs requires outcome measures from those programs that are not readily available. However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. One such measure is the number of publication and research awards won by DHED students. And another is the success that UNC graduates have had in securing positions in academic institutions where they were one of a number of applicants. This implies that their training and expertise is being viewed as favorable compared to applicants from other programs.

The unique strengths of the UNC DHED program are based on three critical elements: (1) the on-site instruction and variety of the teaching experiences obtained (2) the quality of the internships in the spring semester of the second year, and, (3) the UNC School of Dentistry and UNC campus environment.

B. Curriculum

1. Course Review and Development

Each year the DHED faculty who teach specific courses meet to coordinate curricular content and make changes within their courses. If a new course is added, we work with the Office of Academic Affairs to follow university procedures. Recently we have had a change in the leadership of the undergraduate dental hygiene program which has impacted the course faculty for the graduate program. In the coming months we plan to schedule an extensive internal curriculum review and discuss potential revisions to the curriculum and assess areas where we may need to add/alter course offerings and course directorship.

2. Course Sequence and Description

Fall	Title
1st Year	
DENG 701	Introduction To Research Design
DHED 715	Current Concepts in Clinical Skills
DHED 720	Educational Concepts
DHED 736	Clinical/Laboratory Teaching Practicum
DHED 760	Seminar in Education and Research
2nd Year	
DENG 703	Applied Dental Research Methods
*DHED 754	Advanced Intraoral Functions (Periodontics)
*DHED 834	Dental Management Seminar
*DHED 705	Local Anesthesia
DHED 860	Seminar in Education and Research
DHED 993	Master's Research and Thesis

*Taken by some 1st or 2nd year students

Spring

1st Year

DENG 702	Biostatistics
DHED 730	Organization and Administration
DHED 836	Advanced/Clinical Teaching
*DHED 896	Independent Study in DHED
DHED 993	Master's Research and Thesis

2nd Year

DHED 837	Internship
DHED 993	Master's Research and Thesis

The course directors for the program courses have been relatively stable over the past five years and the number of enrolled students per course (3 to 4) varies only slightly from year to year since the number of students in each year of the program is very stable. Course syllabi will be available on site.

DHED 720 Educational Concepts

(2 credits) Fall Semester Year 1

Course Director: Shannon Mitchell; 3 students

This course is designed to introduce the graduate student to various teaching philosophies and methodologies. A variety of educational concepts such as methods of presentation, testing, and measurement are explored. Emphasis is placed on the practical application of theory.

DHED 736 Clinical/Laboratory Teaching

3 credits; Semester: Fall; Year 1

Course Director: Shannon Mitchell; 3 students

This course will provide students with the knowledge and skills to function as a competent clinical instructor. Psychomotor skill development and analysis and remediation of performance problems are two topics related to clinical teaching that are stressed. Clinical evaluation and faculty calibration are also included. Instruction includes seminar and clinical application sessions.

DHED 760 Seminar in Education and Research

1 credit; Semester: Fall; Year 1

Course Director: Rebecca Wilder; 3 students

This course is designed to provide knowledge and stimulate discussion about pertinent topics in dental and dental allied education and research. Part one of a two-course sequence, the course will examine issues related to the academic setting. Topics include current issues in the American Dental Hygienists' Association, International Association of Dental Research and the American Dental Education Association. In addition, the students will gain information about the research process and identify a research question. Students will be expected to complete a literature review on their research question by the end of the fall semester and present the literature review via a PowerPoint presentation to their peers.

DHED 730 Organization and Administration

3 credits; Semester: Spring; Year 1

Course Director: Rebecca Wilder; 3 students

The course is designed to provide information and experiences in leadership, administration, and accreditation for dental hygiene education programs. Critical issues and trends facing dental education, allied dental education and higher education will be addressed.

- DHED 993 Thesis**
3 credits; Semester: Multiple semesters-Spring, Fall; Year 1, 2
Course Director: Rebecca Wilder; 7 students
 Structured research experience under guidance of a research faculty member. Research experience is ongoing throughout the curriculum.
- DHED 860 Seminar in Education and Research II**
1 credit; Semester: Fall; Year 2
Course Director: Rebecca Wilder; 4 students
 This course is designed to provide advanced knowledge and to stimulate discussion about pertinent topics in dental and dental allied education and research. Part two of a two course sequence, the course will examine issues related to the academic setting. Topics will include the process of publication as well as presenting research through oral and poster presentations; interviewing for academic position and formulating a marketable curriculum vitae and teaching portfolio.
- DHED 837 Internship**
9 credits; Semester: Spring; Year 2
Course Director: Shannon Mitchell; 4 students
 A one semester planned and supervised professional internship designed to allow the intern to apply knowledge and skills acquired in previous didactic graduate courses.

BIOLOGICAL SCIENCES

The biological science minor was developed to address a need to enhance the academic qualifications of allied dental educators in the basic science area in order to lessen the need to rely on the expertise of educators whose primary responsibility is to other educational programs. However, no students have selected the Biological Sciences minor in 5 years. In the coming year, the DHED faculty will access if this minor should remain an option for DHED students

CLINICAL EDUCATION

The clinical education minor is designed to prepare clinical educators and supervisors for allied dental programs. Prerequisites: DHED 715, DHED 736

- DHED 836 Clinical Management (3)**
3 credits; Semester: Spring; Year 1
Course Director: Jennie Brame; 3 students
 This course continues the content presented in DHED 136, including information related to the role of a clinical administrator. Topics include the development of clinical requirements, grading, student counseling, clinical facilities, and scheduling and planning of faculty to support the clinical program.
- In addition to DHED 836, graduate students select 2 of the following 3 courses in the Clinical Minor:
- DHED 754 Current Concepts in Periodontology**
3 credits; Semester: Fall; Year 1 or 2
Course Directors: Rebecca Wilder/Lynne Hunt; 1 student
 This course will provide the student with advanced knowledge of current concepts and factors involved in the occurrence and treatment of periodontal disease. These issues will be studied through lectures, case presentations and the periodontal literature. Graduate students will also obtain experience in didactic and laboratory teaching of periodontology.
- DHED 705 Medical Emergencies/Local Anesthesia**
2 credits; Semester: Fall; Year 2
Course Director: Dr. Glenn Reside; 4 students

This course in local anesthesia is taken with predoctoral dental students. The course covers pharmacology, neuroanatomy, anatomy, neurophysiology as well as administration and techniques of local anesthesia. It also serves as an introduction to clinical medicine as well as the evaluation and management of commonly encountered medical emergencies in the dental office. The integration of basic scientific concepts and the application of sound principles of clinical management into the safe and effective delivery of patient care are stressed. The use of nitrous oxide inhalation sedation as an adjunct to patient comfort and reduced stress during dental care is included in this course.

DHED 896

Independent Study

3 credits; Semester: Fall/Spring; Year 1 or 2

Course Director: Rebecca Wilder; 4 students

Students study and participate in completion of projects with a clinical faculty member in a clinical course taught to dental, dental hygiene or dental assisting students. DHED graduate students participate in course planning, weekly teaching of the didactic, laboratory and/or clinical content.

MANAGEMENT/ADMINISTRATION

The management/administration minor is designed to prepare the graduate student for management roles in health care organizations or administrative settings.

DHED 774

Personnel Management

2 credits; Semester: Spring; Year 1

Course Director: Rebecca Wilder; 0 students in 2014/15

This course is designed to 1) introduce the DHED graduate student to personnel management issues in allied dental education and general business 2) teach the student necessary personnel management skills to function as a productive, effective manager of an allied dental education program or dental business setting. Through readings and seminars, students will learn methods that have achieved success in the areas of management.

DHED 834

Principles of Management/Administration

4 credits; Semester: Fall or Spring; Year 1 or 2

Course Director: Rebecca Wilder; 0 students in 2014/15

This course is designed to provide the DHED graduate student with knowledge and skills in basic management and administration. Course format will include seminars led by guest speakers in management/administrative positions, the course director and the students in the class. The management / administrative externship will consist of 6 hours per week in a facility of interest to the student, based on the student's individual career goals.

Elective

3 credits; Semester: fall or Spring; Year 1 or 2

Course Director: Varies with course; 0 students in 2014/15

An elective course with an administrative/management focus is selected by the student. Courses may be taken in other disciplines such as Public Health or Adult Education (NCSU).

ORAL PATHOLOGY

The oral pathology minor was designed to prepare allied dental educators to assume teaching roles in the area of oral pathology. However, no students have selected the Oral Pathology minor in 5 years. In the coming year, the DHED faculty will access if this minor should remain an option for DHED students).

3. Course Evaluation

Evaluation of program specific courses is based on feedback from students on an ongoing basis as well as during the biannual evaluations and during exit interviews. Meetings are scheduled with students each semester to obtain feedback about the curriculum and course offerings.

Upon completion of the program, all students participate in an exit interview where questions are asked as follows: Strengths and weaknesses of the program, research core courses, topics that should be added to the courses/curriculum, GTA experience, collaboration with other graduate students, format of the program, research experience, staff support, mentoring, and internship experience.

4. Requirements for Degree MS

See General Curriculum Overview. The DHED students all conduct original research, present their research at a national/international meeting and submit a paper for publication. The thesis committees are typically interdisciplinary. While there is not a particular focus area for the projects, all students are required to conduct research that supports the American Dental Hygienists' Association National Dental Hygiene Research Agenda. http://www.adha.org/resources/docs/7111_National_Dental_Hygiene_Research_Agenda.pdf

The DHED graduate students are required to pass a comprehensive examination at the end of the fall semester, second year. The examination consists of six questions (4 from core course and 2 from courses in the minor). Students are allowed to take 60 minutes per question. The examination takes place in a classroom in the School of Dentistry and all students are on a one hour per question schedule. They are required to pass each question at a 75% level. Each question is graded by the faculty member who wrote and submitted the question.

Failure to pass the comprehensive examination on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program

5. Evaluation of Progress of Students

DHED students are evaluated frequently on their performance. All classes are very small so feedback from faculty and peers is a common occurrence. At the initiation of the program, all students are assessed on their clinical and radiology skills to facilitate faculty in determining if remediation is required. Once students begin their graduate teaching assistantship, they are evaluated by faculty on their communication and teaching skills (see Table 1). Students are evaluated on every lecture they provide to dental, dental hygiene or dental assisting students. In addition, they are required to provide several presentations to their peers where they are evaluated by the professor and their peers. When students are GTAs they are evaluated like other clinical faculty in the School of Dentistry and provided feedback at the end of the semester. The full time dental hygiene faculty also provide informal feedback to students and observe their teaching in the clinical setting.

Table 1. Didactic TEACHING EVALUATION form used for Graduate Teaching Assistants

NAME _____ DATE _____

TOPIC _____

EVALUATOR _____

A. INTRODUCTION	POSSIBLE POINTS	POINTS EARNED
1. Introduces topic	4	
2. Relates importance of material	4	
3. Establishes a knowledge base	4	
4. States objectives	4	
B. AUDIOVISUALS AND SUPPORT TECHNIQUES		
1. Speaks to the audience with good body language	5	
2. Appropriately uses audiovisuals and equipment	3	
3. Handouts are well prepared and useful	8	
C. CLOSURE		
1. Summarized major points	5	
D. TEACHING TACTICS		
1. Involved students	5	
2. Utilized appropriate questioning tactics	5	
3. Provided time for the audience to think, formulate and respond	5	
4. Exhibited enthusiasm	5	
E. VERBAL AND NON VERBAL BEHAVIOR		
1. Voice control	6	
2. Eye contact with audience	6	
3. Movement	5	
4. Facial expression	5	
F. OTHER		
1. Organization	5	
2. Logical sequencing	5	
3. Appropriate pace	5	
4. Knowledge of subject matter	6	

FINAL GRADE _____ COMMENTS (Please provide specific comments that will assist in the development of the student. Add extra pages if needed or write on back of paper)

The DHED program director provides feedback from course grades, GTA evaluations, and informal feedback from faculty to students based on the Academic Performance Committee meetings held at the end of each semester. Members of the DHED APC are Professors Rebecca Wilder, Shannon Mitchell and Jennifer Brame.

Regarding the evaluation of research progress, a Research Mentoring form is completed by the thesis mentoring committee chair each semester that the student is enrolled in DHED 993, Thesis. This process informs us of the needs of students in the research / thesis area.

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The report below was as submitted to the Southern Association of Colleges in January 2015.

Curriculum

Assessment: Core Faculty Evaluation of Student Progress

Frequency: The Graduate Program Director monitors the performance of graduate students in all core and elective courses, including teaching in clinical courses for BS Dental Hygiene or DDS students. The Academic Performance Committee meets at least biannually to discuss student progress.

Outcome: Any concerns or deficiencies are addressed with the student and educational enhancement plans developed as needed. The Graduate Program Director meets with each student at the end of each semester 2012-2014: All Students have performed at a satisfactory or above level.

Action: Students are evaluated by the faculty they have worked with at the end of each semester. Student evaluations are maintained in the program office. Evaluation systems are reviewed annually by the program faculty to ensure that areas and content evaluated are sufficient so that students receive necessary feedback for improvement.

Assessment: Teaching evaluations

Frequency: Year 1- End of spring and summer semester Year 2, end of fall semester

Outcome: Graduate students are formally evaluated by the students they teach in the clinic and/or classroom. The Program Director discusses the results with them and advises them on improvement strategies.

2012-2014: All students have performed at a satisfactory or above level

Action: The faculty course director formally evaluates the teaching of each student using specific criteria. When a student provides a lecture in a lecture, the faculty director formally evaluates the student with specific criteria.

Assessment: Departmental Meetings/Retreats

Frequency: Periodic departmental meetings are held year- round. Graduate program and curricular matters are discussed often in these meetings. Minutes are maintained on file in the department.

Outcome: The Program Director communicates with the graduate students as changes in the program or curriculum are made based on departmental meetings.

Action: None

Education Goals

Assessment: Comprehensive written exams

Frequency: Once during the program: end of year 2, fall semester, prior to conducting their teaching internship. The examination consists of 6 questions (4 from core courses and 2 from the minor courses). They are provided one hour to complete each question.

Outcome: Student must score a minimum of 75% on the written comprehensive exam.

2012: 100% met criteria

2013: 1 student did not meet criteria and remediated

2014: 1 student did not meet criteria and remediated

Action: None

Research Goals

Assessment: Thesis submission, research presentations, manuscript publications and awards/scholarships

Frequency: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate School

Outcome: Graduate student research culminating in a presentation, award scholarship and/or publication is documented in graduate student/resident or alumni files with the department.

2012-2014: All students completed MS requirements on time

2013: 3 (4) students received external research awards

2014: 4 (4) students received external research awards

2012: 4 (4) published

2013: 4 (4) published

2014: 4 (4) published

C. Faculty

Only 1 faculty member, Professor Rebecca Wilder, is committed to the program more than 30% percent time. Professor Wilder also is the Director for Faculty Development. Faculty in the BS program in Dental Hygiene also actively participate in the DHED program (see Table 2). Bio-sketches for BS DH and DHED faculty are found on the flashdrive.

1. Faculty Research

DHED faculty participate in research and grantsmanship according to their terms and conditions of employment. Since Professor Mitchell and Professor Brame are on Fixed Term Appointments their requirements for research are not as stringent as tenure track faculty. However, all of the faculty are publishing approximately 1 (or more) paper per year and participating in thesis committees. Professor Wilder has received funding through Corporate Foundations and Contracts in the last 5 years. See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

2. Teaching Distribution

Teaching schedules are planned between the Graduate DHED Program Director and the Program Director for the Undergraduate Dental Hygiene Program. Three faculty teach the DHED courses and minor courses in Clinical Education and Management/Administration. Other courses are taken from current offerings in the School of Dentistry, School of Public Health or other schools in the university system.

3. Teaching Evaluation

There is not a definitive process for evaluating program graduate courses like there is for undergraduate courses. Graduate course faculty can devise their own evaluation system for their courses. Since the program and number of students is so small, DHED faculty generally receive feedback through informal mechanisms. Upon completion of the program, all students participate in an exit interview where questions are asked as follows: Strengths and weaknesses of 1) the program, 2) research core courses, 3) topics that should be added to the courses/curriculum, 4) GTA experience, 5) collaboration with other graduate students, 6) format of the program, 7) research experience, 8) staff support, 9) mentoring, and 10) internship experience. In addition, meetings are scheduled with students each semester to obtain feedback about the curriculum and course offerings.

4. Teaching Innovation

The faculty are consistently revising their courses and making changes to the way content is delivered to students. Internship sites are constantly added to make that experience more innovative for students. For example, a site was added in 2014 that allowed 2 students to participate in an internship at the University of Portsmouth in the United Kingdom in a Dental Hygienist/Dental Therapist program. In addition, this year we used current technology to access expertise in accreditation from ADEA staff. This content was part of the students' course in Leadership and Administration (DHED 730).

5. Faculty Mentoring/Support

See General Faculty Overview. The DHED program director is the only faculty member who does not also have course responsibility in the undergraduate dental hygiene program. All of the faculty are very interactive and participate with students in all of the allied programs (undergraduate and graduate). All faculty in the DHED program or undergraduate DH program participate as either a mentor or a mentee in the School of Dentistry Formal Mentoring Program. In addition, the DHED program director mentors all DHED faculty in goal setting, teaching, service, scholarship and research. Within the BS Dental Hygiene and DHED programs, faculty members constantly interact and discuss various aspects of their research/teaching and how improvements can be made.

6. Faculty Teaching/Professional Awards for FY2010-11 thru FY 2014-15

2015	Professor Shannon Mitchell: Old Dominion University Distinguished Alumni Award
2014	Professor Rebecca Wilder: UNC School of Dentistry Four Corners Study Club Faculty Mentoring Award recipient (Inaugural award)
2011	Professor Rebecca Wilder: Dr. Bicuspid Award: Most Effective Dental Hygiene Educator elected by national voting process
2010-2014	Professor Jennie Brame: Dental Hygiene Teacher Excellence Award given by the undergraduate dental hygiene students.

7. Faculty Advising / Mentoring of Students

All DHED students participate in a comprehensive 2 day orientation in August before classes begin. All students receive an evaluation of their clinical and radiology skills. Other content includes Graduate School and School of Dentistry requirements for graduate students, Graduate Teaching Assistantship responsibilities, details about the thesis requirement and general information about the university and surrounding community.

Table 2. Faculty participation in Advising / Mentoring of Completed MS/PhD and non-MS Student Projects from FY 2010-11 thru FY 2014-2015

Faculty	Appointment	MS		PhD		Non-MS**
		# Mentor	# Committee Member	# Mentor	# Committee Member	# Mentor
Hunt, Lynne C	Clin Assist Prof	0	1	0	0	0
Sams, Lattice Deaver	Clin Assist Prof	0	0	0	0	0
Hayes, Cheryl	Clin Assist Prof	0	0	0	0	0
Brame, Jennifer		1	3	0	0	0
Mitchell, Shannon H	Clin Assoc Prof	0	1	0	0	0
Mauriello, Sally M	Professor	4	1	0	0	0
Wilder, Rebecca	Professor	5	8	0	0	0

During their first semester in the program, students complete a required course which culminates in a research topic/question and the selection of a thesis committee chair. The chair then facilitates the selection of the other committee members (usually 2 in addition to the chair). Selection follows the guidelines outlined by the University of North Carolina Graduate School. We typically have one dental hygiene faculty member on each thesis committee or as the thesis chair. Strict deadlines are followed to ensure that students can begin data collection in the spring/summer of their first year.

8. Graduate Teaching Assistants

The DHED Graduate Teaching Assistant (GTA) Program has both formal structure and informal components. Graduate students serve as GTAs during their 21-month education program. The goal of the GTA Program is to foster the development of professional educators in the specialty. Because a significant number of our graduate students pursue professional careers in academia and research, we take seriously the opportunity to conduct a GTA Program and serve as role models and mentors for our GTAs. This experience also serves to enhance the didactic coursework they receive in principles of education. The overall philosophy of the program is to provide GTAs increasingly sophisticated opportunities to act as young instructors for undergraduate dental hygiene and predoctoral dental students. During the first six months of their program, assignments are limited primarily to highly focused instruction and laboratory experiences. The GTAs also assist faculty with laboratory and clinical preparation. There are a few opportunities to serve as facilitators with other projects or seminars offered by full time faculty. During the spring semester of the first year and throughout the second year, GTAs serve as laboratory and clinical instructors. Occasionally, GTA's assist faculty with didactic instruction.

In preparation for their clinical teaching assignments in the spring semester of the first year, all students are required to take (DHED 736) in "Clinical Teaching". The course has both a didactic and clinical component. Students are given special orientation to the clinical teaching program and are assigned to work side-by-side with the DH faculty in the preclinical setting where they become acquainted with the administrative and logistical demands and the clinical teaching setting. During the course, students complete assignments which further acquaint them to the clinical requirements and facility. They have the opportunity to work side-by-side with the full-time faculty members where they have the opportunity to study the faculty member's teaching style and to interact with the full-time faculty member in such a way as to refine and build on GTAs teaching skills. In addition, the students attend a weekly preclinical calibration meeting to acquaint them to the teaching techniques to be used for the following week. This is an ideal instructional setting for young GTAs to learn how to teach because the student faculty in the preclinical setting is much lower than is the case in clinic. Before each semester, all faculty and GTAs are required to attend a half day calibration session.

GTA activities of DHED students in the DHED Graduate Program

Following are examples of the type of Graduate Teaching Responsibilities students may be assigned to during the DHED MS program. Students are assigned approximately 6 hours in the Fall 1 semester and 9 hours in the Spring 1 and Fall 2 semesters.

Year 1			
Semester	Course	sessions/ week	hours/session
Fall	DHYG 252 (Dental Radiology)	1	1 st year graduate students work with the course director and observe/teach first year dental hygiene students in radiology. Prior to this assignment, the graduate students receive an extensive evaluation of their skills and an orientation to the course.

	DHYG 253 Dental Anatomy lab	1	1 st and 2 nd year graduate students assisted with lab activities, answer questions for students; grade laboratory assignments.
	DHYG 257 (Introduction to Dental Hygiene)	1	1 st year graduate student work with the course director to prepare for labs and lectures and perform other functions as needed.
Spring	DHYG 367(Clinical Dental Hygiene)	3	Students are clinical instructors in the dental hygiene clinics.
	DHYG 265 Dental Materials	1	Student work with course director to provide lectures, lead laboratory activities and grade laboratory exercises; provide remediation to students.
	DENT 113 (Preclinical Scaling for DDS Students)	1	Students were laboratory instructors with the 1 st year dental students teaching instrumentation skills.
Summer	DENT – Preventive Recall Clinic	3	Students teach in 3 clinic sessions per week to the DDS 1 students

Year 2			
Semester	Course	sessions/week	hours/session
Fall	DHYG 357/367(Clinical Dental Hygiene)	3	2 nd year graduate students are clinical instructors in the dental hygiene clinics.
	DHYG 257L (Preclinical Dental Hygiene)	3	Students provide preclinical instruction during 2 clinic sessions per week (6 hours total)
	DHYG 253 Dental Anatomy	1	Students assist with lab activities, answer questions for students; grade laboratory assignments.
Spring	Students are in teaching internships		

Students receive a stipend of approximately \$6,900 a year. This amount is modest considering the amount of teaching they do in the dental hygiene, dental assisting and predoctoral programs.

9. Faculty Strengths and Areas of Concern

All dental hygiene faculty that teach or supervise students in the DHED program have a Master of Science Degree or a doctoral degree. The Graduate Program Director's time allocation to the graduate program is approximately 40-50%. Two other dental hygiene faculty teach core courses in the DHED program. However, the two faculty also have course and administrative responsibilities in the undergraduate dental hygiene program and one teaches a major course in the spring in the predoctoral curriculum.

Only two of the full-time faculty members in Dental Hygiene are tenure track/tenured. For future growth and succession planning, it would be beneficial to hire 1-2 tenure track faculty members in the future.

D. Students

1. Admission

See General Student Overview. Once applications are completed in the UNC-CH Graduate School system, the admissions committee, consisting of four members (Wilder, Chair, Brame, Mitchell, Hunt) reviews each application. All candidates are evaluated on the following criteria: GPA, schools attended, previous work experience, letters of recommendation (outstanding, good, average, below average), admissions questionnaire (outstanding, good, average, below average), subjective rating (outstanding, good, average, below average) based on personal or telephone interview. The admissions committee has a final meeting after all interviews are conducted to make final selections.

2. Academic Environment

The DHED graduate students are treated very well by all faculty in the School of Dentistry. We have a detailed orientation (2 day) for the students upon arrival and welcome reception soon after they begin. The students have a graduate room with a desk and other supplies to assist them in their graduate studies. The program director (through program CE and Dental Foundation funds) assists the students with funding for travel to professional meetings and other professional development opportunities. In addition, students are welcomed at interdisciplinary activities throughout the School of Dentistry and University.

3. Alumni

See General Student Overview

a.) Research and Professional Awards Received by Alumni FY 2010-11 thru FY 2014-15

FY 10-11	Jonathan	Owens	<i>Winner of the Olav Alvares Awards for Outstanding Articles by Junior Scholars published in the Journal of Dental Education in 2011.</i>
FY12-13	Brittany	Minichbauer	ADEA/Crest Oral-B Scholarship for Dental Hygiene Students Pursuing Academic Careers, ADEA-American Dental Education Association
FY12-13	Lambert	Cynthia	American Dental Hygienists' Association (ADHA)/Sigma Phi Alpha Journalism Award, ADHA-American Dental Hygienists Association <i>Winner of Best Paper Award for papers published in the Journal of Dental Hygiene in 2013</i>
FY12-13	Qun	Tang	ADEA/Crest Oral-B Scholarship for Dental Hygiene Students Pursuing Academic Careers, ADEA-American Dental Education Association
FY13-14	Brittany	Minichbauer	ADEA/Crest Oral-B Scholarship
FY 13-14	Megan	Mosley	<i>Runner-up winner of Best Paper Award for papers published in the Journal of Dental Hygiene in 2014</i>
FY 13-14	Vivana	Ruiz	<i>Winner of the Olav Alvares Awards for Outstanding Articles by Junior Scholars published in the Journal of Dental Education in 2014.</i>
FY14-15	Viviana	Ruiz	Olva Oleares Award - Outstanding Article by Junior Scholar in J Dent Educ
FY14-15	Jessica	Holloman	ADEA/Crest Oral-B Scholarship for Dental Hygiene Students Pursuing Academic Careers
FY14-15	Kristin	Dillow	Am Acad of Dental Sleep Medicine Student Research Award
FY14-15	Kristin	Dillow	1st Place Graduate Student Research award DENTSPLY/Am Dental Hygiene Association
FY14-15	Whitney	Simonian	Honorable Mention: Masters/Doctoral category in the ADHA/Sigma Phi Alpha Journalism Competition
FY14-15	Brittany	Minichbauer	Am Acad of Dental Sleep Medicine Student Research Award
FY15-16	Anna	Hilla	ADEA/Crest Oral-B Laboratories Scholarships for Dental Hygiene Students Pursuing Academic Careers;
FY15-16	Jennifer	Harmon	International Association of Dental Research (IADR) Behavioral, Epidemiologic and Health Services Research (BEHSR) group Outstanding Student Abstract Award.
FY15-16	Demah	AlGheithy	DENTSPLY/ADHA Graduate Student Clinicians Dental Hygiene Research Program at the American Dental Hygienists' Association Center for Lifelong Learning

b.) Publications of students (1st or co-author) in FY 2010-11 thru FY 2014-15. Students' names are in bold.

Spring 2015 Graduates

Jennifer Harmon: Harmon JB, Sanders AE, Wilder RS, Essick GK, Slade GD, Hartung JE, Nackley AG. Circulating Omentin-1 and Chronic Temporomandibular Disorder Pain. Submitted to the *J Oral Facial Pain Headache*.

Li Chen: Chen L, Mauriello SM, Platin E, Arnold RR. Sporicidal activities of three commercial disinfectant wipes for surface decontamination. To be submitted to JADA.
Thesis Committee: Dr. Sally Mauriello, Chair; Dr. Roland Arnold, Dr. Ricardo Platin.

Melani Decker: A qualitative pilot assessment of oral health information delivered in the medical home. Thesis Committee: Dr. Rocio Quinonez, Chair; Dr. Gary Rozier, Prof. Rebecca Wilder, Dr. Steiner. Paper in preparation and will be submitted to the *Journal of Pediatrics*.

Demah AlGheithy: AlGheithy D, Mitchell S, Platin R, Brame J. The effectiveness of a self-instructional radiographic anatomy module on the improvement of test performance for dental hygiene faculty. To be submitted to the *Journal of Dental Education*.

Spring 2014 Graduates

Brittany Minichbauer: *Minichbauer B, Sheats R, Wilder RS, Essick G. Sleep medicine content in dental hygiene education. *J Dent Educ.* 2015, 79 (5): 484-92.

Jessica Holloman: Holloman J, Mauriello SM, Pimenta L, Arnold RR. Comparison of suction device with saliva ejector for aerosol and spatter reduction during ultrasonic scaling. *J Am Dent Assoc.* 2015, 146(1):27-33

Kristin Dillow: Dillow KD, Essick GK, Sanders AE, Sheats RD, Brame JL. Physician evaluation among dental patients who screen high-risk for sleep apnea. Submitted to JADA.

Whitney Simonian: *Simonian W, Brame J, Hunt L, Wilder RS. Practicum experiences: effects on clinical self-confidence of senior dental hygiene students. *J Dent Hyg.* 2015, *in press*.

Spring 2013 Graduates

Brandon Johnson: Johnson KB, Ludlow JB, Mauriello SM, Platin E. Reducing the risk of intraoral radiographic imaging with collimation and thyroid shielding. *Gen Dent* 2014, 62:34-40.

Megan Mosley: *Mosley M, Offenbacher S, Phillips C, Granger C, Wilder RS. North Carolina Cardiologists' Knowledge, Opinions and Practice Behaviors Regarding the Relationship between Periodontal Disease and Cardiovascular Disease. *J Dent Hyg.* 2014 Oct;88(5):275-84.

Antiana Perry: *Perry A, Patton LP, Wilder RS, Iida H. Knowledge, perceived ability and practice behaviors regarding oral health among pediatric hematology and oncology nurses. *J Dent Hyg., in press*.

2012 Graduates

Nuha Ahmad: *Ahmad NE, Sanders AE, Sheats R, Brame JL, Essick GK. Obstructive sleep apnea in association with periodontitis: a case-control study. *J Dent Hyg.* 2013 Aug;87(4):188-99.

Cynthia Lambert: Lambert CA, Sanders A, Wilder RS, Slade GD, Van Uum S, Russell E, Koren G, Maixner W. Chronic HPA axis response to stress in temporomandibular disorder. *J Dent Hyg.* 2013;87:73-81.

Reprinted: *Lambert CA, Sanders A, Wilder RS, Slade GD, Van Uum S, Russell E, Koren G, Maixner W. Chronic HPA axis response to stress in temporomandibular disorder. *J Dent Hyg.* 2014;88 Suppl 1:5-12.

Viviana Ruiz: *Ruiz VR, Quinonez RB, Wilder RS, Phillips C.. Infant and toddler oral health: attitudes and practice behaviors of North Carolina dental hygienists. *J Dent Educ.* 2014 Jan;78(1):146-56.

Qun Tang: Three Intraoral Radiographic Receptor-Positioning Systems: A Comparative Study. Thesis Committee: Dr. Sally Mauriello, Chair; Dr. John Ludlow; Dr. Enrique Platin. Paper submitted for publication (2014).

2011 Graduates

Julie Sutton: Sutton JD, Ranney LM, Wilder RS, Sanders AE. Environmental tobacco smoke and periodontitis in U.S. non-smokers. *J Dent Hyg.* 2012 Summer;86(3):185-94.

2010 Graduates

Kathryn Bell: Bell KP, Phillips C, Offenbacher S, Paquette D, Wilder RS. Incorporating Oral-Systemic Evidence into Patient Care: Practice Behaviors and Barriers of North Carolina Dental Hygienists. *J Dent Hyg.* 2011 Spring;85(2):99-113.

Jonathan Owens: Owens JB, Southerland J, Buse JB, Malone RM, Wilder RS. Knowledge, Opinions and Practice Behaviors of North Carolina Endocrinologists and Internists Regarding Periodontal Disease and Diabetes. *J Dent Educ.* 2011 Mar;75(3):329-38.

Mary Vinson Lopes: Lopes M, Southerland J, Buse JB, Malone RM, Wilder RS. Diabetes Educators' Knowledge, Opinions and Behaviors Regarding Periodontal Disease and Diabetes. *J Dent Hyg.* 2012 Spring;86(2):82-90.

Aubree Chismark: Chismark A, Asher G, Stein M, Tavoc T, Curran A. Use of Complementary and Alternative Medicine for Work-related Pain Correlates with Career Satisfaction among Dental hygienists. *J Dent Hyg.* 2011 Fall;85(4):273-84.

c.) Employment and Professional Contributions of Alumni FY 2010-11 thru FY 2014-15

Katie Bell (2010)

Current: Assistant Professor of Dental Hygiene Faculty

Pacific University, Hillsboro, OR

Leadership Positions: Faculty Senator; Secretary of the Oregon Dental Hygienists' Association

Member: American Dental Hygienists' Association Institute for Oral Health Research Grant Review Committee

Aubree Chismark (2010)

Current: Assistant Professor of Dental Hygiene Faculty

West Coast University, Anaheim, CA

Jonathan Owens (2010)

Faculty

Current: Assistant Professor

Howard University SOD, Washington, DC

Olav Alvares Award for Outstanding Articles Published in the Journal of Dental Education

Leadership Positions: Advisory Board for the National Center on Dental Hygiene Research and Practice

Mary Vinson (2010)

Current: Not working

Julie Sutton (2011)

Faculty

Previous: Instructor

Hawkeye Community College, Waterloo, IA

Current: Assistant Professor

Faculty

University of Missouri-KC, Kansas City, MO

Leadership Positions: ADHA State Educator Network representative, Missouri

Lisa Barron (2011)

Current: Teaching FT

Faculty

Central Carolina Community College, Sanford, NC

Current: Dean of Health Sciences

Administration

Central Carolina Community College, Sanford, NC

Leadership Positions: IOH Liaison and Governmental Chair for NCDHA

Jessica Peek Scott (2011)

Previous: Director and Instructor

Administration/ Faculty

Kaplan School for Dental Assistants, Charlotte, NC

Current: Department Chair of Allied Health Sciences

Administration/ Faculty

Central Carolina Community College, Sanford, NC

Leadership Positions: Vice President of the Durham Orange Dental Hygiene Association

Nuha Ahmad (2012)

Current: Lecturer

Faculty

King Saud University, College of Applied Medical Sciences

Dental Health Department, Dental Hygiene

Riyadh, Saudi Arabia

Cynthia Lambert (2012)
 Previous: Clinical Assistant Professor of Dental Assisting Faculty
 University of North Carolina-Chapel Hill School of Dentistry
 Current: Instructor of Dental Assisting/Dental Hygiene Faculty
 Central Carolina Community College, Sanford, NC
 Leadership Positions: Vice President of the Durham Orange Dental Hygienists' Association (2012-14);
 Secretary of the Dental Assisting Section of ADEA

Qun Tang (2012)
 Current: Instructor of Dental Hygiene Faculty
 Milwaukee Area Technical College, Milwaukee, WI

Viviana Ruiz (2012)
 Upon graduation with MS, entered International Program for Dentists
 University of Illinois at Chicago
 Current: Private Practice Dentist, Chicago, IL Private Practice-Dentistry
 Olav Alvares Award for Outstanding Article Published in the Journal of Dental Education

Antiana Perry (2013)
 Previous: Instructor Faculty
 Halifax Community College Dental Hygiene

Megan Mosely (2013)
 Previous: Part time Clinical Instructor of Dental Hygiene
 UNC Chapel Hill, NC
 Current: Private Practice DH Clinician Private DH Practice

Brandon Johnson (2013)
 Previous: Part time Clinical Instructor of Dental Hygiene
 UNC Chapel Hill, NC
 Current: Clinical Assistant Professor Faculty
 Department of Diagnostic Sciences
 UNC Chapel Hill School of Dentistry, Chapel Hill, NC

Whitney Simonian (2014)
 Current: Clinical Instructor of Dental Hygiene
 Central Carolina Community College, Sanford, NC Faculty
 Leadership positions: Durham Orange Dental Hygiene Association
 Treasurer: North Carolina Dental Hygienists' Association

Kristin Dillow (2014)
 Current: Research Assistant, Department of Prosthodontics Research

Jessica Holloman (2014)
 Current: Program Director: Innovations in Oral Health: Research
 Technology, Instruction, Practice, Service
 Bouvé College of Health Sciences
 Northeastern University, Boston, MA

Brittany Minichbauer (2014)	
Previous: Clinical Instructor (part-time) of Dental Hygiene UNC Chapel Hill School of Dentistry	Faculty
Current: Private Practice Clinician	Private Practice
Jennifer Harmon (2015)	
Current: Adjunct Clinical Assistant Professor of Dental Hygiene UNC Chapel Hill School of Dentistry	Faculty
Demah AlGheithy (2015)	
Current: Lecturer King Saud University College of Applied Medical Sciences, Dental Health Department Riyadh, Saudi Arabia	Faculty
Melanie Decker (2015)	
Currently unemployed (moving to a new location with husband)	
Li Chen (2015)	
Current: Private Practice Clinician	Private Practice

E. Leadership and Support

See General Leadership and Support overview

1. Administrative Support

One full time Student Services Manager position is allocated to both the dental hygiene undergraduate and graduate programs. This individual serves a vital role in recruitment, admissions, student registration, electronic calendar support, and all student related functions, such as textbook ordering, student orientation and student advocacy. The staff member also provides clerical support including duplication of materials, travel requisitions and purchase orders.

Clinical support staff is not separate from that serving the School of Dentistry. Clinical support staff members available to support the program include appointment clerks, dispensary clerks, sterilization technicians, radiology technicians, financial coordinators, insurance clerks, and dental assistants.

2. Facilities

Each of the full time dental hygiene faculty members has a private office in a suite of offices in the First Dental Building. The staff student services manager has a private office. Dental hygiene graduate students share a large office space, which accommodates eight students. Each student is supplied a workstation. Printers are shared by the students.

With the addition of the Koury Oral Health Sciences Building, our facilities, classroom, laboratory and research space are superior. The graduate students and faculty have ample space and equipment to conduct their teaching and research responsibilities.

F. The Future

Program Size

The size of the program is likely to stay the same given the number of faculty we have to support the program and the rigor of the thesis requirement. It would be beneficial to hire another tenure track faculty member in the Dental Hygiene programs for future growth in the area of scholarship and grantsmanship.

Student Resources

Our resources to assist graduate students with research funding and travel are very limited. To date, we use continuing education funds or monies from the Dental Foundation of North Carolina Graduate Dental Hygiene Education fund. More funding for these endeavors are necessary for student exposure and growth.

Curricular Changes

We would like to have an external program review conducted to provide us with objective analysis regarding the future direction of the program. We are satisfied that the program is graduating students who are competent and ready to enter an academic position. However, we are considering adding new minors that will provide contemporary content for future growth in the dental hygiene profession. For example, we might consider a minor in interprofessional education and collaboration or Public Health. A minor in Clinical Research is another option. We are also considering the addition of a course or content in online teaching. To date we have not made decisions about future changes or implementation.

Quality Improvement of Graduate Education

The research core of courses is changing and the DHED students will only be able to participate in 2 of the 3 courses. We need to determine a way to help them to obtain that content.

The quality of the thesis projects is excellent and we will strive to continue providing the graduate students with a strong research and writing foundation.

Student Qualifications

We will continue recruiting from BS Dental Hygiene programs as well as practicing dental hygienists. We are receiving applications from highly qualified applicants and will continue to strive for this level of student in the future.

Racial, ethnic, and gender diversity in the graduate program

The DHED graduate program is very diverse and we will continue to strive to maintain diversity.

Quality of mentoring

We have a formal mentoring program for junior faculty at the UNC School of Dentistry. This program provides guidance to faculty as they navigate and strive for promotion and/or tenure. The faculty within the dental hygiene program participate in the mentoring program.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
ENDODONTICS



Graduate School Review Site Visit
September 8-10, 2015



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ENDODONTICS

A. Program Overview

1. Program's Mission, Goals, and Objectives

Graduate Endodontics Educational Mission

The primary goal of our advanced education program in Endodontics is to prepare specialists who are fully qualified in the clinical practice of Endodontics, to disseminate knowledge through teaching, to conduct research in oral health science and to prepare future leaders in academics.

UNC Endodontics Department Mission

The mission of the UNC Department of Endodontics is to improve the health of the people of North Carolina and beyond. This is accomplished through teaching, research, service and patient care related to the prevention and treatment of pulpal and periradicular dental pathology and orofacial pain.

Our goal is to educate health care providers in the prevention, diagnosis and treatment of periradicular periodontitis and orofacial pain in a patient centered environment. This is accomplished through the study of the physiology and pathogenesis of pulpal and periapical disease.

Treatment approaches stress an understanding of the biological and research basis of successful evidence-based diagnosis, prevention, treatment and referral for patients in the state of North Carolina and beyond.

Objective

The Endodontics program is a dual MS degree and clinic residency program. The program is a 36-month educational experience that is structured to meet or exceed the accreditation standards of the Commission on Dental Accreditation. We embrace the American Dental Association Council on Dental Education definition of the specialty: *Endodontics is the branch of dentistry which is concerned with the morphology, physiology and pathology of the human dental pulp and periradicular tissues. Its study and practice encompass the basic and clinical sciences including biology of the normal pulp, the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular conditions. (Adopted December 1983)* The program is designed to educate a graduate who is proficient in all aspects within the scope of the definition and standards.

At completion of the endodontic graduate program, the graduate will possess the following qualifications:

1. Advanced knowledge of the biomedical sciences and their application to clinical endodontic practice.
2. Advanced knowledge of the etiology of oral diseases, microbial ecology of the oral flora and the microbiologic aspects of caries.
3. Advanced knowledge of the pulpal/periradicular diseases and the infectious/immunologic processes in oral health and disease.
4. Advanced knowledge in the anatomy of soft and hard tissues of the head and neck with particular emphasis on the teeth and their supporting structures, embryology, histology and physiology of the pulpal/periradicular complex.
5. Advanced knowledge in pathophysiology as it relates to diseases of the pulpal/periradicular complex and orofacial pain.
6. Advanced knowledge of mechanisms of inflammation and wound healing with emphasis on the pulpal/periradicular/periodontal complex.

7. Advanced knowledge in oral medicine and pathology as they relate to the differential diagnosis and management of clinical conditions that may require endodontic treatment.
8. Advanced knowledge in pharmacotherapeutic agents used in the management of systemic diseases that may influence the management of patients requiring endodontic treatment.
9. Advanced knowledge about mechanisms, interactions and effects of drugs used in the prevention, diagnosis and treatment of pulpal and periradicular pathoses.
10. Advanced knowledge in principles of statistics, research design, research methodology, scientific writing, and critical evaluation of the literature.
11. In-depth proficiency in collecting, organizing, analyzing and interpreting data from the medical and dental histories and clinical evaluation to determine their relationship to the patient's endodontic treatment.
12. In-depth proficiency in performing tests and clinical examinations and interpreting the significance of the data in the differential diagnosis of clinical conditions arising from injury to and pathosis of pulp and periradicular tissues.
13. In-depth proficiency in exposing, processing and interpreting 2D and 3D radiographic digital images.
14. In-depth proficiency in establishing differential interpretation of lesions and normal anatomic structures through radiographs or digital images.
15. In-depth proficiency in formulating a diagnosis, prognosis, and treatment plan for conditions that require endodontic treatment in support of the total oral health of the patient, requesting information/consultation from other healthcare professionals as needed.
16. In-depth proficiency in providing appropriate emergency treatment to relieve pain and resolve infections of endodontic origin and recognizing and managing, or preventing endodontic pain and associated anxiety using physical, chemical and psychological modalities.
17. In-depth proficiency in providing nonsurgical and surgical endodontic treatment.
18. In-depth proficiency in retreatment endodontically-treated teeth using both nonsurgical and surgical techniques.
19. In-Depth proficiency in using dental microscopy and magnification technologies.
20. In-depth proficiency in evaluating the results of endodontic treatment and determining whether additional evaluation/treatment is required.
21. In-depth proficiency in communicating to patients the nature of their endodontic conditions, the value of treatment to their overall oral health and ethics applied to patient management.
22. In-depth competency in the management of developing permanent teeth, vital pulp management, revascularization/regenerative endodontics and root-end closure procedures.
23. In-depth competency in evaluating, diagnosing and managing traumatic injuries to teeth and their supporting structures.
24. In-depth competency in providing endodontic treatment for the medically compromised patient.
25. Have an understanding and being competent in developing a differential diagnosis of orofacial pain.
26. Have an understanding and being competent in diagnosing and treating periodontal disease and defects in conjunction with the treatment of the specific tooth undergoing endodontic therapy.
27. Have an understanding and being competent in placing intraradicular restorations and cores in endodontically treated teeth.
28. Have understanding and being competent in performing intracoronal bleaching procedures.
29. Have an understanding and being component in implant dentistry and extrusion procedures.
30. Have knowledge about and being competent in a variety of endodontic techniques.
31. Ability to critically evaluate the scientific literature.
32. Knowledge and application of computer technology.
33. Ability to communicate and teach in a pre-clinical and clinical setting.
34. Knowledge and ability to organize and deliver scientific presentations and educational lectures.

Mechanisms for Assessing Program Mission

See General Program Overview.

3. Demand/Need for Program

Endodontics is a recognized specialty in Dentistry and specialists in this area help save teeth through endodontic therapy that would otherwise require extraction. The professional recognition of Endodontics by the American Dental Association occurred in 1963. The need for Endodontists continues to increase with the growing population, especially with the aging baby boomers. The older a tooth is the more complex the endodontic treatment becomes, due to the calcification inside the pulp chamber. New treatment approaches in the management of traumatically injured teeth, new technologies and an increased need for pulp treatment of teeth in the population are increasing the demand for specialists trained in Endodontics.

The quality of our program is shown by the quality of the MS research projects, subsequent publications, and the national awards of our students and their success rate on the specialty board examinations: 100% of our endodontic students pass the written specialty board year after year. The program continues to attract top ranked applicants for a number of reasons: Multiple faculty teach in the program who collectively have years of academic, private practice and research experience; The outstanding infrastructure of the School of Dentistry clinical facilities that include state of the art imaging and oral health care delivery systems; and The ongoing research program and access to truly outstanding research facilities both within the Department, throughout the School of Dentistry and beyond.

4. Interdisciplinary Activities

Endodontic students participate in a variety of programmatic interdisciplinary activities including patient care at the Raleigh Central Prison and the Durham Veterans Administration where students interact with general dentists, periodontists and other health care providers. Second year students spend 4 months providing endodontic care for patients in the operating room environment at the NC Memorial Hospital with the Pediatric Dentistry students and faculty. In this setting they also interact with the medical team including anesthesiology and nursing. A variety of didactic and seminars are directed at interdisciplinary care including the Interdisciplinary care conference (all specialty programs), Pediatric Dentistry Trauma Seminar (includes students and faculty from multiple departments), Implant seminars (grad perio), and a Sedation course. Students also interact with the DDS students through their graduate teaching assistantship activities in the DDS curriculum teaching (pulp testing, anesthesia), preclinical teaching and clinic teaching (in 3rd year)

5. Interinstitutional Perspective

UNC's graduate program in Endodontics is the only one in the state of North Carolina so there is no within state comparison for the specialty of Endodontics. Direct comparison of the quality of the UNC program to the quality of other programs requires outcome measures from those programs that are not readily available (e.g., board certification, awards, publications etc. from other programs). However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. One such measure is the performance of our graduate students on the certifying examination of the American Board of Endodontics: 100% of our endodontic students have passed the written specialty board year after year. Graduate awards from the American Endodontic Association to support graduate research which are highly competitive have been won every year for the past 5 years.

Unique aspects of our program that applicants mention as reasons for applying to UNC are:

- One of the very few three-year dual masters/certificate programs in the country.
- The UNC environment provides a robust and rich research environment with intra- and inter-departmental opportunities.

- The clinical facilities are outstanding with each resident having their own clinic unit/operator.
- The variety of clinical rotations that offer a rich surgical experience and exposure to diverse patient populations and clinical procedures.

B. Curriculum

1. Course Review and Development

The graduate endodontic curriculum is reviewed in regular faculty meetings and with input from the residents. More in depth evaluations occur at departmental retreats where specific courses and clinical experiences are evaluated as to their appropriateness and benefits for the educational experience. The goal of these reviews is to have a dynamic process that allows continual development and improvement of the graduate educational environment and program. The Department Chair Meets with the residents for feedback on the program, their progress in clinics and in their research program. The Graduate Program Director meets with the residents multiple times a week in small group seminars to review educational material and get feedback on topical areas of interest to the residents. The Graduate Program Director strives to develop a clinical and didactic schedule for the graduate students to ensure optimal use of the residents' time and exposure to the diverse clinics, rotations and classes that are available and change each semester.

2. Course Sequence and Description

Summer

1st Year

DENG 707	Regional Anatomy
DENG 720	Applied Pharmacology
OBIO 720	Topics in Oral Biology

Fall

1st Year

DENG 701	Introduction to Research Design
DENG 704	Interdisciplinary Care Conference
ENDO 710	Advanced Clinical Endodontics
ENDO 811	Endodontics Seminar and Case Analysis
ENDO 812	Endodontics Literature Review Seminar
OBIO 721	Directed Studies in Oral Biology
OBIO 722	Directed Studies in Oral Biology
ORPA 762	Oral and Maxillofacial Pathology Seminar
PERI 820	Introduction to Implants

2nd Year

DENG 703	Applied Dental Research Methods
DENG 704	Interdisciplinary Care Conference
ENDO 710	Advanced Clinical Endodontics
ENDO 811	Endodontics Seminar and Case Analysis
ENDO 812	Endodontics Literature Review Seminar
PEDO 806	Pediatric Emergency Care

3rd + Year

ENDO 993	Thesis
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Spring

1st Year

DENG 702	Biostatistics
DENG 704	Interdisciplinary Care Conference
ENDO 710	Advanced Clinical Endodontics
ENDO 821	Endodontics Seminar and Case Analysis
ENDO 812	Endodontics Literature Review Seminar
OBIO 723	Neuroscience
OBIO 724	Pain Conditions
ORAD 706	Advanced Oral Radiology
ORPA 763	Oral and Maxillofacial Pathology Seminar
PERI 821	Clinical Implantology

2nd Year

DENG 704	Interdisciplinary Care Conference
ENDO 710	Advanced Clinical Endodontics
ENDO 841	Endodontics Seminar and Case Analysis
ENDO 812	Endodontics Literature Review Seminar
DENG 751	Advanced pain & Anxiety Control

3rd + Year

ENDO 993	Master's Thesis
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Enrollment in courses has been stable over the last 5 years. The graduate program enrolls 3 students per year totally 9 students. Third year students are enrolled in the Master's thesis course, thus leaving 3-6 students who are enrolled in the other course offerings. Third year students are encouraged to attend seminars on an audit basis. Course syllabi will be available on site.

Endo 710 Advanced Clinical Endodontics
(3 credits) Summer, Fall, and Spring 1st, 2nd, 3rd Yr
Course Director: Dr. Peter Tawil

Description: This clinical course provides experience in all phases of endodontics, including emergency treatment, routine endodontic therapy, surgical endodontics and treatment of dental trauma.

ENDO 811 Endodontics Seminar and Case Analysis
(3 credits) Fall, and Spring 1st, 2nd, 3rd Yr (optional)
Course Director: Dr. Peter Tawil

Description: Advanced education students in endodontics apply critical thinking skills while presenting comprehensive cases with endodontic conditions utilizing diagnosis and treatment planning options considered through a problem-based approach. Outcomes are reviewed and critiqued. Advanced education students will also apply critical thinking skills to the review of endodontic books and current literature pertaining to the field of endodontics and pulp biology. This is a 3 credit hour course given 3 hours a week each fall and spring semester. Faculty facilitate discussions and advanced education students in endodontics make case presentations as scheduled on Wednesdays from 8am to 9am and book review presentations or seminars scheduled on Fridays from 2pm to 4pm.

ENDO 812 Endodontics Literature Review Seminar
(2 credits) Fall, and Spring 1st, 2nd, Yr
Course Director: Dr. Peter Tawil

Description: Advanced education students in endodontics apply critical thinking skills to review scientific literature pertaining to the field of endodontics and pulp biology. This is a 2 credit hour course given 2 hours a week each fall (812, 832) and spring (822, 842) semester for two years. Faculty facilitate discussions and advanced education students in endodontics review literature articles as scheduled on Wednesdays (or certain Fridays) from 10am to 12pm.

ENDO 993 Master's Thesis
(3 Credits) Fall and Spring Semester 3rd Yr
Course Director: Dr. Peter Tawil

3. Course Evaluation

Course evaluations are carried in a variety of ways. Graduate core courses are evaluated by the course directors for improvement within the course. The usefulness of these courses to the specialty training program and MS degree is reviewed by the faculty and with the residents. During this past year's review and based on resident evaluations and review of the CODA standards for the specialty there were several changes made to the curriculum. For example, it is a requirement that Endodontic Residents have exposure to implant dentistry so this was added to the curriculum. Feedback from the residents was used to alter which year would be most optimal for them to participate in an interdepartmental trauma seminar. These evaluations are ongoing with both formal course evaluations and informal reflections from the residents that are used to add or emphasize course and seminar content.

Residents review the faculty annually to provide feedback on the faculty member's teaching in both didactic and clinical courses. These evaluations include domains such as knowledge of topic, communication skills, availability, timeliness, and other factors important to effective teaching.

4. Requirements for Degree

See General Curriculum Overview. In addition to completing their required course work, their clinic rotations, clinical patient care and their thesis research, each resident must pass a comprehensive oral examination. The comprehensive examination is a case based oral exam scenario administered by two Diplomates of the American Board of Endodontics in the same format as the American Board of Endodontics oral exam. The examiners review the responses of each candidate for different areas of knowledge and if they are in agreement that the answers showed insufficient understanding or synthesis of critical areas of knowledge, the resident is failed for that section.

Failure to pass any part of the comprehensive examination on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program.

5. Evaluation of Progress of Students

See General Curriculum Overview. Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, comprehensive examination, and performance reviews (Table 1).

Informal evaluations take place during conferences, clinics, lectures and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student's transcript.

The Academic Performance Committee meets biannually per ADA accreditation requirements to discuss the progress of each graduate student and consists of all endodontic full time faculty and part-time faculty. All faculty complete a student assessment twice each year and meet as a group to discuss the residents' progress and areas of excellence and those needing improvement. Constructive comments are developed to help establish goals for the coming 6 month period to help guide residents in their learning process. The scores and verbal feedback on each resident are discussed. The program director then meets with the students individually and reviews their performance.

Table 1. Graduate Resident Evaluation Form

Each item is rated as 5=Excellent, 4=Working above appropriate level, 3=Working at appropriate level; 2=Working below appropriate level; 1=Poor; n/a= not applicable

Resident Name:

Evaluation Period:

PROFESSIONAL AND PERSONAL

Punctuality

Preparation for Assignment

Respect for the Views of Others

Works Well as a Team Member

Solicits Consultations and Advice when Appropriate

Works Independently at Appropriate Level

Accepts Constructive Criticism and Suggestions in a Positive Manner

Reliable in Fulfilling Assignments

Respects the Facilities, Equipment and Supplies

Respects Institutional Policies

Demonstrated Leadership Skills

Demonstrates Ethical Conduct in Professional and Personal Activities

Comments:

CLINICAL

Treatment Plans are Current

Records Complete and Legible Including Histories

Patient Records are Current

Ability to Make Diagnoses/Conclusions Correctly

Planning and Preparation for Clinical Procedures

Adherence to Universal Precaution Standards

Correct Use of Instruments

Correct Use of Assistants

Time Utilized Appropriately

Clinical Competence

Interest in Patients Well Being

Patient Management

Communication with Patients and Parents

Demonstrates Ethical Conduct in Clinical Activities

Comments:

DIDACTIC ACTIVITIES

Preparation

Contribution in Class

Understanding of Theories and Principles

Demonstrates Appropriate Level of Problem Solving

Writing Skills

Presentation Skills

Demonstrates Ethical Conduct in Didactic Activities

Comments:

Relevant COURSE ACTIVITIES

Resident is ready to be advanced to a position of higher responsibility

Clinical proficiency is assessed through direct observation by attending faculty, one-on-one immediate evaluations of cases by faculty (UNC Endodontic Case Review Report), biannual faculty evaluations of students, written case submissions and the comprehensive oral examination. From cases treated, each resident must select 10 cases to develop and submit as a written case history portfolio in the ABE format. The Graduate Program Director and Department faculty track each resident's progress and proficiencies.

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015.

Curriculum

Assessment: End of semester oral examinations ENDO 812 Literature Review

Frequency: Twice per year. (1st and 2nd year students)

Outcome: Adequate synthesis and knowledge of endodontic literature in a clinical based situation.

Remediation given if student does not show progress and synthesis of material. Unsuccessful remediation results in failing grade.

2012 All 6 students passed 2013 All 6 students passed 2014 All 6 students passed

2015: All 6 students passed

Action: None

Assessment: Biannual evaluation of students

Frequency: Twice a year

Outcome: An assessment of the student's didactic and clinical progress and performance is obtained from course directors and reviewed by the Academic Performance Committee. The Graduate Program Director meets with each student and the performance is reviewed. Feedback on enhancement of the resident and/or program is pursued. 2012-2015: All students performed at satisfactory or above level.

Action: An educational enhancement plan is developed for any student not showing adequate progress

Documentation is maintained on file in the department and each resident is allowed to view this information at any time.

Patient Care

Assessment: Faculty audits/Reviews of completed cases

Frequency: Ongoing

Outcome: Appropriate progress in clinical improvement over the years in the program, both in proficiency and competency. Each student is assigned a faculty mentor that reviews the cases on an ongoing fashion. 2012-2015: All students showed appropriate progress.

Action: Evaluations of cases by faculty are to be performed in a more timely basis.

Education Goals

Assessment: End of year comprehensive oral examinations

Frequency: Once a year for second and third year students

Outcome: External oral examiners evaluate each student's clinical and basic knowledge. A student with an unsatisfactory completion of the oral examination is provided an educational enhancement plan and allowed to retake the oral exam. Unsatisfactory performance during the retake oral exam results in dismissal from the program.

2012: All 5 students passed 2013: All 6 students passed 2014: All 6 students passed

2015: All 6 students passed

Action: None

Assessment: Case portfolios

Frequency: Once, at the end of the final year of the program

Outcome: External examiners review the case portfolios for satisfactory treatment planning and treatment completion.

2012-2015: All endodontic students have submitted case portfolios deemed acceptable by the reviewers.

Action: Program director reviews the variety of cases assigned to a student and adjusts assignment of cases as needed to insure students have had the opportunity to treat a diverse patient population.

Research Goals

Assessment: Research progress report; Oral defense of thesis; Thesis document

Frequency: Each semester a student is enrolled in ENDO 993.

Oral defense of thesis prior to submission of thesis to Graduate School.

Submission of thesis to Graduate School.

Outcome: Adequate progress in research; Successful oral defense of thesis as determined by thesis committee. Successful submission of thesis to the Graduate School

2012 – 15: All students completed on time

Action: Research progress will be evaluated each semester that a student is enrolled in ENDO 993 by the student's research mentor.

Assessment: Submission of a manuscript suitable for publication

Frequency: Annually

Outcome: 100% of students in their final year have submitted at least one manuscript to a refereed journal for publication.

Action: None

Assessment: Alumni survey

Frequency: Once every 5 years.

Outcome: 75% response rate from last survey in 2009

Action: Informal feedback from Tar Heel Endodontic Association members' formal alumni survey in 2015.

Assessment: ABE Diplomate Status

Frequency: Alumni Survey

Outcome: Completion of Board Certification as ultimate outcome of program.

2012-13: None obtained their Certification

2014: 2 (3) completed the Certification

2015: pending

Action: Graduating resident will be contacted to assess their progress and stress the importance of completing Board Certification.

Future outcomes assessment plans

The program's outcome assessment plan generates continuous outcome data that are analyzed by the program director with broad input from the faculty. Through regular faculty meetings and focused retreats, the outcome assessment data are used to make programmatic changes, including changes in instructional objectives and course outlines. These changes are chronicled in minutes of meetings that are maintained in our outcome assessment plan document.

Greater efforts are being made to encourage graduates to complete the American Board of Endodontic certification process. Graduates are required to pass the ABE written exam and start working on their case portfolio during their program. We plan to have more regular communications/surveys (every 3 years instead of 5 years) to encourage them to complete the certification process that consists of a completed portfolio submission and an oral exam.

C. Faculty

Three full-time faculty and one part-time faculty (50% FTE) serve as the core faculty for the graduate students (see Table 2). Three are Board-certified in the specialty of Endodontics and are Diplomates of the American Board of Pediatric Dentistry and one has a PhD. One additional faculty member also is Board-certified in the specialty of Endodontics but serves 100% in administration and is not counted for purposes of this graduate program review. Bio-sketches for full-time faculty are on the flashdrive.

Dr. Tim Wright is the Interim Chair of the department and serves an administrative role only in the department, since he is a Pediatric Dentist by training.

Two faculty hold joint appointments:

- Dr Khan Asma: adjunct appointment at the University of Texas at San Antonio
- Dr Peter Z. Tawil: adjunct appointment at the University of Technology in Jamaica

In addition to our full-time and regular part-time faculty, the Department of Endodontics has a rich supply of outstanding adjunct faculty, many of whom are Board Certified. These dedicated faculty members provide clinic coverage and seminars to the residents and teach in our practice management curriculum.

1. Research Activities

The Endodontics program has had continual involvement with the UNC Center for Pain Research and Innovation (CPRI) which is administratively housed in the Department of Endodontics. The extensive clinical and basic research activities within the CPRI provide a rich resource for student research, collaboration and consultation. Dr. Asma Khan's research is focused in and supported by the CPRI group. Graduate students have worked on variety of research projects with members of the CPRI, and not surprisingly, many of them have worked with Dr. Asma Khan. In addition to pain research, the program has been involved in a variety of clinical investigations directed at improving our knowledge of endodontic therapies and improving the health of those we serve. These studies are largely completed as part of the

graduate students' thesis research and serve to support the research and teaching missions of the department.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research

2. Teaching Distribution

All department faculty participate in both DDS and graduate teaching in both the didactic and clinical settings. This is done to ensure that students have access to multiple faculty who have different teaching styles and different skills and interests. Teaching in all settings and educational programs also allows all of the faculty to participate in program development at both the DDS and graduate level.

The chair, in discussion with the department faculty, determines how best to deploy faculty given their clinical expertise, research interests, time available, educational program, and time/need for faculty development.

3. Teaching Evaluation

Teaching in the graduate program is assessed through a bi-annual faculty evaluation that is completed by all the students. The Chief Resident is responsible for compiling the evaluations completed by the residents of each faculty member. The evaluation is directed at evaluating the faculty member's knowledge, teaching style, professionalism, timeliness and availability and many other factors considered critical to effective teaching and mentoring. The anonymous evaluations are provided to each faculty member and then reviewed with them by the Department Chair as part of their annual evaluation. Teaching effectiveness, courses, and clinical experiences are also evaluated during exit interviews with the graduating students. Exit interviews are conducted near completion of the residency program and are done as a one on one discussion with the program director. Post-graduation surveys are now being used as a follow up to determine if graduates feel the program did meet their needs and prepare them to face the challenges of their career choice.

Faculty are evaluated annually using a standardized approach that has been implemented throughout the School of Dentistry. Each faculty member is assessed on their accomplishments during the previous year in scholarship and research, patient care, teaching, services and professionalism. Strengths, weaknesses and areas for improvement and action plans to implement change are discussed with the Dean and the Dean's Cabinet. This information is relayed back to individual faculty members through the chair as part of the annual review process and the faculty member's development program.

4. Teaching Innovation

- Book Club Review: Graduate Student "flip the class" concept, in which the students present an oral presentation about the chapter in question
- Semester Oral Literature Examination: Based on the same format as the American Board of Endodontics board examination
- DDS preclinical: Online teaching video modules and tests

5. Faculty Mentoring/Support

Part of the annual review process includes discussions regarding the faculty member's goals for the coming year and opportunities for development in teaching, research, leadership and other areas of interest. The development plan is personalized for each individual member and plans may include, but are not limited to, participation in a national leadership training program, adding additional technical help to support a faculty member's research, working with the UNC Learning Resource Center to assist in learning new and innovative teaching and assessment methods.

6. Faculty Teaching/Professional Awards (recognition) for FY 2010-2011 thru FY 2014-2015

Dr. Asma Khan

- 2008-2013 JB Freedland Distinguished Scholar, School of Dentistry, UNC

Dr. Eric Rivera

- 2012-2015 Chosen by peers for Top Dentists Award as a specialist for Chapel Hill, NC.
- 2013 Auxiliary to the Durham Academy of Medicine, Dentistry, and Pharmacy Legacy Award

Dr. Peter Z. Tawil

- 2014 Certificate for International Volunteer Service, ADA Committee on International Programs and Development
- 2014 Paul Calas, SFE International Endodontics Research Award
- 2014 ADA CE Online Courses: Peer-reviewed leading author

Dr. J. Timothy Wright

- 2014 Fellow American Association for the Advancement of Science
- 2014 Distinguished Scientist Award for Research in Mineralized Tissues, International Association for Dental Research
- 2013 Fellow International Association of Dentistry
- 2013 Burton Borgelt Faculty Advisor of the Year Award, International Association of Student Clinicians/ American Dental Association
- 2012 Honorary Lifetime Membership Award: UNC Dental Alumni Association

7. Faculty Advising/Mentoring of Students

See General Faculty Overview.

The Graduate Program Director and the Business Manager for the Department are in contact with incoming residents to help ensure a smooth transition into the program. Upon entering the program, the students work closely with the faculty and program director during an orientation process that introduces them to campus life, opportunities at the School of Dentistry and the specialty of endodontics. The residents are encouraged to interact with all the faculty and staff in the department to gain broad clinical experiences and diverse perspectives. The Department Chair meets with the residents as a group and also works closely with the Chief Resident to maintain open communication between faculty and residents. All of the faculty are engaged in mentoring students related to clinical care. The department has numerous social events providing opportunities for rich family and interpersonal interactions.

Research mentoring occurs over the entire three years of the program. The Oral Biology course, OBIO 720 (Topics in Oral Biology Summer 1st Year), introduces the students to a variety of possible mentors (basic, translational, and clinical) from across the school. The student is encouraged to seek out research mentors based on their research interests. Department seminars with the students and faculty help identify gaps in knowledge and the potential for completing research thereby helping direct first year students towards potential projects and mentors. The program director closely monitors progress of the research component and offers the resident feedback as part of the biannual review process. Faculty members in the Department of Endodontics typically serve as the student's research mentor and often serve as committee members. Mentoring for research is very individualized with resident/mentor meetings occurring on a regular basis in addition to the thesis advisory committee meetings.

Table 2. Faculty Participation in Advising/Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

<i>Faculty</i>	<i>Appointment</i>	MS	MS	PhD	PhD	Non-MS
		<i># Mentor</i>	<i># Committee Member</i>	<i># Mentor</i>	<i># Committee Member</i>	<i>#Non-MS</i>
Tawil, Peter Z.	Assistant Professor	3	4	0	0	0
Khan, Asma Ahmed	Associate Professor	7	2	0	0	4
Rivera, Eric M.	Associate Professor	6	5	0	0	2
*Card, Steven J.	Clinical Assist. Professor	0	0	0	0	0
**Pettiette, Mary T.	Clinical Assoc. Professor	0	1	0	0	0

*50% FTE

** Appointed as Assistant Dean for Admissions for the School of Dentistry in July 2014

Dr. Wright, Interim Chair and Director of Strategic Initiatives, is listed in the Pediatric Dentistry Self-Study.

8. Graduate Teaching Assistants

All graduate students in Endodontics serve as graduate teaching assistants. GTA training begins when the students start their residency in endodontics with the update in endodontic summer class. Students are calibrated with our techniques, expected outcomes and teaching philosophy. They take part in summer preclinical DDS course education and during their 3rd year, they teach 1 half day per week in the DDS endodontic clinic.

9. Faculty Strengths and Areas of Concern

Faculty and the Department Chair are reviewed annually and goals set for the following year. The Department Chair meets one-on-one with the Dean to review their performance during the previous year and to ensure that the department is fulfilling its mission in teaching, research and service. The major area of concern is the ongoing search for a Chair. The Interim Chair has been in the position since 10/1/2014 and is also the Director of Strategic Initiatives for the School of Dentistry.

D. Students

1. Admission

See General Student Overview.

The program receives approximately 100 applications a year and accepts three students. Applications are reviewed by faculty based on GPA scores, academic achievements and letters of reference. The top ten candidates are invited to an in-person interview with faculty, staff, and students. Input from the current residents on the applicants is provided by the Chief Resident. A ranking of the candidates based on a 10-point scale is then collected by the program director from all involved parties and an average score is generated for each candidate. The candidates with the highest scores are then contacted and offered a position.

2. Academic Environment

Graduate students are provided with their own desk space in the residents' room and basic technical and office needs are provided by the program. The faculty strive to be approachable by the students and adhere to an open door policy. Students are encouraged and invited to talk with individual faculty members or to all faculty members regarding suggestions, comments, concerns or any other problems. At the initiation of their studies, every resident is given the Endodontic Department's policy manual that delineates in detail responsibilities and rights for endodontic graduate students. This document, entitled "Resident Manual for Graduate Endodontics," is updated each year prior to the arrival of the incoming students. The guidelines are reviewed and discussed with the new students.

Resident input into a variety of issues ranging from curriculum to clinic operations is sought on a regular basis. Each second year resident serves as Chief Resident of Administration for four months, the liaison between faculty, residents and staff. The Chief Resident attends the weekly departmental faculty meetings to provide the resident perspective on issues and to bring forward any concerns regarding the program and ideas for improvement. The Chief Resident also meets on a regular basis with the Head Dental Assistant to aid in smooth clinic operations and optimal patient care. This leadership experience is felt to be essential for optimizing our graduate program and clinical activities and is a valuable educational experience in interpersonal communication and interaction.

3. Alumni

a.) Research and Professional Awards Received by Alumni FY 2010-11 thru FY2014-15

FY11-12	Steven	Richardson	Graduate Student Research Grant, American Association of Endodontics
FY11-12	Sheng	Zhong	Graduate Student Research Grant, American Association of Endodontics
FY12-13	Johann	Galicea	Graduate Student Research Grant, American Association of Endodontics
FY12-13	Hsin	Chen	Graduate Student Research Grant, American Association of Endodontics
FY13-14	Hsin	Chen	Foundation Research Grant, American Association of Endodontics
FY14-15	Jeffery	Parker	Graduate Student Research Grant, American Association of Endodontics
FY14-15	Elena	Kan	Graduate Student Research Grant, American Association of Endodontics

b.) Publications of students (1st or co-author) in FY 2010-2011 thru FY 2014-2015. Students' names are in bold.

Yamauchi N, Nagaoka H, Yamauchi S, Teixeira FB, Miguez P, Yamauchi M. Histochemical and Immunohistochemical Characterization of Newly Formed Tissues After Tissue Engineering Treatments in Immature Teeth with Apical Periodontitis. *J Endodo*. 2011 Dec;37:1636-1641.

Cevitanes LHS, Hajati AK, Paniagua B, Lim, PF, Walker DG, **Palconet G**, Nackley AG, Ludlow JB, Styner MA, Zhu H, Phillips C. Quantification of Condylar Resorption in TMJ Osteoarthritis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2011;111:757-70.

King W, Bair E, Duggan D, Maixner W, Khan AA. The relationship between resting arterial blood pressure and acute postoperative pain in endodontic patients. *J Orofac Pain* 2012;26:321-327.

Zhong S, Zhang S, Bair E, Nares S, Khan AA. Differential expression of microRNAs in normal and inflamed pulps. *J Endod* 2012;38:746-752.

Maresca C, Barrero C, Duggan D, Platin E, Rivera E, Hannum W, Petrola F. Utilization of blended learning to teach preclinical endodontics. *J Dent Educ* 2014 76:1194-2014.

Galicia J, Naqvi AR, Ko C, Nares S, Khan AA. miRNA181a Negatively Regulates Toll-Like Receptor Agonist-Induced Interleukin-8 Production in Human Dental Pulp Fibroblasts and Macrophages. *Genes and Immunity*. In Press

Chan L., Zhong S., Naqvi AR, Self-Fordham J, Nares S, Khan AA. microRNAs: Novel modulators of endodontic periapical pathology. *J Endod*. 2013;39:1498-1503. *Noted on cover page of Journal*

Pettiette M, Moretti A, **Zhong S**, Khan A. Potential correlation Between Statins and Pulp Chamber Calcification. *J Endod* 2013 Sep;39 (9):119-23.

Richardson SL, Khan AA, Rivera EM, Phillips C. Access to endodontic care in North Carolina public health and Medicaid settings. *J Public Health Dent*. 2013 Oct 9. doi: 10.1111/jphd.12041. [Epub ahead of print]

Hosseini B, Wright R, Khan AA, Duggan D, Bencharit S. Effects of Antibiotics on Bone and Soft Tissue Healing Following Immediate Single-tooth Implant Placement into Sites with Apical Pathology. *Journal of Oral Implantology*. 2014 In Press

Tawil P.Z., Duggan D.J., **Galicia J.C.** Mineral Trioxide Aggregate (MTA): Its History, Composition, and Clinical Applications. *Compend Contin Educ*, 2015; 36(4): 247–252.

P.Z. Tawil, V.M. Saraiya, **J.C. Galicia**, D.J. Duggan. Periapical Microsurgery: The effect of root dentinal defects on short and long term outcome. *Journal of Endodontics*, JOE, 2015; 41:22-27.

c.) Employment and Professional Contributions of Alumni FY 2010-2011 thru FY 2014-2015

Name	Year of Graduation	Current Employment	Board Certification Part I /Diplomate	Professional/Intellectual Contributions
Keenon Johnson	2011	Private Practice Raleigh, NC	Part I completed	Adjunct Faculty at UNC-CH
Wayne King	2011	Private Practice Norwood Dental Clinic, Norwood, NC		
Paulo Nogueira	2011	Private Practice Island Endodontics Hawaii	Part I completed?	
Steven Richardson	2012	Private Practice Mesa, Arizona		
Sheng Zhong	2012	Private Practice Endodontic Assoc Limited Minneapolis, MN		
Thomas Brown	2013	Private Practice Orange Park, FL		ADA House of Delegates, Univ Florida Adjunct Faculty
Linda Chan	2013	Private Practice Schaumburg, IL		
Cristina Maresca	2013	Peak Endo Apex, NC	Part I completed	Adjunct Faculty at UNC-CH
Hsin Chen	2014	Private Practice Fayetteville, NC		
Johnah Galicia	2014	Assistant Professor and Faculty Practice Endodontist, Dugoni SOD, University of the Pacific, San Francisco, CA	Diplomate	Published over 25 scientific papers and reviews, two-time AAE/Dentsply Research Award Winner, Mentor and lecturer to endodontic residents.
Bashir Hosseini	2014	Sandhills Endodontics Fayetteville, NC	Diplomate	Member of AAE, ADA, Greater Fayetteville Dental Society
Melita Islambasic	2015	Private Practice Tampa, FL		
Elena Kan	2015	Private Practice Miami, FL		
Bryan Mitchell	2015	Private Practice Houston, Texas		

E. Leadership and Support

See General Leadership and Support overview

1. Administrative Support

The Department of Endodontics has a full time Business Manager who provides technical, financial, clerical and administrative support. The department also has a full-time clinical patient care coordinator that assists with clerical duties and clinical assignment and monitoring of patient care.

2. Facilities

Clinical. Each resident has his own clinical operatory and there is also a residents room in close proximity to the departmental offices.

Instructional, research, and administrative equipment. The department has access to state of the art teaching, clinical and research facilities through the School of Dentistry. Several department members have laboratory space in the new Koury building. The department faculty have individual offices and there is administrative space congruent to the Chair's office in the First Dental Building.

F. The Future

Program Size

Given the clinical setup in our dental building and the fixed number of faculty, the size of our program will likely be stable over the next five-to-ten years.

Student Resources

Treatment provided by Endodontists is technically expensive due to the many different and emerging technologies used in the delivery of care (microscopes, 3D imaging, rotary instrumentation, highly specialized instruments and equipment). The cost of these resources limits the number of operatories or care delivery areas that can be established thereby becoming an important factor in how many students can be trained per year. Previously, the department had five full-time faculty and currently has 3.5 FTEs with recruitment underway for a Chair, which will raise the full-time faculty to 4.5 FTEs. Given the faculty involvement in both the DDS and graduate program and the intensity of faculty to student ratio required for teaching endodontics, program expansion would not be possible without additional faculty support.

Curricular Changes

Maintaining the quality of graduate education requires that the program be current with up-to-date technologies and methodologies. This requires funding to update our clinical equipment (microscopes, new software, ultrasonics, electric torque controlled hand pieces, radiographic hardware, etc.). The program can be further enhanced by optimizing interactions with different groups that have meaningful areas for interfacing with endodontics. These efforts are currently underway with new interactions with periodontology (half-time faculty member is dually boarded in both endodontics and periodontics). The department has agreed to work with the Department of Pediatric Dentistry to establish a new teaching/patient care clinic to address the tremendous need to treat young patients with immature and incompletely developed teeth that have endodontic needs. These new opportunities will help better prepare our graduates to care for the people we serve and support our mission.

Student Qualifications

We are currently attracting excellent candidates.

Racial, ethnic, and gender diversity in the graduate program

We have been and still are very diverse. Our program attracts qualified candidates from a national and international level.

Quality of mentoring

While the current faculty development program works quite well, the department is currently conducting a search for the Department Chair. This position is critical for all mentoring activities in our department.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
OPERATIVE DENTISTRY



Graduate School Review Site Visit
September 8-10, 2015



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Advanced Education Program in Operative Dentistry

A. Program Overview

1. Program Background

The Department of Operative Dentistry at the University of North Carolina at Chapel Hill (UNC) offers a 36-month graduate program leading to a Master of Science degree and a Certificate in Operative Dentistry. The educational experience is structured to provide meaningful experiences and training in the areas of clinical operative dentistry with particular emphasis on contemporary concepts in conservative esthetic dentistry. The primary objective of the program is to provide advanced Operative Dentistry training that will prepare graduates for careers in dental education and research. Graduates also have the potential for other careers such as clinical or technical research directors, and consultants to dental corporations, insurance providers, public health policy organizations, professional dental societies and philanthropic dental research or education funding agencies.

One vital component of our program is the development and successful completion of a thesis research project. Core courses in research design and protocol development assist students in this task. Specific research themes include basic (biomedical) research, behavioral and social sciences research, and translational research. The mission of our program includes the development of educators who are able to analyze the literature with respect to research design and relative value of research study results.

Faculty who teach in the Advanced Education Program in Operative Dentistry are actively involved in Biomaterials, Cariology, Mineralized Tissue and Educational research areas. These efforts help support the learning of the Master of Science in Dentistry students. Graduate program faculty have received grant support from industry, NIH, NIDCR, UNC University Research Council, UNC School of Dentistry and the NC TraCs Institute.

2. Program's Mission, Goals, and Objectives

The mission of the Advanced Education Program in Operative Dentistry is to improve the oral health of patients by training dentists to be leaders and care givers who will address oral health problems of their patients at the highest possible level of competency; to develop trainees to a level of clinical excellence in the treatment of patients using the latest in contemporary operative dentistry skills and technologies; and to prepare dentists to be able to successfully pursue careers in a variety of roles including administration, education, advocacy, research and service.

The goal of this program is to train dentists as clinician investigators who can (1) diagnose and provide optimal treatment for their patients in the area of contemporary operative and conservative esthetic dentistry and (2) identify and solve oral-related problems through research and teaching.

At completion of the Advanced Education Program in Operative Dentistry, the graduate will possess the following qualifications:

1. Knowledge of the etiology of oral diseases as well as preventive measures and current treatment available to provide comprehensive oral health care for patients.
2. Knowledge and skills to educate and motivate patients to achieve and maintain optimum oral health.
3. Knowledge and skills to diagnose and plan appropriate therapy in an organized and understandable manner.
4. Knowledge and skills to understand current evidence-based concepts in contemporary operative dentistry including in-depth knowledge and experience with conservative esthetic procedures.

5. Knowledge and skills to diagnose and manage disease or trauma of soft, hard and pulp tissues in permanent teeth.
6. Knowledge and skills in dental materials science and specific restorative dental procedures common to the discipline of operative dentistry.
7. Knowledge and skills to work with appropriate specialty disciplines to coordinate interdisciplinary patient care.
8. Knowledge and skills in the management of restoring simple dental implants including coordination of treatment with periodontics.
9. Knowledge and skills required to manage medical emergencies that may occur during dental care in the office environment.
10. Knowledge and skills so that appropriate levels of infection control are practiced in the clinical setting.
11. Knowledge and application of the scientific method, of research design, an understanding of statistics and an appreciation for these disciplines as applied to problem solving.
12. Ability to critically evaluate the scientific literature.
13. Knowledge and basic skills to be able to conduct clinical and/or simple laboratory research of dental materials.
14. Knowledge and application of computer technology (word processing, spreadsheets, statistics, programs designed for presentation, preparation/communication).
15. Ability to communicate and teach in a clinical setting.
16. Knowledge and ability to organize and deliver scientific presentations and educational lectures.
17. Knowledge of community and national issues that impact the overall health of patients, and the knowledge and skill to assume a role of leadership in the advocacy of such issues.

Mechanisms for Assessing Program Mission

See General Program Overview.

3. Demand/Need for Program

Operative/Restorative Departments in Dental Schools around the world need faculty who are able to provide dental students with quality, evidence-based training in materials and procedures utilized in the treatment of dental caries and other conditions not consistent with optimal form and function of teeth. This program seeks to develop these future academicians.

The Advanced Education Program in Operative Dentistry was established in 1997 and accepts two to three students per year.

Table 1. Number of Students Who Successfully Completed the MS Over the Last 5 Years by Year of Graduation

	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Number of Graduates	2	2	3	3	3

4. Interdisciplinary Activities

See General Program Overview.

5. Interinstitutional Perspective

The Advanced Education Program in Operative Dentistry at the UNC School of Dentistry offers a comprehensive curriculum in operative dentistry similar in scope to the other six Graduate programs in Operative Dentistry in the USA (Indiana University, University of Iowa, University of Michigan, Nova Southeastern University, Boston University, University of Southern California). Each offers a three-year MS degree with a clinical certificate and required preparation and defense of a thesis.

The University of North Carolina School of Dentistry has training programs in every recognized specialty, is a Tier 1 Research institution, and has faculty in every discipline who are world renowned experts. Students are attracted because of the breadth and depth of educational experience offered. Objectively judging the success of the Advanced Education Program in Operative Dentistry is difficult. However, graduates of this program are deemed to be valuable as evidenced by the observation that 12 out of the 13 graduates of the last five years are currently employed and fulfilling a teaching role at various educational institutions. This implies that their training and expertise is being viewed as favorable compared to applicants from other programs.

B. Curriculum

1. Course Review and Development

See General Curriculum Overview. The Advanced Education Program in Operative Dentistry utilizes the Advanced Dental Education Program Directors committee and Operative Dentistry faculty to review and revise curriculum and course content.

2. Course Sequence and Description

Summer

1st Year

DENG 707	Regional Anatomy
DENG 720	Applied Pharmacology
OPER 731	Cariology
OPER 732	Introduction to Operative Dentistry

Fall

1st Year

DENG 701	Introduction to Research Design
DENG 704	Interdisciplinary Care Conference
OBIO 721	Directed Studies in Oral Biology - Inflammation
OBIO 722	Directed Studies in Oral Biology - ECM Component
OPER 701	Operative Dentistry Seminar
OPER 702	Operative Literature Review
OPER 736	Graduate Dental Biomaterials
OPER 790	Operative Dentistry Clinic II
PERI 820	Introduction to Implants

2nd Year

DENG 703	Applied Dental Research Methods
DENG 704	Interdisciplinary Care Conference
OPER 701C	Operative Dentistry Seminar III
OPER 702	Operative Literature Review I
OPER 790	Operative Dentistry Clinic II

3rd Year

OPER 993	Master's Research and Thesis
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Spring

1st Year

DENG 702	Biostatistics
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DENG 704	Interdisciplinary Care Conference
OPER 701	Operative Dentistry Seminar
OPER 702	Operative Literature Review I
OPER 704	Operative Clinical Seminar A
OPER 736	Graduate Dental Biomaterials
OPER 790	Operative Dentistry Clinic II
ORAD 706	Advanced Oral Radiology
PERI 821	Clinical Implantology

2nd Year

DENG 704	Interdisciplinary Care Conference
OPER 702	Operative Literature Review I
OPER 704	Operative Clinical Seminar A
OPER 790	Operative Dentistry Clinic

3rd Year

OPER 993	Master's Research and Thesis
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Course Specifics

This section describes the program-specific courses for MS students. For each course, the course director, and the number of enrolled students in the Fall 2014 and Spring 2015 semesters are provided. The course directors for the program specific courses have been relatively stable over the past five years and the number of enrolled students per course varies only slightly from year to year since the number of students in each year of the program is very stable.

Course Title: OPER 702 Review of Scientific Literature
(1 credit) / Fall and Spring Semesters / 1st, 2nd & 3rd (Audit) Year

Course Director: Donovan, TE

Number of Students: 9

The course consists of a series of lectures and literature reviews on topics related to dental materials and restorative dentistry. Attendance is mandatory, and each student is required to turn in a comprehensive paper on the topic covered in any missed session. Course objectives are: 1) to develop reading and critical thinking skills based on the scientific literature, with emphasis on restorative dentistry and related topics, 2) to become familiar with the classic literature in the field of restorative dentistry, and 3) to gain insight into research methodology in order to be able to critically evaluate new products, clinical techniques and research related to restorative dentistry and related topics.

Course Title: OPER 731 Cariology

(1 credit) / Summer / 1st Year

Course Director: Zandona, A

Number of Students: 3

This course is an e-learning program on modern caries management developed through a collaboration of the world's leading experts in cariology. This course is an online course supported by The Global Dental Schools Network. The purpose of the program is to provide an overview of the dentistry's current understanding of the carious process and methods of effective caries management. Course objectives are: 1) to understand key stages of the caries process, 2) to understand coronal caries diagnosis, 3) to understand caries risk factors and their use, 4) to understand current professional interventions, 5) to

understand homecare interventions, 6) to understand treatment planning for coronal caries, and 7) to understand what we currently know about root caries.

Course Title: OPER 732 Introduction to Operative Dentistry
(3 credits) / Summer Semester / 1st Year

Course Director: Boushell, LW

Number of Students: 3

Incoming graduate students typically come from very different training and experience backgrounds. The purpose of this course is to provide a broad introduction to key Operative Dentistry concepts taught at UNC so that incoming graduate students are prepared for clinical patient care and for teaching in the predoctoral courses and clinics. Students are exposed to a wide variety of topics, including intensive training in direct restorations, dental photography, fabrication of diagnostic casts and implant stents, etc. The overriding objectives of the course are 1) to reinforce basic principles of operative dentistry, 2) refine clinical skills, 3) enhance/add approaches of clinical problem solving, and 4) establish concepts of acceptable clinical performance levels.

Course Title: OPER 790 Operative Dentistry Graduate Clinic
(2-6 credits) / Summer (Audit), Fall and Spring Semesters / 1st, 2nd, 3rd (Audit) Years

Course Director: Donovan, TE

Number of Students: 9

Operative Dentistry Graduate Clinic is a patient care-focused activity. Graduate students throughout the program will engage in patient care approximately 10 hours a week, totaling approximately 500 hours of patient care by the end of the program. Clinic is supervised by full-time Operative Dentistry faculty and, occasionally, by adjunct faculty who contribute expertise and a “private practice perspective.” Although there are no specific number of procedures required to graduate, student performance in the clinic is assessed by a number of factors, including patient management, timeliness of care, clinic utilization, time management, organization, punctuality, and professional conduct. These and other elements of the clinical component of the program are monitored and reviewed by the patient care coordinator, the graduate program director, and the performance review committee. Objectives are: 1) to provide students an opportunity to practice clinical dentistry under faculty supervision, 2) to teach students the most advanced clinical techniques relative to Operative Dentistry and related disciplines, 3) to conform to the patient care mission of the department and the school of dentistry, 4) to provide patients with evidence-based dental care.

Course Title: OPER 701 Operative Dentistry Seminar
(1 credit) / Fall Semester and Spring Semesters / 1st, 2nd Year

Course Director: Boushell, LW

Number of students: 6

This course uses a seminar series to provide educational material in Operative Dentistry discipline-specific topics. Faculty may choose from a variety of presentation formats, including lecture, hands-on exercises, case analysis presentation, assignments, literature review, etc. Faculty may also choose to evaluate students by administering written or oral quizzes. Although there is no formal exam for these seminars, the topics covered expose students to the bulk of the material assessed using the mid-program comprehensive written exam administered at the end of Year 2.

Course Title: OPER 736 Advanced Dental Materials
(2 credits) / Fall and Spring Semesters / 1st Year
Course Director: Donovan, TE
Number of Students: 3

The course consists of a series of lectures, seminars, literature reviews, and student presentations on topics related to dental materials and restorative dentistry. Attendance is mandatory, and each student is required to turn in a comprehensive paper on the topic covered in any missed session. The objectives of the course are 1) to develop a basic understanding of the nature of the materials used in restorative dentistry, 2) to understand the critical manipulative variables essential for success with the various groups of dental materials, 3) to become familiar with the classic literature in the field of dental materials, and 4) to gain insight into research methodology in order to be able to critically evaluate new products and research related to those products.

Course Title: OPER 993 Master's Thesis
(3 credits) Fall and Spring Semesters 3rd Year
Course Director: Boushell, Lee
Research project activities towards MS thesis

3. Course Evaluation

The faculty of the Advanced Education Program in Operative Dentistry currently use the following measures to evaluate courses and whether the educational experience is meeting the mission and goals of the program:

- 1) Ongoing resident performance in core and elective didactic courses
- 2) Faculty review of resident overall performance
- 3) Weekly case review seminars
- 4) The written comprehensive examination
- 5) Monitoring of research progress, accomplishments of mile-markers
- 6) Exit interviews
- 7) Resident success in graduation from the program and success in gaining employment
- 8) The faculty of the Advanced Education Program in Operative Dentistry plan to begin tracking the number of residents who complete Part I of the American Board of Operative Dentistry in 2015
- 9) The faculty of the Advanced Education Program in Operative Dentistry plan to begin the use of Alumni Surveys in 2015.

4. Requirements for Degree

See General Curriculum Overview.

The Advanced Education Program in Operative Dentistry uses a written examination designed to evaluate the student's depth and breadth of knowledge on topics presented in didactic and core courses. The examination is given in the fall of the 3rd year of the residency and students must achieve 70% in order to pass. Use of a standardized test allows us to monitor residents' performances in different cohorts. Individual post-test review is done to discuss missed concepts. Failure to pass the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and re-examination. Failure to pass the Comprehensive Examination for a second time will result in dismissal from the certificate program and academic ineligibility to receive the MS degree.

5. Evaluation of Progress of Students

See General Curriculum Overview.

Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, a comprehensive examination and performance reviews. Informal evaluations take place during conferences, clinics, lectures, and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student's transcript

The Program Director of the Advanced Education Program in Operative Dentistry schedules a meeting of the Academic Performance Committee (APC) at least twice per year (at the end of each semester). The APC consists of faculty who consistently teach the residents in both seminars and clinic. Each resident is evaluated by faculty (directly involved with both clinical and seminar instruction), clinical/clerical staff (directly involved with each resident) using standardized assessment tools (see Tables 2, 3, and 4). The program director combines all assessments and presents the combined assessment individually to each resident. Educational Enhancement plans are designed and implemented as needed.

Table 2. Faculty Evaluation of Residents

Resident Name:
Evaluation Period:

PROFESSIONAL AND PERSONAL

Scale: 5=Special Merit, 4=Excellent, 3=Good, 2=Adequate, 1=Inadequate, U=Unable to Evaluate

Punctuality	5	4	3	2	1	U
Prepares for assignments	5	4	3	2	1	U
Appropriate dress and grooming	5	4	3	2	1	U
Is respectful of others	5	4	3	2	1	U
Works well as a team member	5	4	3	2	1	U
Is well organized	5	4	3	2	1	U
Works independently at appropriate level	5	4	3	2	1	U
Is reliable in fulfilling assignments (including teaching)	5	4	3	2	1	U
Accepts constructive criticism and suggestions in a positive manner	5	4	3	2	1	U
Demonstrates leadership skills	5	4	3	2	1	U

COMMENTS:

DIDACTIC ACTIVITIES

Comes to class prepared	5	4	3	2	1	U
Contributes in class	5	4	3	2	1	U
Understands theories and principles	5	4	3	2	1	U
Demonstrates appropriate level of problem solving	5	4	3	2	1	U
Demonstrates writing skills	5	4	3	2	1	U

COMMENTS:

CLINICAL

Scale: 5=Special Merit, 4=Excellent, 3=Good, 2=Adequate, 1=Inadequate, U=Unable to Evaluate

Plans and prepares for clinical procedures	5	4	3	2	1	U
Correctly uses instruments	5	4	3	2	1	U
Utilizes time appropriately	5	4	3	2	1	U
Demonstrates consistent clinical competence	5	4	3	2	1	U
Shows interest in patients well being	5	4	3	2	1	U
Communicates well with patients	5	4	3	2	1	U
Works well with staff	5	4	3	2	1	U
Respects the facilities, equipment and supplies	5	4	3	2	1	U
Solicits consultations and advice when appropriate	5	4	3	2	1	U
Adheres to clinical policies and guidelines	5	4	3	2	1	U
Practices proper infection control	5	4	3	2	1	U
Provides proper documentation of clinical treatment	5	4	3	2	1	U

COMMENTS:**Table 3. Graduate Student Evaluation Form to be Completed by Clinical Staff****Resident Name:****Evaluation Period:**

Scale: 5=Special Merit, 4=Excellent, 3=Good, 2=Adequate, 1=Inadequate, U=Unable to Evaluate

Keeps treatment plans current (PCC evaluation)	5	4	3	2	1	U
Procedures are consistent with appointment time	5	4	3	2	1	U
DA's informed of treatment and special materials/equipment so needs can be anticipated	5	4	3	2	1	U
Practices proper infection control	5	4	3	2	1	U
Patients dismissed on time from AM & PM clinics	5	4	3	2	1	U
Dental assistants are used efficiently (including four-handed dentistry)	5	4	3	2	1	U
Active & helpful in attempting to resolve clinical problems	5	4	3	2	1	U
Clinical staff are treated as important team members	5	4	3	2	1	U

Table 4. Graduate Student Evaluation Form to be Completed by Clerical Staff**Resident Name:****Evaluation Period:**

Scale: 5=special Merit, 4=Excellent, 3=Good, 2=Adequate, 1=Inadequate, U=Unable to Evaluate

Communications are clear and direct	5	4	3	2	1	U
Responds punctually to messages from staff	5	4	3	2	1	U
Helpful in dealing with problems	5	4	3	2	1	U
Complies with dept. vacation and leave policies	5	4	3	2	1	U
Has a clear understanding of clerical staff's role	5	4	3	2	1	U
Clerical staff are treated as important team members	5	4	3	2	1	U

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments and program improvements as submitted to the Southern Association of Colleges in January 2015 are given below.

Learning Outcomes: At the completion of the program, graduates will possess the following qualifications:

1. The skills to base clinical decisions on a foundation of evidence derived from their formal education and from critical review of the literature.
2. A broad understanding of cariology and caries management based on risk assessment.
3. The ability to treat a variety of dental defects (caries, tooth fracture, non-carious defects) in a proficient manner.
4. Experience in and respect for research and scholarship.
5. The motivation to continue to advance the field by teaching, engaging in community activities, and becoming leaders in the profession.

Curriculum

Assessment: Ongoing performance in core and elective didactic courses

Frequency: Each semester, according to core courses schedule

Outcome: Satisfactory completion of courses

2011 – 2015: 100% Pass Rate

Action: None

Assessment: Exit interviews

Frequency: Every year

Outcome: Qualitative programmatic content evaluation by graduating classes

Action: Continuous curriculum evaluation to ensure proper content is reflected in course and seminar offerings

Patient Care

Assessment: Weekly Case Review Seminar

Frequency: Spring Semester

Outcome: Residents demonstrate an ability to critically analyze cases in progress and discuss means to complete cases

Action: Continue assessment method

Education Goals

Assessment: Written comprehensive exam

Frequency: End of second year

Outcome: The examination evaluates the student's depth and breadth of knowledge on topics in didactic and core courses

2011 – 2015: 100% Pass Rate

Action: Use of a standardized test allows us to monitor resident's performances in different cohorts; Individual post-test review is done to discuss missed concepts

Assessment: Faculty Review of Residents Overall Performance

Frequency: Biannually

Outcome: Overall didactic and clinical performance and progress of each student is evaluated by the Academic Performance Committee using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July.

2011: One student elected to withdraw from MS program and received Clinical Certificate only.
2012: All students performed at satisfactory or above level.
2013: All students performed at satisfactory or above level.
2014: Two students were deemed to not show acceptable clinical proficiency and promise and were dismissed from the Clinical Certificate. Both students are completing the MS degree only. Both students must pass the written comprehensive examination to continue in the MS program
2015: All students performing at satisfactory or above level.
Action: Educational enhancement plans will continue to be provided to students whose performance is deemed below acceptable at a biannual review by the Academic Performance Review committee (APC). Such plans have been successful with some students.

Assessment: American Board of Operative Dentistry

Frequency: End of 3rd Year or Post-graduation

Outcome: Number of graduates who present for the board

Action: Encourage students to seek board certification status via the American Board of Operative Dentistry while working toward completion of their program. Tracking of number of residents who present and pass Part I of the board during the program initiated in 2015.

Assessment: Alumni Surveys

Frequency: Every 5 years

Outcome: Planned

Action: We plan to do this starting in 2015, when we believe there will be critical mass of alumni body

Research Goals

Assessment: Research progress; Oral defense of thesis; Thesis submission, Research presentations, Manuscript publications and awards/scholarships

Frequency: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate School

Outcome: Adequate progress in research; Successful oral defense of thesis as determined by thesis committee; Successful submission of thesis to the Graduate School; Graduate student research culminating in a presentation, award

2011 One student withdrew from MS; others successful

2013: 1 student received external research funding

2012-2014: All graduating students submitted manuscripts to peer review journals

2012-2015 100% thesis submission on time

Action: Thesis planning begins in early fall of year 1 to ensure feasibility and timing for completion of thesis work; Thesis Advisors closely monitor resident's thesis progress; Research progress of a student enrolled in a 993 course is evaluated via the Mentor MS Research Performance Report; Track annually publication outcomes of master's thesis

Summary of Programmatic Changes Taken as a Result of Assessment Outcomes:

1. Integration of second and third year residents as GTAs in the UNC DDS1 Cariology course. This intensive course was implemented to expose residents to the most up-to-date research in the field of dental caries. The emphasis of the course is on caries management based on risk assessment, and this philosophy should permeate all patient-care delivered throughout the program.
2. Additional guest seminars with content experts are being scheduled to enhance specific areas of the curriculum.
3. New Introduction to Operative Dentistry OPER 732 course. This 9-hr/week didactic and hands-on course occurs in July and August of year 1. Incoming residents are given an intensive

review of the fundamentals in Operative Dentistry by departmental faculty. Topics covered include: Dental Anatomy, Conservative /Advanced Operative Dentistry. In addition, incoming residents are introduced to Clinical Dental Photography.

4. Current exit interviews are indicating the need to incorporate additional didactic, laboratory, and clinical training in the area of CAD/CAM dentistry as well as better coverage of Implant Dentistry (including indications for implant surgical guides, design and fabrication, treatment planning and restoration).

C. Faculty

Nine full-time and 1 half-time faculty members currently are actively involved in the graduate program (See Table 5). All faculty have responsibilities in the DDS program as well. Faculty biosketches can be found on the flash drive.

1. Research Activities

Faculty in the Advanced Education Program in Operative Dentistry are strongly encouraged to be actively pursuing personal research interests as well as collaboration with their peers. The faculty are encouraged to publish at least 1-2 manuscripts per year. The Advanced Education Program in Operative Dentistry expectations of faculty are similar to other Tier 1 level research institutions. Faculty who teach in the Advanced Education Program in Operative Dentistry are actively involved in Biomaterials, Cariology, Mineralized Tissue and Educational research areas. These efforts help support the learning of the Master of Science in Dentistry students. Graduate program faculty have received grant support from industry, NIH, NIDCR, UNC University Research Council, UNC School of Dentistry and the NC TraCs Institute

Rewards of participating in research/scholarly activity include national and international recognition by peers, promotion within the dental school, opportunity for expanded responsibility, and opportunity for innovation.

The UNC School of Dentistry promotes faculty development through formal mentoring committees, sponsored workshops in grantsmanship and research design. Informal means of faculty support and mentoring include research project collaboration, general collegiality, and joint grant/manuscript authorship efforts.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research

2. Teaching Distribution

This is discussed at faculty meetings as well as in the context of annual faculty evaluations and is modified within the specific terms & conditions (as well as needs) of each faculty member. Placement of faculty is strategic based on teaching roles (preclinical teaching helps to support clinical teaching in the DDS clinics as well as at the graduate level).

3. Teaching Evaluation

The School of Dentistry conducts evaluations of faculty/courses by students on a regular basis for core didactic courses. These can be accessed by the faculty and discussed at annual reviews within the department. For program specific courses, the faculty continually seek student assessment for didactic courses, seminars, conferences and clinics on a more informal but regular basis. Finally, an exit interview is also conducted as the graduate students complete the program. In this final session students are again asked to provide their feedback as to the quality of the program, courses, and clinical supervision.

4. Teaching Innovation

Dentiform teeth and enamel/dentin simulation devices are examples of teaching aids that have been studied and found to provide predictable identification of DDS students who are more likely to have difficulty in the pre-clinical operative dentistry course. Video capture technologies have been incorporated so as to improve levels of technique communication. Faculty calibration studies have been accomplished and have identified areas of calibration that are particularly problematic. A Computer Training Module has been developed to enhance specific learning in operative dentistry.

5. Faculty Mentoring / Support

See General Faculty Overview.

Operative Dentistry faculty members constantly interact and discuss various aspects of their research/teaching and how improvements can be made. It is an ongoing process occurring on almost a daily basis. Faculty are afforded the opportunity and are encouraged to attend the ADEA AAL Institute for Teaching and Learning as well as the UNC Center for Faculty Excellence.

6. Faculty Teaching/Professional Awards for FY 2010-2011 thru FY 2014-2015

Ahmed, SN (Clinical Assistant Professor)

- 2014 Excellence in Teaching – DDS Class of 2016, UNC Spurgeon Dental Society
- 2014 Ann and G. Randolph Babcock Fellowship, Dental Foundation of North Carolina
- 2013 Leadership Award for Advanced Dental Education Programs, UNC Spurgeon Dental Society
- 2013 Outstanding Table Clinic Presenter – 101st Hinman Dental Meeting

Boushell, LW (Associate Professor)

- 2015 UNC School of Dentistry, Dean's Faculty Excellence Award
- 2015 UNC School of Dentistry, Spurgeon Dental Society, DDS Class of 2018 Certificate of Appreciation
- 2015 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2015
- 2014 UNC School of Dentistry, Spurgeon Dental Society, DDS Class of 2017 Certificate of Appreciation
- 2014 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2014
- 2013 UNC School of Dentistry, Spurgeon Dental Society, DDS Class of 2016 Certificate of Appreciation
- 2013 The 101st Thomas P. Hinman Dental Meeting Outstanding Table Clinic Presentation Award
- 2013 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2013
- 2011 Richard F. Hunt Memorial Award for Excellence in Pre-doctoral Teaching

Donovan, TE (Professor)

- 2014 Graduate Teaching Award UNC
- 2013 Graduate Teaching Award UNC
- 2012 Honorary Life Member American Dental Society of Europe
- 2010 Honorary Life Member Canadian Academy of Restorative Dentistry and Prosthodontics

Heymann, HO (Thomas P. Hinman Distinguished Professor)

- 2015 Richard F. Hunt Award for Excellence in Teaching
- 2015 Selected for inclusion: "Top Clinicians in CE for 2015" by Dentistry Today
- 2015 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2015
- 2015 Elected to Life Membership, Omicron Kappa Upsilon Dental Honor Society
- 2014 Kaplan Distinguished Scholar, University of Florida, College of Dentistry
- 2014 Appointed as the first Thomas P. Hinman Distinguished Professor at UNC School of Dentistry

- 2014 Selected for inclusion: "Top Clinicians in CE for 2014" by Dentistry Today.
- 2014 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2014
- 2013 Selected for inclusion: "Top Clinicians in CE for 2013" by Dentistry Today
- 2013 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2013
- 2012 Selected as a featured clinician for the 100th Anniversary Thomas P. Hinman Dental Meeting.
- 2012 Elected to Life Fellow, American Academy of Esthetic Dentistry
- 2012 Selected for inclusion: "Top Clinicians in CE for 2015" by Dentistry Today
- 2010 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2010

Miguez, P (Clinical Assistant Professor)

- 2015 The Class of 1958 Distinguished Service Award, University of North Carolina
- 2014 Tarrson Fellowship, American Academy of Periodontology
- 2013 Finalist for the Teaching Fellowship, American Academy of Periodontology
- 2012 IADR/Philips Oral Healthcare PRG Young Investigator Research Grant
- 2011 Joseph and Josephine Rabinowitz Award for Excellence in Research, School of Dental Medicine, University of Pennsylvania

Ritter, AV (Professor)

- 2014 Fulbright Specialist Roster candidate.
- 2014 UNC Celebration of Faculty Diversity, Achievement and Success recognition
- 2013 Omega Kappa Upsilon Dental Honor Society, Faculty Member Induction
- 2011 UNC Chapel Hill Class of 1958 Award, for best clinical research paper in a given year with the paper, "An eight-year clinical evaluation of filled and unfilled one-bottle dental adhesives." Ritter AV, Swift EJ, Heymann HO, Sturdevant JR, Wilder AD. *J Am Dent Assoc* 2009,140(1): 28-37.
- 2011 Nominated for Faculty Award for Excellence in Doctoral Mentoring, UNC Chapel Hill

Sturdevant, JR (Associate Professor)

- 2012-2015 America's Top Dentists-Consumer's Research Council of America
- 2012 Teaching Award, First Year DDS Students (Class of 2015)
- 2010 America's Top Dentists-Consumer's Research Council of America

Swift EJ, Jr (Professor)

- 2011-2015 Recognized as one of the "Top Dentists in Chapel Hill," Chapel Hill Magazine, May-June 2015
- 2015 UNC Chapter of ASDA Advocate Award For "a commitment to dental students and organized dentistry"
- 2014 UNC School of Dentistry Leadership Award (1st annual) "For significant contribution to the life of the school"
- 2011-2014 Adjunct Senior Scientist Houston Center for Biomaterials and Biomimetics, University of Texas Dental Branch
- 2011 Certificate of Appreciation – Class of 2014 DDS-1 Teaching Award, UNC School of Dentistry
- 2011 Fellow, American College of Dentists

Walter, R (Clinical Associate Professor)

- 2013 Josephine and Joseph Rabinowitz Award for Excellence in Research, University of Pennsylvania School of Dental Medicine

Zandona, A (Associate Professor)

- 2015-2016 Fellow ADEA/ADEA Gies Foundation, Dr. Anthony R. Volpe Scholar in the ADE Leadership Institute
- 2013 Trustees Teaching Award, IUPUI

7. Faculty Advising/Mentoring of Students

Program specific student orientation is provided by the Program Director. The Program Director and the Operative Dentistry faculty are available and encourage students to request guidance and support in the areas of personal activities, academic pursuit, research experience and clinical training throughout the student's time at UNC-CH (Table 5).

Table 5. Faculty Participation in Advising/Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

Faculty	Rank	<i>MS</i>	<i>MS</i>	<i>PhD</i>	<i>PhD</i>	<i>Non-MS</i>
		# Mentor	# Committee Member	# Mentor	# Committee Member	# Mentor **
Sturdevant, John	Assoc Prof	0	1	0	0	0
Boushell, Lee W	Assoc Prof	1	2	0	0	3
Ferreira Zandona, Andrea	Assoc Prof CL Assist	4	6	0	2	10
Miguez, Patricia A	Prof	1	2	0	0	3
Ahmed, Sumitha	CL Assist					
Nazar	Prof CL Assoc	0	0	0	0	2
Walter, Ricardo	Prof	2	2	0	0	2
Heymann, Harald O	Prof	1	8	0	0	0
Donovan, Terrence E	Prof	6	10	1	0	0
Ritter, André	Prof	3	6	0	0	0
Swift, Edward J	Prof	0	6	0	0	1

** DDS/ Short Term Training/Other UNC degree program

8. Graduate Teaching Assistants

All graduate students in the department serve as graduate teaching assistants (Table 6). Our GTAs receive discipline specific training during their first semester at UNC (OPER 731 and OPER 732) along with opportunity to teach these concepts to DDS1 students in our preclinical courses (DENT 105 and DENT 112). The GTAs then shadow faculty in the DDS2/3 operative dentistry clinics before shouldering the responsibility of guiding/teaching the DDS2/3 dental students in clinical patient care. Our graduate students receive feedback in the form of DDS student evaluations which may help identify strengths and areas of limitation. When the graduate students are evaluated semiannually, one of the areas addressed is their ability to teach didactically and clinically. Feedback is received from dental students and/or other graduate students as well as faculty and staff. Results of the feedback are given to the graduate students and discussed at the semiannual evaluation session or in some cases after a lecture has been given.

**Table 6. Course- and Year-Specific Operative Dentistry
Graduate Teaching Assistant Responsibilities**

Summer – Yr 1		
Course	Direction	GTA Duties/Goals
OPER 731	AEOD Program Director (Dr. Boushell)	-Learn Current theory and Practice of Caries Diagnosis and Treatment -Understand/Recognize teaching responsibilities and opportunities throughout the program -Examine teaching approaches and philosophies
OPER 732	AEOD Program Director	-Review Fundamentals of Operative Dentistry -Understand/Recognize teaching responsibilities and opportunities throughout the program -Examine teaching approaches and philosophies

Fall Semester – Yr 1		
Course	Direction	Duties/Goals
DENT 105 Dental Anatomy	Dr John Sturdevant	-Review, discuss and lead DDS 1 students in the development of their understanding of the masticatory system and dental complex the instruction of a full time faculty member

Spring Semester – Yr 1		
Course	Direction	Duties/Goals
DENT 112 Conservative Operative Dentistry	Dr Lee Boushell and Dr Sumitha Ahmed (Co- Directors) and 4 Full Time Faculty	-Review, discuss and lead DDS 1 students in the development of their understanding of surgical management of dental caries and restoration of the dentition to normal form and function under the instruction of a full time faculty member -Assist DDS1 students in all aspects of hand-skill development and dental biomaterials manipulation under the instruction of a full time faculty member
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Shadow full time faculty as they supervise and direct the clinical learning environment -Observe methods/discuss strategies of clinical teaching -Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

Summer Semester – Yr 2		
Course	Direction	Duties/Goals
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

Fall Semester – Yr 2		
Course	Direction	Duties/Goals

DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students
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Spring Semester – Yr 2

Course	Direction	Duties/Goals
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

Summer Semester – Yr 3

Course	Direction	Duties/Goals
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

Fall Semester – Yr 3

Course	Direction	Duties/Goals
DENT 302 Advanced Operative Dentistry	Dr Rick Walter	-Review, teach and lead DDS 3 students in the development of their understanding of advanced restorative and esthetic procedures utilized in the dental care of patients under the instruction of a full time faculty member
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

Spring Semester – Yr 3

Course	Direction	Duties/Goals
DDS2/3 Operative Dentistry Clinic	Full Time Operative Dentistry Faculty	-Supervise/discuss/demonstrate operative dentistry principles and practice to DDS2/3 students

9. Faculty Strengths and Areas of Concern

The full-time faculty of our program are highly qualified individuals with much to offer. In addition, our part-time faculty bring a wealth of practical experience and expertise for our students. However, each faculty member has multiple responsibilities leading to limited opportunities for planning and collaboration. This has the potential to threaten levels of calibration among the faculty which increases frustration among the graduate students. In addition, the retirement of senior faculty potentially threatens the content of learning that the graduate students receive and there is an ongoing need for carefully designed faculty succession plans. Currently there is no formal process whereby faculty are given feedback about their didactic and clinical teaching effectiveness

D. Students

1. Admission

Applications for admission to the Advanced Education in Operative Dentistry Program are reviewed by the Graduate Program Director, the Department Chair, the Graduate Clinical Program Director and at least one full professor who teaches in the Graduate Operative Clinic (OPER 790). Applicants who appear to have adequate professional development are invited for an onsite interview. The interview process includes meetings with all available graduate program faculty. Applicants are evaluated based on the following criteria:

- 1) Applicants must have a diploma certifying successful completion of doctoral level studies in dentistry from a recognized dental institution.
- 2) Students must be able to demonstrate adequate mastery of the written and spoken English language as assessed by TOEFL and written/spoken correspondence.
- 3) Students must be able to demonstrate minimally acceptable knowledge and hand skill development by successful completion of written and practical examination processes specific to the discipline of operative dentistry.

2. Academic Environment

The Advanced Education Program in Operative Dentistry provides physical protected space for residents to personalize their work/study environment. Accommodations are made to support fair and equitable activities consistent with various religious practices as needed. Our faculty maintain an “open-door” policy so as to be available to the residents for consultation. The program hosts at least bi-annual special events that provide for extended community, support and recognition. The Advanced Education Program in Operative Dentistry Faculty seek to customize teaching methodologies and content based on individual student need.

3. Alumni

a.) Research and Professional Awards Received by Alumni FY 2010-2011 thru FY 2014-20 15

FY12-13	R Kaur	2012 AADR Bloc Travel Award, AADR-The American Association for Dental Research. Title: “Influence Of Dentin Desensitizers On The Microtensile Bond Strengths Of Self-Etch And Etch-And-Rinse Adhesives To Dentin” Mentor: Swift Jr, EJ
FY13-14	S Ahmed	Outstanding Table Clinic Presentation – 101 st Annual Hinman Meeting in Atlanta. Title: “Didactic and Computer-Based Interactive Training Module Improves Precise Preclinical Use of the Periodontal Probe” Mentor: Boushell, LW
FY13-14	V Olafsson	Outstanding Table Clinic Presentation - 101st Annual Hinman Meeting in Atlanta. Title: “Oral Moistures: Help or Harm?” Mentor – Ritter, AV
FY14-15	U Guha	Best in Session, Table Clinic, 102nd Annual Hinman Meeting in Atlanta Title: “Potential Erosive Tooth Wear by Bottled Drinking Water” Mentor: Donovan, TE
FY14-15	M Atieh	Academy of Operative Dentistry 2014 Phillips Student Research Award. Title: "Accuracy Evaluation of Intra-oral Optical impressions: A Novel Approach" Mentor – Duqum, I

b.) Publications of students (1st or co-author) in FY 2010-2011 thru FY 2014-2015.
Students' names are in bold.

2010

1. **Oliveira GMS, Oliveira GB**, Ritter AV. Crown fragment reattachment: report of an extensive case with intra-canal anchorage. *Dent Traumatol* 2010;26(2):174-181.
2. **Naorungroj S**, Wei HH, Arnold RR, Swift EJ Jr, Walter R. Antibacterial surface properties of fluoride-containing resin-based sealants. *J Dent* 2010;38(5):387-391.
3. **Oliveira GM, Oliveira GB**, Ritter AV. Crown fragment reattachment: report of an extensive case with intra-canal anchorage. *Dent Traumatol* 2010;26(2):174-181
4. **Maresca C**, Pimenta LA, Heymann HO, Ziemiecki TL, Ritter AV. Effect of finishing instrumentation on the marginal integrity of resin-based composite restorations. *J Esthet Restor Dent* 2010;22(2):104-112.
5. **Sheikh H**, Heymann HO, Swift EJ, Ziemiecki TL, Ritter AV. Effect of saliva contamination and cleansing solutions on the bond strength of self-etch adhesives to dentin. *J Esthet Restor Dent* 2010;22(6):402-410.
6. Reis AF, Carrilho MR, **Ghaname E**, Pereira PN, Giannini M, Nikaido T, Tagami J. Effects of water-storage on the physical and ultramorphological features of adhesives and primer/adhesive mixtures. *Dent Mater J*. 2010 Nov;29(6):697-705. Epub 2010 Nov 19.

2011

1. Boushell LW, **Nagaoka H**, Nagaoka H, Yamauchi M. Increased MMP-2 and BSP response to human coronal caries. *Caries Res* 2011(accepted for publication 6/28/2011)
2. Yamauchi N, **Nagaoka H**, Yamauchi S, Teixeira FB, Miguez P, Yamauchi M. Immunohistological characterization of newly formed tissues after regenerative procedure in immature dog teeth. *J Endod*. 2011 Dec;37(12):1636-41
3. Yamauchi N, Yamauchi S, **Nagaoka H**, Duggan D, Zhong S, Lee SM, Teixeira FB, Yamauchi M. Tissue engineering strategies for immature teeth with apical periodontitis. *J Endod*. 2011 Mar;37(3):390-7
4. Sricholpech M, Perdivara I, **Nagaoka H**, Yokoyama M, Tomer KB, Yamauchi M. Lysyl hydroxylase 3 glucosylates galactosylhydroxylysine residues in type I collagen in osteoblast culture. *J Biol Chem*. 2011 Mar 18;286(11):8846-56
5. Miguez PA, Terajima M, **Nagaoka H**, Mochida Y, Yamauchi M. Role of glycosaminoglycans of biglycan in BMP-2 signaling. *Biochem Biophys Res Commun*. 2011 Feb 11;405(2):262-6.

2012

1. Sricholpech M, Perdivara I, Yokoyama M, **Nagaoka H**, Terajima M, Tomer KB, Yamauchi M. Lysyl hydroxylase 3-mediated glucosylation in type I collagen: molecular loci and biological significance. *J Biol Chem*. 2012 Jun 29;287(27):22998-3009
2. Walter R, Swift EJ Jr, **Nagaoka H**, Chung Y, Bartholomew W, Braswell KM, Pereira PN. Two-year bond strengths of "all-in-one" adhesives to dentine. *J Dent*. 2012 Jul;40(7):549-55.
3. **Oliveira GMS, Oliveira GB**, Ritter AV, Heymann HO, Swift EJ, Yamauchi M. Influence of tooth age and etching time on the microtensile bond strengths of adhesive systems to dentin. *J Adhes Dent* 2012;14(3):229-234. PMID: 22282746
4. **Swarn A**, Swift EJ Jr. Management of high caries risk patients: part I--risk assessment. *J Esthet Restor Dent*. 2012 Aug;24(4):233-5.
5. **Swarn A**, Swift EJ Jr. Management of high caries-risk patients: part 2--treatment. *J Esthet Restor Dent*. 2012 Oct;24(5):296-8.

6. **Swarn A.** Commentary. Effect of different light-curing modes on degree of conversion, staining susceptibility and stain's retention using different beverages in a nanofilled composite resin. *J Esthet Restor Dent.* 2011 Apr;23(2):115

2013

1. Ritter AV, **Ramos MD, Astorga F**, Shugars DA, Bader JD. *J Public Health Dent.* 2013 Summer;73(3):252-60. doi: 10.1111/jphd.12024. Epub 2013 Jun 17.
2. Ritter AV, **Ramos MD, Astorga F**, Shugars DA, Bader JD. *J Public Health Dent.* 2013 Summer;73(3):252-60. doi: 10.1111/jphd.12024. Epub 2013 Jun 17.
3. **Erickson K**, Donovan TE, Swift EJ Jr. Critical Appraisal: Dental Erosion. *J Esthet Restor Dent.* 2013 Jun;25(3):212.
4. Yamada S, **Nagaoka H**, Terajima M, Tsuda N, Hayashi Y, Yamauchi M. Effects of fish collagen peptides on collagen post-translational modifications and mineralization in an osteoblastic cell culture system. *Dent Mater J.* 2013;32(1):88-95.

2014

1. Miguez PA, Terajima M, **Nagaoka H**, Ferreira JA, Braswell K, Ko CC, Yamauchi M. *J Dent Res.* 2014 Apr;93(4):406-11. doi: 10.1177/0022034514521237. Epub 2014 Jan 30.
2. **Nagaoka H**, Nagaoka H, Walter R, Boushell LW, Miguez PA, Burton A, Ritter AV, Yamauchi M. *Biomed Res Int.* 2014;2014:702821. doi: 10.1155/2014/702821. Epub 2014 Mar 25.

2015

1. **Ahmed SN**, Donovan TE, Swift Jr, EJ. Dental Erosion: The Unrecognized Epidemic. *J Esthet Rest Dent*, 19 Jun 2015, DOI: 10.1111/jerd.12169.
2. **Ahmed SN**, Donovan TE. Gingival displacement: Survey results of dentists' practice procedures. *J Prosthet Dent.* 2015 Jul;114(1):81-85.e2. doi:10.1016/j.prosdent.2014.11.015. Epub 2015 Apr 24. PMID: 25917854.
3. **Ahmed SN**, Donovan TE, Swift EJ Jr. Evaluation of contemporary ceramic materials. *J Esthet Restor Dent.* 2015 Mar-Apr;27(2):59-62. doi: 10.1111/jerd.12163. No abstract available. PMID: 25891193.
4. **Sulaiman TA, Delgado AJ**, Donovan TE. *J Prosthet Dent.* 2015 Jun 3. pii: S0022-3913(15)00212-7. doi: 10.1016/j.prosdent.2015.04.011. [Epub ahead of print]
5. **Sulaiman TA, Delgado AJ**, Donovan TE. *J Prosthet Dent.* 2015 Jun 3. pii: S0022-3913(15)00212-7. doi: 10.1016/j.prosdent.2015.04.011. [Epub ahead of print]
6. **Puranik CP**, Hill A, Henderson Jeffries K, Harrell SN, Taylor RW, Frazier-Bowers SA. Characterization of short root anomaly in a Mexican cohort--hereditary idiopathic root malformation. *Orthod Craniofac Res.* 2015 Apr;18 Suppl 1:62-70. doi:10.1111/ocr.12073. PMID:25865534.

c.) Employment and Professional Contributions of Alumni FY 2010-2011 thru FY 2014-2015

2010

Greice C. B. Oliveira Faculty
 Assistant Professor
 Department of General Dentistry and Oral Medicine
 University of Louisville School of Dentistry

Supawadee Naorungroj Faculty
 Division of Operative Dentistry
 Department of Conservative Dentistry
 School of Dentistry, Prince of Songkla University

2011

Mario Ramos Faculty
Assistant Professor
Department of Cariology and Restorative Dentistry
Nova Southeastern University

Gustavo Oliveira Faculty
Assistant Professor
Department of General Dentistry and Oral Medicine
University of Louisville School of Dentistry

2012

Roopwant Kaur Faculty
Clinical Assistant Professor
Department of General Dentistry
Division of Operative Dentistry
Eastern Carolina University, College of Dental Medicine

Ayesha Swarn Faculty
Assistant Professor
Department of Restorative Dentistry
University of Colorado School of Dental Medicine

2013

Fernando Astorga Faculty
Assistant Professor
Department of Restorative Dentistry
University of Colorado School of Dental Medicine

Kristi Erickson Faculty
Assistant Director, AEGD Program
Specialty Consultant for Operative Dentistry
Branch Health Clinic, Naval Station, Norfolk, VA

Hiroko Nagaoka Faculty
Assistant Professor
Department of Restorative Dentistry
University of Kentucky School of Dentistry

2014

Sumitha Ahmed Faculty
Clinical Assistant Professor
Department of Operative Dentistry
UNC School of Dentistry

Silvia Amaya Pajares (Peru) Resident
University of Iowa
Graduate Prosthodontics Program

Alex Delgado Faculty
Clinical Assistant Professor
Department of Restorative Dental Science, Division of Operative
University of Florida College of Dentistry

2015

Upoma Guha Faculty
Assitant Professor
University of Buffalo
Buffalo, NY

Vilhelm Olafsson Faculty
Assistant Professor
Iceland School of Dentistry

Clayton Rau Faculty
Assistant Director, AEGD Program
Camp Lejeune, NC

E. Leadership and Support

See General Leadership and Support overview.

1. Administrative Support

Two clinical and two clerical staff are supported by state funds. There is adequate clinical and clerical staff to support the advanced training program.

2. Facilities

The physical facilities are adequate to support the Advanced Education Program in Operative Dentistry.

F. The Future

Program Size

The Advanced Education Program in Operative Dentistry would benefit from 1-2 additional full time faculty. We do not anticipate any increase in the number of residents per year nor do we anticipate any decrease in the number of residents per year.

Student Resources

There is additional need for specific instruction in the area of CAD/CAM dentistry so as to better prepare our residents to fulfill their national and international teaching roles. The program would benefit from state-of-the-art CAD/CAM technology for the purposes of training.

Curricular Changes

Residents would benefit from the receipt of additional instruction in Teaching Methodologies, Occlusion/Occlusal Disease, Ceramic Restorative Materials/CAD/CAM Technologies and Implant Restorative Theory and Practice. Plans for implementation include review of current curriculum, identification of specific areas of weakness, strategic identification of curricular timing and faculty with levels of expertise in the teaching of the subject material and appropriate assessment of resident mastery.

Quality Improvement of Graduate Education

The residency could be improved by limiting the School of Dentistry dependence on GTAs in accomplishing its teaching mission. Less dependence would allow residents to focus more on learning and development of mastery of all areas of program content.

Student Qualifications

The minimum TOEFL score was increased for the 2016 class to hopefully increase English communication skills of international applicants. Requiring participation in ESL classes in both oral and written communication on campus is under consideration. Better and more strategic advertising, increased travel to various institutions for the purpose of program promotion, and participation in PASS are being considered as ways to reach better qualified students.

Racial, Ethnic, and Gender Diversity in the Graduate Program

The Advanced Education Program in Operative Dentistry will continue to excel in areas of diversity.

Quality of Mentoring

The Advanced Education Program in Operative Dentistry has the opportunity to be more intentional in the inclusion of junior faculty at the administrative level as well as in teaching roles. There is a need for senior faculty to be present in seminars and clinic sessions with junior faculty so as to provide active/constructive/instructional peer review for the purposes of strategic development of junior faculty. Senior faculty have opportunity to include/mentor junior faculty by inviting collaboration, designing research together, engaging in writing manuscripts together. Senior faculty have opportunity to actively teach junior faculty how to teach and to take intentional steps to refine and enhance the knowledge and skills of junior faculty.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
ORAL AND
MAXILLOFACIAL PATHOLOGY



Graduate School Review Site Visit
September 8-10, 2015



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ORAL AND MAXILLOFACIAL PATHOLOGY

A. Program Overview

1. Program Mission

The mission of the advanced education program in Oral and Maxillofacial Pathology at UNC is to prepare specialists who are fully qualified to begin independent clinical and laboratory practice of oral and maxillofacial pathology, including patient care, teaching, and research.

This graduate program and clinic residency program is a 36-month educational experience that is structured to meet or exceed the Accreditation Standards of the Commission of Dental Accreditation. This program provides an opportunity to participate in interdisciplinary working relationships with other members of the health care team, including hospital-based units.

We embrace the American Dental Association's definition of the specialty: *Oral pathology is the specialty of dentistry and discipline of pathology that deals with the nature, identification, and management of diseases affecting the oral and maxillofacial regions. It is a science that investigates the causes, processes, and effects of these diseases. The practice of oral pathology includes research and diagnosis of diseases using clinical, radiographic, microscopic, biochemical, or other examinations. (Adopted May 1991)*

The goals and objectives of the program are to produce graduates who are able to demonstrate advanced knowledge and competence in:

- a) Surgical Oral Pathology (histopathology) to include gross and microscopic examination of tissue; order and interpret special studies; correlate histopathological features of a lesion with its biologic behavior, clinical appearance and/or radiographic presentation; and generate appropriate pathology reports.
- b) Clinical Oral Pathology to include acquisition and interpretation of a medical/dental history; evaluation of oral lesions; accurate diagnosis and management of oral lesions; ordering and interpreting laboratory tests; accurate interpretation of imaging studies; and assessment of need for a biopsy to provide patient care in management of a wide spectrum of oral and maxillofacial conditions.
- c) Medical Sciences to include systemic and general pathology; microbiology; genetics; immunology; cytology; anatomic, clinical, and molecular pathology.
- d) Research Sciences to include principles of the scientific method, research design, basic biostatistics, and critical review of published studies. Additionally, define a research problem in oral and maxillofacial pathology, design a protocol to produce relevant data using the scientific method and present the work in a scholarly fashion orally and in writing.
- e) Instruction of students at all levels of dental education and continuing education in clinical and histopathological sciences related to oral and maxillofacial pathology.

- f) Engagement in cooperative efforts with other dental and medical specialists to gather and interpret diagnostic data necessary for the diagnosis and management of disorders of the head and neck.
- g) The skills required for the successful management of an oral and maxillofacial pathology laboratory.
- h) Promoting ethical and professional behavior during the training, teaching, and practice of oral and maxillofacial pathology.

Mechanisms for Assessing Program Mission

See General Program Overview.

2. Demand/Need for Program

The Program is the only one in the State of North Carolina and the region. Virginia, West Virginia, Tennessee, and South Carolina do not offer an Advanced Dental Education Program in Oral and Maxillofacial Pathology.

The number of applications to the program has been constant and includes USA and international applicants. We have successfully filled the residency spots with our top choice candidate every year for the last five years.

When compared to other programs in the nation, we use as benchmarks the programs in the University of Iowa, University of Florida, Ohio State University, and Baylor University. Our graduates have comparable pass rates on national board examinations and on fellowship examinations. All our graduates, except one, are currently employed as an oral and maxillofacial pathologist either in an academic institution or in private practice.

The feedback we receive from applicants indicates that they select our program due to the reputation of UNC, the location of our program within a health science center, the reputation of the faculty, and the ability to obtain a Master of Science Degree as well as a Certificate at the end of their program.

3. Interdisciplinary activities

Graduate Students in our program complete formal rotations at UNC Hospitals for seven months in Surgical Pathology (which includes the subspecialties of Dermatopathology, Ear Nose and Throat, Gastrointestinal, Genitourinary, Breast, Soft Tissue, and Bone), Cytopathology, Autopsy, and Clinical Pathology (which includes Hematopathology/Hematology, and Molecular Pathology).

A combined multidisciplinary conference (Clinical-Pathological-Radiographic Conference – CPRC) takes place biweekly. During that conference, pathology and radiology faculty and residents present and discuss challenging cases that require collaboration between the two specialties. It is always staffed by the program directors of oral radiology and oral pathology.

Graduate OMP students also attend Oral and Maxillofacial Surgery Grand Rounds when appropriate. A combined oral surgery and oral pathology clinic is a very good avenue for OMP residents to interact in discussions about cases with surgery faculty and residents. It is always staffed by the program directors of oral surgery and oral pathology.

Oral and maxillofacial surgery residents from UNC and from Vanderbilt University as well as Oral Medicine residents from Carolinas Medical Center come to our program to rotate for one month at a time; during this time our residents interact with them on a daily basis during didactic and clinical conferences and histopathology sessions and discussions.

Once per year, all our residents travel to the Gorlin Conference for Oral and Maxillofacial Pathology Residents, at which they attend didactic sessions and interact with all other OMP residents in the USA and present and exchange interesting cases. The Department covers the cost of registration for this conference.

4. Interinstitutional Perspective

The UNC OMP program is the only OMP program in North Carolina. There are only 15 programs in the United States and only 3 in the Southeast (UNC, Florida, and Maryland). Direct comparison of the quality of the UNC program to the quality of other programs requires outcome measures from those programs that are not readily available. However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. Our graduates have comparable pass rates on national board examinations and on fellowship examinations. All but one of our graduates are currently employed as an oral and maxillofacial pathologist either in an academic institution or in private practice.

B. Curriculum

1. Course Review and Development

The Teaching Committee of the OMP Program meets every year to evaluate the status of the curriculum. The agreed modifications are made to each course as discussed and implemented for the next cycle the course is offered.

2. Course Sequence and Description

First Year - Summer Semester	
Course Number	Course Name
OMSU 707	Regional Anatomy (SOM)
OMSU 720	Applied Pharmacology (SOM)
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
First Year - Fall Semester	
DENG 701	Research Design & Methods
OBIO 721	Introduction to Extracellular Matrices
OBIO 722	Introduction to Host Pathogens Interactions
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
ORAD 704	Oral Radiology Diagnosis
First Year - Spring Semester	
DENG 702	Research Design & Methods
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs

Second Year - Fall Semester	
DENG 703	Applied Research Methods
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
ORPA 750	Hospital Rotation (SOM)
Second Year - Spring Semester	
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
ORPA 750	Hospital Rotation (SOM)
Third Year - Fall Semester	
ORPA 993	Master Thesis
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
ORPA 750	Hospital Rotation (SOM)
ORPA 992	Research
Third Year - Spring Semester	
ORPA 993	Master Thesis
ORPA 731	Surgical Oral Pathology Seminar
ORPA 732	Current Perspectives in Oral Pathology
ORPA 733	Advanced Oral Pathology CPCs
ORPA 750	Hospital Rotation (SOM)
SOM: SCHOOL OF MEDICINE	

ORPA 731 Surgical Oral Pathology Seminar
(1 to 3 credits) All semesters; all years
Course Director: Dr. Ricardo Padilla

This course requires the student to independently prepare diagnoses for unknown cases weekly, to discuss and defend their diagnoses and to be prepared to discuss clinical and management aspects of the disease. Cases are retrieved from the UNC archives, inter/institutional exchanges cases, AFIP and AAOMP conference cases as well as other sources. Each student is expected to prepare a diagnosis for each case, compose a diagnostic report on selected cases by reviewing the current literature on the lesions to be discussed. The student should not only be able to state the correct diagnosis for each case but be prepared for a discussion that simulates management of the case in an oral pathology laboratory setting, including the ordering of special stains or studies. Students will develop communication skills that will lead to effective interaction among medical and dental colleagues. Regular case sign-out sessions are also considered part of the course.

ORPA 732 Current Perspectives on Oral and Maxillofacial Pathology (Literature Review)
(1 to 3 credits) 11 semesters; all years
Course Director: Dr. Ricardo Padilla

This seminar series focuses on critical review of current research in the field of oral and maxillofacial pathology and other related disciplines. In addition, students are exposed to the historic aspects of the development of this specialty through classical literature review. A topic or journal is selected by the faculty or the Graduate Students/Residents. If a topic, they will select appropriate articles from a variety of current journals that present reports on recent developments in surgical pathology, otolaryngology pathology and oral and maxillofacial pathology, as well as oral surgery and other areas of significance to oral pathology. Students are expected to discuss and critically review the assigned papers. When appropriate, papers that present a historical perspective on the knowledge base of oral pathology are assigned so that the student develops an appreciation for the current state of the art in oral pathology. Additionally, current topics in oral and maxillofacial pathology from other sources are reviewed.

ORPA 733 Advanced Oral and Maxillofacial Pathology
(Clinical-Pathologic Correlations / CPCs)
(1 to 3 credits) All semesters; all years
Course Director: Dr. Ricardo Padilla

The etiology, pathogenesis, molecular, clinical and histopathology aspects of disease are presented, with emphasis on clinical aspects. Course format varies among CPC, lecture and student presentations. This course prepares the students to assume the role of oral pathology consultants in the SOD clinics. Laboratory and clinical management topics are also included.

ORPA 750 Hospital Rotations / Hospital Surgical Pathology
Semester: Repeatable – summer, spring and fall of 2nd & 3rd years
(1 to 3 credits)
Course Director: Dr. Ricardo Padilla

The practice of oral and maxillofacial pathology calls for the association, cooperation and frequent consultation with medical pathologists. A high level of competence in the broad scope of pathology is of major importance. Competency in utilization of diagnostic techniques shared by oral and maxillofacial pathology and pathology is the broad objective of this rotation/course. Experiences in clinical chemistry, microbiology, immunology, hematology, and molecular pathology are recommended.

Graduate students spend between six and 12 months in the Pathology Department. These rotations are usually completed during the second and third years, although the availability of space and level of training may require alteration. While at the hospital rotation, the student is supervised by the Director of the Residency Education in the Department of Pathology and their Chief Residents. Visiting students are expected to observe all aspects of training, including grossing and signing out of surgical specimens, autopsies, laboratory medicine, and pathology subspecialties as assigned by supervisors. All conferences and other activities of the pathology department during this rotation must be attended as well as ENT Tumor Board.

During this rotation time, the OMP student is expected to be involved in:

- Autopsy service (minimum of 10 cases, may be archival material)
- Surgical pathology service
- Hematopathology service
- Dermatopathology service
- Laboratory medicine/pathology service
- Molecular pathology service
- All conferences and grand rounds along with general pathology residents
- ENT tumor board

ORPA 993 Master's Thesis
(3 credits) Fall and Spring Semester 3rd Year
Course Director: Ricardo Padilla
Research project activities towards MS Thesis

3. Course Evaluation

Core courses are evaluated via the Office of Academic Affairs. The program-specific courses are evaluated by the Graduate Students on a yearly basis. All graduating students undergo a voluntary exit interview with the Program Director. The outcome (suggestions/criticisms/commendations) are recorded by the Program Director and discussed with the Teaching Committee on a yearly basis.

4. Requirements for Degree

See General Curriculum Overview.

Comprehensive in-service examinations are given annually in the format of the AAOMP Fellowship Exam, which includes theory-based questions, clinical and radiographic case-based questions, and histopathological slides of lesions. A passing grade of 70% is required in every section of the Mock Fellowship Exams. The outcome of the exam is reviewed with the graduate student. Failure to pass any part of the comprehensive examination on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program. Records regarding performance and corrective actions are maintained by the Program Director as described in the prior section.

5. Evaluation of Progress of Students

See General Curriculum Overview.

Students are evaluated formally and informally. Informal evaluations take place during the regular conferences, discussions, lectures, and daily biopsy sign out sessions. Students are expected to participate in seminar discussions and may be asked to present a review of the literature on selected cases as directed by the faculty. Feedback is immediate and students' progress is monitored and discussed with them in meetings with the director at least at six month intervals. Deficiencies are documented and the records maintained by the program director. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student's transcript.

Students are responsible for documenting consultations in the predoctoral, dental hygiene and graduate specialty clinics. Clinical consultation cases are reviewed and discussed with faculty on demand as they occur, and also weekly with the Program Director during the clinical-pathological conference (CPC) conference. Feedback regarding these consultations is given during the conference.

A Graduate Student who demonstrates any clinical or academic deficiencies will receive a written academic enhancement plan designed by the Program Director. This plan will be reviewed and approved by the Assistant Dean of Advanced Education and Graduate Studies. A report of each academic enhancement plan and outcome will be filed in the Graduate Student's file that is kept by the Program Director.

The Academic Performance Committee meets biannually per ADA accreditation requirements to discuss the progress of each graduate student and consists of the Chair of Diagnostic Science and the Program Director.

Table 1. GRADUATE STUDENT/RESIDENT EVALUATION FORM

UNC Oral and Maxillofacial Pathology Graduate Program

Resident Name:

Level of training for evaluation: First / Second / Third year Graduate Student

Evaluation Period:

Evaluation is based on expected level of training. The following scale is used:

- 3 Working at appropriate level or better
- 2 Working below appropriate level but still temporarily acceptable with verbal correction
- 1 Unacceptable and requiring educational enhancement
- U Unable to evaluate

PATHOLOGY (LABORATORY AND HISTOPATHOLOGY)

Demonstrates appropriate specimen management during grossing	3	2	1	U
Clinical/radiographic correlations with microscopy fitting to level of training	3	2	1	U
Histopathology expertise is appropriate for level of training (IHC, DDX, etc.)	3	2	1	U
Descriptions and differential diagnoses are appropriate for level of training	3	2	1	U

ACADEMICS AND COURSEWORK

Attends and participates in lectures, seminars, and conferences	3	2	1	U
Completes assignments timely and properly	3	2	1	U
Performs academically at expected competence	3	2	1	U

CLINICAL

Presents and discusses necessary cases with faculty in a timely fashion	3	2	1	U
Clinical competence is appropriate for level of training	3	2	1	U
Consult notes are suitable and current	3	2	1	U
Correct use of special tests, radiographs, and other and referrals	3	2	1	U
Communication with patients and patient education is at level of training	3	2	1	U

PERSONAL – ethical conduct and professional growth

Respect for others and their opinions (ethical conduct)	3	2	1	U
Works well as a team member	3	2	1	U
Works Independently at appropriate level	3	2	1	U
Accepts Constructive Criticism and Suggestions in a Positive Manner	3	2	1	U
Attendance and Punctuality	3	2	1	U
Respects the Facilities, Equipment and Supplies	3	2	1	U
Respects Institutional Policies	3	2	1	U

COMMENTS:

Program Director:

Graduate Student:

Outcome of corrective measures from previous semester on separate page? YES / NO

Corrective measures for next semester on separate page? YES / NO

All written evaluation materials are confidential and collected by the Program Director. A conference between the Graduate Student and the Program Director to review the evaluations occurs and a summary report is produced. Graduate. Students will have an opportunity to respond to this evaluation either in writing or by a direct conference.

A survey of graduates is conducted periodically after graduation. This includes a summary of recent publications in scholarly journals, awards, employment, and completion of Fellowship exam and the ABOMP certifying exam as outcome measures. Results of the survey are used to assess modifications and improvements in the existing program.

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. We assess the outcomes of the instructional sessions via immediate question and answers, annual mock fellowship examinations administered by the Faculty as well as daily evaluation of diagnostic skills on the microscope and during patient case in the clinic. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015.

Curriculum

Biomedical Sciences

Assessment: Enrollment and successful completion of ADE core courses

Frequency: Every semester as graded by the Course Director

Outcome: All residents have achieved a grade of HP or P

Action: None

Surgical Oral Histopathology

Assessment: Evaluation of biopsy cases with OMP faculty; Weekly surgical oral pathology “unknowns” conference (ORPA 731); Mock AAOMP Fellowship examination / In-service exam

Frequency: Daily by OMP Faculty (verbal); Weekly by Program Director/Course Director; grade at the end of each semester; Yearly

Outcome: All residents have performed appropriately on a consistent basis; All residents have achieved a grade of P or HP; All residents have passed this exam

Action: None

Cytology

Assessment: Performance and evaluation of oral exfoliative cytology cases during daily clinic consults and sign-out; Fine-needle aspiration biopsy and cytopathology

Frequency: Weekly; Evaluated verbally by Hospital Faculty at the end rotation as part of ORPA 750; grade at the end of each semester

Outcome: All residents have performed appropriately; All residents who have done a rotation under ORPA 750 have performed appropriately

Action: None

Radiology

Assessment: Case discussions with Program Director as part of ORPA 733; Participation in clinical-pathologic-radiological-correlations conferences between oral pathology and oral radiology Faculty and Residents

Frequency: Weekly; Biweekly conference with verbal feedback

Outcome: All residents have performed appropriately

Action: None

Education Goals

Assessment: Faculty Evaluation of Residents

Frequency: Biannually in December and in June w/discussion of all the students' progress during Academic Performance Committee meeting using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July by Program Director

Outcome: 2012-2014: All students performing at satisfactory or above level

Action: None

Assessment: Comprehensive in-service written, clinical, radiological, and microscopic examinations in the format of the AAOMP board examination (Mock Boards)

Frequency: Spring Semester 3rd Year

Outcome: 2012 /2013 /2014 100% Pass

Action: None

Assessment: Preparation for American Association of Oral and Maxillofacial Pathology (AAOMP) Board Examination (Given only in October – must have completed program prior to exam)

Frequency: Spring Semester 3rd Year

Outcome: Performance on the AAOMP preparation examination and the OMP courses

Action: None

Assessment: Exit Interview

Frequency: Spring semester 3rd year

Outcome: Between 2012 and 2015 only two students graduated. No suggestions were offered

Action: None

Assessment: Alumni Survey

Frequency: Every 5 years

Outcome: Feedback on program's strengths and opportunities for improvement

Action: Survey to be conducted in 2015/2016

Research Goals

Assessment: Oral defense of thesis; Thesis submission, Research presentations, Manuscript publications and awards/scholarships

Frequency: Each semester a student is enrolled in ORPA 993

Outcome: Adequate progress in research; Successful oral defense of thesis as determined by thesis committee. Successful submission of thesis to the Graduate School:

2012: no graduates

2013: no graduates

2013: 1 student received external research award by AAOMP

2014: 1 (1) completed on time

2015: 1 (1) completed on time

C. Faculty

Three full-time faculty members currently serve as the core faculty for the graduate students (see Table 2). Drs. Murrah, Padilla, and Curran are all Board-Certified Oral and Maxillofacial Pathologists in good standing as well as Fellows of the American Academy of Oral and Maxillofacial Pathology. Faculty CVs can be found on the flash drive.

Faculty Joint Appointments

Dr. Valerie A. Murrah is appointed in the Department of Pathology and Laboratory Medicine and the Department of Otolaryngology, Head and Neck Surgery.

1. Research Activities

- Dr. Ricardo Padilla's research focus is in bone tissue engineering, tissue histomorphology and, recently, human papillomavirus-related oral disease and oral cancer. Currently, he allocates 5-10% of his time to research.

- Dr. Valerie Murrah’s research interest is in proliferative verrucous leukoplakia and oral lichen planus.
- Dr. Alice Curran’s research focus is on the role of the dentist in obesity prevention.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

2. Teaching Distribution

All faculty teach in the DDS, dental hygiene, and graduate courses. The Program Director has the main responsibility for teaching the Graduate Students enrolled in the program (courses ORPA 721, 722, 723, 750). Beginning the next academic cycle, Dr. Valerie Murrah will become the course director of ORPA 721. The other OMP faculty also teach the residents regularly during sign-out sessions of histopathology cases which is a component of ORPA 721.

3. Teaching Evaluation

All ORPA courses are evaluated by the Graduate Students. Due to the small number of students in the program, in order to maintain anonymity of the evaluations of ORPA courses, the Chief Resident gives the Program Director the combined resident evaluation of the courses on a yearly basis.

4. Teaching Innovation

The Program Director (PD) uses the Socratic method in the ORPA courses. Literature reviews and discussions of current and historical publications selected by the PD take place in the school’s library. Residents are encouraged to read the articles in digital format in order to have access to high-definition color photographs of lesions clinically and histopathologically. The PD makes a conscious effort to select articles with high-quality images to enhance learning. During all ORPA courses, whiteboards are used to create algorithms of patient management, immunohistochemical phenotypes of tumors, and work on differential diagnoses of cases. Histopathology conferences take place at the multi-headed microscope so that all residents are able to see the same field of view as the PD in order to participate in discussions regarding the cases being studied. Clinical-pathologic conferences occur using high-definition large-screen televisions on a weekly basis, and the PD prepares challenging cases or uses cases from clinical consults to discuss lesions and their management. Teach-back and “flipped classroom” formats and strategies are also used frequently during all ORPA courses.

The Program Director was an early adopter of audience response device technology and the use of such “clickers” has proved very effective in maintaining student engagement, reviewing attendance, and obtaining immediate feedback regarding the effectiveness of the delivery of the content in predoctoral courses. Throughout the presentation of a lecture, “clicker questions” are embedded into the presentation at selected points after critical concepts are covered. If the responses of the embedded questions during the lecture reflect that the students did not grasp a concept, the explanations is expanded, modified, or repeated as necessary to enhance learning. Graduate Students are instructed on how to develop this type of question. The software to complete this teaching strategy is available via UNC license.

5. Faculty Mentoring/Support

See General Faculty Overview.

The Program Director and Faculty receive mentoring by the Department Chair regarding research and scholarly activity on a regular and constant basis. The PD is also given release time to attend research-relevant courses and conferences.

Dr. Padilla maintains research collaborations with multiple PI’s including Drs. Ching-Chang Ko and Dr. Lyndon Cooper at UNC SOD, and Dr. Mike Brennan at CMC Medical Center in Charlotte, NC. He is a

collaborator on multiple research projects. Dr. Padilla has attended multiple campus-based research, ethics, and leadership courses. He also attends the annual meeting of the American Academy of Oral and Maxillofacial Pathology.

6. Faculty Teaching/Professional Awards for FY 2010-11 thru FY 2014-15

- Dr. Valerie A. Murrah is past President of the AAOMP and ABOMP and former Chair of the Fellowship Exam of the AAOMP.
- Dr. Ricardo J. Padilla is a current examiner of the AAOMP Fellowship Committee serving his second of five-year term.
- Dr. Alice Curran is a former Chair of the Fellowship Exam of the AAOMP.

7. Faculty Advising / Mentoring of Students

The Oral and Maxillofacial Pathology Graduate Student (New Resident) orientation occurs during the first week of July. This is in addition to the general School of Dentistry Graduate School orientation, which takes place during the last week of June. The Program Director, the Chief Resident, and the Department Manager complete the orientation of the new graduate student.

During the first months of training, students are encouraged to explore research opportunities and to identify a mentor. Graduate students are encouraged to request mentorship from any expert they consider appropriate for their project. However, at least one of the UNC OMP Faculty members should be part of the student's Thesis Committee.

Table 2. Faculty Participation in Advising/Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

Faculty	Rank	<i>MS</i>		<i>PhD</i>		<i>Non-MS</i>
		# Mentor	# Committee Member	# Mentor	# Committee member	# Non-MS *
Valerie Murrah	Professor	1		0	0	1
Alice Curran	Assoc Prof	0	3	0	0	0
Ricardo Padilla	Clin Assoc Prof	1	6	0	0	0

* DDS/ Short-Term Training/Other UNC degree program

8. Graduate Teaching Assistants

Student teaching is assigned and evaluated by the Program Director. All graduate students function as GTAs and participate in a limited way as lecturers or clinical instructors, approximately 2–4 hours per semester. They participate in Predoctoral (DDS) and Dental Hygiene courses in the SOD. All lectures planned for delivery by GTAs involve a planning session between the PD and the resident. A lesson plan is discussed, references are selected, and the PD or Course Director critiques the teaching visual aids developed by the student before the actual lecture takes place. The graduate student also presents the lecture to the PD or Course Director and modifications are made as needed. The PD or Course Director also attends most of their lectures and provides each graduate student with verbal and written feedback regarding the lecture. After the lecture, the graduate students write test questions regarding their topic, and those questions are discussed with the PD or Course Director.

Dent 124 is a didactic course for DDS undergrads. Part of the course involves lab sessions where the DDS students are proctored by GTAs as they perform clinical procedures such as medical history review, head and neck examination, restorative charting and periodontal charting. The GTAs work with about 4 pairs of students each. The GTAs review the required clinical procedures, provide demonstrations of those procedures and then proctor DDS students as they perform the procedures. The

program director reviews the entire process with the GTAs prior to the clinical lab session and then follows up to determine the effectiveness of the instruction. The program director is actively teaching on the clinic floor with the GTAs and is available to answer any questions. “Grades” per se are not awarded to the dental students by the GTAs, but the GTAs do sign off on the work of the students when they determine that there has been adequate completion of the prescribed exercises.

Concerning clinical consults, the Program Director accompanies the GTAs on consults until it is determined that they have an acceptable level of competency to attend consults on their own. Later, all consults performed solo by the GTAs are subsequently reviewed by the PD or other grad faculty member for appropriate diagnosis and management.

9. Faculty Strengths and Areas of Concern

The UNC program is staffed by three board-certified oral and maxillofacial pathologists, including a former president of the American Academy of Oral and Maxillofacial Pathology and a former president of the American Board of Oral and Maxillofacial Pathology. All three oral and maxillofacial pathologists have served on the Fellowship Committee of the AAOMP. Two of the faculty have been PIs or Co-PIs on NIH-funded research grants. Dr. Murrah is currently on the Board of Directors of the American Dental Education Association. All faculty serve as attending pathologists in one of the largest CLIA-certified oral and maxillofacial laboratories in the country.

There are no areas of concern at this time regarding faculty.

D. Students

1. Admission

See General Student Overview.

The Program Director reviews all applications and 3–5 are interviewed via Skype, with the program director as the primary interviewer. Current graduate students also participate in a secondary role. All interviewers evaluate all interviewed candidates, and subsequently the evaluations are tabulated and considered by the PD. The top candidates are invited to an on-site interview that includes one-on-one interviews with the PD, Department Chair, UNC Hospital faculty as available, OMP graduate students, and SOD officers/administrators as available. Other potential interviewers are possible mentors for the candidate based on common research interests. Everyone who interviews the candidate evaluates the candidate and reports to the PD. Once the on-site interviews are complete, the OMP faculty discusses the outcomes and evaluations and decides which candidate is most adequately prepared for the program and the best match for the program. One student is accepted each year.

2. Academic Environment

The Program Director and the Department Chair maintain an open-door policy at all times, as well as a respectful and cordial relationship with all residents, faculty, and staff. The environment of the residency training is of patient-centered health care, professionalism, respect towards all, and inclusivity. Graduate students are encouraged to voice concerns or complaints about any aspect of the program or their experience at UNC.

3. Alumni

Only three students have graduated from the program between 2011 and 2015.

a.) Research and Professional Awards Received by Alumni FY 2010-11 thru FY2014-15

FY 2013-14	Tiffany	Peters	American Association Oral Pathology Waldron Award Best Resident Scientific Poster Presentation
FY 2010-2011	James	Rokos	AAOMP Shafer Award for best score in AAOMP Fellowship Examination

b.) Publications of students (1st or co-author) in FY 2010-11 thru FY 2014-15. Students' names are in bold.

Rokos J, Carlos R, Romañach MJ. Clinical pathologic conference case 6: infantile myofibroma. Head Neck Pathol. 2011 Sep;5(3):292-5. doi:10.1007/s12105-011-0294-7. Epub 2011 Sep 3. PubMed PMID: 21892764; PubMed Central PMCID: PMC3173535.

Whitt JC, **Rokos JW**, Dunlap CL, Barker BF. Segmental odontomaxillary dysplasia:report of a series of 5 cases with long-term follow-up. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2011 Aug;112(2):e29-47. doi:10.1016/j.tripleo.2011.03.013. Review. PubMed PMID: 21684782.

c.) Employment and Professional Contributions of Alumni FY 2010-11 thru FY 2014-15

Student	Year	Assessment	Outcome	Employment
T. Peters	2015	AAOMP Fellowship Exam	Pass	Graduated May 2015
*D. Mora	2014 2014	AAOMP Fellowship Exam ABOMP Board Exam	Pass Fail	Unknown
J. Rokos	2010 2010	AAOMP Fellowship Exam ABOMP Board Exam	Pass Pass	Director - Oral Pathology Laboratory of the Carolinas Private practice 2013 - Present Assistant Professor of Oral Pathology University of Missouri, Kansas City School of Dentistry's Oral Pathology Laboratory 2010 – 2013

*Ongoing personal crisis at the time of examination; he will attempt this examination again this year.

E. Leadership and Support

See General Leadership and Support overview

1. Administrative Support

The UNC OMP Program is supported by staff from the Department of Diagnostic Sciences. Some of the staff members are state employees, and some have salary support from funds generated by the Dental Faculty Practice Oral and Maxillofacial Biopsy Service.

Staff	Number	Type of support
Laboratory Supervisor	1	Technical and administrative
Biopsy service secretary	1	Secretarial
Full-time Laboratory technician / histopathology	1	Technical and clerical
Part-time Laboratory technicians / histopathology	2	Technical and clerical
Departmental Secretary	1	Secretarial
Department Manager	1	Administrative

2. Facilities

All facilities and equipment allocated to the program are adequate.

F. The Future

Program Size

The ideal number of Graduate Students in the program is one per year. It is our intention to maintain the same level of enrollment for the foreseeable future. If more students were to be desired and accepted, there would be a critical need for additional spots for rotations in the hospital services and also physical space to allocate for their desk space, work space, etc.

Student Resources

There is a decline in applications to OMP programs nationwide. The reason is unknown, but is suspected to be related to the low level of reimbursement that insurance companies maintain for oral and maxillofacial biopsy services. A significant effort by OMP faculty is made at professional meetings to scout for high-quality potential applicants and engage in conversations with them to motivate them to apply to our program. The SOD will be well-served to continue supporting faculty attendance to OMP meetings to scout for desirable applicants.

Curricular Changes

The PD and Department Chair have discussed the creation of a separate OMP graduate course that encompasses the formal instruction and evaluation of daily sign-out of biopsy cases and generation of pathology reports and coding. Currently it is a component of ORPA 731, but we have decided to create such a course in the next academic cycle.

Quality Improvement of Graduate Education

Case exchanges are a great tool for teaching. We have begun the preparation of a UNC OMP case exchange program to be implemented with willing programs (Iowa, Navy, Ohio State, Baylor, University of Florida, University of Michigan). The PD has discussed this with the corresponding PDs of those programs, and our exchange will begin in the fall of 2015. This case exchange program has been enthusiastically approved and supported by the Department Chair.

Graduate students also will be allowed to participate in selected out-of-state pathology courses after the approval of the PD. Their participation in such courses will not be counted as "leave." The graduate students are responsible for logistical and financial arrangements related to those activities.

Racial, Ethnic, and Gender Diversity in the Graduate Program

The applicant pool for our program has historically been very diverse. We will continue to encourage and consider underrepresented minority applicants, although we do not perceive a lack of representation among the applicant pool on a yearly basis.

Quality of Mentoring

The UNC SOD has a formal mentoring program for junior faculty. The PD and Department Chair participate as mentors in several of these committees. In the future, the PD will request a mentoring committee for mid-career faculty.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
ORAL AND
MAXILLOFACIAL RADIOLOGY



Graduate School Review Site Visit
September 8-10, 2015



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ORAL AND MAXILLOFACIAL RADIOLOGY

A. Program Overview

1. Program's Mission, Goals, and Objectives

The primary goal of the graduate program in Oral and Maxillofacial Radiology is to prepare specialists who are fully qualified as oral and maxillofacial radiologists, who can teach, conduct research and provide patient care in an oral health care institution or who can provide patient care in a private setting. This graduate program and clinic residency program is a 36-month educational experience that is structured to meet or exceed the Accreditation Standards of the Commission of Dental Accreditation. This program provides an opportunity to participate in interdisciplinary working relationships with other members of the health care team, including hospital-based units. We embrace the American Dental Association's definition of the specialty: *Oral and maxillofacial radiology is the specialty of dentistry and discipline of radiology concerned with the production and interpretation of images and data produced by all modalities of radiant energy that are used for the diagnosis and management of diseases, disorders and conditions of the oral and maxillofacial region. (Adopted April 2001)*

The objectives of the program are to produce graduates who are able to:

1. Demonstrate advanced knowledge in:
 - a. Imaging Sciences: radiation biology, radiation physics, radiation protection and digital imaging computer science.
 - b. Clinical Sciences: intraoral, extraoral and cone beam CT radiographic imaging, radiographic interpretation of conditions affecting the oral and maxillofacial region.
 - c. Medical Sciences: oral and maxillofacial pathology and head and neck anatomy.
 - d. Research Sciences: research design and basic biostatistics.
2. Provide patient care using oral and maxillofacial radiological procedures, including intraoral, panoramic, cephalometric, tomographic and digital imaging, cone beam computed tomography, conventional computed tomography and magnetic resonance imaging.
3. Apply knowledge of the principles of radiation protection for patients, self and others.
4. Apply knowledge of oral and general pathology, head and neck anatomy, radiation physics, and radiation protection to radiographic interpretation of conditions affecting the oral and maxillofacial region.
5. Apply knowledge of information technology for the acquisition and processing of radiographic and CT Information in clinical and research settings.
6. Instruct students at all levels of dental education in clinical and cognitive radiological sciences related to oral and maxillofacial radiology.
7. Define a research problem in oral and maxillofacial radiology, design a protocol to produce relevant data using the scientific method, solve that problem, and present the work in a scholarly fashion.
8. Engage in cooperative efforts with other dental and medical specialists to gather and interpret diagnostic data leading to the interpretation of complex conditions in the oral and maxillofacial region.

All objectives are reviewed and updated at annual intervals.

Mechanisms for Assessing Program Mission

See General Program Overview.

2. Demand/Need for Program

The recognition of OMR as a specialty in 1999 by the American Dental Association signified an important response to the remarkable development of this field and its impact on the practice of dentistry. The use of advanced imaging modalities, such as computed tomography (CT) and magnetic resonance imaging (MRI), is an important part of this development. The introduction of cone-beam computed tomography (CBCT) has put three-dimensional imaging at the fingertips of the dental practitioner. With the ever increasing complexity of dental care, the need for advanced diagnostic imaging keeps rising as well. The transition from film-based radiography to digital radiography has also impacted the practice of dentistry. Dentists face a host of new technologies, which are being replaced at a more rapid rate than ever before. These developments have created new opportunities to improve patient care, but they can only be deemed progress when used appropriately and efficiently, both on an individual patient level as well as on a societal level. Academic dentistry needs to ensure that all dental health care providers are proficient at their expected level of radiological patient management. This implies defining and meeting the evolving educational needs of the DDS student, the OMR graduate student, the allied dental health student and the profession at large. The dental curriculum needs to be adapted to prepare young graduates for making informed decisions regarding the use of new technologies and new imaging modalities.

The emerging role of the clinical oral and maxillofacial radiologist has represented a relatively small but significant paradigm shift illustrated by the growing need for OMR specialists to fulfill academic needs as well as the needs of the practicing dentist for clinical radiologic expertise. The UNC Oral and Maxillofacial Radiology (OMR) program is currently one of eight programs in the United States that trains dentists to become Oral and Maxillofacial Radiologists. The UNC OMR program is one of four programs in the United States that offers a combined certificate program and Master of Science program. Graduates from combined programs are uniquely qualified to pursue careers in academic institutions and have a profound effect on the profession through teaching, research and clinical services. The UNC OMR program offers a balance between clinical and scholarly activities that prepares our students for all aspects of OMR. The UNC OMR program has a well-established reputation as a comprehensive training program and has prepared and continues to prepare graduates that make substantial contributions to the advancement of dentistry and the oral health of patients.

The UNC program is accredited by the Commission on Dental Accreditation (CODA) for a maximum of three graduate students each year. Traditionally, the program accepts two candidates, but reserves the right to deviate from that number within the CODA limit based on the quality and quantity of the applicants. The applicant pool is generally diverse in terms of country of origin, but has seen an increase in U.S. applications in recent years. The program also has an established relationship with the NAVY, which has sent a total of four students to our program in the past six years. The UNC OMR program is one of three programs selected by the NAVY to prepare a cadre of OMR specialists to serve the diagnostic imaging needs of their dental patients.

3. Interdisciplinary Activities

The program curriculum (See Curriculum for course details) provides substantial opportunities for interdisciplinary activities within and beyond the School of Dentistry. Two courses (RADI 462 and RADI 585) are given by faculty from the Division of Radiologic Science of the Department of Allied Health Sciences. These courses are part of the training program for radiologic technologists and allow OMR students to interact with medical radiologic allied health students and faculty. The ORAD 705 course includes a seminar on radiation oncology in the hospital. The ORAD 707 course includes hospital rotations, including Neuroradiology/Head and Neck interpretation, Neuroradiology conference, and Tumor Board (ENT, Radiology and Pathology). Students are also provided with the opportunity to interact with other disciplines through research. The Master's thesis committee is required to include one member from outside the department, which provides interdisciplinary interaction as demonstrated by

collaborative research between OMR faculty and students with faculty and graduate students of the UNC Department of Physics and Astronomy and the Department of Biomedical Engineering.

In addition, the OMR graduate students are given the opportunity to provide volunteer radiological services for the North Carolina Mission of Mercy (MOM) clinics and the Student Health Action Coalition (SHAC) clinic. These clinics involve general dentistry volunteers as well as volunteers from many dental specialty areas.

4. Interinstitutional Perspective

The UNC OMR program is the only OMR program in North Carolina and one of eight programs in the United States. Direct comparison of the quality of the UNC program to the quality of other programs requires outcome measures from those programs that are not readily available. However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. One such measure is the performance of our graduate students on the certifying examination of the American Board of Oral and Maxillofacial Radiology. With few exceptions, all of our graduate students have passed this examination. Secondly, graduate students from the UNC OMR program have been successful in securing positions in academic institutions where they were one of a number of applicants. This implies that their training and expertise is being viewed as favorable compared to applicants from other programs.

The unique strengths of the UNC OMR program are based on four critical elements: (1) the quality of the OMR faculty, (2) the curriculum, (3) the clinical radiologic facilities, and (4) the UNC School of Dentistry and UNC campus environment. The UNC OMR division has been recognized nationally and internationally as a result of its faculty's achievements and expertise. Since 2002, the division has included three oral and maxillofacial radiologists. A fourth faculty member has expertise in the radiological sciences and education and a fifth faculty member is dedicated to teaching and the Allied Health Education Center organization. The clinical, scientific and educational expertise of this group is quite unique and not rivaled by many other programs. While one of the radiologists has recently retired, the recruitment of a replacement is underway, which demonstrates the commitment of the administration to preserve the strength of the program. While the curriculum continues to evolve based on developments in dentistry and radiology, it has always struck a balance between developing clinical and scholarly skills. This is often mentioned by applicants as one of the deciding criteria to apply to our program. Few programs offer such a balanced curriculum, with most emphasizing clinical skills without developing scholarly skills. Students at UNC have the opportunity to participate in multiple areas of radiologic research including (1) the development and assessment of 2D and 3D imaging modalities, including digital radiography, tomosynthesis and cone-beam computed tomography, with applications in cariology, endodontics, orthodontics and periodontology; (2) radiation biology and dosimetry; and (3) educational research. The expertise of the OMR faculty and the variety of topics that is available provide ample opportunity for graduate students to define a research problem in OMR as part of their MS requirement.

The UNC School of Dentistry has modern and up-to-date clinical facilities, including a well-equipped radiology clinic. The professional engagement of the radiology faculty has resulted in a number of corporate-academic relationships that has brought state-of-the-art radiological equipment to the clinic. As such, the program is able to offer students a rich clinical experience. Key to this experience is the interaction of the students with other disciplines, both within and outside the School of Dentistry. The program is fortunate to be part of a School with excellent faculty in all areas of dentistry and training programs in all dental specialty areas. In addition, UNC is home to world-class leaders in many other disciplines, some of which are very valuable to advance the science and clinical aspects of OMR.

B. Curriculum

1. Course Review and Development

Review and development of program specific courses is conducted biannually. Students have the opportunity and are encouraged to evaluate courses and course instructors of the preceding semester. Students are also encouraged on an ongoing basis to provide comments and suggestions regarding courses and the curriculum. Program review and development takes place on an ongoing basis during weekly faculty meetings. Input parameters include student feedback, changes in School of Dentistry requirements, changes in CODA requirements, and other developments in dentistry and OMR.

2. Course Sequence and Description

Summer

1st Year

DENG 707	Regional Anatomy
DENG 720	Applied Pharmacology
OBIO 720	Topics in Oral Biology
ORAD 707	Graduate Clinical Oral Radiology
ORAD 802	Clinical Radiology Conference

Fall

1st Year

DENG 701	Introduction to Research Design
DENT 308	Radiologic Interpretation
ORAD 707	Graduate Clinical Oral Radiology
ORAD 710	Classical Radiology Literature Review
ORAD 802	Clinical Radiology Conference
ORPA 762	Oral and Maxillofacial Pathology Seminar
RADI 662	Instrument and Imaging Methods

2nd Year

DENG 703	Applied Dental Research Methods
ORAD 704	Advanced Radiologic Diagnosis II
ORAD 707	Graduate Clinical Oral Radiology
ORAD 802	Clinical Radiology Conference
RADI 585	Radi Health Phys.

3rd Year +

ORAD 993	Master's Research and Thesis
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Spring

1st Year

DENG 702	Biostatistics
ORAD 702	Advanced Oral Radiology Technology
ORAD 706	Advanced Oral Radiology
ORAD 707	Graduate Clinical Oral Radiology
ORAD 710	Oral and Maxillofacial Radiology Literature Review
ORAD 802	Clinical Radiology Conference
ORPA 763	Oral and Maxillofacial Pathology Seminar

2nd Year

DENG 704	Interdisciplinary Care Conference
	Principles for Advanced Diagnostic and Therapeutic Radiology
ORAD 705	
ORAD 707	Graduate Clinical Oral Radiology
ORAD 802	Clinical Radiology Conference

The course directors for the program-specific courses have been relatively stable over the past five years and the number of enrolled students per course varies only slightly from year to year since the number of students in each year of the program is very stable. Course Directorship beginning in the spring of 2015 has changed with the retirement of Dr. Ludlow. Course syllabi will be available on site.

DENT 308 Radiologic Interpretation

(Audit) Fall Semester 1st Year

Course Director: Dr. Don Tyndall

The series of topics on radiographic diagnosis is designed to reinforce the concept that radiographic data assist in the assignment of patient abnormalities into general categories of conditions: developmental, trauma, inflammation, systemic disease, diseases of bone and fibro-osseous conditions, and neoplasia. This method facilitates the development of differential diagnostic impressions when conditions other than caries and periodontitis (apical or marginal) are present.

ORAD 702 Advanced Oral Radiological Sciences

(4 credits) Spring Semester 1st Year

Course Director: Dr. Rick Platin

This course emphasizes the principles of radiographic procedures when imaging the oral and maxillofacial complex. Conventional radiographic techniques, tomography, panoramic radiography, Magnetic Resonance Imaging (MRI), and Computed Tomography (CT) techniques are discussed including the theory and practice of quality assurance, trouble-shooting techniques and the use of quality assurance test tools in the evaluation of equipment function and image assessment.

ORAD 703 Advanced Oral Radiologic Diagnosis

(Audit) Summer Term I 1st Year

Course Director: Dr. Don Tyndall

The purpose of this course is to present: (1) The radiographic diagnosis of common and unusual developmental and acquired abnormalities of the dentition, mandible, maxilla and orofacial complex, (2) radiology of injuries and regressive changes to the dentition and facial bones, (3) radiology of diseases of the dentition and periodontium, and (4) implant imaging principles and diagnosis. This material prepares the radiologist to be a competent consultant in the dental school setting or private practice setting and teach this material to DDS and specialty level students.

ORAD 704 Advanced Oral Radiologic Diagnosis

(3 credits) Fall Semester 2nd Year

Course Director: TBD

This is a two-course sequence (703-704). Topics are covered through textbook reviews, seminars, and presentation of cases. Students prepare for each topic by reading assigned texts. Material is synthesized and presented on each topic.

ORAD 705 Advanced Diagnostic and Therapeutic Radiology

(4 credits) Spring Semester 2nd Year

Course Director: Dr. André Mol

This course is designed to provide OMR graduate students with information on a variety of advanced medical imaging modalities and on topics related to oral and maxillofacial radiology, including radiology administration, ultrasound, nuclear medicine, computed tomography, salivary gland radiology, radiation oncology, effects of radiation therapy in the oral cavity, digital image processing, and measures of diagnostic performance.

ORAD 706 Advanced Oral Radiology
(2 credits) Spring Semester 1st Year
Course Director: Dr. André Mol

This course is designed to provide postdoctoral students with information on advanced oral and maxillofacial imaging modalities. The topics include material designed to prepare the student in the radiologic management of patients with complex diagnostic problems. A substantial portion of the course is focused on cone beam computed tomography (CBCT), including specialized hands-on sessions. The other portion of the course consists of more traditional aspects of maxillofacial imaging such as quality assurance, radiation protection and equipment selection. One session will be devoted to magnetic resonance imaging (MRI) in the diagnosis of oral and maxillofacial disease. The presentations on CBCT will provide the students with advanced information on the technology, dosimetry and applications of CBCT in dentistry. Two sessions will be devoted to CBCT image interpretation to enhance the recognition of normal anatomy and pathologic findings.

ORAD 707 Advanced Clinical Oral Radiology
(Audit) Summer Terms I and II, 1st, 2nd, and 3rd Year
(3 credits) Fall, Spring, 1st, 2nd, and 3rd Year
Course Director: Dr. André Mol

This course is designed to provide the OMR graduate student with experience in the radiographic interpretation of diseases of the oral and maxillofacial region using traditional and advanced imaging modalities in case-based scenarios, in multidisciplinary management of tumors of the head and neck, and in the radiologic management of maxillofacial conditions using advanced imaging modalities. The course includes graduate radiology interpretation sessions, observation of the hospital tumor board, observation of the hospital Head and Neck Radiology reading service and participation in the School of Dentistry's advanced imaging service.

ORAD 710 Classical Radiology Literature Review
(1 credit) Fall and Spring Semester 1st Year
Course Director: TBD

The OMR Classical Literature Review course is intended to introduce the student to the literature of topical areas of general interest to those teaching and working in the area of Oral and Maxillofacial Radiology. Areas are explored by sampling journal articles of historical interest as well as current review articles. Representative articles are chosen to illustrate fundamental concepts, sound research methodology, and pitfalls in research design.

ORAD 802 Clinical Radiology Conference
(Audit) Summer Terms I and II 1st, 2nd, and 3rd Year
(1 credit) Fall and Spring Semesters 1st, 2nd, and 3rd Year
Course Director: Dr. André Mol

The course consists of three types of seminars: one seminar is dedicated to radiologic case presentations of any area in the oral and maxillofacial region; one seminar is either dedicated to diseases of the temporomandibular joint (TMJ) and to magnetic resonance imaging (MRI), or consists of a combined oral pathology/oral radiology seminar (CPRC) where imaging findings are related to histological features. The latter is taught in collaboration with the Oral and Maxillofacial Pathology section. TMJ/MRI seminars and CPRC seminars alternate on Fridays.

RADI 662 Instrument and Imaging Methods
(4 credits) Fall, 1st Year
Course Director: Lauren Noble

An overview of radiographic imaging methods examining the imaging process as a sequence of events from x-ray production through hard copy processing. The imaging equipment is discussed in terms of function, influence on the image and the impact of alteration on image characteristics, and compensation techniques for changes in the sequence

RADI 585 Radiologic Health Physics
(3 credits) Fall Semester 2nd Year
Course Director: Nelson Couch

This course includes the physics of diagnostic radiology including: radiation effects on tissue, radiation detection and measurement, protection methods and techniques, and environmental radiation issues.

ORAD 993 Master's Thesis
(3 credits) Fall and Spring Semester 3rd Year
Course Director: Andre Mol
Research project activities towards MS Thesis

3. Course Evaluation

Evaluation of program specific courses is based on feedback from students on an ongoing basis as well as during the biannual evaluations.

4. Requirements for Degree

See General Curriculum Overview. The purpose of the comprehensive examination is two-fold: (1) assess the student's level of competency in subjects essential to OMR and (2) prepare the student to challenge the certifying examination of the American Board of Oral and Maxillofacial Radiology. The level and format of the comprehensive examination closely resembles those of the OMR Board examination. The comprehensive examination consists of two parts. Part 1 is the didactic examination covering Radiological Physics, Imaging Technology and Radiation Biology and Protection. This part of the examination is scheduled early in the first summer semester of the second year, i.e., at the end of the second year. Part 2 is the clinical interpretive competency examination. This part is scheduled at the beginning of the spring semester of the third year. Both Part 1 and Part 2 require a Pass grade in order to graduate from the Program.

Failure to pass any part of the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program.

Pass/Fail for the comprehensive examination:

- a. Part 1: a minimum of 70% on all three written components of the exam. Each question has a fixed point value that is determined in advance. The exam is mostly MCQs with some short answer essay questions. There are three examiners, each one responsible for one part. If a student fails a component, the exam is discussed with the other two examiners prior to determining the final grade.
- b. Part 2: Oral component (6 cases) and written component (14 cases). In order to pass this exam, the student must pass at least 4 out of 6 oral cases and 10 out of 14 written cases. The oral exam is scored by two examiners and the written exam is scored by two examiners

5. Evaluation of Progress of Students

See General Curriculum Overview. Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, comprehensive examination, and performance reviews.

Informal evaluations take place during conferences, clinics, lectures and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student's transcript.

The Academic Performance Committee (APC) meets biannually per ADA accreditation requirements to discuss the progress of each graduate student and consists of the full-time faculty members of the Division of Oral and Maxillofacial Radiology. Following the Summer and Fall semesters, an electronic evaluation instrument is sent to each student and each Radiology faculty member. Each student performs a self-assessment, using the same criteria as the faculty. Following submission of all data and review by the APC, a meeting with the Program Director and one faculty member is scheduled to discuss the results. Progress, accomplishments and concerns are discussed. The student is provided with a copy of the evaluation summary. Each of the following evaluation criteria is scored using a three-point scale (*Excellent, Good, Inadequate*):

Professional and Personal

- a. Respect for the views of others
- b. Ability to work as a team member
- c. Solicits consultations and advice when appropriate
- d. Works independently at appropriate level
- e. Accepts constructive criticism and suggestions in a positive manner
- f. Reliable in fulfilling assignments
- g. Demonstrates leadership skills
- h. Ability to self-assess

Clinical

- i. Planning and preparation for radiological procedures
- j. Equipment use
- k. Time utilization
- l. Use of technologists
- m. Ability and motivation to solve clinical problems
- n. Patient management
- o. Ability to make correct diagnoses and draw appropriate conclusions
- p. Report writing skills

Didactic

- q. Preparation
- r. Contribution in class
- s. Understanding of theories and principles
- t. Problem solving skills

Research

- u. Knowledge of scientific principles
- v. Critical thinking skills
- w. Ability to design a research study
- x. Initiative and progress
- y. Scientific writing skills

Graduate Teaching Assistant (GTA) Performance

- z. Lectures
- aa. Clinical teaching
- bb. DDS interpretation
- cc. Communication with students
- dd. Educational Enhancement

6. Learning Outcomes and Assessment Policies and Processes

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015.

Curriculum

Assessment: End of semester course examinations.

Frequency: Two semesters per year for three years

Outcome: All passed, except for one student who accumulated 9 hours of L in 2012.

Action: An educational enhancement plan was designed and executed. The student fulfilled the requirements of the plan as well as all other required course work. The student graduated in 2014.

Assessment: Comprehensive examinations by radiology faculty.

Frequency: Once at the end of the second year (Part 1: academic examination) and once in the Spring semester of third year (Part 2: clinical competency)

Outcome:

2012: Part 1: 2 retakes; 2 passed on retake Part 2: 2 of 2 passed

2013: Part 1: 2 retakes; 2 passed on retake Part 2: 1 of 1 passed

2014: Part 1: 3 of 3 passed Part 2: 3 of 3 passed

Action: Remediation and retake when performance is below satisfactory

Assessment: Biannual evaluation of graduate students.

Frequency: Twice per year.

Outcome: Overall didactic and clinical performance and progress of each student is evaluated by the Academic Performance Committee using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July.

2012: All students performing at satisfactory or above level except for one.

2013: All students performing at satisfactory or above level.

2014: All students performing at satisfactory or above level.

Action: An educational enhancement plan was designed and executed for the student who underperformed in 2012. The student fulfilled the requirements of the plan as well as all other required course work. The student graduated in 2014.

Patient Care

Assessment: Feedback from radiologic technologists about clinical radiography skills

Frequency: Daily feedback

Outcome: Suggestions for improvement provided individually to students. Overall evaluation provided at the end of each semester

Action: None

Assessment: Supervision by radiology faculty of all radiology reports produced by students.

Frequency: Daily feedback from faculty.

Outcome: Suggestions for improvement provided individually to students. Overall evaluation provided at the end of each semester

Action: None

Assessment: Observation appraisal of graduate students teaching methods by radiology faculty

Frequency: At the end of each semester

Outcome: Suggestions for improvement provided individually to students. Overall evaluation provided at the end of each semester

Action: None

Education Goals

Assessment: Survey of American Board Oral Maxillofacial Radiology results

Frequency: Yearly

Outcome:

2012: Part 1: 2 passed, 1 failed Part 2: 1 passed, 1 failed

2013: Part 1: 4 passed Part 2: 1 passed, 1 failed

2014: Part 1: 3 passed Part 2: 5 passed, 1 failed

Action: None

Assessment: Survey of graduate's attitudes of program and job success (CV's)

Frequency: Every 5 years.

Outcome: No current update

Action: Survey is being revised and prepared for distribution this year.

Research Goals

Assessment: Research Progress Report; Oral Defense of Thesis; Thesis document.

Frequency: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate School (Appendix W –UNC-CH Graduate School Handbook).

Outcome: Adequate progress in research; Successful oral defense of thesis as determined by thesis committee. Successful submission of thesis to the Graduate School

2012: 2 completed on time 2013: 0 completed on time, 2 delayed.

2014: 2 completed on time, 2 completed from 2013

Action: Research progress of students enrolled in a 993 course is evaluated via the Mentor MS Research Performance Report.

Assessment: Research presentations, manuscript publications and awards/scholarships

Frequency: Annually

Outcome: Graduate student research culminating in a presentation, award scholarship and/or publication is documented in graduate student or alumni files with the department.

2012: 4 publications 0 awards 2013: 0 publication, 0 awards

2014: 0 publications, 1 award

Action: Annual review of number of students who are authors on a manuscript.

Future outcomes assessment plans

Examples of improvements to the program based on assessment results include restructuring of the comprehensive examination, development of education enhancement methods, inclusion of more advanced imaging interpretation in the curriculum and increased student involvement in advanced imaging report writing.

The current methods of outcomes assessment appear to be adequate for program review and program development. It is desirable, however, to implement new technologies to collect, process and analyze the information. Web-based survey instruments appear well suited for this task and allow for a more streamlined process. We hope to develop and implement this new technology within a year.

C. Faculty

Three full-time faculty members currently serve as the core faculty for the graduate students (See Table 1). A faculty search is underway to identify a replacement for Dr. John Ludlow who retired in December 2014. Of the three faculty, two are Board certified in the specialty of Oral and Maxillofacial Radiology and are Diplomates of the American Board of Oral and Maxillofacial Radiology. The third holds a PhD in Education in addition to a certificate in Radiological Sciences. Biosketches for the full time faculty are found on the flashdrive.

1. Research Activities

See General Faculty Overview. Our research goal is to be the premier graduate program in oral and maxillofacial radiology by helping to develop and evaluate innovative radiographic systems for diagnosis as well as assessing their associated radiation risks. Our other goals include training each graduate student to be capable of performing independent research and of having a viable and productive academic career. This is important because our graduate program is designed to produce academic radiologists for dental education.

The major areas of research interest are as follows: digital tomosynthesis, caries detection, educational research, applications of CBCT in dentistry, and radiation dose from oral and maxillofacial radiographic procedures. Standards of quality are derived from acceptance of papers for publication, grants successfully funded and awards from journals for best articles of the year.

The greatest reward we receive from participating in research and scholarly activity is the satisfaction of having advanced the art and science of oral and maxillofacial radiology while preparing graduate students for successful academic careers. There is usually no additional compensation for research productivity unless FTE percentage exceeds that required for the Y component of salary (See General Faculty Overview). Generally, if goals are met or exceeded it is noted at the time of the radiology faculty annual evaluations.

The radiology faculty strive to obtain research funding from outside sources and to publish between 4-8 papers in peer reviewed publications each year.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research

2. Teaching Distribution

All faculty teach in both the DDS and graduate clinics. The policy for the distribution of teaching loads is based on a combination of a faculty member's expertise and a reasonable balanced teaching load amongst the faculty. Lectures or seminars are conducted by the faculty with most expertise. Clinical radiology conferences (ORAD 802) are equally distributed among the two board-certified radiologists. In areas involving specific radiologic technology, Dr. Rick Platin participates most heavily in those sessions (e.g., ORAD 702). For graduate radiology interpretation clinics (ORAD 707) these are distributed equally among the oral radiologists.

3. Teaching Evaluation

The School of Dentistry conducts evaluations of faculty by students on a regular basis for core didactic courses. These are accessed by the faculty and discussed at annual reviews within the department. The radiology faculty continually seek student assessment for didactic courses, seminars, conferences and clinics on a more informal but regular basis. Each graduate student is interviewed semiannually by two faculty members and students are asked if they have suggestions for improvements in the program. Finally, an exit interview is also conducted as the graduate students complete the program. In this final

session students are again asked to provide their feedback as to the quality of the program and instructional pedagogy and are asked to fill out a formal evaluation regarding the program.

EXIT SURVEY 2015	
DIDACTIC	
1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree	
	Comments/Suggestions
Course requirements were clearly stated	
Scientific knowledge base sufficient for managing clinical procedures	
Scientific knowledge base sufficient for managing radiation protection issues	
Scientific knowledge base sufficient for making diagnostic decisions	
Instructors were enthusiastic about teaching course material	
Instructors were able to point out clinical relevance of topics	
Examinations covered material on which you were expected to be tested	
CLINICAL	
1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree	
	Comments/Suggestions
I feel adequately prepared to acquire and interpret intraoral radiographs	
I feel adequately prepared to acquire and interpret skull films	
I feel adequately prepared to acquire and interpret CBCT scans	
I feel adequately prepared to interpret MDCT scans	
I feel adequately prepared to interpret MRI scans	
I feel adequately prepared to interpret Ultrasound scans	
I feel adequately prepared to provide and manage radiological services for my patients	
The amount of time allocated to clinical radiology instruction and practice is appropriate	
RESEARCH	
1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree	
	Comments/Suggestions
The research experience was appropriate	
I received adequate guidance in my research	
I feel adequately prepared to initiate and execute a research project	
GRADUATE TEACHING ASSISTANT (GTA) EXPERIENCE	
1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree	
	Comments/Suggestions
Amount of GTA activity was appropriate	
I received adequate guidance to improve my teaching skills	
GENERAL	
1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree	
	Comments/Suggestions
Overall I am satisfied with my educational experience in this program	
The didactic components of the program are sound	
The pre-clinical and laboratory components of the program are sound	
The clinical components of the program are sound	
The curriculum is appropriate for training in oral and maxillofacial radiology	
Program faculty were easy to work with and effective in their teaching methods: Ludlow	
Program faculty were easy to work with and effective in their teaching methods: Mol	
Program faculty were easy to work with and effective in their teaching methods: Platin	
Program faculty were easy to work with and effective in their teaching methods: Tyndall	
OTHER COMMENTS AND SUGGESTIONS	

4. Teaching Innovation

The program faculty have implemented a variety of new programs and approaches during the past five years.

1. Implementation and training of SimPlant implant planning software for the School of Dentistry 2013-14. This program is used by our students for evaluating cone beam CT volumes as well as for planning dental implant placement. Each graduate specialty program is trained in how to use

the software and how it can be useful for patient care. Radiology residents get more detailed training in the use of the software.

2. Radiology graduate students attend special training sessions given by Dr. Bruce Howerton, UNC Adjunct professor and private practice oral and maxillofacial radiologist, for advanced training in using the software for cone beam CT volumes and digital dentistry.
3. Community service incorporated into teaching opportunities. Approximately five years ago, our graduate students began participating in the North Carolina Missions of Mercy (NC MOM) free dental clinics. NC MOM operates an x-ray truck complete with four digital panoramic units and three intraoral digital units. This gives them an opportunity to advance their clinical skills as well as the ability to teach dental students basic panoramic technique and interpretation. Similarly, our radiology graduate students participate in the free Student Health Action Committee (SHAC) clinics in the School of Dentistry on a weekly basis. This SHAC clinic experience also gives the graduate students some additional didactic and interpretation experience with the dental students.
4. Innovation to the DDS radiology curriculum. This past fall (2014), Dr. Tyndall introduced an innovative approach to teaching radiology interpretation for the DDS program, DENT 308. In this course, students watched a computer-based recorded lecture on a particular disease category. The students were then assigned cases on the schools Sakai website to practice what they had learned from the recorded lectures. The students interpreted the posted cases on their own and then checked their answers against the posted correct answers one week later. Following this, the students were divided into groups of 10. Each student was given a new case to interpret in a seminar style format. This combination of lecture, case-based examples, and seminars is an innovative approach similar to "flipping the classroom". Student feedback was very positive and their performance improved as well. Radiology graduate students observed the methods and actually participated in leading seminars
5. PhD program through Kings College London (KCL). Approximately four years ago, Dr. Tyndall developed a relationship with KCL where UNC radiology graduate students, after completing their Master's degree, could obtain a PhD in the radiological sciences. In this arrangement, the research is conducted at UNC with two faculty mentors. The program is administered and degrees conferred through KCL who also provides supervising faculty. This program gives our students the opportunity to obtain an advanced degree not available on this campus. One student has completed the program and one student is currently enrolled and is at the beginning of her third year.
6. Dr. Platin integrated the laboratory and lecture components of the DENT 125 course to better prepare students for their radiology lab experience by bringing DXXTR manikins into the classroom demonstrating how they worked. Student feedback was very positive.
7. Image Analysis Assignment in the DENT 311 course requiring students to troubleshoot images provided by the instructor; implemented in 2013. Following submission of their responses, the instructor holds a seminar on the assignment providing a great deal of opportunities for discussion. Based on the responses provided by the instructor, students are asked to self-assess and come up with a grade. This approach places the onus of the grade on the students, shows trust from the instructor, eliminates the burden of having to correct grades and turns the assignment into a great learning tool. Students reported that this was one of the most useful learning experiences of the course.
8. Innovations and enhancement to the oral radiology graduate courses implemented by Dr. Mol
 - a. Revision and update of the ORAD 705 course
 - b. Enhancement of the ORAD 707 course, ensuring two sessions each week for all students and addition of new case series.
 - c. Addition of a seminar in the ORAD 802 course dedicated to MRI of the temporomandibular joint and the head and neck region.
 - d. Optional enhancement seminar in Neuroradiology.

5. Faculty Mentoring/Support

See General Faculty Overview. Within the Oral and Maxillofacial Radiology Division, radiology faculty members constantly interact and discuss various aspects of their research/teaching and how improvements can be made. It is an ongoing process occurring on almost a daily basis.

6. Faculty Teaching/Professional Awards for FY 2010-11 thru FY 2014-15

Dr. Tyndall received the “Digital Dentistry Educator of the Year Award” from Sirona Dental at the annual users meeting in Charlotte, NC December, 2014.

Dr. André Mol was elected to the American Board of Oral and Maxillofacial Radiology in 2014.

Dr. Platin received the Faculty Achievement and Success Award, Diversity and Multicultural Affairs, University of North Carolina at Chapel Hill, December 2014.

7. Faculty Advising/Mentoring of Students

See General Faculty Overview. Program specific student orientation is provided by the Program Director. It comprises a detailed discussion of all topics listed in the Program Manual (available on site), including (1) the educational mission and objectives as well as requirements for successful completion of the program; (2) general information, such as cost and stipends, health insurance, computer requirements, building access and ID cards, and travel; (3) rights and responsibilities, such as schedule and attendance, professionalism, GTA requirements, research, evaluation, educational enhancement, training and compliance; and (4) policies, including CODA policies, Graduate School policies, School of Dentistry Policies and Program policies.

Table 1. Faculty participation in Advising/Mentoring of Completed MS/PhD and non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

Faculty	Appointment	MS	MS	PhD	PhD	non-MS
		# Mentor	# Committee Member	# Mentor	# Committee member	# Non-MS **
Ludlow, John*	Professor	6	9	0	0	2
Mol, André	Clinical Associate Professor	4	6	0	0	0
Platin, Enrique	Clinical Professor	3	7	0	0	0
Tyndall, Donald	Professor	5	7	1	1	0

* Retired December 2014

** DDS/ Short Term Training/Other UNC degree program

8. Graduate Teaching Assistants

All radiology graduate students serve as graduate teaching assistants. They are trained by the radiology faculty to supervise DDS student clinics and to present material in didactic courses. They are supervised until the faculty feel they are competent to function without further supervision. If the graduate student is giving lectures, the course director will meet with the graduate student and help him/her develop the lectures. In most cases the course director also sits through the first lecture given by the graduate student and then meets with the student to evaluate and provide feedback. When the graduate students are evaluated semiannually, one of the areas addressed is their ability to teach didactically and clinically. Feedback is received from dental students and/or other graduate students as well as faculty and staff.

Results of the feedback are given to the graduate students and discussed at the semiannual evaluation session or in some cases after a lecture has been given. The radiology faculty does not believe the compensation received by the GTA's is adequate.

Oral and Maxillofacial Radiology Graduate Teaching Assistant Duties and Responsibilities

YEAR 1

Summer Orientation
none

Fall Semester
none

Spring Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.

Summer Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
DENT 125	Drs. Mol, Platin, Tyndall	Teach pre-clinical intraoral radiography to first-year dental students, including supervision of image acquisition, image mounting and evaluation.
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

YEAR 2

Fall Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
DENT 308	Dr. Tyndall	Lead small group seminars
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

Spring Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

Summer Semester		
Course	Direction	Duties/Goals
DENT 333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
DENT 125	Drs. Mol, Platin, Tyndall	Teach pre-clinical intraoral radiography to first-year dental students, including supervision of image acquisition, image mounting and evaluation.
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

YEAR 3

Fall Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
DENT 308	Dr. Tyndall	Prepare and deliver lectures; lead small group seminars
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

Spring Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

Summer 1 Semester		
Course	Direction	Duties/Goals
DENT 233/333/433	Drs. Mol, Tyndall	DDS interpretation. Supervise radiological interpretation of intraoral and panoramic radiographs in small group format. Verify and correct pre-doctoral radiographic reports.
DENT 233/333	Drs. Platin, Tyndall	Teach clinical intraoral radiography
DENT 125	Drs. Mol, Platin, Tyndall	Teach pre-clinical intraoral radiography to first-year dental students, including supervision of image acquisition, image mounting and evaluation.
On-call service	Drs. Mol, Tyndall	Provide clinical radiological consultation and instruction as needed.

9. Faculty Strengths and Areas of Concern

The graduate program faculty are well balanced in teaching, research, and service. To the best of our knowledge, the faculty's record of scholarship is greater than all peer programs. Dental student and graduate student evaluations of faculty teaching skills and abilities are scored very high. The radiology faculty have a reputation for being student friendly and always available to help, developing cordial but

respectful relationships with each student. The atmosphere created by the faculty is one that promotes learning in a safe and stimulating environment. Another strength is the fact that the faculty members work very well together and are quite collegial. In addition, the faculty complement each other in their specific skill sets. Together the strength of the radiology faculty unit is greater than the sum of its parts.

There are no obvious concerns with the faculty except for the fact that we are still short one member due to retirement. We are expecting that the position will be filled in the next few months.

D. Students

1. Admission

See General Student Overview. Once applications are completed in the UNC-CH Graduate School system, the OMR admissions committee, consisting of all full-time OMR faculty members, reviews each application. Based on academic achievements, standardized results, recommendation letters and the quality of the statement of purpose, a select number of candidates are invited to the UNV School of Dentistry for a one-day interview. The interview process includes one-on-one meetings with the Program Director, all other members of the OMR faculty, faculty from the Division of Oral Pathology and the Department Chair. The candidates also meet with the current graduate students as a group. Based on feedback from those involved in the interviewing process, the admissions committee decides which applicant(s) are recommended for admission to the program.

2. Academic Environment

The University of North Carolina and the UNC School of Dentistry (SoD) provide a rich environment to ensure that students learn in a welcoming and egalitarian atmosphere. Upon arrival, students are properly oriented receiving critical information essential to their transition into the SoD. The SoD policies and procedures provide students with a framework that will guide them through their educational experience. OMR graduate students are provided with their own desk space in the OMR residents' room. Basic technical and office needs are provided by the program. The OMR faculty strives to be maximally approachable by the students and adheres to an open door policy. Students are encouraged and invited to talk with individual faculty members or to all faculty members regarding suggestions, comments, concerns or any other problems.

3. Alumni

The following awards were received by OMR graduate students in the past five years:

a.) Research and Professional Awards Received by Alumni FY 2010-11 thru FY2014-15

2015 Dr. Laurence (Lars) Gaalaas Derek T. Turner Research Award

The award was presented by the North Carolina section of the American Association for Dental Research for the following poster: *Gaalaas L, Tucker A, Shan J, Chtcheprov P, Platin E, Mol A, Lu JP, Zhou O. Developing an Intraoral Digital Tomosynthesis System Using CNT X-ray Technology Preliminary Images.* The poster was presented at the annual Dental Research in Review Day at the UNC School of Dentistry.

2014 Dr. Robert Timothy Albert G. Richards Graduate Student Research Grant

The award was presented by the American Academy of Oral and Maxillofacial Radiology at the annual meeting in Orlando, FL. The award assists postgraduate students in conducting applied research in oral and maxillofacial radiology by providing funds for supplies, equipment and other costs such as computer time or laboratory work. Dr. Timothy's project, *Study Design Strength of Evidence and Level of Clinical Efficacy Reported in the CBCT Scientific Literature*, determined the strength of evidence and the level of efficacy reported in scientific literature on cone-beam computed technology (CBCT) to date.

2010 Dr. Angela Broome Albert G. Richards Graduate Student Research Grant

The award was presented by the American Academy of Oral and Maxillofacial Radiology at the annual meeting in San Diego, CA. The award assists postgraduate students in conducting applied research in oral and maxillofacial radiology by providing funds for supplies, equipment and other costs such as computer time or laboratory work. Dr. Broome's project, *E-Learning for Radiographic Caries Interpretation: Development of a Testing Module*, demonstrated a novel online method for testing student caries interpretation skills.

2010 Dr. Angela Broome Howard R. Raper Oral & Maxillofacial Radiology Award

The award was presented by the American Academy of Oral and Maxillofacial Radiology at the annual meeting in San Diego, CA and is co-sponsored by Indiana University and Dentsply/Rinn. The Award recognizes a graduate student with potential for an academic career in oral and maxillofacial radiology.

In the past five years, a number of OMR graduate students have been selected to participate in the Future Faculty Fellowship Program (FFFP). The FFFP is a semester-long program that introduces graduate students to evidence-based teaching practices, helps them understand the roles and responsibilities of faculty members at different types of institutions of higher education and helps them reflect on their professional goals (from <http://cfe.unc.edu/teaching-and-learning/resources-for-graduate-students>). The following students participated in the program: Dr. Jeff Price (2010), Dr. Heidi Kohltfarber (2011), Dr. Ali Syed (2013), Dr. Brittany Kurzweg (2015) and Dr. Li Zhen Lim (2015).

b.) Publications in print or accepted of students (1st or co-author) in FY 2010-11 thru FY 2014-15. Students' names are in bold.

Shan J, Tucker A, **Gaalaas L**, Wu G, Platin E, Mol A, Lu J, Zhou O. Stationary intra-oral digital tomosynthesis using a carbon nanotube X-ray source array. *Dentomaxillofac Radiol* 2015. *Accepted*.

Ludlow JB, **Timothy R**, Walker C, Hunter R, Benavides E, Samuelson DB, Scheske MJ. Effective dose of dental CBCT- a meta-analysis of published data and additional data for nine CBCT units. *Dentomaxillofac Radiol* 2015; 44(1): 20140197.

Tyndall DA, **Price JB**, Tetradis S, Ganz SD, Hildebolt C, Scarfe WC. Position statement of the American Academy of Oral and Maxillofacial Radiology on selection criteria for the use of radiology in dental implantology with emphasis on cone beam computed tomography. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2012; 113(6): 817-826.

Tyndall DA, **Kohltfarber H**. Application of cone beam volumetric tomography in endodontics. *Tex Dent J* 2012; 129(11): 1195-1208.

Price JB, Thaw KL, Tyndall DA, Ludlow JB, Padilla RJ. Incidental findings from cone beam computed tomography of the maxillofacial region: a descriptive retrospective study. *Clin Oral Implants Res* 2012; 23(11): 1261-1268.

Cevitanes LH, **Alhadidi A**, Paniagua B, Styner M, Ludlow J, Mol A, Turvey T, Proffit WR, Rossouw PE. Three-dimensional quantification of mandibular asymmetry through cone-beam computerized tomography. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2011; 111(6): 757-770.

AlHadidi A, Cevitanes LH, Mol A, Ludlow J, Styner M. Comparison of two methods for quantitative assessment of mandibular asymmetry using cone beam computed tomography image volumes. *Dentomaxillofac Radiol*. 2011; 40(6): 351-357.

Palconet G, Ludlow JB, Tyndall DA, Lim PF. Correlating cone beam CT results with temporomandibular joint pain of osteoarthritic origin. *Dentomaxillofac Radiol* 2012; 41(2): 126-130.

Cevitanes LH, Hajati AK, Paniagua B, Lim PF, Walker DG, **Palconet G**, Nackley AG, Styner M, Ludlow JB, Zhu H, Phillips C. Quantification of condylar resorption in temporomandibular joint osteoarthritis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010; 110(1): 110-117.

c.) Employment and Professional Contributions of Alumni FY2010-11 thru FY 2014-15

2015

Dr. Laurence Gaalaas, Clinical Assistant Professor, Department of Diagnostic and Biological Sciences, Division of Oral Medicine and Diagnosis, University of Minnesota School of Dentistry, Minneapolis, MN.

Dr. Robert Timothy, Clinical Assistant Professor, Department of General Dentistry, East Carolina University School of Dental Medicine, Greenville, NC.

2014

Dr. Deeba Kashtwari, Clinical Assistant Professor, Department of Oral & Maxillofacial Diagnostic Sciences, Division of Oral and Maxillofacial Radiology, University of Florida College of Dentistry, Gainesville, FL.

Dr. R. Todd Erickson DDS, MS, Associate professor and Director of Oral and Maxillofacial Radiology, Arizona School of Dentistry & Oral Health, A.T. Still University, Phoenix, AZ.

Dr. Jake Phillips, CAPT DC US Navy, Oral Maxillofacial Radiology, Radiology Department, San Diego, CA.

Dr. Ali Syed, Assistant Professor, Department of Oral and Maxillofacial Medicine and Diagnostic Sciences, Case Western Reserve School of Dental Medicine, Cleveland, OH.

2012

Dr. Martin Evers, LCDR, DC, US Navy. NMCP Physical Dental Operations Officer, NMCP Oral and Maxillofacial Radiology, Portsmouth, VA.

Dr. Heidi Kohltfarber, Assistant Professor, Department of Oral Diagnosis, Radiology and Pathology, Loma Linda University, Loma Linda, CA.

2011

Dr. Angela Broome, Clinical Assistant Professor and Unit Chief Oral and Maxillofacial Radiology, Department of General Dentistry, East Carolina University School of Dental Medicine, Greenville, NC.

Dr. Jeffrey B. Price, Associate Professor and Director of Oral and Maxillofacial Radiology, University of Maryland School of Dentistry, Baltimore, MD.

2010

Dr. Abeer Alhadidi, Assistant Professor, Department of Oral and Maxillofacial Surgery, Oral Medicine and Periodontology, University of Jordan Faculty of Dentistry, of Oral and Maxillofacial Radiology, Amman, Jordan.

Of the graduate students listed above, all are Board certified with the exception of the class of 2015 and Dr. Erickson of the class of 2014, who will be taking Part 2 of the certifying examination in the fall of 2015. Drs. Gray (class of 2016), Gaalaas (class of 2015) and Price (class of 2011) have been active in the American Academy of Oral and Maxillofacial Radiology by providing leadership for the AAOMR student organization.

E. Leadership and Support

See General Leadership and Support overview

1. Administrative Support

The administrative support for the program is adequate. Support for the oral and maxillofacial radiology graduate program is multilayered. The School of Dentistry provides support through the Office of the Assistant Dean for Advanced Education/Graduate studies. The Diagnostic Sciences Department provides the program with program manager support. This is not a full-time position but rather is part of the responsibilities of the department manager. The department also provides some secretarial assistance. The School of Dentistry's Office of Computing and Information systems provides the computer networking and technical support necessary to support the teaching and research activities of the program. The above support is through state supported sources. Finally, the Dental Faculty Practice Radiology Group provides some means of support through the purchase of computers, research equipment for funding thesis work as well as funds for graduate students to travel to meetings. The latter represent non-state funds generated by radiology faculty members through private practice in the school's intramural practice.

2. Facilities

The school and departmental physical facilities and space for teaching, and research administration are adequate. The addition of a dedicated radiology research space would be helpful. However, most radiological research can be conducted in the radiology clinic or in offices of the graduate students and or faculty. Instructional and research administrative equipment also is quite adequate. This includes equipment provided throughout the University and the School of Dentistry.

F. The Future

Program Size

The UNC Oral and Maxillofacial Radiology program is allowed to accept up to three students per year. Normally, the program accepts two students each year unless there are three outstanding candidates. The full-time complement of radiology faculty is four. There is a fifth faculty member who has minimal involvement with the graduate program. There are five full-time radiological technologists and 6-8 graduate students at any one point in time. The number of faculty and staff associated with the Oral and Maxillofacial Radiology program will most likely experience a slight increase or at least remain stable in the next five to ten years. This prediction is based on the demand for radiology education to dental students, graduate students and the dental community as a whole. OMR is one of the fastest growing specialties in dentistry. The growth is driven by the development of novel technologies that cut across all specialties. The demand for Interpretation services from intramural and extramural referral sources has been increasing steadily in the last five years. The demand has been so high that the existing radiologists at our institution are challenged to keep up with the intramural demand. As a result, it was necessary to redirect extramural referrals to a private OMR practice. In addition, technical imaging services provided by radiologic technologists will continue to be in demand as more intricate imaging devices become available in OMR. Finally, the number of graduate students will likely reach a limit of three per year since the number of graduate programs in OMR is increasing each year. It is predicted that OMR programs will compete for graduate students, but UNC will continue to be one of the most coveted programs as long as the strength of the OMR division is maintained along with the strengths of the School of Dentistry as a whole. The greatest challenge with respect to the program's ability to recruit high quality candidates is increased competition from programs that offer substantial larger stipends, in particular from those that receive graduate medical education (GME) funds.

Resources

The addition of a dedicated imaging research laboratory would enhance the growth of the program. Currently, our faculty and graduate students who need imaging equipment for research purposes are forced to work after hours so as not to interfere with patient care. Working after hours is not only inconvenient, but often requires resetting equipment, which can be time consuming and a detriment to research that requires longitudinal data collection. While the OMR program is supported by faculty from the Neuroradiology section of the Department of Radiology, access to patients with advanced medical imaging studies remains limited. As the demand for advanced image interpretation skills from oral and maxillofacial radiologists continues to evolve, resources need to be available to further integrate the program with the neuroradiology section.

Curricular Changes

We are planning no new curricular changes of significance over the next five years. The radiology faculty continually monitors the curriculum to ensure that it contains the latest technical, scientific and clinical information. Important curricular changes happen as a result of the introduction of new technologies and new approaches to diagnosis. The OMR program updates its curriculum on a regular basis to reflect state of the art technologies and applications of those technologies. An example is the change that took place when digital acquisition technology was introduced. The curriculum was changed to deemphasize film and chemical processing and these topics were replaced by material related to digital receptors, scanning techniques and means to ensure the quality of digital images.

As stated in the Program Overview, knowledge of and experience in the use of advanced medical imaging modalities, including MDCT, MRI, Ultrasound and Nuclear medicine, will likely become more important in the next five to ten years. Further integration of the program with medical radiology divisions can be accomplished through cross-appointment of faculty, increasing the number of hospital rotations and providing access to hospital patient databases.

Quality Improvement of Graduate Education

The program is of high quality as indicated by the board certification pass rate of our graduate students and the fact that almost all of our graduate students are the first choice when applying for academic positions. A short-term enhancement of the quality of the program would be the implementation of a web-based teaching file for improved case accessibility as well as accountability. More challenging CBCT, MDCT and MRI cases for our residents would also bring improvement. We are currently seeking new sources for such cases from the hospital and several CBCT private practice reading services. As stated previously, the quality of graduate education in OMR can be improved by providing students with more hospital experiences in Computed Tomography (CT) and Magnetic Resonance Imaging (MRI), Ultrasound and Nuclear Medicine. Being the only program in the state, the short-term solution would be to provide external rotations to our residents in these areas and the long-term solution would be to revisit our agreement with UNC Department of Radiology in an effort to come to an agreement that will benefit both parties and increase the educational experiences of our graduate students. Acquiring GME funding through increased hospital involvement would improve the educational experience as well as ensure a healthy applicant pool for the short and long term. There are no other programs in the state or region and eight total programs in the US with one in Canada.

Student Qualifications

Offering GME funding would be the most effective means of assuring a larger high-quality applicant pool. Continuing to offer highly innovative research in collaboration with the Department of Physics and Astronomy as well as the Department of Computer Science is one way we have been able to attract highly qualified applicants. Our plan is to continue to excel in teaching, research and clinical services, and to provide the best facilities and resources where students can flourish. An important resource is our faculty members who are nationally and internationally known researchers whose academic publications have

contributed to the advancement of OMR. Many of our students have come to our program specifically to study under our faculty whom they have met at professional meetings or come to know through their scholarly work. It is of vital importance to the program that this reputation is maintained and strengthened. In recent years, the ability to maintain and develop scholarly activities has been more challenging as a result of increased clinical demands, administrative responsibilities and regulations.

Racial, ethnic, and gender diversity in the graduate program

Historically, our graduate program has been racially, ethnically and gender diverse without specific programs to enhance diversity. We plan to continue to follow the rules and guidelines of the University and to offer OMR applicants the same admissions and educational opportunities regardless of sex, race, ethnicity or creed. Low stipend money may be a problem in the future to attract a diverse applicant pool.

Quality of mentoring

The SoD already has in place an active and effective mentoring program for junior faculty. Each graduate student is assigned a mentor upon arrival in the program usually connected to a research project. The quality of the mentoring in the program can be improved by making sure that students have the “right” mentors who are readily available to students when needed. The university could offer a yearly workshop to potential mentors to emphasize the responsibility that comes when agreeing to mentor students. Guidelines could be developed to help all mentors navigate the course of mentoring and standardize the mentoring process.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
PEDIATRIC DENTISTRY



Graduate School Review Site Visit
September 8-10, 2015



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PEDIATRIC DENTISTRY

A. Program Overview

1. Program's Mission, Goals, and Objectives

The mission of the Department of Pediatric Dentistry is to improve the oral health care of infants and children through adolescence, including those with special health care needs. We seek to achieve this through service, education and research. This mission is accomplished by providing excellence in oral health education and service for patients, care-givers, dentists and primary care providers and by engaging in research directed at advancing our knowledge of oral health. Our programs are focused on the provision of outstanding educational experiences to develop clinically competent dentists, oral health care advocates and dental leaders who will address the oral health issues of children. The goal of this program is to train dental specialists as clinician investigators who can (1) diagnose and provide treatment for the common and unusual oral health problems that occur during infancy, childhood and adolescence and (2) identify and solve oral-related problems through research and teaching.

This graduate program and clinic residency program is a 36-month educational experience that is structured to meet or exceed the Accreditation Standards of the Commission of Dental Accreditation. This program provides an opportunity to participate in interdisciplinary working relationships with other members of the health care team, including hospital-based pediatric care.

We embrace the American Dental Association's definition of the specialty: *Pediatric Dentistry is the practice and teaching of comprehensive preventive and therapeutic oral health care **for children from birth through adolescence**. The specialty shall be construed to include care for special patients beyond the age of adolescence who demonstrate mental, physical and/or emotional problems. (Adopted October, 1995).*

At completion of the pediatric dentistry graduate program, the graduate will possess the following qualifications:

1. Knowledge of the etiologies of oral diseases and skills to provide comprehensive oral health care for the pediatric population.
2. Knowledge and skills to educate and motivate children and their parents and caregivers to achieve and maintain optimum oral health.
3. Knowledge and skills to diagnose and plan appropriate therapy in an organized and understandable manner.
4. Knowledge and skills to understand child development and identify variations in physical, psychological and social maturation of children.
5. Knowledge and skills to diagnose and manage disease or trauma of soft, hard and pulp tissues in primary and young permanent teeth.
6. Knowledge and skills in materials science and restorative dental procedures required for children.
7. Knowledge and skills to recognize and guide normal growth and development of the craniofacial complex and treat developmental abnormalities when appropriate.
8. Knowledge and skills in the management of oral medicine, oral pathology and oral surgery in children.
9. Knowledge and skills to manage the oral health care for children with special health care needs, such as emotionally, mentally or physically disabled children.

10. Knowledge and skills to manage oral health care for medically compromised patients.
11. Knowledge and skills to educate and guide the behavior of children and their parents in learning to accept the dental treatment experience (non-pharmacologic behavior management).
12. Knowledge and skills to manage pharmacotherapeutic agents for control of pain, apprehension and behavior in conscious children.
13. Knowledge and skills to function as a member of an interdisciplinary health care team in both outpatient and hospital environments.
14. Knowledge and skills to manage comprehensive oral health care for children under general anesthesia.
15. Knowledge and experience in communicating and cooperating with other health and childcare professionals and laypersons to improve the overall health of children in the community.
16. Knowledge and skills to solve problems relying upon critical thinking and evidence-based decision making.
17. Knowledge and skills required to manage medical emergencies that may occur during dental care in the hospital or office environment.
18. Knowledge and skills to manage a contemporary pediatric dental practice.
19. Knowledge and application of the scientific method, of research design, an understanding of statistics and an appreciation for these disciplines as applied to problem-solving.
20. Ability to critically evaluate the scientific literature.
21. Ability to communicate and teach in a clinical setting.
22. Knowledge and ability to organize and deliver scientific presentations and educational lectures.
23. Knowledge of community, regional and national issues that impact the overall health of children and the knowledge and skill to assume a role of leadership in the advocacy of such issues.
24. The curriculum will facilitate preparation for, and the faculty will encourage completion of, certification by the American Board of Pediatric Dentistry.

(Revised 8/14)

All objectives are reviewed and updated at annual intervals.

Mechanisms for Assessing Program Mission

See General Program Overview.

2. Demand/Need for Program

NC is the 10th largest state with a population of 8,407,248 with children comprising a large proportion of the population.¹ Children under 18 make-up 25% of the overall population and 7% (national average—6.8%) of the children are under the age of 5.¹ Race is a variable impacting health care access in NC.² There are wide gaps between Caucasians and minorities in NC on almost every indicator of health, including oral health.¹ There is approximately 30% minority representation across the state, with 22% being African American (national average—12.8%), 6.0% of Hispanic or Latino origin, 1.2% Native American and 1.4% Asian.¹ Of particular importance is that NC has experienced the fastest rate of growth in the country in its Hispanic population over the past two years, with the majority being Mexicans or Mexican-Americans who come to the state for agricultural work. The impact of this latter population on the organization and delivery of health care services varies across the state, but is profound, with access to care generally being slow or not provided in an adequate fashion. Poverty is a major social problem and leading barrier to health care access in NC with oral health care being most acute in this region.² In 2004, the most recent year for which data are available, per capita income in NC was \$29,322, giving the state a national ranking of 38th, among the lowest in the Region.¹ Only 14 states have a higher poverty level than NC.¹ Over the next decade poverty is expected to contribute to major disparities in oral health in this state and region.² The rural nature of NC adds to the problem of health care access.

The Region is more rural than the U.S. in general and the state of NC has over 32% of its citizens living in non-metropolitan areas, ranking 32nd of the 50 states in this category.¹ The National Survey of Children with Special Health Care Needs (CSHCN) identified approximately 280,771 children with special health care needs in NC. This rate of 14% is higher than the national average of 12%. The national survey noted that about 22% of CSHCN in NC had conditions that affected their daily activities to a significant extent (e.g. school absences). Over 18% of the children were reported to have been without health insurance sometime in the past year and another 35% reportedly had insurance that was not adequate to address their developmental needs. Nearly 15% continue to be without a personal doctor or other health care provider, and another 9% depend on an Emergency Department for their primary care services. Perhaps most alarmingly, nearly 20% experienced problems getting a referral for their targeted service needs and nearly 30% were without family-centered care. To summarize: Race, poverty, geography and children's special health needs are factors that conspire to make NC children less healthy than those in other states.

“You're not healthy unless you have good oral health” (C. Everett Koop, US Surgeon General 1981-89). Dental caries is the most prevalent oral disease among US children.³ Although national surveys conducted during the past three decades show a decline in the overall prevalence of dental caries in the US, it remains a serious problem for children.³ Fewer than 10% of the children nationwide under age six have made a preventive dental visit.⁴ The prevalence of untreated caries in children two to five living in poverty is close to 80% and is not declining as it is for older children.⁵ The estimated dental bill to restore children's decayed teeth exceeds two billion dollars in the US making it one of the single most uncontrolled diseases of children.⁵ Oral health is considered by the public⁶ and directors of Head Start programs⁷ and social services agencies⁸ as the #1 unmet health care need among children in NC and this region. More than one-third of NC's children have experienced dental decay before age five.² Every year over 25% (over 40,000) of the state's children begin kindergarten having experienced dental caries.⁸ Children under five years of age with severe caries are seldom treated by a general dentist.⁹ With few exceptions, pediatric dentists must treat these children. The dental workforce in the state is insufficient to meet the need for care. In 2004, there were 3,628 licensed, active dentists in the state.¹ This represents a dentist-to-population ratio of 4.2 dentists per 10,000 population—a rate that is well below the national average of 5.7 dentists per 10,000 population. Only eight counties have a dentist-to-population ratio equal to or greater than the national average. Seventy-nine of 100 counties qualify as federally-designated dental health professional shortage areas. The dentist-to-population ratio has remained flat since 1987, consistently 40% to 50% lower than the national ratio. NC has one of the lowest pediatric dentist-to-populations ratios in the country and the problem is likely to be exacerbated because a large number of pediatric dentists will retire in the next decade.² Pediatric dentists have been shown to provide more comprehensive dental care to young children than general dentists.¹⁰ Historically, NC pediatric dentists are four times more likely to participate in Medicaid¹¹ and care for a greater proportion of Medicaid patients relative to their absolute supply than do general dentists.¹⁰ Table 1 summarizes the state's ranking among the 50 states in selected health workforce disciplines, underscoring NC's need for pediatric dentists.

Table 1. NC National Rankings for Selected Health Care Professionals

Health Profession	Rank	Health Profession	Rank
Physician	30	Physical Therapy	44
Nursing	35	Special Education	41
Psychology	22	Nutrition	22
Audiology	30	Social Work	25
Speech/Language	30	Pediatric Dentistry	45
Occupational Therapy	39	Psychiatry	20

(U.S. Department of Health and Human Services, 2000)

There are several well-documented challenges that make it difficult to meet the oral health needs of children in this state and region. These include socio-demographic characteristics, inadequate access to care, oral disease prevalence and a shortage in dental workforce, especially pediatric providers.

The UNC graduate program in Pediatric Dentistry is one of 87 such programs in the country and the only three year program that requires a master's degree. We have accepted 3 students per year for the last three years. Being the only three year program, we are able to appeal to and recruit students looking for longer term training with the goal of becoming leaders and future academicians in pediatric dentistry. In addition to the clinical training, our students receive rigorous training in the scientific basis for the practice of pediatric dentistry. Our numbers of applicants have steadily increased in the last 5 years with an estimated 70 applicants for the 3 student acceptances.

There are several unique aspects to the UNC Department of Pediatric Dentistry that attracts students:

1) Quality and number of faculty. UNC has one of the largest number of faculty for a department of pediatric dentistry allowing one on one mentorship of our graduate students, 2) Interdisciplinary activities and close ties with the UNC Schools of Public Health and Medicine, 3) Diverse research areas and availability of mentors and 4) High achieving students who continue to garner national and international awards.

3. Interdisciplinary Activities

The Department's close association with several programs serving children with special health care needs is a valuable source of interdisciplinary educational experiences. These include the UNC-CH Clinical Center for the Study of Development and Learning (CDL), our University-affiliated LEND Program (Leadership Education in Neurodevelopmental Disorders at the Carolina Institute for Developmental Disabilities) and the Division of Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH), a program serving autistic people. Dr. Milano is our faculty liaison to LEND for whom he provides consultation and acts as resource for referral of patients to our school-based clinics as needed.

The dental school-based UNC Craniofacial Center provides many patients with extensive services related to craniofacial malformations. The Craniofacial Center is supported by NIH and the State's Children's Special Health Services. It provides a team approach to the treatment for cleft lip and palate along with associated morbidity.

The Baby Oral Health Program (BOHP) alternates between three sites, our school-based clinic, the UNC Children's Hospital Continuity Care Clinic and the Lincoln Community Health Center. The latter two

sites are based in pediatric medicine clinical arenas, providing superb collaborative training grounds for dentistry and medicine and the residents and attending faculty in these clinical sites. One of our goals in BOHP is to ensure the inclusion of Bright Futures in Practice: Oral Health and to serve as mentors for pediatric residents/attending faculty in their clinical training in infant oral health.

The UNC Hospital's dental clinic and operating room suites are the sites of interdisciplinary medical and dental care for CSHCN. Our trainees obtain extensive experiences in caring for a diverse population of medically compromised children and children that require the use of a general anesthetic. Each resident treats (as the primary operator) approximately 90 cases with the aid of general anesthesia.

The Durham County Health Department is a community-based, family-centered comprehensive health care facility in a large county health department in an inner-city location. Most of the patients come from poor or immigrant families with low socioeconomic status, including those on School Health Funds. A pediatric dental program has been in place for over 30 years. This program has a mobile dental van and program for Expectant Mothers/New Babies. Our trainees provide care for a day per week for four months in the setting.

The Gateway Education Center (GEC) is a community-based program in Greensboro, NC serving patients with significant developmental disabilities including cerebral palsy and autism. Our trainees provide care for these patients at the GEC.

The Cherokee Indian Hospital is a remote site on the Cherokee Indian Reservation in the foothills of the Smokey Mountains, we have conducted a summer program in a modern, state-of-the-art equipped hospital-based clinic since 1982. These young Native American child patients have high levels of dental disease.

4. Interinstitutional Perspective

UNC's graduate program in pediatric dentistry is the only one in the state of North Carolina. We compete nationally for the best candidates. Our current first year class is made up of three residents: one from the University of North Carolina, one from the Ohio State University and one from the University of Michigan. All were recruited by many other institutions. The latter two were among the top of their dental school class and were recruited by their home institutions for their training in pediatric dentistry.

Our students compete and garner many national research awards. For example, The Healthy Smiles, Healthy Children (foundation organization of the American Academy of Pediatric Dentistry) sponsors a national research competition and selects three pediatric dentistry postdoctoral students/residents each year to receive a yearlong research fellowship. The AAPD Committee on Scientific Affairs selects the recipients on a competitive basis from eligible submissions. Since the start of this competition in 1999 to 2012, UNC pediatric dentistry graduate students has been selected as recipient of this award, sometimes receiving 2 or 3 of the awards. More recently, two of the second year graduate students competed in a national research poster competition with nearly 400 entrants from all of the major programs and received the first and third place awards.

Although, we have been successful in recruiting the best candidates, we do have some challenges. Compared to our counterparts at the University of Michigan, University of Washington and the Ohio State University, we are the only ones that do not provide support for tuition and tuition remission. We also currently provide a stipend level of \$30,000. This is \$15,000 lower than the national average for stipends for graduate students in pediatric dentistry.

B. Curriculum

1. Course Review and Development

The current 36-month degree program prepares trainees for a career in clinical practice, academics, administration, leadership, research, public health administration and patient care. Students can combine pediatric dentistry with other educational programs in the basic sciences, social sciences, public health or allied health professions, leading to a MS/MPH/or PhD degree. Emphasis is placed on a broad-based educational experience aimed at developing analytical skills that include clinical, hospital, didactic, research opportunities and leadership training. All students are prepared for the specialty certification examination of the American Board of Pediatric Dentistry.

The courses are reviewed in the context of the Alumni Survey results (every five years) and annual review of annual program exit surveys (annually within 6 month of completion of the program). Additionally, students conduct an item by items analysis of the courses every 2-3 years and the results are discussed at a special department retreat by faculty and students.

2. Course Sequence and Description

SUMMER

1st Year

DENG 799 Orientation for Clinical & Research Program

FALL

1st Year Title

DENG 701 Introduction to Research Design

ORTH 801 Orthodontic Technique

ORTH 803 Orthodontic Diagnosis

ORTH 806 Science of Tooth Movement

ORTH 809 Preventive Orthodontics

PEDO 800 Maternal and Child Health Seminar Series

PEDO 801 Pediatric Diagnosis and Treatment Planning Seminar

PEDO 803 Principles of Pediatric Dentistry

PEDO 804 Advanced Clinical Pediatric Dentistry

PEDO 806 Treatment of Pediatric Dental Emergencies

2nd Year

DENG 703 Applied Dental Research

ORTH 809 Preventative Orthodontics

PEDO 800 Maternal and Child Health Seminar Series

PEDO 801 Pediatric Diagnosis and Treatment Planning Seminar

PEDO 803 Principles of Pediatric Dentistry

PEDO 804 Advanced Clinical Pediatric Dentistry

PEDO 806 Treatment of Pediatric Dental Emergencies

3rd Year

PEDO 993 Master's Research and Thesis

SPRING

1st Year

DENG 702 Biostatistics

DENG 751 Advanced Pain & Anxiety Control

ORTH 808 Growth & Development

ORTH 809 Preventative Orthodontics
ORTH 810 Multidisciplinary Management of Craniofacial Anomalies
PEDO 800 Maternal and Child Health Seminar Series
PEDO 801 Pediatric Diagnosis and Treatment Planning Seminar
PEDO 803 Principles of Pediatric Dentistry
PEDO 804 Advanced Clinical Pediatric Dentistry
PEDO 805 Contemporary Practice Management
PEDO 806 Treatment of Pediatric Dental Emergencies

2nd Year

ORTH 809 Preventative Orthodontics
PEDO 800 Maternal and Child Health Seminar Series
PEDO 801 Pediatric Diagnosis and Treatment Planning Seminar
PEDO 803 Principles of Pediatric Dentistry
PEDO 804 Advanced Clinical Pediatric Dentistry
PEDO 805 Contemporary Practice Management
PEDO 806 Treatment of Pediatric Dental Emergencies

3rd Year

PEDO 993 Master's Research and Thesis

Enrollment in program courses has been stable over the last 5 years. The graduate program enrolls 3 students per year totally 9 students. Third year students are enrolled in the Master's thesis course, thus leaving 3-6 students who are enrolled in the other course offerings. Course syllabi will be available on site.

PEDO 800 - MCH SEMINARS

(1Credit) Fall and Spring Semester 1st, 2nd, and 3rd Yrs

Course Director: Dr. Mike Milano.

This is a seminar series that examines a broad range of issues related to the health of mothers and children including pediatric dentistry, pediatric medical issues, practice management, social issues and child advocacy.

PEDO 801 - PEDIATRIC DIAGNOSIS AND TREATMENT PLANNING SEMINAR

(1 Credit) Fall and Spring Semester 1st, 2nd, and 3rd Yrs

Course Director: Dr Tim Wright.

This course is a seminar wherein diagnosis and treatment planning options are considered through a problem-oriented approach. For each case, treatment planning objectives are derived by consensus. Clinical outcomes are assessed for in-progress and completed cases.

PEDO 803 - PRINCIPLES OF PEDIATRIC DENTISTRY

(1 Credit) Fall and Spring Semester 1st and 2nd Yrs

Course Director: Dr Kimon Divarus.

This seminar course covers the fundamentals of pediatric dentistry, with emphasis on the scientific basis of clinical routines. The course relies on readings of classic and contemporary literature with seminars that involve discussions and critiques of readings. The course prepares the student for the Comprehensive Written Examination of the ABPD and provides experience in critical analysis of research design and data.

PEDO 804 - ADVANCED CLINICAL PEDIATRIC

(8 Credits) Fall and Spring Semester 1st and 2nd Yrs

Course Director: Dr Jessica Lee

This clinical course provides experience in all phases of pediatric dentistry, including dental treatment under conscious sedation and general anesthesia. Cases embrace all phases of treatment and the clinical application of didactic material presented in other courses.

PEDO 805 - CONTEMPORARY PRACTICE MANAGEMENT

(1 Credit) Spring Semester 2nd Yrs

Course Director: Dr Mike Roberts

This course provides residents with an understanding of design, implementation and management of a modern pediatric dental practice. Most seminar leaders are guest speakers, many of whom are private practitioners who are Adjunct Faculty in the Department.

PEDO 806 - TREATMENT OF PEDIATRIC DENTAL EMERGENCIES

(1 Credit) Fall and Spring Semester 1st, 2nd, and 3rd Yrs

Course Director: Dr Jessica Lee

This seminar series serves as a faculty/resident forum for reviewing recent emergency cases and a critique of the care provided. Discussions focus on case reviews for the management of dental pain, infection and trauma (including child abuse). Endodontic faculty and residents participate in this seminar series.

PEDO 993 - MASTER'S THESIS

(3 Credits) Fall and Spring Semester 3rd Yr

Course Director: Research mentor and thesis committee members.

ORTHO 809 - PREVENTIVE ORTHODONTICS

(3 Credits) Fall and Spring Semester 1st, 2nd, and 3rd Yrs

Course Director: Dr Lorne Koroluk

This course provides an opportunity for students to learn and demonstrate a thorough orthodontic diagnosis and establish realistic treatment objectives, considering all aspects of the patient's treatment needs. Clinical experience is provided in treating limited orthodontic malocclusions seen commonly by pediatric dentists.

OMSU 751 - ADVANCED APPROACHES TO PAIN AND ANXIETY CONTROL

(1 Credit) Spring Semester 1st Yrs

Course Director: Dr Mike Roberts

Roberts and Anesthesiology Staff. This course is a 1.5/hour week seminar led by faculty directing the residents in didactic and applied studies of basic acute pain and anxiety control sciences, physiological monitoring and physical evaluation for pharmacologic patient management. Introduction to general anesthesia is included.

ORTHO 810- ORAL-FACIAL COMMUNICATIVE DISORDERS

(1 Credit) Spring Semester 1st Yrs

Course Director: Dr Lorne Koroluk.

This course provides an overview of a multi-discipline approach to the clinical management of children with oral, facial and communicative disorders.

PEDO 993 – MS Thesis

(3 Credits) Fall and Spring Semesters 3rd Yrs

3. Course Evaluation

See General Curriculum Overview. The courses are reviewed at the end of each year in the context of the faculty evaluations. This process is led by the Chief Resident (student representative). All students have input into this process and the results are presented to the Chair of the Department of Pediatric Dentistry. The Chair then meets with the Chief Residents and collects and discusses comments. The final results are discussed with the faculty member during the end of the year evaluations with the Chair. Additionally, the courses are also evaluated in the context of the Alumni Survey results (every five years) and annual review of annual program exit surveys (annually within 6 months of completion of the program). Additionally, students conduct an item by items analysis of the courses every 2-3 years and the results are discussed at a special department retreat by faculty and students.

4. Requirements for Degree

See General Curriculum Overview. In order to assist students to meet the requirements for the MS degree, students are expected to follow the department's internal research timeline (available on site).

The PEDO 803 Principles of Pediatric Dentistry course is a literature review seminar that covers the fundamentals of pediatric dentistry and related disciplines. This seminar meets for three hours every other week for two years. At the end of years one and two, students take comprehensive written and oral examinations based on the course content. For the written exam, residents must achieve a minimum score of 75% on each subject area of the exam.

The oral examination is graded on a pass/fail system. Residents must successfully pass the oral exam to pass the PED DENT 803 course and be promoted to the next year of study. The oral exam is administered by a pair of faculty and consists of four clinical vignettes that will be presented to the resident for discussion. Each vignette is 15 minutes in duration. Questions and acceptable answers are developed by the faculty for each vignette. Faculty utilize 'open-ended' questions to obtain information on the resident's thought process, clinical decision making, knowledge and skills. Residents are expected to give evidenced-based answers and occasionally cite references to support rationale. The exam is graded using the following criteria: 1) Information gathering and diagnosis, 2) Treatment plan and management, and 3) Treatment variation and complications.

Each category is graded on a 4-point scale:

- 4=Demonstrates in depth management and knowledge of this case
- 3=Demonstrates appropriate management and knowledge of this case
- 2=Demonstrates less than appropriate management and knowledge
- 1=Demonstrates wrong and inappropriate management and knowledge.

Each faculty member independently scores each category for each vignette. Faculty do not discuss scores or come to a consensus. Results are discussed at the spring Academic Performance Committee meeting.

Failure to pass either of the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program

5. Evaluation of Progress of Students

See General Curriculum Overview. The Pediatric Dentistry Academic Performance Committee meets at the end of Fall and Spring semesters to discuss the progress of each graduate student and consists of all Full Time Faculty. The program director meets one on one with each graduate student twice a year to provide feedback from the APC and student evaluations and to set goals for the following semester.

The assessment tool used by full-time faculty to evaluate graduate students is provided below:
5=Excellent, 4=Working above appropriate level, 3=Working at appropriate level;
2=Working below appropriate level; 1=Poor; n/a= not applicable

Resident Name:

Evaluation Period:

PROFESSIONAL AND PERSONAL

Punctuality

Preparation for Assignment

Respect for the Views of Others

Works Well as a Team Member

Solicits Consultations and Advice when Appropriate

Works Independently at Appropriate Level

Accepts Constructive Criticism and Suggestions in a Positive Manner

Reliable in Fulfilling Assignments

Respects the Facilities, Equipment and Supplies

Respects Institutional Policies

Demonstrated Leadership Skills

Demonstrates Ethical Conduct in Professional and Personal Activities

COMMENTS:

CLINICAL (PED 804 Advanced Clinical Pediatric Dentistry)

Treatment Plans are Current

Records Complete and Legible Including Histories

Patient Records are Current

Ability to Make Diagnoses/Conclusions Correctly

Planning and Preparation for Clinical Procedures

Adherence to Universal Precaution Standards

Correct Use of Instruments

Correct Use of Assistants

Time Utilized Appropriately

Clinical Competence

Interest in Patients Well Being

Patient Management

Communication with Patients and Parents

Demonstrates Ethical Conduct in Clinical Activities

COMMENTS:

DIDACTIC ACTIVITIES

Preparation

Contribution in Class

Understanding of Theories and Principles

Demonstrates Appropriate Level of Problem Solving

Writing Skills

Presentation Skills

Demonstrates Ethical Conduct in Didactic Activities

COMMENTS:

Relevant COURSE ACTIVITIES

Resident is ready to be advanced to a position of higher responsibility

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015

Curriculum

Assessment: Compare UNC results to national results on American Academy of Pediatric Dentistry (AAPD) In-Service national examination

Frequency: Taken twice by students: Within one month of entering the program and within 3 months of completing the program

Outcome: Class of 2013: all 3 scored above national average. Class of 2014: 2 scored above and 1 below

Action: Efforts will continue to focus on the Case-Based domain of the exam. All 3rd year students to participate in the Department's Diagnosis and Treatment Planning Seminar Series as one way of helping them further refine their case-based knowledge and skill.

Assessment: Annual program exit survey

Frequency: Within 12 months of program completion

Outcome: Response rate excellent: 2012, 66%; 2013/2014, 100%

Action: In 2013, sedation clinic was moved to the mornings as a result of survey feedback

Assessment: Alumni survey

Frequency: Every 5 years

Outcome: Response rate acceptable: Most recent survey sent Feb 2015 to 2010-2014 cohorts

Action: Items from previous survey implemented. Most recent survey results will be summarized and discussed Fall 2015

Patient Care

Assessment: Periodic Record Audit/Reviews

Frequency: Bi-yearly w/discussion results during a full faculty meeting

Outcome: The last bi-yearly Record Audit was completed in January 2014. Opportunities for improvement were reviewed and discussed and implemented during our New Resident Orientation.

Action: Record reviews will continue in the context of daily clinical care and through the Diagnosis and Treatment Planning Seminar Series (PED DEN 801). In 2012 a new clinical patient care summary form was implemented.

Education Goals

Assessment: Faculty Evaluation of Residents

Frequency: Biannually in December and in June w/discussion of all the students' progress during Academic Performance Committee meeting using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July by Program Director

Outcome: 2012-2014: All students performing at satisfactory or above level.

Action: Continue using the current faculty evaluation as a template. Each resident will be asked to develop 2-3 goals to be completed during following evaluation period. Program director will foster and monitor goals for each resident.

Assessment: Comprehensive written and oral (verbal) examinations. Students must score a minimum of 75% on the written comprehensive exam and pass the oral exam as determined by 2 independent full time faculty members.

Frequency: Twice during the program: end of year 1 and end of year 2

Outcome: 2012 /2013 /2014 100% Pass on both written and oral

Action: None

Assessment: American Board of Pediatric Dentistry (ABPD) Diplomate Status – The Diplomate Process often takes 5-6 years to complete the certification process.

Frequency: ABPD listing checked annually

Outcome: Goal is 75% Diplomate status for the cohort of 2004 and beyond. 70% of 2009-2013 cohorts have Diplomate status. All graduates in 2014 have begun the process. Our board certification rates remain above the national average

Action: None

Research Goals

Assessment: Meets internal departmental timeline for progress; Oral defense of thesis; Thesis submission; Research presentations; Manuscript publications and awards/scholarships

Frequency: Each semester a student is enrolled in PEDO 993. Oral defense of thesis prior to submission of thesis to Graduate School

Outcome: 100% Successful oral defense of thesis as determined by thesis committee; 100% Successful submission of thesis to the Graduate School; ~ 85% Manuscript publication

Action: Research progress of a student enrolled in a 993 course will be evaluated via the Mentor MS Research Performance Report

C. Faculty

Seven full-time faculty members serve as the core faculty for the graduate students (See Table 2). Six are Board-certified in the specialty of Pediatric Dentistry and are Diplomates of the American Board of Pediatric Dentistry; three have PhDs, and another three are trained dually in public health and pediatric dentistry. Bio-sketches for full-time faculty can be found on the flashdrive.

Faculty Joint Appointments

Several faculty in the Department of Pediatric Dentistry hold joint appointments.

Jessica Y. Lee	Jointly appointed as Professor, Department of Health Policy and Management
Eric Everett	Jointly appointed as a Member of the Carolina Center for Genome Sciences, University of North Carolina at Chapel Hill
Rocio Quinonez	Jointly appointed as Adjunct Associate Professor, Department of Pediatrics

1. Research Activities

The Department of Pediatric Dentistry has a well established and long history of conducting research in a wide variety of fields to improve the oral health of children. The department is currently involved in research in the areas of genetics (PIs Wright and Everett), child health services research (PI: Lee), and clinical studies. Current research investigates the molecular control of tooth formation and the identification and characterization of hereditary conditions involving the craniofacial complex. These studies involve human and mouse models. The Department has substantial funding from the National Institute of Dental Research for characterization of the phenotype and genotype of hereditary craniofacial conditions such as cleft palate and amelogenesis imperfecta. The Department is also engaged in investigations to understand environment and genetic interactions of conditions such as fluorosis and determinants of bone density. The department is actively involved in all four major domains of health services research: quality, effectiveness, efficiency and ecology. More specifically current-ongoing studies examine healthcare disparities in oral healthcare delivered to low-income young children, dental health professional shortage areas, and cost effectiveness studies of publicly financed programs.

Faculty, residents, PhD students and dental students are all actively involved in interdisciplinary research projects. More information about the Department of Pediatric Dentistry's diverse research program can be found at ReachNC. ReachNC is a Web portal that enables users to search, browse and find experts and assets within North Carolina higher education and research institutions.

The faculty of the Department of Pediatric Dentistry published 28 manuscripts in peer-reviewed journals and 14 abstracts this past academic year. This is higher than years past. The faculty consistently publish an average of 18 publications per year.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

2. Teaching Distribution

All faculty teach in both the DDS and graduate clinics. Faculty with administrative duties are assigned a day administrative time. Faculty with funded research are also assigned research time to reflect their funding level. All faculty are assigned scholarship time. The Chair makes clinical and didactic teaching assignments depending on the needs of both the faculty and the department.

3. Teaching Evaluation

Faculty and courses are evaluated annually. Each item is rated on the following scale: 1 (Inadequate); 2 (Adequate); 3(Good); 4(Excellent); 5 (Special Merit); NA (Not applicable)

FACULTY EVALUATION Department of Pediatric Dentistry, UNC Period covered: Faculty Member:
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Rating

PROFESSIONAL AND PERSONAL

- Respects the views of others
- Works well with residents and other faculty members
- Accepts suggestions in a positive manner
- Gives specific directions to residents in terms of duties, projects, deadlines, etc.
- Provides guidance in a tactful manner
- Fulfills commitments reliably
- Respects the facilities, equipment and supplies

Respects institutional policies
Remains accessible to residents during office hours

CLINICAL

Arrives to clinic punctually
Remains readily accessible during clinic coverage time
Allows resident to work independently, when appropriate
Assists resident with unfamiliar procedures, when requested
Teaches clinical techniques consistent with department policy
Encourages efficient utilization of support staff
Adheres to standards for universal precautions
Maintains interest in patient well-being
Treats patients with appropriate kindness and compassion
Communicates clearly with residents
Communicates clearly with patients and parents

DIDACTIC ACTIVITIES

Prepares well for seminars and lectures
Presents relevant and current material
Lectures in a clear and concise manner
Uses audiovisual material appropriately
Discusses alternate theories, principles and treatment options
Allows adequate time for class preparation (promptly distributes reading lists, handouts, assignments, etc.)
Encourages open but focused discussions
Overall contribution to resident education

Comments

Each graduate student completes an exit survey 3-4 months following completion of the program. The contents of the survey include questions for each course /clinical experience/ rotation/ and the research experience. Survey available on site. The faculty discuss the results of the exit survey at the December/January Department retreat. Programmatic and course changes are made as needed.

4. Teaching Innovation

Wide-spread professional engagement in early oral health care is dependent on a capable and competent workforce that is well trained and willing to address the needs of the preschool population. In North Carolina and beyond, general dentists are key players in this arena! To address this issue, our School of Dentistry added a new curricular component in 2005—the Baby Infant Oral Health Program (bOHP). The goal of bOHP is to provide a clinical educational setting for DDS students and pediatric dental residents experience hands-on delivery of oral health services for infants and toddlers. In bOHP, DDS Students participate in clinical rotations through in Community Health Centers and County Health Departments, where their child patients are among the highest risk populations. Over the past decade, bOHP has become a critical component of the School's role in addressing the current crisis related to access to care for high-risk children in the state. Beginning in 2012, all senior DDS Students completed the bOHP rotation as one dimension of the pediatric training.

In addition to the educational arena, bOHP serves as a model of care for infant and toddler oral health in the private and public health sectors. In 2008, we introduced the bOHP Kit, a multimedia educational tool kit produced by the School and aimed to enhance and increase new and established practitioners' comfort and competence in providing preventive oral health care to preschool age children. In 2012 we introduced a free open-access website (www.babyoralhealthprogram.org) with the components of the program for greater ease in dental education and clinical practice.

5. Faculty Mentoring / Support

See General Faculty Overview. Part of the role of School of Dentistry faculty development program is to identify faculty who are eligible for campus, national and international awards. Since fall of 2008, several faculty members have been nominated for awards. The results of those nominations are: two junior faculty have received campus research development awards; one faculty member has received a UNC distinguished professorship; and, two faculty received national awards that had never been awarded previously to UNC faculty (ADDR and OKU). Dr Rocio Quinonez received the OKU Craig teaching award for innovations in teaching and Dr Tim Wright the Burton Borgelt Faculty Advisor of the Year Award, International Association of Student Clinicians/ American Dental Association

Faculty take advantage of the many development workshops and other opportunities through local and national venues. Workshops are offered through the School of Dentistry, the UNC campus as well as the American Dental Education Association (ADEA) annual sessions and professional organizations where faculty hold memberships. The department and the Dean's office provide financial support for workshop participation through discretionary funds. In some cases, the Dean provides new faculty financial support for travel to one domestic scholarly/professional development meeting per year for the first two years of employment.

6. Faculty Teaching / Professional Awards (Recognition) for FY 2010-11 thru FY 2014-15

Dr. Kimon Divaris

- 1) Faculty Appreciation Award – Advanced Education Programs, School of Dentistry, UNC-Chapel Hill (2015)
- 2) Holiday Dental Conference Clinical Research Award (2015)
- 3) Reviewer Appreciation Award for Exemplary Service, Journal of Dental Research, International and American Associations for Dental Research (2015)
- 4) Top 20 outstanding reviewer award, MedEdPORTAL Publications, Association of American Medical colleges (2014)
- 5) Reviewer Appreciation Award for Exemplary Service, Journal of Dental Research, International and American Associations for Dental Research (2014)
- 6) Member, Leadership Institute Cohort IV, American Academy of Pediatric Dentistry, The Healthy Smiles, Healthy Children Foundation, Kellogg School of Management. (2013-16)
- 7) Dental Foundation of North Carolina, Class of 1958 Distinguished Service Award. (2013)
- 8) Southeastern Society of Pediatric Dentistry (SSPD) Frank H. Farrington Leadership and Service Award (2013)

Dr. Jessica Lee

- 1) Named one of Chapel Hill Magazine "Top Dentists" (2010-2015)
- 2) American Academy of Pediatric Dentistry Advanced Leadership Institute (University of Pennsylvania Wharton School of Business) (2012) American Academy of Pediatric Dentistry "Pediatric Dentist of the Year" (2011)
- 3) US Presidential Early Career Award for Scientists and Engineers (2010)
- 4) UNC School of Dentistry Distinguished Clinical Research Award (2010)

Dr. Rocio Quinonez

- 1) Society of Teachers of Family Medicine- National Service Award Smiles for Life Oral Health Curriculum (2014)
- 2) Fellow of the American College of Dentists (2013)
- 3) Top Chapel Hill-Durham Area Dentist (2012, 2013)
- 4) Distinguished Mentor Award, UNC School of Dentistry (2011)
- 5) Omicron Kappa Upsilon (OKU) National Dental Honor Society (2010)
- 6) Charles Craig National Teaching Award (2010)

Dr. Mike Roberts

- 1) John C. Brauer Award, UNC Dental Alumni Association Board of Directors (2014)
- 2) Fellow, International College of Dentists (2010)
- 3) Top Dentists – Chapel Hill Area (2007-2010)

Dr. J. Tim Wright

- 1) Fellow American Association for the Advancement of Science (2014)
- 2) Distinguished Scientist Award for Research in Mineralized Tissues, International Association for Dental Research (2014)
- 3) Fellow, International Association of Dentistry (2013)
- 4) Burton Borgelt Faculty Advisor of the Year Award, International Association of Student Clinicians/American Dental Association (2013)

7. Faculty Advising / Mentoring of Students

See General Faculty Overview. Faculty advisors provide one-on-one guidance and support for a graduate student in the areas of personal activities, academic pursuit, research experience and clinical training throughout the resident's educational duration at UNC with the goal of optimizing the graduate student's educational experience and transition to a successful career in the specialty of Pediatric Dentistry. Specific Duties of a faculty advisor include: Provide advice regarding academic pursuits and assist in the student's evaluation process, Assist and guide in the exploration of research opportunities and potential research mentors within the academic community, Help maximize the graduate student's clinical experience within the program by discussing cases, evaluating appropriateness of types and quantity of clinical experiences, and Serve as a counselor or refer the graduate student to appropriate individuals when personal issues arise.

The Chair of the Department of Pediatric Dentistry in consultation with faculty members and the Graduate Program Director make the assignment of a faculty advisor. Each graduate student is assigned an advisor following MATCH day results. Graduate students may request a change in advisor at any time by contacting either the Chair or the Graduate Program Director. In addition, students are expected to follow the internal research department timeline.

**Table 2. Faculty participation in Advising / Mentoring of Completed MS/PhD
and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015**

Faculty	Appointment	MS	MS	PhD	PhD	Non-MS
		# Mentor	# Committee Member	# Mentor	# Committee Member	# Non MS **
Kimon Divaris	Associate Professor	4	7	0	2	3
Eric Everett	Professor	1	4	5	8	13
Jessica Lee	Distinguished Professor	7	9	1	4	7
Michael Milano	Clinical Associate Professor	2	0	0	0	0
Rocio Quinonez	Associate Professor	3	5	0	0	8
Michael Roberts	Clinical Professor	1	5	0	0	4
J. Tim Wright	Distinguished Professor	2	4	3	3	4

** DDS/ Short Term Training/Other UNC degree program

8. Graduate Teaching Assistants

All graduate students in the Department of Pediatric Dentistry serve as graduate teaching assistants. The course assignments and teaching evaluations are provided below.

Pediatric Dentistry Graduate Teaching Assistant Duties and Responsibilities

YEAR 1

Summer Orientation		
Course	Direction	Duties/Goals
3 hour Orientation Session	DDS and Grad Program Director (Drs. Quinonez and Lee)	Provide an overview of teaching experiences and responsibilities throughout the program Examine teaching approaches and philosophies.

Fall Semester		
Course	Direction	Duties/Goals
DENT 324 Growth and Development: ADVANCED PEDIATRIC DENTISTRY	Dr. Rocio Quinonez and 4 full time faculty members	Review, discuss and lead practical case reviews sessions for DDS 3 students under the instruction of a full time faculty member.
DENT 206 Applied Growth and Development	Dr. Rocio Quinonez and 4 full time faculty members	Provide an introduction to the pediatric dentistry clinic to DDS 2 students. Review, discuss and participate in diagnosis and treatment session for DDS 2 students under the instruction of a full time faculty member.

Spring Semester		
Course	Direction	Duties/Goals
DENT 112 Conservative Operative Dentistry	Dr. Tom McIver (Pediatric Dentistry Section Course Director) and 3 Full Time Faculty	Develop and conduct at least one classroom lecture to DDS 1 students under the guidance of Dr McIver Serve as a group leader for one of 8 small groups in the DENT 112 Conservative Operative Dentistry preclinical lab for 3 sessions.

Summer Semester		
None		

YEAR 2

Fall Semester		
Course	Direction	Duties/Goals
DENT 105 Dental Anatomy	Dr. Kimon Divaris (Pediatric Dentistry Section Course Director)	Develop small interactive session on a specific topic of dental anatomy under the guidance of Dr Divaris Serve as a group leader for one of 3 small groups in the DENT 105 Dental Anatomy preclinical lab for 1 session.
DENT 324 Growth and Development: ADVANCED PEDIATRIC DENTISTRY	Dr. Rocio Quinonez and 4 full time faculty members	Review, discuss and lead practical case reviews sessions for DDS 3 students under the instruction of a full time faculty member.
DENT 206 Applied Growth and Development	Dr. Rocio Quinonez and 4 full time faculty members	Provide an introduction to the pediatric dentistry clinic to DDS 2 students. Review, discuss and participate in diagnosis and treatment session for DDS 2 students under the instruction of a full time faculty member.

Spring Semester		
None		

Summer Semester		
Course	Direction	Duties/Goals
Offsite rotation at Cherokee	Drs. Wright, Quinonez,	Spend one week at the Cherokee Indian

Indian Reservation	Lee, Divaris, Milano Koroluk and McIver	Reservation with a full time faculty member and 6 dental students. Intensive experience to develop skills as a clinical instructor under the direct supervision of a full time faculty for 5 days.
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YEAR 3

Fall Semester		
Course	Direction	Duties/Goals
DENT 105 Dental Anatomy	Dr. Kimon Divaris (Pediatric Dentistry Section Course Director)	Develop small interactive session on a specific topic of dental anatomy under the guidance of Dr Divaris Serve as a group leader for one of 3 small groups in the DENT 105 Dental Anatomy preclinical lab for 1 session.
DENT 324 Growth and Development: ADVANCED PEDIATRIC DENTISTRY	Dr. Rocio Quinonez and 4 full time faculty members	Review, discuss and lead practical case reviews sessions for DDS 3 students under the instruction of a full time faculty member.
DENT 206 Applied Growth and Development	Dr. Rocio Quinonez and 4 full time faculty members	Provide an introduction to the pediatric dentistry clinic to DDS 2 students. Review, discuss and participate in diagnosis and treatment session for DDS 2 students under the instruction of a full time faculty member.
DENT 235(FS) Clinical Pediatric Dentistry, DENT 335(FS) Clinical Pediatric Dentistry, DENT 435(FS) Clinical Pediatric Dentistry	Drs. Wright, Quinonez, Lee, Divaris, Milano Koroluk and McIver	Serve as graduate teaching assistant in clinical pediatric dentistry alongside a full time faculty member.

Spring Semester		
Course	Direction	Duties/Goals
DENT 235(FS) Clinical Pediatric Dentistry, DENT 335(FS) Clinical Pediatric	Drs. Wright, Quinonez, Lee, Divaris, Milano	Serve as graduate teaching assistant in clinical pediatric dentistry alongside a full

Dentistry, DENT 435(FS) Clinical Pediatric Dentistry	Koroluk and McIver	time faculty member.
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Full time faculty or the course director for the course complete the resident teaching evaluation below for the didactic sessions in which GTAs are involved.

Resident Teaching Evaluation

Name:
Date(s):
Topic/Sessions:
Faculty member:

5=Excellent, 4=Working above appropriate level, 3=Working at appropriate level;
2=Working below appropriate level; 1=Poor; n/a= not applicable

	Score
Introduction	
Introduces the topic	
Related importance of material	
Establishes a knowledge base	
States objectives	
Audiovisuals	
Speaks to audience, maintain eye contact	
Appropriately uses audiovisual	
Is familiar with equipment	
Involved students	
Provided reinforcement	
Utilized appropriate questioning tactics	
Provided time for student to think, formulate and respond	
Exhibited enthusiasm	
Verbal and Non Verbal	
Voice control	
Eye contact with audience	

Facial expression	
Other	
Organization	
Logical sequencing	
Appropriate pace	
Knowledge of subject matter	
Comments	

9. Assessment of Program Faculty Strengths and Areas of Concern

The graduate program in Pediatric Dentistry is well supported by a cadre of full-time faculty members that serve as the core faculty for the graduate students. Six are Board-certified in the specialty of Pediatric Dentistry and are Diplomates of the American Board of Pediatric Dentistry; three have PhDs, and another three are trained dually in public health and pediatric dentistry. Bio-sketches for full-time faculty are found the attachments. The major area of concern is the ongoing search for a graduate program director. The incumbent graduate program director has been in this position since January 2012. In July of 2014, she also assumed the role as Chair of the Department. She is carrying out both administrative duties. The search for a program director is ongoing with applicants being interviewed at the end of August, 2015.

D. Students

1. Admission

See General Student Overview. A committee of three faculty members screens all the applications for admission to the graduate program in pediatric dentistry. Thirteen candidates are invited for an interview with all faculty and graduate students. Criteria used for an offer of an interview are academic record, leadership record, letter of recommendation and personal statement. The Pediatric Dentistry program participates in both PASS and MATCH.

2. Academic Environment

See General Student Overview. The Pediatric Dentistry program provides a rich and welcoming environment for students. Each student is assigned a faculty advisor to assist in the transition to graduate school and to provide advice/referral if personal/financial/or academic issues arise during the program. Graduate students are provided with their own desk space in the residents' room and basic technical and office needs are provided by the program. The faculty strive to be approachable by the students and adhere to an open door policy. Students are encouraged and invited to talk with individual faculty members or to all faculty members regarding suggestions, comments, concerns or any other problems.

3. Alumni

a.) Research and Professional Awards Received by Alumni FY 2010-11 thru FY2014-15

Kevin Ricker (2015): Received an MS Research Support Award supported by the Dora Lee and John C. Brauer Dental Research Fund. These competitive grants are awarded to top 25% graduate student proposals.

Chien Sim (2013): Awarded one of three 2012-13 national AAPD 3M ESPE Research Fellowship Awards and presented preliminary results from her research entitled, "Pediatric Dentists Compliance to AAPD Dietary Recommendations" at the AAPD Annual Session on Orlando, Florida.

Maggie Fetner (2014): Awarded one of three 2012-13 national AAPD 3M ESPE Research Fellowship Awards and presented preliminary results from her research entitled, "Health Information Seeking Behaviors among Low income Caregivers" at the AAPD Annual Session on Orlando, Florida.

Allison Cavanaugh (2012): Recipient of the Alpha Gamma Delta Foundation Scholarship Award Resident Liaison to the North Carolina Academy of Pediatric Dentistry

Kerry Dove (2012): Recipient of a 2011-2012 American Academy of Pediatric Dentistry 3M ESPE Preventative Pediatric Dentistry Postdoctoral Research Fellowship (formally the OMNII Pediatric Dentistry Postdoctoral Research Fellowship Award).
Resident Liaison to the North Carolina Academy of Pediatric Dentistry

Travis Hicks (2012): "Strategies for detection and intervention: How to recognize and treat patients with anorexia nervosa and bulimia nervosa in the dental setting." *Dimensional Dental Hygiene*, 2010.
Recipient of a 2011-2012 American Academy of Pediatric Dentistry 3M ESPE Preventative Pediatric Dentistry Postdoctoral Research Fellowship (formally the OMNII Pediatric Dentistry Postdoctoral Research Fellowship Award)

Marshall Long (2012): Recipient of a 2011-2012 American Academy of Pediatric Dentistry 3M ESPE Preventative Pediatric Dentistry Postdoctoral Research Fellowship (formally the OMNII Pediatric Dentistry Postdoctoral Research Fellowship Award)

Kimon Divaris (2011): Recipient of the International Association of Dental Research (IADR) Behavioral, Epidemiologic and Health Services Research Scientific Group (BEHSR) Outstanding Postgraduate Abstract Award.
Recipient of the University of North Carolina Graduate and Professional Student Federation's (GPSF) Travel Award.
Re-appointed as a Consultant to the Committee of Scientific Affairs of the American Academy of Pediatric Dentistry.
Completed the requirements for and was awarded the Graduate Certificate in Global Health
Completed the core requirements for the PhD in Epidemiology and successfully defended his dissertation proposal.

Jina Kang (2011): Recipient of the 2010-11 Ann and G. Randolph Babcock Fellowship
Recipient of the 2011 University of North Carolina School of Dentistry Tuner Research Award.
Recipient of the 2011 Raymond Tseng Research Travel Award.
Completed the requirements for and was awarded her MS degree.
Completed the requirements for and was awarded the Graduate Certificate in Global Health.

Bien Lai (2011): Recipient of a 2010-2011 North Carolina Translational and Clinical Sciences Institute Research Grant.

Recipient of the 2011 Raymond Tseng Research Travel Award.

Completed the requirements for and was awarded her MS degree.

b.) Publications of students (1st or co-author) in FY 2010-11 thru FY 2014-15. Students' names are in bold.

1. **Long CM**, Quinonez RB, Rozier RG, Kranz AM, Lee JY. Barriers to pediatricians' adherence to AAP oral health referral guidelines: North Carolina general dentists' opinions. *Pediatric Dentistry*. 2014;36:250-256.
2. **Swinney F**, Vann WF, Jr, Mihas P, Burgette JH, Ammerman A and Lee JY. Caregivers Perceptions about Discussing Children's Weight: A Pilot Study. *Dentistry Volume 2 : Issue 2 Ref. #: 1000DOJ2110*.
3. **Sanzone LS**, Lee JY, Divaris K, DeWalt DA, Baker AD and Vann WF Jr. A Cross Sectional Study Examining Social Desirability Bias in Caregiver Reporting of Children's Oral Health Behaviors. *BMC Oral Health* 2013, 13:24. DOI: 10.1186/1472-6831-13-24. PMC3680187
4. **Hicks TM**, Lee JY, Nguyen T, La Via M, Roberts MW. Knowledge and practice of eating disorders among a group of adolescent patients. *J Clin Pediatr Dent* 2013;38(1):39-44.
5. **Cherry WR**, Lee JY, Shugars D, White R, and Vann WF Jr. Antibiotic Use for Treating Dental Infections in Children: a Survey of Dentists' Prescribing Practices. *J Am Dent Assoc*. 2012;143:31-38. PMID: 22207664.
6. **Kang J**, Vann WF Jr., Andersen J and Lee JY. The Safety of Sedation for Overweight/Obese Children in the Dental Setting. *Pediatr Dent* 2012;34:392-6. PMID: 23211915
7. **Miller EK**, Lee JY, Tawil PZ, Teixeira FB and Vann WF Jr. Emerging Therapies for the Management of Traumatized Immature Permanent Central Incisors. *Pediatr Dent* 2012;34:66-9. PMID: 22353461
8. **Jackson SL**, Vann WF Jr., Pahel BT, Kotch JB, Lee JY. The Impact of Poor Oral Health on Children's School Performance *Am J Pub Health* 2011; February 17: e1-e7. doi:10.2105/AJPH.2010.200915. PMID: 21330579.
9. **Miller EK**, Lee JY, DeWalt DA, Vann WF Jr. Impact of Caregiver Health Literacy on Children's Oral Health Outcomes, *Pediatrics* 2010;126:107-114. PMID: 20547644, PMCID: 196223
10. **Da Costa E**, Lee JY, Rozier RG, Zeldin L. Dental Care for Pregnant Women: An Assessment of North Carolina General Dentists, *J Am Dent Assoc* 2010;141:986-994. PMID: 20675424
11. **Lai, B.**, Milano, M., Roberts, M.W., Hooper, S.R.: "Unmet dental needs and barriers to dental care among children with autism spectrum disorders." *J Autism Dev Disord* 42(7): 1294-303, 2012.
12. **Sim C**, Iida H, Vann WF Jr, Quinonez RB, Steiner M. Dietary Recommendations for infants and toddlers among pediatric dentists in North Carolina. *Pediatr Dent* 2014;36(4):322-8.
13. Lee JY, **Divaris K**, Baker D, Rozier RG, Vann Jr WF. The relationship of oral health literacy with oral health status and dental neglect. *Am J Public Health* 2012 May;102(5):923-9. PMID: 22021320 PMCID: PMC3267012
14. Lee JY, **Divaris K**, Baker D, Rozier RG, Lee SY, Vann Jr WF. Oral health literacy levels among a low-income WIC population. *J Public Health Dent* 2011 Spring; 71(2):152-160. PMID: 21774139
15. Vann WF Jr, Lee JY, Baker D, **Divaris K**. Oral health literacy among female caregivers: impact on oral health outcomes in early childhood. *J Dent Res* 89(12):1395-1400, 2010. PMID: 20924067 PMCID: PMC3123718

Received the class of 1958 Distinguished Clinical Research Award

16. **Divaris K**, Ntounis A, Marinis A, Polyzois G, Polychronopoulou A. Loss of natural dentition: multi-level effects among a geriatric population. *Gerodontology* 2012 Jun;29(2):e192-e199. PMID: 21083739
17. Polychronopoulou A, **Divaris K**. A longitudinal study of Greek dental students' perceived sources of stress. *J Dent Educ* 2010 May; 74(5):524-30. PMID: 20442430
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c.) Employment and Professional Contributions of Alumni FY 2010-11 thru FY 2014-15

Name	Year of Graduation	Current Employment	Adjunct Faculty	Board Certification Part 1/ Diplomate	Professional/ Intellectual contributions
Elizabeth Miller	5/9/2010	Private Practice Rocky Mt, NC		Part 1	
Stephanie Jackson	5/9/2010	Private Practice Charlotte, NC		Diplomate	
Jossein Shanhangian	5/9/2010	Private Practice San Diego, CA		Diplomate	
Ray Tseng	5/9/2010 Cert Only	Private Practice Cary, NC	UNC	Part 1	NCDS Access to care comm chair
Jina Kang Yoo	5/8/2011	Durham County Health Dept	UNC	Diplomate	
William Cherry	5/8/2011	Private Practice Wilmington, NC		Part 1	
Shannitta Bridgers	5/8/2011	Private Practice Fayetteville, NC		Part 1	
Wen Pui Bien Lai	5/8/2011	Full Time Faculty Singapore National		Diplomate	
Kimon Divaris	5/8/2011 Cert/PhD Epi	Full Time Faculty UNC		Diplomate	RO1 funding
Kerry Dove	5/13/2012	Private Practice Concord, NC	UNC	Diplomate	AAPD Public Policy Advocate

Catherine Long	5/13/2012	Private Practice Monroe, NC		Part 1	
Allison Eggleston	5/13/2012	Private Practice Wilmington, NC		Diplomate	
Travis Hicks	5/13/2012	Private Practice Raleigh, NC		Part 1	
Lauren Sanzone	5/12/2013	Indian Health Service Juneau, Alaska		Diplomate	
Chien Joo Sim	5/12/2013	Full Time Faculty Singapore National		Diplomate	
Jordan Olsen	5/12/2013	Private Practice Fayetteville, NC		Diplomate	
Maggie Fetner	12/15/2013	Private Practice Burlington, NC	UNC	Part 1	
Felicia Swinney	5/11/2014	Private Practice Durham, NC	UNC	Part 1	

E. Leadership and Support

See General Leadership and Support overview

1. Administrative Support

Our program is based in the Department of Pediatric Dentistry of the UNC-CH School of Dentistry. There are ten dental assistants dedicated to the pediatric dentistry specialty clinics. The staff dental hygienist coordinates public health and preventive services and our coordination with agencies that support children. Administrative support is provided by an office manager, an office assistant, the dental hygienist/program coordinator, a fluently bilingual patient care coordinator, and a receptionist-appointment clerk.

2. Facilities

Our department maintains a specialty clinic in the school with three dental suites and ten dental chairs dedicated for advanced comprehensive pediatric patient care. A pre-sedation/recovery area is located in the clinic for patients that require conscious sedation. Graduate students have access to preventive rooms, consultation rooms, all dedicated exclusively to the department. Our administrative and office facilities are spacious and state-of-the-art. All students are assigned a desk in the graduate student workroom.

Our Department is an integral part of one of the world's richest biomedical education and research-oriented academic settings. The University is recognized internationally for the excellence of its research, teaching, and service programs. The School of Dentistry's facilities include the Koury Oral Health

Sciences Building (KOHS), a well-equipped research facility contiguous with the building in which the Department's clinical and administrative facilities are located. Four of the departmental faculty members have dedicated research laboratory space in the KOHS.

F. The Future

Program Size

The Department of Pediatric Dentistry anticipates a stable enrollment of 3 pediatric dental graduate students for the next 5-10 years. Our students are supported by clinic income and outside contracts that have been stable over the past 10 years.

Student Resources

In order to recruit the best and the brightest from our applicant pool, support for tuition and out of state tuition is needed. This has been a barrier in recruiting out of state students.

Curricular Changes

No new curricular changes are planned at the moment. The program will continue to assess and review the program objectives and the curriculum on an annual basis.

Quality Improvement of Graduate Education

UNC Chapel Hill graduate program in pediatric dentistry is the only one in the state of North Carolina. We compete nationally for best candidates. Compared to our counterparts at the University of Michigan, University of Washington and the Ohio State University, we are the only ones that do not provide support for tuition and tuition remission. Support for this would greatly enhance our program.

Student Qualifications

Many of our students already have terminal degrees their area of study. We will continue to recruit at the national meeting for pediatric dentistry.

Racial, ethnic, and gender diversity in the graduate program

The graduate program does direct outreach to both Howard and Meharry Universities. Additionally, the current make up of students includes majority women and students coming from underserved areas of North Carolina.

Quality of mentoring

The Department has a strong mentoring program for both faculty and students as evidenced by recent successes of the graduate students and promotion of young faculty.

References

1. North Carolina Health Statistics, Center for Health and Environmental Statistics, Department of Environment, Health and Natural Resources. www.schs.state.nc.us/SCHS. Raleigh, NC 2006.
2. North Carolina Institute of Medicine, Task Force on Dental Care Access. Report to the North Carolina General Assembly and to the Secretary of the North Carolina Department of Health and Human Services. Chapel Hill, NC: NC Institute of Medicine. May, 1999.

3. Proceedings of Surgeon General's workshop and conference on children and oral health: The face of a child. Available at: www.nidcr.nih.gov/sgr/children/children.htm. 2000.
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10. Cashion SW, Vann WF, Jr., Rozier RG, Venezia RD, McIver FT. Children's utilization of dental care in the NC Medicaid program. *Pediatr Dent* 1999; 21:97-103.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
ORTHODONTICS



Graduate School Review Site Visit
September 8-10, 2015



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ORTHODONTICS

A. Program Overview

1. Program Background

The graduate program and clinic residency program in Orthodontics is 33 months in duration and awards a certificate in Orthodontics and Dentofacial Orthopedics and a Master of Science Degree in Orthodontics from the Graduate School at the University of North Carolina-Chapel Hill. The program is structured to meet or exceed the Accreditation Standards of the Commission of Dental Accreditation. The program embraces the American Dental Association's definition of the specialty: *Orthodontics and dentofacial orthopedics is the dental specialty that includes the diagnosis, prevention, interception, and correction of malocclusion, as well as neuromuscular and skeletal abnormalities of the developing or mature orofacial structures. (Adopted April 2003)*

The opportunity to continue training for a PhD in the Curriculum in Oral Biology is encouraged and facilitated for interested residents. The Orthodontic program provides an opportunity to participate in interdisciplinary working relationships with other members of the health care team, including hospital based care, as well as clinical care experience in treating dentofacial deformities (DFD) and craniofacial syndromic (CFC) patients.

2. Program's Mission, Goals, and Objectives

The advanced education program in orthodontics and dentofacial orthopedics at the University of North Carolina has long been recognized as one of the pre-eminent programs in the world. The faculty and residents of the Department of Orthodontics constantly strive to uphold and enhance its position of international recognition through their commitment to evidence-based education, clinical excellence, scholarship, and service to the profession and community.

The program's goals include:

- a. Clinical proficiency – Residents are educated to be clinically proficient orthodontists in accordance with the guidelines set forth by the American Dental Association and the American Association of Orthodontists, with an objective of preparing them educationally and clinically to successfully complete the certifying examination of the American Board of Orthodontics and to serve their communities and the profession with compassion, integrity, and dignity. Furthermore, the program strives to instill in its graduates a commitment to further the profession through teaching, leadership, and a desire to be lifelong learners in the field.
- b. Educational foundation – In order to fulfill the mission, residents are educated in the biomedical and clinical sciences to enable them to properly diagnose, develop treatment plans, and treat patients of all ages with a broad range of malocclusions. Residents are trained to use a variety of contemporary fixed and removable appliances, skeletal anchorage, and orthognathic surgery to treat patients who present with not only routine orthodontic problems, but also with craniofacial defects, dentofacial deformities, interdisciplinary needs, and social, financial, and medical concerns.
- c. Acquisition of critical thinking skills – The program emphasizes evidence-based clinical decision-making and critical thinking skills by integrating both clinical training and research aspects of the program throughout the residency program. Residents are educated in research methodology and are required to design, implement, and complete a research project culminating

in a thesis and/or publishable research manuscript in partial fulfillment of the Master of Science degree. Interested residents are encouraged and the program facilitates pursuit of a PhD degree or other master's degree such as a Master of Public Health.

- d. Commitment to service – A culture of service is a hallmark not only of the School of Dentistry but also of the Department of Orthodontics, and residents are provided a variety of opportunities to serve in clinical capacities by providing care to economically disadvantaged and craniofacial patients as well as in programmatic and institutional roles. They attend local, state, national, and international meetings where not only do they meet leaders in the specialty, but also learn how graduates of our program contribute to the profession in various capacities.

Mechanisms for Assessing Program Mission

See General Program Overview

3. Demand/Need for Program

The program has always attracted exceptionally talented and dedicated residents nationwide and worldwide. Approximately 225 completed applications have been received each year for the past 3 years to fill our six residency positions. Many of the accepted students have brought additional expertise and skills to our program such as previous graduate research training, practice as general or military dentists, and even specialty training in other advanced dental education programs. Their prior scholarly and clinical experiences have brought diversity and breadth to the program that has benefited not only their peers but also the faculty.

North Carolina (NC) is a notably rural state. According to the US Census Bureau, in 2010 NC had the second highest number of rural residents (behind only Texas) (1). In addition, NC has been reported as having a much smaller than average dental workforce in comparison to other states (2). In 2009, only 6% of all dental practitioners in NC were orthodontists (3) and in 2010 48 counties with a population of 1,472,712 did not have an orthodontic practice location (4). Over a 20 year span (1990 to 2010), the percent of counties with practitioners whose average age was over 50 increased from 16% in 1990 to 64% in 2010 (4). The UNC-CH Orthodontic Program is the only orthodontic program in NC and is committed to training orthodontists to serve NC residents. Since graduating the first class in 1954, the program has graduated 345 residents: 45% practice in the State of North Carolina; 20% have located to other Southeastern states; and the remaining graduates are dispersed throughout the U.S. and abroad.

4. Interdisciplinary Activities

The program offers residents the opportunity to treat orthognathic surgery and craniofacial patients through two special programs that include seminars, treatment planning, and clinical care. The Dentofacial Deformities (DFD) program involves both orthodontists and oral and maxillofacial surgeons (OMFS). The extensive training orthodontic residents receive in dentofacial deformities and orthognathic surgery is unparalleled as a consequence of the longest and largest continuous and ongoing study of orthognathic surgical stability in the world. This study now contains data on over 2000 subjects and has been supported by the National Institutes of Health continuously from 1979 to 2014. Currently, the DFD program is supported by departmental funds.

In the second year of the program, each resident examines, obtains diagnostic records, and develops orthodontic-orthognathic surgical treatment plans for 25-30 new patients with a dentofacial deformity, learns from the additional 125 to 150 new patients of their peer residents in weekly treatment planning sessions, and attends as a second and third year resident the weekly conferences with the oral and maxillofacial surgeons. Thus during their residency, orthodontic residents gain experience in examining,

analyzing, and discussing with the oral maxillofacial surgeons approximately 250 orthognathic surgical patients.

The Craniofacial Clinic (CFC) involves orthodontists, ENT, OMFS, speech pathologists, prosthodontists, plastic surgeons, and general dentists. Each resident treats approximately 10 CFC patient in the graduate orthodontic clinic. Both DFD and CFC are strong interests of applicants.

Orthodontic residents also participate in a monthly periodontology-orthodontics conference in which interdisciplinary cases and literature are reviewed by both programs' residents. Furthermore, the residents have frequent interactions with residents in the pediatric dentistry program who participate in several orthodontic courses including a technique course, orthodontic biomechanics, diagnosis and treatment planning, and growth and development.

Residents participate in two formal extramural experiences: a rotation in the Wake Country Health Department and a week-long trip to California to observe in private practices. The Wake County experience provides residents with the opportunity for four-handed dentistry, supervised but relatively independent decision-making, and experience in a multi-disciplinary setting. The latter exposes residents to a variety of practice models which provide clarity for the residents at a period in their training when they are formulating their practice or career plans.

For resident's research, the program offers the opportunity to participate in an interdisciplinary / interinstitutional research collaboration. In the past five years, the interdisciplinary / interinstitutional collaborators have included the UNC Mathematics Department, UNC Computer Sciences Department, NCSU Industrial Engineering, and Duke Psychology Department. The collaboration provides a depth of learning.

The rotations, electives, and extramural experiences are valuable components of the program and provide further opportunities to hone residents' skills as specialists in the field.

5. Interinstitutional Perspective

The UNC Orthodontics program is the only orthodontic program in North Carolina. Direct comparison of the quality of the UNC program to the quality of other programs requires outcome measures from those programs that are not readily available. However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. These measures include 1) the number of applications received each year from highly qualified applicants; 2) the willingness of applicants to take the GRE examination. The GRE is not required by any other SOD program; and 3) the performance of our graduate students on the certifying examination of the American Board of Orthodontists.

The unique strengths of the UNC Orthodontics program are based on four critical elements: (1) the clinical and research expertise of the Orthodontic faculty, (2) the curriculum, (3) the interdisciplinary opportunities, and (4) the UNC School of Dentistry and UNC campus environment.

B. Curriculum

1. Course and program review and development

Weekly departmental meetings are held which are attended by all full-time faculty and three resident representatives. Programmatic issues are frequently a topic at these meetings and facilitate dialogue about the need to make adjustments to the schedule or curriculum.

Every summer the full and part-time faculty meet at an all-day retreat to systematically and critically review the program. These reviews often result in significant changes to the program to improve outcomes and efficiencies and to ensure that the program remains rigorous and current with the best practices.

2. Course Sequence and Description

Fall

1st Year

DENG 701	Introduction to Research Design
ORTH 801	Orthodontic Technique
ORTH 803	Orthodontic Diagnosis
ORTH 805	Advanced Clinical Orthodontics
ORTH 806	Science of Tooth Movement

2nd Year

DENG 703	Applied Dental Research Methods
ORTH 802	Current Topics in Orthodontics
ORTH 805	Advanced Clinical Orthodontics
ORTH 815	Oral/Pharyngeal Function
ORTH 820	Advanced Biomechanics

3rd Year +

ORTH 993	Master's Research and Thesis
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Spring

1st Year

DENG 702	Biostatistics
ORAD 706	Advanced Oral Radiology
ORTH 805	Advanced Clinical Orthodontics
ORTH 807	Orthodontic Biomaterials
ORTH 808	Growth & Development

2nd Year

DENG 704	Interdisciplinary Care Conference
ORTH 802	Current Topics in Orthodontics
ORTH 805	Advanced Clinical Orthodontics
ORTH 810	Multidisciplinary Management of Craniofacial Anomalies
ORTH 822	Environment of Specialty Practice

3rd + Year

ORTH 993	Master's Research and Thesis
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The course directors for the core courses have been relatively stable over the past five years and the number of enrolled students per course varies only slightly from year to year since the number of students in each year of each program is very stable. With the resignation of Dr. Emile Rossouw in March 2015

and the addition of Dr. Tate Jackson in July 2015, course directorship has been discussed at the departmental faculty retreat in July 2015 and some changes made.

ORTH 801: Orthodontic Technique

(4 credits) Fall Semester First Year

Course Director: Ching-Chang Ko

Enrolled Programs: ORTH, PEDO

of Enrolled Students: 9 (ORTH-6, PEDO-3)

Hands-on course to introduce orthodontic technique and procedures to beginning orthodontic graduate students.

Course Objectives:

- To familiarize residents with the instruments, appliances, and wires used chairside.
- To teach new residents fundamental concepts in the placement of brackets, bands, and ligation.
- To introduce residents to the stages of orthodontic treatment.
- To provide an opportunity to practice on typodonts techniques that are utilized in the clinical management of patients.
- To practice techniques of wire bending, retainer fabrication, and headgear adjustment.
- To introduce simple biomechanics for orthodontic tooth movement.
- To review ABO finishing criteria.

ORTH 802: Current Topics

(1 credit) Summer, Fall, Spring Semester Second and Third Year

Course Director: Tung Nguyen

Enrolled Programs: ORTH

of Enrolled Students: 12

Review current orthodontic literature and discuss the strengths and weaknesses of individual manuscripts.

Course Objectives:

- To develop skills to critically evaluate current orthodontic and dental literature.
- To discuss the strengths and weaknesses of each selected manuscript.
- To gain background knowledge of the research topic.
- To develop skills to resolve conflicting literature reports.
- Find out problems in the area of interest to the researcher that have already been investigated in the past.
- To identify potential areas and hypothesis for research.
- To identify potential sources of information for conducting the detailed research.

ORTH 803: Diagnosis and Treatment Planning

(2 credits) Fall Semester First Year

Course Director: Lorne Koroluk

Enrolled Programs: ORTH, PEDO

of Enrolled Students: 9 (ORTH-6, PEDO-3)

This course is a seminar series for orthodontic and pediatric dentistry graduate students that meets twice weekly during the fall semester. The initial part of this course covers the development of a diagnostic database, analysis of diagnostic records and development of a systematic prioritized problem list for patients with dental and skeletal malocclusions. The latter portion of the course emphasizes treatment planning and treatment options for orthodontic patients

Course Objectives:

Upon completion of this seminar series graduate students should be able to:

- Complete a clinical interview and a systematic examination of soft tissue, skeletal and dental relationships for orthodontic patients.
- Collect appropriate orthodontic records such as radiographs, photographs, study models and any other necessary information to aid in the diagnosis and treatment planning of orthodontic patients.
- Perform an accurate arch length analysis and recognize the shortcomings of the analysis.
- Perform a comprehensive cephalometric analysis and recognize the shortcomings of such an analysis. Be familiar with the various types of cephalometric analysis.
- Demonstrate the use of the Bolton tooth-size analysis and evaluate its results including its shortcomings.
- Perform a diagnostic set-up given a set of diagnostic casts and treatment objectives.
- Accurately describe skeletal and dental relationships utilizing the Ackerman-Proffit diagnostic format.
- Generate a prioritized problem list in three planes of space and note potential solutions to identified problems.
- Prescribe appropriate treatment goals and treatment plans to intercept and/or correct malocclusions in the child, pre-adolescent, adolescent and adult patient with all types of skeletal and dental problems.
- Present and implement orthodontic treatment plans so that patient and orthodontist expectations are realistically identified and achieved during the course of treatment.

ORTH 805: ADVANCED CLINICAL ORTHODONTICS

(5 credit) Fall and Spring Semesters First and Second Year

Course Director: Ching-Chang Ko

Enrolled Programs: ORTH

of Enrolled Students: 18

This course contains a daily clinical hands-on practice (75%) and a daily clinical seminar (25%).

Residents are trained to be clinically proficient orthodontists in accordance with the guidelines set forth by the American Dental Association and the American Association of Orthodontists.

ORTH 806: Biomechanics

(2 credits) Fall Semester First Year

Course Director: Ching-Chang Ko

Enrolled Programs: ORTHO, PEDO

of Enrolled Students: 9 (ORTH-6, PEDO-3)

Mechanical Principles in orthodontic force production and control; biological response to orthodontic force.

Course Objectives:

To provide a scientific framework for the use of biomechanical knowledge in the clinical treatment of patients. Part of this lecture is designed to provide residents with a learning experience through which they will answer the following questions. What are displacement, force, moment, and couple? How are they measured and calculated? What are the practical applications of biomechanics in orthodontic therapy? More specifically, as a participant in this course you will be able to do the following:

- Define, explain, and correctly use terms and concepts used to describe biomechanics in orthodontia. (scalar, vector, tensor)
- Assess morphological changes due to tooth movement & facial growth: displacement vs deformation (strain)
- Assess transmissibility of forces and equilibrium of forces. (stress)

- Evaluate how forces affect an object, or, identify center of resistance, center of rotation, the countervailing couple, translation, rotation, and tipping of the object.
- Correlate static mechanics to tooth movement: constitutive law such Hook's law.
- Execute Free Body Diagram (FBD) for solving the orthodontic problems.
- Be aware of finite element models used to illustrate force distribution for some of problems, which are then compared to the FBD predictions.

ORTH 807: Biomaterials

(2 credits) Spring Semester First Year

Course Director: Ching-Chang Ko

Enrolled Programs: ORTHO

of Enrolled Students: 6

Introduction to orthodontic biomaterials and integration with the basic principles of engineering science and orthodontics. The course is to provide a perspective of the whole subject of orthodontic biomaterials and develop a logical framework of meta-theory for future practice. There are fourteen lectures and three laboratories.

Course Objectives:

- To introduce students to orthodontic biomaterials while integrating the basic principles of engineering, science and orthodontics.
- To strengthen the overall understanding of biomechanics by having a better working knowledge of biomaterials.
- To increase awareness of the future directions of innovations that orthodontic products may take.

ORTH 808: Level IV Growth and Development

(3 credits) Spring Semester First Year

Course Director: Sylvia A. Frazier-Bowers

Enrolled Programs: ORTH, PEDO

of Enrolled Students: 9 (ORTH-6, PEDO-3)

This course is a seminars series for orthodontic and pediatric dental graduate students that meets twice weekly during the Spring semester. There are approximately 25 two-hour sessions scheduled during the course. In the course students develop an understanding of the principles of growth and development, emphasizing craniofacial development from an evolutionary, molecular and anatomic perspective.

ORTH 810: Multidisciplinary Management of Craniofacial Anomalies

(2 credits) Spring Semester Second Year

Course Director: Lorne Koroluk

Enrolled Programs: ORTH, PEDO

of Enrolled Students: 9 (ORTH-6, PEDO-3)

The clinical management of craniofacial anomalies, including cleft lip and palate, and the associated interdisciplinary approach to treatment planning.

Course Objectives:

Upon completion of this course the student will be able to:

- understand the coordination of professional services provided to patients with craniofacial anomalies by the UNC Craniofacial Center.
- learn principles of cleft lip and palate surgery
- understand the clinical and objective assessment of VP function
- understand the diagnosis and management of dental anomalies for children with craniofacial anomalies

- learn the diagnosis and timing for alveolar bone grafting, coordination with orthodontic treatment and the timing for surgical correction of skeletal deformities

ORTH 815: Oral Pharyngeal Function

(1 credit) Fall Semester Second Year

Course Director: Sylvia Frazier-Bowers

Enrolled Programs: ORTH

of Enrolled Students: 6

The course is to provide understanding the maturation of oral and pharyngeal function, including speech and its relation to dentofacial development, the effect of function on treatment outcomes, and the effect of treatment and oral pathology on oral function.

Course Objectives:

- Discuss the development and mechanisms of oral and pharyngeal function
- Review the relationships between malocclusion/deformity and function
- Discuss the errors that are often made in cause/effect assumptions regarding the etiology of dentofacial problems
- Discuss the effects that orthodontic and orthognathic surgery treatment can have on oral function
- Review the effects of oral pathology on oral-pharyngeal function

ORTH 820: ADVANCED BIOMECHANICS

(3 credits) Summer Semester First Year

Course Director: Ching-Chang Ko

Enrolled Programs: ORTHO

of enrolled students: 6

Concepts in orthodontic mechanics emphasizing on clinical biomechanics are taught. These include the A-P (class II and III), transverse and vertical corrections, segmented arch approaches and space closure. Theorems such as one coup, two couples, Castigliano's theory, and elasticity are introduced. Laboratorial material testing is performed by the students to illustrate properties of various orthodontic materials. Characterization of the materials will be studied and analyzed for clinical application and failure conditions.

Course Objectives:

- To integrate biomaterials and biomechanics within the framework of a simulated oral cavity environment.
- To observe first-hand the properties of orthodontic appliances, to rank them objectively, and to foster evidenced-based judgments.
- To reinforce concepts of scientific discovery and reporting within an orthodontically-practical format.

ORTH 822: Environment of Specialty Practice

(1 credit) Spring Semester Second Year

Course Director: Lorne Koroluk

Enrolled Programs: ORTH

of Enrolled Students: 6

This course is designed to prepare graduate students to act as effective managers in an environment of orthodontic specialty care, whether that be in private clinical practice or in a larger institution. Principles of communication, patient management, and business management are emphasized.

Course Objectives:

- Understanding basic principles of effective communication with patients and other professional care providers.

- Understanding the basic principles of risk management in an orthodontics specialty practice.
- Understanding the basic principles of human resource management, including legal requirements for employers.
- Understanding state and federal regulations for the specialty practice of orthodontics, including OSHA regulations.
- Understanding basic financial accounting principles involved in orthodontic practice valuation.

ORTH 993 MS Thesis
 (3 credits) Fall and Spring Semesters 3rd Year
 Course Director: Ching Chang Ko

3. Course Evaluation

Evaluation is an ongoing process in a seminar-clinical setting, and informal feedback is provided to residents through their constant interaction with faculty. Courses are assessed by exit interviews, alumni surveys, board certification, and alumni engagement in teaching. Exit interviews and alumni surveys suggest that graduates strongly believe they obtained excellent course training and preparation for a career in orthodontics and dentofacial orthopedics. They cite as particular strengths of the program their intensive training and experience in the management of orthognathic surgery patients and the comprehensive practice management instruction they receive throughout their program. Annual feedback to develop strategies to connect didactic scientific knowledge to clinical practice takes place in a lunch meeting between the program director and the all residents at the end of year.

4. Requirements for Degree

See General Curriculum Overview. Students receive a mix of a broad range of malocclusions to treat and are required to complete approximately 65% of new case starts in order to graduate. Formative assessments of resident acquisition of the professional knowledge are accomplished using two written exams in the first year in addition to resident case presentations of all new and transfer cases with the attending faculty and in clinical seminars. Assessment of resident proficiency in the clinical skills is accomplished through one oral exam in the second year (spring semester) and through the weekly case progress and case finish seminars in the third year. The summative comprehensive oral exam is accomplished by an exit oral exam in the third year (fall semester). The purpose of the comprehensive examinations are two-fold: Assess the student's level of competency in subjects essential to Orthodontics and prepare the student to challenge the certifying examination of the American Board of Orthodontics. Six faculty members grade the level and format of the comprehensive examinations to assess resident ability to diagnose and treatment plan and carry out treatment demonstrating knowledge of growth and development, genetics and embryology, anatomy, and pathology of oral tissues. Pass/Fail is determined by the consensus of the examiners. Failure to pass any part of the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program.

5. Evaluation of Progress of Students

See General Curriculum Overview. Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, comprehensive examinations, and performance reviews. Informal evaluations take place during conferences, clinics, lectures and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student's transcript.

Orthodontics Self-Study

All full- and part-time faculty complete a semi-annual standardized evaluation form (Table 1) on each resident. The Academic Performance Committee which consists of the full-time faculty members in the department meets biannually per ADA accreditation requirements to review the evaluation forms and to discuss the progress of each graduate student. If indicated, the faculty agree on an educational enhancement plan to improve the performance of an individual resident. This plan is overseen by the program director who implements and appraises the faculty of outcomes of the educational enhancement plan at the subsequent all-faculty meeting or sooner by individual follow-up with each faculty member. The following formal evaluations/exams occur during the three year training period:

- A. First Year:
 - a. End of first semester
 - i. Comprehensive written examination on material covered in first semester
 - b. End of year:
 - i. Comprehensive written examination
 - ii. Formal review of treatment plans for incoming transfer patients
 - iii. Written faculty evaluations by full-time and part-time faculty of seminar and clinical performance
- B. Second year:
 - a. Winter term (\pm):
 - i. Written faculty evaluations by full-time and part-time faculty of seminar and clinical performance
 - ii. Formal review of cases in progress
 - b. Mid-residency:
 - i. Residents receive a written summary of performance midway through the residency, noting inadequacies if present.
 - ii. ABO case write-ups on selected cases
 - c. End of year:
 - i. Formal review of incoming transfer cases
 - ii. Written faculty evaluations by full-time and part-time faculty of seminar and clinical performance
 - iii. ABO written examination
- C. Third Year:
 - a. Case reviews of cases in treatment
 - b. Case reviews of completed cases
 - c. Written faculty evaluations by full-time and part-time faculty of seminar and clinical performance
 - d. Written clinical outcome assessments of all finished cases
 - e. ABO-like oral examination
- D. Clinical Evaluations completed by attending faculty twice a year (fall and spring).
A copy of the evaluation form follows.
- E. In addition, oral defense for the Master's degree takes place between February and April, prior to graduation. The defense is open to all SOD members and dissertation committees will examine the research completed by the student

Table 1. Faculty Evaluation of Residents

UNC Department of Orthodontics

Faculty: _____

Clinical Evaluation of Resident: _____

Resident: _____

Date: _____

Each item is rated on the following scale: 1 = Working below appropriate level;

2 = working at appropriate level; 3 = working above appropriate level;

U = Unable to evaluate.

IF YOU CHOOSE 1 OR 3, COMMENT TO EXPLAIN

	1	2	3	U
Diagnosis and Treatment Planning				
1. Completeness of records and diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Thoroughness of examination and ability to extract information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Understanding of theories and principles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Understanding of related previous orthodontics treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Ability to arrive at, and defend, an alternative procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Ability to determine if and when an objective is achieved and when next procedure should be started	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

TECHNICAL SKILL	1	2	3	U
1. Skill in carrying out procedures being attempted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Effective use of proper instruments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Completion of procedure in reasonable amount of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Quality of _____product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

RELATIONSHIP WITH PATIENT AND PARENT	1	2	3	U
1. Personal interest in patient's well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Ability to communicate with patient and parent and elicit Confidence and cooperation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ability to communicate treatment objectives, what is involved and patient progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Professional Management	1	2	3	U
1. Prior proper planning of all procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Solicits consultation and advice when necessary and respects views of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ability to work harmoniously as member of a team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ability to function independently in a clinical situation with constant supervision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Acceptance of suggestions and criticism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Concentration on task at hand with minimum of outside conversation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

PERSONAL AND PROFESSIONAL ETHICS	1	2	3	U
1. Aware of current ethical issues in dentistry/orthodontics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Applies personal ethical and moral reasoning in all professional decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Implements ethical judgement into clinical and personal behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Orthodontics Self-Study

<u>Attendance and Chart Entries</u>	1	2	3	U
1. Sees patients regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Keeps records up to date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Punctuality in keeping appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Has instructor see patient regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

<u>SEMINARS</u>	1	2	3	U
1. Actively engaged in seminars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Regular and on time attendance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Resident is ready to be advanced to a position of higher responsibility yes no

6. Learning Assessments

At the completion of the program, graduates will possess the following qualifications:

- a) The skills to base clinical decisions on a foundation of evidence derived from their formal education and from critical review of the literature
- b) The ability to treat a variety of dental and skeletal malocclusions in a proficient manner
- c) Experience and respect for research and scholarship
- d) The motivation to continue to advance the specialty by teaching, engaging in community activities, and becoming leaders in the profession

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015.

Curriculum

Assessment: Faculty Review of residents via standard evaluation form

Frequency: Biannually

Outcome: Overall didactic and clinical performance and progress of each student is evaluated by the Academic Performance Committee using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July.

Pass Rate –2011-2014: 100% Successful Evaluation

Action: Continue assessment method; Documentation is maintained on file in the department and each resident is allowed to view this information at any time.

Assessment: Scoring of quality of each case finished using validated American Board of Orthodontics Model Grading System

Frequency: At completion of each case

Outcome: Residents gain insight into their strengths and weaknesses in treating malocclusions to board standards. Residents increased use of residency cases to submit for certification via the Initial Certification Exam of the American Board of Orthodontics

Action: Continue assessment method; Program is discussing feasibility of requiring residents to create a portfolio of finished cases to document proficiency.

Assessment: Written comprehensive exam

Frequency: Fall and Spring semester: 1st yr

Outcome: The examination evaluates the student's depth and breadth of knowledge on topics in didactic and core courses

Pass Rate –2012-2015 100% Pass Rate

Orthodontics Self-Study

Action: Program is considering options to provide more rigorous cephalometric training to include the possibility of developing a core course devoted to cephalometrics

Assessment: Oral comprehensive exam

Frequency: Fall Semester: 3rd Yr

Outcome: Three to four faculty members including the Program Director serve as examiners. The examination evaluates the student's depth and breadth of knowledge on fundamental biomedical and clinical topics. Open-ended questions are framed within the context of a clinical case or problem

Pass Rate: 2011-14 100%

Action: None

Patient Care

Assessment: Biweekly Case Review Seminar of progress cases and finished cases

Frequency: 3rd Year: Fall & Spring Semesters

Outcome: Residents demonstrate an ability to critically analyze cases in progress and to discuss means to complete cases to standards of American Board of Orthodontics.

Action: None

Education Goals

Assessment: Tracking of completion rate of new case starts

Frequency: Annual; Final assessment at conclusion of 3rd year

Outcome: Completion rate of case starts exceeds expectation of 65%

2012: 79.6% 2013: 88.5% 2014: 78.8% 2015: 80.0%

Action: None

Assessment: Exit interviews

Frequency: Annual

Outcome: Residents report that the unique strengths of the graduate program include their excellent preparation in practice management and experience with orthognathic surgical cases. Concerns have been regularly expressed regarding the management of the craniofacial patients.

Action: The program has been making progress with identifying craniofacial patients who have not been seen on a regular basis. We are also working with the Craniofacial Team to identify other community providers to render care to this group of patients since the Graduate Program is unable to accept any more cases at this time. A more rigorous protocol for assignment of craniofacial patients to the Graduate Program will be developed.

Assessment: American Board of Orthodontics Phase I Exam

Frequency: End of 2nd Year

Outcome: # of graduates who present for ABO Written Exam

2012: 3 (6) 2013: 6 (6) 2014: 5 (6) 2015: 6 (6)

Action: Prior to 2015, students were encouraged to but not required to take the written ABO exam. After 2015, 2nd year residents are required to take the written ABO exam prior to graduation.

Research Goals

Assessment: Research progress; Oral defense of thesis; Thesis submission, Research presentations, Manuscript publications and awards/scholarships

Frequency: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate school

Outcome: Adequate progress in research; Successful oral defense of thesis as determined by thesis committee. Successful submission of thesis to the Graduate School; Graduate student research culminating in a presentation, award

2012-15: 100% thesis submission on time

Action: Research progress of a student enrolled in a 993 course is evaluated via the Mentor MS Research Performance Report; Track annually publication outcomes of master's thesis

Future outcomes assessment plan

We review the program on an annual basis at the full-time faculty retreat to assess the strengths and weaknesses of the program. In the future, we will bring in an outside academic consultant/examiner to review our programs and make suggestions for improvement. We will continue to update our assessment plans and adjust to the growing needs of the program.

C. Faculty

Seven full-time faculty members currently serve as the core faculty for the graduate students (Table 5). In addition, a faculty search is underway for a full time position. Of the seven faculty, five are Diplomates of the American Board of Orthodontics (ABO) and one is also a Diplomate of the American Board of Pediatric Dentistry as well as a Fellow of the Royal College of Dentists of Canada in both Orthodontics and Pediatric Dentistry. One faculty has served as an American Board of Orthodontics examiner while another has served as an American Board of Pediatric Dentistry and Royal College of Dentists of Canada examiner. All clinical faculty have completed specialty training in orthodontic programs accredited by the Commission on Dental Accreditation, and thus are well-trained in biomedical sciences. Three faculty members possess a PhD degree. Bio-sketches for full-time faculty are found on the flashdrive.

In addition to involvement in the American Association of Orthodontists and the American Association of Dental Research, the faculty are involved in the following societies/activities:

Dr. Hershey	American Psychological Association
Dr. Koroluk	American Board of Pediatric Dentistry, Royal College of Dentists of Canada
Dr. Ko	Orthopedic Research Society, Biomaterials Society, American Ceramic Society
Dr. Frazier-Bowers	Carolina Center for Genome Sciences, The Marfan Foundation – Professional Advisory Board
Dr. Nguyen	NC Physician Advisory Group
Dr. Phillips	NCTracs; American Statistical Association

Faculty hold the following joint appointments:

Dr. Hershey	UNC Health Policy and Management
Dr. Koroluk	UNC Pediatric Dentistry
Dr. Ko	NCSU Material Sciences and Engineering, UNC Applied and Materials Sciences

1. Research Activities

The Department of Orthodontics has a well-established and long history of conducting research in a wide variety of fields. The department is currently involved in research in the areas of craniofacial genetics (Frazier-Bowers), 3D imaging (Nguyen), educational methodology (Jackson), biomaterials/biomechanics

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(Ko), bone tissue engineering (Ko), clinical studies (Koroluk), and patient-centered outcomes (Phillips). Currently, the program has three active external grants to support its research activities (see General Faculty Overview). Every full-time faculty member is expected to have research and scholarly activity. The collective research portfolio is comparable to that of other Research Tier I universities. Faculty research frequently involves collaboration with other School of Dentistry departments and with UNC research centers such as the Population Center, Cystic Fibrosis Center, Cecil G Shep's Center for Health Services Research, and UNC Materials Interdisciplinary Research Team (MIRT).

An assessment of research productivity is completed annually by the Chair. A rubric is generated by means of a systematic survey detailing each faculty member's accomplishments and goals for the next year. The reward system of meeting or exceeding goals includes an incentive plan to provide an annual bonus based on merit in research. (See General Faculty Overview) The department also supports the presentations of faculty and resident research at national and international meetings such as the International Association of Dental Research /American Association of Orthodontists/American Association of Dental Research. All faculty members are also actively involved as research mentors. The faculty of the Department of Orthodontics published 83 manuscripts in peer-reviewed journals and 31 abstracts during the past two academic years.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

Several initiatives exist to facilitate the development and sustainability of faculty research:

- The department provides support for a professional grant writer to assist with development and editing of grants.
- There is a provision for collaborative internal review of projects, proposals, and manuscripts.
- When necessary, there is a re-allocation of teaching responsibilities to accommodate research activities and presentations.

2. Teaching Distribution

All faculty teach in both the DDS and graduate courses and in the graduate clinic. The policy for the distribution of teaching loads is based on a combination of a faculty member's expertise and a reasonable balanced teaching load amongst the faculty. The selection of course directors is based on experience, interest and expertise in the individual course topic. Teaching assignments are reviewed annually at departmental retreats and are mutually agreed upon.

3. Teaching Evaluation

Departmental teaching evaluations are completed once a year by all residents for all full-time faculty and part-time clinical attending faculty. A scanned computer form is used to evaluate the didactic and clinical performance of faculty (Table 2). Individual faculty performance is assessed and possible areas of improvement are identified and shared with the faculty by the Chair. The data are also used to facilitate the annual review process for all faculty members. As part of the annual review process, the department chair requests all faculty to complete a self-assessment of their accomplishments during the previous year with respect to teaching, research and scholarly activity, clinical practice, and service. Along with these accomplishments, each faculty member submits a list of personal goals for the upcoming year. The department chair reviews this material during a personal session with each individual. All department faculty members are also then reviewed by the administration of the School of Dentistry. Each faculty member receives a subjective assessment of their performance to identify strengths and possible areas of concern to help improve performance in the future.

Table 2. Resident Evaluation of Faculty

UNC Department of Orthodontics

Faculty Evaluation: _____

Resident: _____

___1st Yr

___2nd Yr

___3rd Yr

Date: _____

Each item is rated on the following scale: 1 = Inadequate; 2 = Good; 3 = Excellent; U = Unable to evaluate

Professional and Personal: _____	1	2	3	U
1. Respects the views of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Works well with residents and other faculty members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Responds to questions in a positive manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Provides guidance in a tactful manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Completes Commitments reliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Respects the facts, equipment and supplies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Complies with institutional and departmental policies accessible to residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CLINICAL	1	2	3	U
1. Arrives to clinic punctually	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is accessible to residents during clinic coverage time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Allows residents to work independently, when appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Encourages efficient utilization of support staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Adheres to standards for universal precautions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Maintains interest in patients well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Treats patients with appropriate kindness and respect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Communicates clearly with residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Communicates clearly with patients and parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Communicates clearly with staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Teaching of diagnostic Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Teaching of Treatment Planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Management of clinic time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Quality of clinical instruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DIDACTIC ACTIVITIES	1	2	3	U
1. Organization of materials for seminars and lectures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Presents relevant and current material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Uses audiovisual equipment appropriately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Discuss alternate theories, principles and treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Allows adequate time for class preparation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Encourages open but focused discussion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Quality of preparatory materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Quality of seminar interaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Students also participate in individual exit interviews with the department chair and graduate program director and a new written exit survey (Table 3) will be implemented in the spring of 2016 to evaluate individual courses and clinics.

Table 3. Orthodontic Graduate Program Evaluation

The following program evaluation is designed to provide information so that the orthodontic training program can be improved to better meet the needs of our students. Please complete all the questions and make comments liberally. Your input is essential and greatly appreciated.

Cumulative Knowledge-Base/Didactic Experience

1. Do you feel you received sufficient scientific knowledge-base to make appropriate decisions relative to diagnosis and treatment planning?

Excessive		Acceptable		Inadequate
5	4	3	2	1

Comments:

2. Do you feel you received sufficient scientific knowledge-base relative to clinical decisions to provide orthodontic treatment?

Excessive		Acceptable		Inadequate
5	4	3	2	1

Comments:

3. Do you feel you received sufficient scientific knowledge-base relative to provide orthodontic care for orthognathic surgery patients?

Excessive		Acceptable		Inadequate
5	4	3	2	1

Comments:

4. Do you feel you received sufficient scientific knowledge-base relative to provide orthodontic care for craniofacial patients?

Excessive		Acceptable		Inadequate
5	4	3	2	1

Comments:

4. Teaching Innovation

The Department of Orthodontics has extensive experience in innovations for teaching and curricular development at both the DDS and graduate levels.

- a. As part of the practice management course, the department has developed a five-day experience in California during which the rising third year residents gain an in-depth exposure to a wide variety of orthodontic practices. They gain valuable insight into the different practice models available, along with personal insight in how to run a successful practice. The experience is highly valued by the residents.
- b. The department uses interactive graduate webinars to facilitate and enhance the educational experience with other schools and practitioners, both nationally and internationally. Recently, the department produced a series of recorded graduate seminars for each of the program graduate courses. These videos are available to other orthodontic programs to help enhance their didactic content.
- c. The faculty has a long history of innovation using novel teaching methodology in the DDS program. All of the DDS courses use a self-instructional format with computer-based teaching modules. The modules and accompanying self-tests minimize the number of traditional lecture

sessions. Small group seminars led by graduate students facilitate DDS student learning and comprehension of the course material. The graduate students gain valuable teaching experience in these seminars, as well as in the DDS orthodontic clinic where they function as clinical instructors.

5. Faculty Mentoring/Support

Faculty take advantage of the many development workshops and other opportunities through local and national venues (Table 4). Workshops are offered through the School of Dentistry, the UNC campus as well as the American Dental Education Association (ADEA) annual sessions and professional organizations where faculty hold memberships. The department and SOD encourage and have actively funded participation in the following activities.

Table 4. Faculty Participation in Development Workshops

	Frazier-Bowers	Jackson	Koroluk	Nguyen
The ADEA Institute for Teaching and Learning and FACES	2012	2013, 2015		2010-2013
UNC Academic Leadership Program	2015-2016			2011
IADR/AADR grant writing	2005			2011
Center for Faculty Excellence	2009		2012	2012
Council on Orthodontic Education	2013			2010

6. Faculty Teaching/Professional Awards (recognition) for FY 2010-2011 thru FY 2014-2015

Sylvia A. Frazier-Bowers, DDS, PhD

- 2013 SAO Faculty Lecture Award, Southern Association of Orthodontists
- 2012 Class of 2012 Excellence in Mentoring Award, SNDA, UNC School of Dentistry
- 2011 Class of 2011 Excellence in Teaching Award, Department of Orthodontics, UNC School of Dentistry

H. Garland Hershey, Jr., DDS

- 2015 Faculty Teaching Award, Residents, Department of Orthodontics
- 2013 Recognition as author of one of "The 100 Top-Cited Articles in Orthodontics from 1975 to 2011" (Hershey, Stewart & Warren.)
Executive Committee, CoA, American Psychological Association
- 2012 Examiner, American Board of Orthodontics
- 2011 Dale Wade Award, American Board of Orthodontics
- 2010 Distinguished Alumnus Award (Hickerson Award), University of Iowa
Examiner, American Board of Orthodontics

Tate H. Jackson, DDS, MS

- 2010 Southeastern Academy of Prosthodontics Excellence in Prosthodontics Award
International College of Dentists Leadership Award

Ching-Chang Ko, DDS, MS, PhD

- 2015 Faculty Mentor Award by Student Research Group, UNC SOD
- 2014 Faculty Teaching Award, Resident, Department of Orthodontics,
Faculty Member, Omicron Kappa Upsilon (OKU) Dental Honor Society

Tung T. Nguyen, DDS, MS

- 2014 Co-Author, Milo Hellman Award for best clinical research, American Association of Orthodontics
Top Reviewer, American Journal Orthodontics and Dentofacial Orthopedics
- 2012/2013 Faculty Teaching Award, Resident, Department of Orthodontics
- 2012 BF and Helen E Dewel Award for best clinical paper published in the American Journal of Orthodontics and Dentofacial Orthopedics
Michael Matlof Memorial Fellowship Award, American Association of Orthodontist Foundation
- 2010/2011 Robert E Gaylord Fellowship, American Association of Orthodontist Foundation
- 2010 Faculty Teaching Award, Resident, Department of Orthodontics

Ceib Phillips MPH, PhD

- 2015 Daniel M. Laskin Publication Award (Co-Author: Manuscript selected as best article in *J Oral Maxillofac Surg*)
- 2015 BF and Helen E Dewel Award (Co-author: Manuscript selected as best clinical article in AJODO)
- 2015 IADR/AADR Oral and Maxillofacial Surgery Group Award. Co-author on highest rated abstract "Surgeon Agreement/Bias when Evaluating Lip Surgery Outcomes in CL/P Patients"
- 2011 Induction as Honorary Member in the Edward H Angle Orthodontic Society
- 2011 Arthur H. Wuehrmann Prize for best journal article published in the Oral Radiology Section of OOOOE (co-author)
- 2008-2010 Working on Women in Science Scholar, School of Dentistry

7. Faculty Advising/Mentoring of Students

An absolute strength of the program lies in the rigor of the research in which residents are engaged. Few programs can match the breadth and experience of clinical and basic science mentorship within the program nor the success and renown of the scholarship that emerges from the program and department. Three active externally-funded grants and an impressively productive department with respect to publications and national and international presentations ensure an environment in which residents can complete a meaningful project in partial fulfillment of the requirements for their required master's thesis. During the new resident orientation, faculty are invited to present their research areas. An open door policy is implemented so that the residents can freely discuss with each faculty for their research interest from which the dissertation topic and mentor are determined. Both the mentor and the student then work together to choose committee members.

To assist residents with the timely completion of their research, the Assistant Dean of Advanced Dental Education oversees and implements strict adherence to a series of research deadlines which require the participation of all residents in all advanced education programs. The timeline encompasses all three years of the advanced education programs.

Resident research ranges from analysis of data obtained in the ongoing longitudinal study of stability of orthognathic surgical corrections, use of 3D imaging for assessment of treatment outcomes, health services outcomes research with respect to treatment of Medicaid patients, biomaterials and biomechanical studies of orthodontic techniques, and use of genetics to explore etiologies of malocclusions. In addition to required presentation of their research at the School of Dentistry's

Research in Review Day and public thesis defense, residents are strongly encouraged to submit at least one publishable manuscript of their research findings by the time they graduate.

All faculty maintain an open door policy for student interaction. Students are encouraged to discuss with the program director or individual faculty issues related to clinical difficulties and personal issues.

Table 5. Faculty Participation in Advising/Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

Faculty	Rank	MS		PhD		Non-MS
		# Mentor	#Committee Member	# Mentor	# Committee Member	
Nguyen, Tung T	Assoc Prof	5	8	0	0	4
Frazier-Bowers, Sylvia A	Assoc Prof	3	4	0	3	5
Koroluk, Lorne	Assoc Prof	3	5	0	0	1
	CL Assist					
Jackson, Tate Harris	Prof	0	0	0	0	0
Ko, Ching-Chang	Professor	7	4	1	3	5
*Hershey Jr, H G	Professor	1	5	0	0	0
**Phillips, Ceib L	Professor	9	15	0	2	1

*In second year of phased retirement (50%FTE)

**Assistant Dean for Advanced Education & Graduate Studies; Program Director for Curriculum in Oral Biology

8. Graduate Teaching Assistants

All graduate students are actively engaged in didactic instruction in the four DDS growth and development courses, as well as in preclinical laboratory and clinical instruction in the DDS orthodontic clinic. Students receive written and in-person instruction and training with full-time faculty in preparation for these didactic and clinical assignments. Protocols in the DDS clinic manual (on site) serve as a resource for their use during clinic instruction. The department faculty who serve as course directors for the DDS courses meet with the GTAs on a regular basis during each semester to review seminar material and act as resource.

GTAs receive teaching evaluations by the DDS students each semester. Course directors also directly observe GTA performance and provide personal feedback to improve their performance.

**Table 6. Department of Orthodontics Master Program
Graduate Teaching Assistant Duties**

YEAR 1

Summer Semester		
Course	Direction	Duties/Goals
DENT 126 Growth and Development	Dr. H. Garland Hershey	Lead small group (~10 students per group) seminar discussions of course material for DDS1 students.

YEAR 2

Fall Semester		
Course	Direction	Duties/Goals
DENT 206 Applied Growth and Development	Dr. Sylvia A. Frazier-Bowers	Lead small group (~10 students per group) seminar discussions of course material for DDS2 students.

Spring Semester		
Course	Direction	Duties/Goals
DENT 213 Biomechanics and Preclinical Orthodontics	Dr. H. Garland Hershey	Lead small group (~10 students per group) seminar discussions of course material for DDS2 students. Provide direct laboratory instruction for groups of approximately ten DDS2 dental students.

Summer Semester		
Course	Direction	Duties/Goals
DENT 234X Clinical Orthodontics	Dr. Tate H. Jackson	Provide direct and complete clinical supervision of DDS2 and DDS3 dental students treating simple and comprehensive orthodontic cases.

YEAR 3

Fall Semester		
Course	Direction	Duties/Goals
DENT 334F/DENT 434F Clinical Orthodontics	Dr. Tate H. Jackson	Provide direct and complete clinical supervision of DDS3 and DDS4 dental students treating simple and comprehensive orthodontic cases.
DENT 305 Growth and Development	Dr. Tung T. Nguyen and Dr. Tate H. Jackson	Lead small group (~10 students per group) seminar discussions of course material for DDS3 students.

Spring Semester		
Course	Direction	Duties/Goals
DENT 334S/DENT 434S Clinical Orthodontics	Dr. Tate H. Jackson	Provide direct and complete clinical supervision of DDS3 and DDS4 dental students treating simple and comprehensive orthodontic cases.

9. Faculty Strengths and Areas of Concern

Faculty have been teaching in the department for an average of 14 years (range .25 to 43 years), demonstrating the commitment and collegiality of our members. In summary the program is fortunate to have a talented and long-standing cadre of full and part-time faculty who are committed to upholding the mission of preparing residents who will demonstrate excellence in their practice. All full time faculty are engaged in research and are committed to nurture the critical thinking of residents. The major area of concern is the length of time it has taken for the search for an additional faculty member.

D. Students

1. Admission

The department selection, review, and admissions committee is comprised of all full-time faculty members. The program director oversees the multi-step process for selecting candidates for the advanced education program by establishing the committee and the internal deadlines for each step. Each application is reviewed by two faculty members for merit using criteria including class standing, grade point average, letters of recommendation, past personal and professional accomplishments, and other pertinent information deemed important by the faculty in the department. The GRE is required and scores are also considered in the overall assessment of applicants. Interviews are offered to candidates selected by committee consensus, and each candidate is individually interviewed by all committee members using a one-on-one format. While residents do not participate in the confidential final ranking of candidates, their input is formally solicited and considered during the committee's deliberations. After all candidates are interviewed, a rank order list of candidates is developed by consensus of the entire selection committee. The rank list is submitted to MATCH by the Program Director. Applicants who successfully match to our program are required to submit applications to the Graduate School which oversees aspects of the education for the master's degree.

2. Academic Environment

See General Student Overview. The Orthodontic program provides a rich and welcoming environment for students. Graduate students are provided with their own desk space in the residents' room and basic technical and office needs are provided by the program. The faculty strive to be approachable by the students and adhere to an open door policy. Students are encouraged and invited to talk with individual faculty members or to all faculty members regarding suggestions, comments, concerns or any other problems.

The UNC Orthodontic Program occupies 3,869 square feet of clinical space with 21 chairs, a 582 square foot patient waiting area, a 714 square foot resident room, a 536 square foot laboratory, a 1959 square foot faculty office space, and two seminar rooms with 574 square feet. Thus, both the space and facility are adequate for housing 18 residents.

A number of factors should be mentioned as important contributors to the success the department has achieved in our five decades of existence. The first three are environmental or “extra departmental.” The remaining one is the example of departmental programs that we believe are worthy of specific mention.

- a) The location of the department within a dental school widely regarded as one of the most respected in the world. The school has long valued the department and allowed it to pursue the teaching, research and service programs that have brought us to our current level of achievement. Perhaps the most critical contributor to departmental success has been our ability to attract and retain a group of academically strong faculty with sustained contributions across a wide range of professional activity.
- b) The position of the dental school within an institution perennially ranked as a top five public university. The department and school have long been recognized and valued by the university as academically strong contributors to university success. Department faculty have benefited from working with outstanding colleagues not only in the other health disciplines across the campus but with interinstitutional collaborators.
- c) The location of the university in the Research Triangle has facilitated collaboration with colleagues outside the university in related fields and allowed our faculty to use resources located within Research Triangle that are simply not available on campus.
- d) Within the department, the orthodontic resident representatives participate weekly in departmental meetings to provide feedbacks on daily operations. The residents also reviewed the course contents in July 2015 and presented their recommendations to the annual department retreat on July 10th 2015. This feedback will be considered in improving future curriculum.

3. Alumni

Results of exit interviews, alumni surveys, and performance on the Phase II written exam of the American Board of Orthodontics demonstrate that we are achieving program goals. With the implementation of new certification criteria by the American Board of Orthodontics, residents are identifying potential cases early in their residency with the intent of submitting them for their Initial Certifying Exam (ICE). In the past five years (2010-2014), an average of 70% of graduates have received Diplomate status, which is greater than the past record of 30%.

a.) Research and Professional Awards Received by Alumni FY 2010-2011 thru FY 2014-2015

FY10-11	Kristen	Fritz	Student Research Award, American Academy of Dental Sleep Medicine
FY10-11	Matthew	Olmsted	Research Excellence Award, American Academy of Dental Sleep Medicine
FY10-11	Christopher	Canales	Graduate Student Research Grant, Southern Association of Orthodontists
FY10-11	Lindsey	McCarthy	Graduate Student Research Grant, Southern Association of Orthodontists
FY10-11	Kervin	Mack	Graduate Student Research Grant, Southern Association of Orthodontists
FY10-11	Dennis	Weber	Graduate Student Research Grant, Southern Association of Orthodontists
FY11-12	Maura	Slack	Proctor and Gamble Research Grant
FY11-12	Gibson	McCall	Graduate Student Research Grant, Southern Association of Orthodontists
FY11-12	Crystal	Cox	Graduate Student Research Grant, Southern Association of Orthodontists
FY11-12	Matthew	Larson	AAO Charley Schultz Resident Scholar Awards – Clinical Research
FY11-12	Neker	Bernuy	AAO Joseph E. Johnson Clinical Awards for Table Clinic
			Graduate Student Research Grant, Southern Association of Orthodontists
			Graduate Student Research Grant, Southern Association of Orthodontists
			Orthodontics Self-Study

FY11-12	Cameron	Walker	Graduate Student Research Grant, Southern Association of Orthodontists
FY12-13	Megan	LeCornu	Graduate Student Research Grant, Southern Association of Orthodontists
FY12-13	Lindsay	Golubic	Graduate Student Research Grant, Southern Association of Orthodontists
FY13-14	Richard	Uhlir	Graduate Student Research Grant, Southern Association of Orthodontists AAO Charley Schultz Resident Scholar Awards – Basic Research
FY13-14	James	Martin	Graduate Student Research Grant, Southern Association of Orthodontists
FY13-14	Michael	Kelly	Research Impact Award, Graduate School UNC-CH
FY13-14	Megan	LeCornu	Graduate Student Research Grant, Southern Association of Orthodontists
FY13-14	Stephanie	Rhoads	1st place Scientific Poster Competition 40th Moyers Symposium American Association of Orthodontists -Joseph E. Johnson Table Clinic Research Award
FY14-15	Dana	Tang	Daniel M. Laskin Publication Award, Oral and Maxillofacial Surgery Foundation
FY14-15	Tanya	Al-Talib	Graduate Student Research Grant, Southern Association of Orthodontists
FY14-15	Matthew	Brown	Graduate Student Research Grant, Southern Association of Orthodontists
FY14-15	Camille	Guez	Graduate Student Research Grant, Southern Association of Orthodontists
FY14-15	Thomas	Covington	Graduate Student Research Grant, Southern Association of Orthodontists
FY14-15	Heather	Hendricks	Graduate Student Research Grant, Southern Association of Orthodontists AAO Charley Schultz Resident Scholar Awards – Basic Research FASEB MARC Travel Award

b.) Publications of students (1st or co-author) in FY 2010-2011 thru FY 2014-2015. Students' names are in bold.

2011

Klein KP, Brown MW, Miller KT, Proffit WR. In-office distance learning for practitioners. *Am J Orthod Dentofac Orthop* 140:126-132, 2011.

2012

Klein KP, Hannum WM, Koroluk LD, Proffit WR. Interactive distance learning for orthodontic residents: utilization and acceptability. *Am J Orthod Dentofac Orthop*, 2012 Mar; 141(3):378-85.

Klein KP, Hannum WM, Proffit WR. Interactive distance learning in post-doctoral education: problems and potential solutions. *J Dent Education* 76:322-329, 2012.

Ko CC, Rocha E, **Larson M**. Past, present, and future of finite element analysis in dentistry. In: Moratal D, ed., Finite Element Analysis - From Biomedical Applications to Industrial Developments. InTech-Open Access: www.intechopen.com. Croatia, 2012: 3-24.

2013

Canales C, Larson M, Grauer D, Sheats R, Stevens C, Ko CC. A novel biomechanical model assessing orthodontic, continuous archwire activation. *Amer J Orthod Dentofac Orthoped* 2013; 143(2):281-90. NIHMSID: NIHMS433195. Publ. IDYMOD4199.

Canales C, Larson M, Grauer D, Sheats R, Stevens C, Ko CC. A novel biomechanical model assessing orthodontic, continuous archwire activation. *Am J Orthod Dentofacial Orthop*. 2013 Feb. 143(2):281-90. NIHMSID: NIHMS433195. Publ. IDYMOD4199.

Hendricks HM, Lee, P and Frazier-Bowers SA. *PTHIR* Alterations in Primary Failure of Eruption of Anterior Dentition. *J Dent Res* SI, 2013.

Jackson TH, Mitroff SR, Clark K, Proffit WR, Lee JY, Nguyen TT. Face symmetry assessment abilities: clinical implications for diagnosing asymmetry. *Am J Orthod Dentofacial Orthop* 2013; 144:663-71. PMID: PMC4017242

Jackson TH, Clark K, Mitroff SR. Enhanced facial symmetry assessment in orthodontists. *Vis cogn* 2013 ;21(7) . doi: 10.1080/13506285.2013.832450. PMID: PMC3851030

Jackson T, Nguyen T, Clark K, Lee J, Proffit W, and Mitroff S. Characterizing Clinical Skill Acquisition: Face Symmetry Assessment Abilities in Orthodontists. *J Dent Res* 2013; 91 (Spec Iss B): 166452.

Mack KB, Phillips C, Jain N, Koroluk LD. Relationship between body mass index percentile and skeletal maturation and dental development in orthodontic patients. *Am J Orthod Dentofac Orthop* 2013; 143(4) 448.

Proffit WR, **Jackson TH**, Turvey TA. Changes in the pattern of patients receiving surgical-orthodontic treatment. *Am J Orthod Dentofacial Orthop* 2013;143:793-98. PMID: PMC4034071

Rhoads SG, **Hendricks HM**, Frazier-Bowers SA. Establishing the diagnostic criteria for eruption disorders based on genetic and clinical data. *Am J Orthod Dentofacial Orthop* August 2013;144:194-202.

Rhoads SG, **Hendricks HM**, Frazier-Bowers SA. Establishing the diagnostic criteria for eruption disorders based on genetic and clinical data. *Am J Orthod Dentofacial Orthop* 2013;144:194-202.

Slack M, Swift E, Rossouw E, Phillips C. Tooth whitening in the orthodontic practice: a survey of orthodontists. *Am J Orthod Dentofac Orthop* 2013; 143(4 Suppl) S64-71.

Walker D, Cevidanes L, Schilling J, Ludlow J, Lim P, Styner M, Nguyen T, Baranowski D, Paniagua B, and Benavides E. TMJ Osteoarthritis : A Clinical and CBCT Investigation. *J Dent Res* 2013; 91 (Spec Iss B): 166452.

Weber DJ, Koroluk LD, Phillips C, Nguyen T, Proffit WR. Clinical effectiveness and efficiency of a customized versus conventional orthodontic bracket systems. *J Clin Orthod* 2013; 47:261-6

2014

Cevidanes LH, **Walker D**, Schilling J, Sugai J, Giannobile WV, Paniagua B, Benavides E, Zhu H, Marron JS, Jung B, Baranowski D, Rhodes J, Ludlow JB, Nackley A, Lim PF, Nguyen T, Goncalves J, Wolford L, Kapila S, Styner M. 3D Osteoarthritic Changes in TMJ Condylar Morphology Correlates with Specific Systemic and Local Biomarkers of Disease. *Osteoarthritis and Cartilage*. 2014; 22(10):1657-67.

Cox, C, Nguyen T, Koroluk L, Ko CC. In Vivo Force Decay of Niti Closed Coil Springs. *Am J Orthod Dentofacial Orthop* 2014;[145](#):505–13. PMID: PMC3979479

Frazier-Bowers SA, **Hendricks HM**, Wright JT, Lee J, Long K, Dibble CF, Bencharit S. Novel mutations in *PTH1R* associated with primary failure of eruption and osteoarthritis. *J Dent Res* 2014; 93:134-9. PMID: PMC3895335

Hendricks HM, Divaris K, Bencharit S, Wright JT, Frazier-Bowers SA. Candidate Gene Analysis of the TNFSF11 gene in Primary Failure of Eruption. FASEB 2014. (Abstract not published.)

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c.) Employment and Professional Contributions of Alumni FY 2010-2011 thru FY 2014-2015

Resident	Location	Private Practice	ABO Exam
2011			
Mack, Kervin Brandon	Burlington, NC	YES	PASSED
McCarthy, Lindsey Eidson	Charlotte, NC	YES	
Olmsted, Matthew John	Greensboro, NC	UNC Adjunct Faculty	PASSED
Canales, Christopher	Alabaster, AL	YES	PASSED
Weber, Dennis	Fleming Island, FL	YES	PASSED
Klein, Katherine Pennington	Boston, MA	YES	PASSED
2012			
Slack, Maura Elisabeth	Port Charlotte, FL	YES	
McCall, Glenn Gibson	Greenville, NC	UNC Adjunct Faculty	PASSED
CoYes, Crystal Renee	Wilson, NC	YES	
Walker, Cameron	Overland Park, KS	YES	PASSED
Larson, Matthew	Eau Clair, WI	YES	PASSED
2013			
Rhoads, Stephanie	Cranberry, PA	YES	PASSED
Le Cornu, Megan	Santa Clarita, CA	YES	PASSED
Bernuy, Neker Esteban	San Antonio, TX	YES	PASSED
Jackson, Tate	Chapel Hill, NC	UNC Faculty	PASSED
Kessel, Neil	AFB Travis, CA	Army	PASSED
Walker, David	Morehead City, NC	YES	PASSED

Orthodontics Self-Study

2014

Hunter, Ross	Woodland, TX	YES	
Kelly, Michael	Middletown, Ct	YES	PASSED
Martin, James	Gainesville, GA	YES	PASSED
Tang, Dana	San Antonio, TX	YES	PASSED
Uhlir, Richard	Chapel HILL, NC	YES	PASSED
Weber, Peter	Wesley Chapel , FL	YES	PASSED

2015

Covington, Thomas	Wilmington, NC	YES	
Al-Talib, Tanya	Las Vegas, NV	YES	
Brown, Matt	Kinston, NC	YES	
Guez, Camille	Carpentras, France	YES	
Scherer, Jason	Canton, Ohio	YES	
Hendricks, Heather	Michigan ,Ann Arbor		Craniofacial Fellowship

E. Leadership and Support

See General Leadership and Support overview.

1. Administrative Support

The Department of Orthodontics has limited state support for administrative, clerical, and secretarial positions. Currently, only one of the 10.5 positions (Department Manager) is funded by state dollars. The remainder of these positions are supported from the department's clinic revenue. Of the 10.5 positions, two are lab technicians, four are dental assistants, and one manages a specialized Dentofacial Deformities clinic shared between the Department of Orthodontics and Oral and Maxillofacial Surgery. This leaves three positions (Department Manager, Clinic Manager, and Patient Care Support/Receptionist) to maintain the daily functions of a large graduate clinic (which trains 18 residents) and to take care of financial, administrative, and clerical duties. Additional support/administrative staff would improve resident education and improve the quality of patient care. Additional administrative support would help coordinate the didactic and clinical missions of the department and alleviate the time that faculty spend on clerical/administrative tasks to focus on the development of teaching material and scholarly research. Teaching, clinical and research activities are compromised as a result of the shortage of support staff.

2. Facilities

The graduate orthodontic clinic is equipped with 21 chairs, each with a computer with internet access. A separate attending office, two consultation rooms (one of which also functions as an imaging room), dedicated photography space, and sterilization facilities are located within the clinic. A dedicated orthodontic laboratory, equipped with a 3D printer, is located adjacent to the clinic.

All full-time faculty members have private offices adjacent to the clinical facilities, and the department has primary use of two nearby seminar rooms that are equipped with digital projection technology. Teleconferencing capabilities are available within the department and video conferencing technology is easily accessible one floor above.

- A large secured office space provides each resident with a cubicle for study and computer connection. It also houses a small library of texts to supplement department holdings in faculty offices.
- There is a separate office for the Department Manager equipped with a photocopier, fax machine and scanner. The Clinic Manager has a private, HIPAA-compliant office within the graduate orthodontic clinic.
- A 3D imaging lab serves as research center for faculty and residents, but is also used to teach residents emerging 3D technology.
- Cloud-based software is becoming an essential requirement in orthodontic patient care and education. Information Technology (IT) and server support is lacking for much of the software needed for patient management and education.

F. The Future

1. Program Size

Despite recent decreases in state-funded support (a trend assumed to continue in the coming five-to-ten years), the program will maintain the current enrollment of graduate students. A focused dual track PhD/Certificate program will be created with the twin goals of: 1) diversifying the program to attract a broader and educator-qualified applicant pool and 2) adding the potential for an increase in enrollment with externally-funded students.

The program has enjoyed a strong national and international reputation for both excellent scholarship and for being an outstanding educational program with a diverse and productive faculty. The faculty has continuously held NIH R01 funding since 1978. Recently, some senior faculty have retired or assumed SOD administrative responsibilities. The program has added one tenure track junior faculty member in 2015. An additional open rank position is actively being recruited with the goal of a full-time hire by the third quarter of 2015. The addition of these two faculty members will allow the program to support its mission, and more specifically, to increase research, education, and patient care focused on subspecialty treatment (e.g. treatment of patients with craniofacial anomalies) and inter-professional treatment.

Administrative, clinical, and technical auxiliary staff must be increased to support the mission of the program over the coming five- and ten-year time horizons. An administrative patient care coordinator to aid in the distribution and clerical management of patients treated in teaching clinics is actively being recruited, with the goal of a full-time hire by the end of the third quarter of 2015. Long-term planning for additional staff support includes step-wise increases following future additions in faculty and graduate students.

Resources

The specialty of orthodontics is a field experiencing an explosive growth in the use of new technology. Accordingly, the standard of care is rapidly evolving. In order to maintain an educational program teaching the current best methods of care and generating new knowledge with novel research, the use of emerging technology and the staff to support that technology must be increased. Physical plant investments (e.g., 3D imaging and fabrication tools), new auxiliary support staff to manage technology resources, and new faculty with technology expertise all must be supported. Without these financial, human, and physical resources, it will be difficult for the program to fulfill its mission, grow, and evolve.

Curricular Changes

New clinical techniques, consistent with emerging technology (e.g., the use of 3D printed models for clinical appliance fabrication) will be incorporated into the curriculum. These changes will be addressed through the creation of a departmental plan and timeline that sets measurable goals and deadlines. Implementation of new techniques will be coordinated by individual full-time and adjunct faculty members, and measure of outcomes will take place centrally by full-time faculty members under the direction of the Graduate Program Director.

Quality Improvement of Graduate Education

In addition to the increases in faculty, staff, and technological resources described above, a comprehensive review and re-invigoration of both clinical and didactic curricula would be of great benefit. Given the technology-driven changes occurring in the profession, a comprehensive evaluation and plan to update not only educational content, but also educational methodology, will ensure that the program remains in the upper echelon regionally, nationally, and internationally.

Importantly, an increase in common resources for the School of Dentistry Graduate Programs is essential to facilitate these goals. Central resources in terms of educational specialists and technical support are needed for curriculum re-invigoration and methodological advances (e.g. the production of self-directed teaching materials).

Student Qualifications

Financial pressure on graduates of dental education continues to increase and to factor prominently in students' selection of post-doctoral training programs and in the decision to choose an academic career or private practice. In order to continue to attract the most qualified graduate students, an affordable balance between tuition, fees, and student stipends must be maintained. This balance must compare favorably to peer institutions regionally and nationally to offer a competitive advantage. The program will ensure that in addition to fulfilling educational and research missions, internal funding will be actively pursued by increasing efficiency in teaching clinics to help support the cost of graduate education. Due to central operation of the SOD financial office, the department has lost hundreds of thousands of dollars of income in 2015. The department would like to negotiate with the administrators to secure our financial income, which can be used to strengthen our program for future competition.

Additionally, post-doctoral observer externship opportunities will continue to be made available and promoted. These ten month opportunities are intended to provide prospective and current foreign trained orthodontists with extended observation opportunities in all aspects of the program. The program benefits by attracting and interacting with highly-motivated national and international scholars who are more likely to have diverse backgrounds and interests since they are seeking an externship opportunity.

Racial, ethnic, and gender diversity in the graduate program

The program adheres strictly to both the University and the School of Dentistry policies regarding non-discrimination. Additionally, a purposeful discussion of diversity in all aspects, including but not limited to age, gender, race, ethnic background, and life experience, takes place during the annual application and selection process regarding individual applicants and overall class composition for each graduating cohort.

2. Quality of mentoring

Graduate Students: Semi-annual reviews of students will continue with an increased emphasis on the establishment of short and long-term goals for educational, research, and professional activities.

Additionally, a cohort advisor for each graduating year of students will be assigned to assist each class in navigating the program successfully. These advisors will be full-time and part-time faculty members.

Faculty: Junior faculty development will be guided by a senior faculty member from the program in conjunction with a mentoring team composed of members of the University community. Guidance will include scholarship, teaching, administrative, and service support in pursuit of promotion and tenure. Additionally, support will be provided for professional development (e.g., attending the Institute for Teaching and Learning) and formal education opportunities. Junior faculty will also be supported in seeking extramural support for professional development (e.g., American Association of Orthodontist Foundation Fellowships, NIH). Policies will be enforced to help protect dedicated research and scholarship time through equitable distribution of program responsibilities and duties.

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University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
PERIODONTOLOGY



Graduate School Review Site Visit
September 8-10, 2015



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Advanced Education Program in Periodontology

A. Program Overview

1. Program's Mission, Goals, and Objectives

We seek to provide excellence in education through innovation, applied technology and by creating an atmosphere for learning and personal career development. Our department is committed to advancing the science of periodontology and creating new knowledge. We seek to serve the community, the state and the profession by providing and fostering periodontal care to improve oral and overall health. We aspire to educate high quality individuals not only to serve as outstanding clinicians and community leaders, but to also be academic leaders who can advance the field of periodontology.

This graduate program and clinic residency program is a 36-month educational experience that is structured to meet or exceed the Accreditation Standards of the Commission of Dental Accreditation. This program provides an opportunity to participate in interdisciplinary working relationships with other members of the health care team. We embrace the American Dental Association's definition of the specialty: *Periodontics is that specialty of dentistry which encompasses the prevention, diagnosis and treatment of diseases of the supporting and surrounding tissues of the teeth or their substitutes and the maintenance of the health, function and esthetics of these structures and tissues. (Adopted December 1992)*

The program's mission is to graduate individuals in the specialty of Periodontology who exemplify and demonstrate the highest skills and knowledge in the field. To that end we seek to offer a rigorous graduate experience that:

- Comprehensively trains dentists in accordance with standards set forth by the Commission on Dental Accreditation and the American Academy of Periodontology.
- Educates clinical scholars and scholarly clinicians, who can make evidence-based decisions on the periodontal care of patients and/or populations of North Carolina, the nation and the world.
- Prepares and qualifies graduates for successful completion of the American Board of Periodontology certifying examination.
- Fosters commitments to teaching and community engagement and service.
- Improves the quality of periodontal diagnosis, treatment and health for the people of North Carolina and beyond.

Mechanisms for Assessing Program Mission

See General Program Overview

2. Demand/Need for Program

There is a need to educate future specialists in diagnosis and treatment of periodontal diseases and conditions to meet the demand for this aspect of health care in the state of North Carolina. UNC-CH has been the only dental school in the state with a periodontology specialty training program for almost 50 years. In addition, the specialty program gives support to predoctoral dental education at UNC for advanced cases of periodontal diseases and surgical implant dentistry. As indicated by Waldman & Chaudhry in their commentary on the ADA report on Distribution of Dentists in the United States for the year 2006, there is a shortage of periodontists in particular regions and states of the nation. That includes North Carolina, with a ratio of Periodontists/100,000 Adult Population of approximately 1.5 since 1991, compared to a mean of 2.1 (range 0.7 to 4.6) for the U.S. (Waldman & Chaudhry, 2009).

For the past decade, the program has received an average of 90-100 applications every year from dentists around the world for three to four available student enrollees.

The reputation of UNC School of Dentistry is excellent, being considered among the top dental schools in the nation. The graduate program at UNC is world renowned for its high standards. Our faculty is known nationally and internationally, mostly for their research excellence. Faculty credentials are of high quality and our visibility is noted worldwide. The physical facilities of UNC are exceptional. Furthermore, our patient population is very large and diverse. In addition, UNC SOD has virtually all of the specialty programs approved by the ADA. We take pride in graduating periodontists of the highest standards, as judged by their high rate of success in passing the American Board of Periodontology. Approximately 90% of our graduates who took the ABP examination passed both phases of the exam becoming Diplomates of the American Board of Periodontology.

3. Interdisciplinary Activities

There are many opportunities for the residents in Periodontology to interact with other specialties and dental students in general.

- a. OBIO 702 – Topics in Oral Biology – students are exposed to various aspects of biomedical and dental research being conducted at UNC SOD and campus wide.
- b. Hospital Anesthesiology Rotation – residents rotate through UNC Hospital Anesthesiology for 3 weeks, full time, where they interact with various departments in medicine – in the operating room where they are exposed to the anesthesiology specialty under both general and intra-venous forms of anesthesia.
- c. VA Hospital Rotation – residents actively see patients at the Durham VA for the diagnosis and treatment of periodontal diseases and conditions. These patients are usually severely medically compromised. In addition, the periodontology residents interact with other dental and medical specialties in that facility.
- d. Oral Pathology Rotation – it occurs once a week, on a rotation basis, here our residents attend the pathology literature seminar, clinic and the histopathology laboratory, learning all aspects of this specialty.

4. Interinstitutional Perspective

UNC's graduate program in Periodontology is the only one in the state of North Carolina. Direct comparison of the quality of the UNC program to the quality of other programs requires outcome measures from those programs that are not readily available. However, there are indirect outcome measures that indicate that the UNC program compares favorably with other programs. One such measure is the performance of our graduate students on the certifying examination of the American Board of Periodontology. Approximately 90% of our graduates who took the ABP examination passed both phases of the exam becoming Diplomates of the American Board of Periodontology.

The unique strengths of the UNC Periodontology program are based on five important elements:

- 1) The department has a greater than average number of faculty, currently seven full-time and three part-time faculty.
- 2) The UNC Periodontology faculty represents a balance of talented clinicians and researchers in the field.
- 3) Residents in our program are assured extensive cross training by a curriculum that takes advantage of the full complement of dentistry fields represented in the UNC School of Dentistry.
- 4) The availability of a large patient pool that ensures that residents will diagnose, treat and manage cases representing a broad spectrum of diseases and conditions.
- 5) The state of the art facilities and equipment.

Unlike many programs that typically have twenty or fewer applicants, UNC periodontology receives on the average 100 applications annually for only three or four positions.

B. Curriculum

1. Course Review and Development

The department convenes yearly curriculum meetings to discuss the Graduate program courses and curriculum as a whole. In this meeting, the faculty evaluates the current performance or adequacy of the department's courses, equipment and educational materials to produce scholars with a thorough knowledge of the field of periodontology, excellent clinical skills, and the ability to make evidence based clinical decisions. Weaknesses and strengths are discussed and curriculum/course changes are planned to address issues that come up. The committee uses several indicators of performance: student/graduate performance on Mock Boards and the Mock American Board of Periodontology certifying examination, course evaluations, informal student feedback, and exit interviews.

2. Course Sequence and Description

This section describes the program specific courses. The course directors for the courses have been relatively stable over the past five years and the number of enrolled students per course varies only slightly from year to year since the number of students in each year of the program is stable. The number of students varies from three to nine, depending on which years of the program participate in the course. Course syllabi will be available on site.

Summer

1st Year

DENG 707	Regional Anatomy
DENG 720	Applied Pharmacology
OBIO 720	Topics in Oral Biology
PERI 710	Periodontal Therapy

Fall

Title

1st Year

DENG 701	Introduction to Research Design
DENG 704	Interdisciplinary Care Conference
OBIO 721	Directed Studies In Oral Biology - Inflammation
OBIO 722	Directed Studies In Oral Biology - ECM Component
ORPA 762	Oral and Maxillofacial Pathology Seminar
PERI 711	Periodontal Therapy
PERI 721	Case Analysis
PERI 761	Seminar in Periodontology
PERI 820	Clinical Implantology
PERI 893	Advanced Clinical Periodontics and Clinical Practice

2nd Year

DENG 703 Applied Dental Research Methods
DENG 704 Interdisciplinary Care Conference
PERI 721 Case Analysis
PERI 761 Seminar in Periodontology
Advanced Clinical Periodontics and
PERI 893 Clinical Practice

3rd Year +

PERI 993 Master's Research and Thesis

Spring

1st Year

DENG 702 Biostatistics
DENG 704 Interdisciplinary Care Conference
DENG 751 Advanced Pain and Anxiety Control
ORAD 706 Advanced Oral Radiology
Oral and Maxillofacial Pathology
ORPA 763 Seminar
PERI 721 Case Analysis
PERI 761 Seminar in Periodontology
PERI 820 Clinical Implantology
Advanced Clinical Periodontics and
PERI 893 Clinical Practice

2nd Year

DENG 704 Interdisciplinary Care Conference
PERI 721 Case Analysis
PERI 761 Seminar in Periodontology
Advanced Clinical Periodontics and
PERI 893 Clinical Practice
OBIO 723 Directed Studies in Oral Biology -
(Neuroscience) Neuroscience
OBIO 724 Directed Studies in Oral Biology -
(Neuroscience) Oralfacial Pain Conditions

3rd Year +

PERI 993 Master's Research and Thesis

PERI 711 Periodontal Therapy
(2 Credit) Fall 1st Yr
Course Director: Dr. Antonio Moretti

This course presents the basic topics of periodontal therapy. This two-semester course will provide first year residents with the theoretical and practical basis to diagnose and manage periodontal disease. Different aspects of periodontal therapy will be discussed and presented, including treatment planning, surgical and non-surgical treatment modalities, evaluation of therapeutic outcomes as well as interactions with other dental and medical specialties. The course structure includes lectures, case discussions and hands-on training.

PERI 721 Case Analysis Seminar
(2 Credit) Fall, Spring Semesters 1st, 2nd Yrs
Course Director: Dr. Antonio Moretti

The weekly Case Analysis Seminars serve as a venue in which residents present their selected graduate clinic cases. The seminar focus on the diagnosis and management of periodontal diseases and conditions as discussed within the context of specific patient cases. For each session, a resident will present and lead the discussion using appropriate case documentation and materials. The seminar stresses clinical decision-making, evidence, technique and presentation skills.

PERI 761 Seminar in Periodontology: Literature Review I
(2 Credit) Fall, Spring Semesters 1st, 2nd Yrs
Course Director: Dr. Antonio Moretti

This Seminar Series is focused on the review of classic literature in the specialty of periodontology. This foundational educational experience builds both knowledge and understanding on the most commonly referred scientific publications pertaining to the specialty. Participants learn how to develop an appreciation for the historical work and critically assess the papers based on past and present knowledge on the topic. First, Second and Third Year residents are expected to attend and actively participate in discussions during this seminar series. The seminar is offered during part of the Summer, the whole Fall and whole Spring semesters with a total of approximately 40 weekly two-hour sessions. The full series of topics is repeated yearly. In average 11 to 15 articles are discussed per week with the presence of one or two faculty members and one leading resident

PERI 820 Introduction to Dental Implants
(1 Credit) Fall, Spring Semesters 1st Yr
Course Director: Dr. Thiago Morelli

Introductory course in dental implant therapy is designed to complement previous predoctoral exposure to implant treatment. It consists of a series of lectures supported by projected material presented by faculty in departments of Prosthodontics, Periodontology, Oral Surgery and Radiology.

PERI 893 Clinical Periodontics
(2-6 Credits) Summer (Audit), Fall, Spring Semesters 1st, 2nd Yrs, 3rd Yr (Audit)
Course Director: Dr. Antonio Moretti

Course covers the prevention, diagnosis, management and treatment of diseases and conditions of the supporting and surrounding tissues of the teeth or their substitutes. The biology and development of the tooth (or implant)-supporting tissues, the etiology and pathogenesis of periodontal (and peri-implant) diseases and interventions for improving periodontal (and implant) health and esthetics are studied in depth.

PERI 993 Thesis Preparation
(3 credits) Fall, Spring Semesters 3rd Yr
Course Director: Dr. Antonio Moretti
Student research project is prepared for defense and publication.

3. Course Evaluation

Program specific course evaluation is an informal process consisting of feedback from students via e-mail and in person. In addition, exit interviews cover feedback on curriculum and courses. The program will be using electronic course evaluation software in the coming year. As a result of feedback from students, we are currently reformatting and updating the methodology and materials of our Classical Literature Seminars.

4. Requirements for Degree

See General Curriculum Overview. Both the ABP (American Board of Periodontology) Mock Board and Final Oral Comprehensive Examinations, take place in the Spring Semester of the third year:

ABP Mock Board:

The ABP mock board exam follows the guidelines set for the oral examination (Part 2) of the American Board of Periodontology <https://abperio.org/>. It is offered during the spring semester of the final year of residency and is conducted by at least three faculty examiners. The Graduate Program Director informs residents of the impending examination at least three months prior to the examination. The faculty examiners present a brief medical/dental history followed by images that may include natural teeth and/or implants, radiographs, intra and/or extra oral lesions, periodontal etiologic factors, surgical procedures, wound healing and/or results of therapy. Candidates are permitted to ask pertinent questions about the patient and request that a slide be revisited. Approximately three scenarios or “protocols” are presented during the mock board. Six skills are measured in each protocol (i.e., diagnosis, etiology, prognosis, treatment planning, selected therapy, evaluation of results/maintenance of therapy). Faculty examiners ask open-ended questions to obtain information on candidate skills. Candidates benefit by giving evidence-based answers and citing references to support the rationale. Candidates are expected to have expert knowledge of all currently acceptable modalities of therapy. The student’s performance is evaluated independently by each examiner using the rating scale below. The program director compiles the evaluation data and reports the final grade to the resident. The passing grade is defined as an average score of 3.

EVALUATION RATING SCALE DEFINITIONS

	Unsatisfactory (1)	Marginal (2)	Satisfactory (3)	Outstanding (4)
Diagnosis (intra-and extra-oral pathoses and Periodontal Dx) (1)	Dx is incorrect or incomplete and potentially harmful.	Dx is incomplete but safe	Dx is correct but not outstanding	Dx is correct and is thoroughly and impressively reasoned
Etiology (2)	Etiology that is incorrect or incomplete and potentially harmful.	Etiology is incomplete but safe	Etiology is correct but not outstanding	Etiology is correct and is thoroughly and impressively reasoned
Prognosis (3)	Prognosis that is incorrect or incomplete and potentially harmful.	Prognosis is incomplete but safe	Prognosis is correct but not outstanding	Prognosis is correct and is thoroughly and impressively reasoned
Treatment Planning (4)	Tx plan is incorrect or incomplete and potentially harmful.	Tx plan is incomplete but safe	Tx plan is correct but not outstanding	Tx plan is correct and is thoroughly and impressively reasoned
Selected Therapy (5)	Selected Therapy is incorrect or incomplete and potentially harmful.	Selected Therapy is incomplete but safe	Selected Therapy is correct but not outstanding	Selected Therapy is correct and is thoroughly and impressively reasoned
Evaluation and Maintenance of Therapy (6)	Evaluation and Maintenance of Therapy are incorrect or incomplete and potentially harmful.	Evaluation and Maintenance of Therapy are incomplete but safe	Evaluation and Maintenance of Therapy is correct but not outstanding	Evaluation and Maintenance of Therapy are correct and is thoroughly and impressively reasoned

Oral Comprehensive Examination:

The oral comprehensive examination evaluates the trainee’s depth and breadth of knowledge of basic oral biology, periodontology and supporting evidence. The main topics are as follows: (1) Epidemiology, (2) Physiology, (3) Histology, (4) Microbiology, (5) Immunology and (6) Pharmacology. The comprehensive oral examination is conducted by at least three Department of Periodontology faculty members. It is offered in the spring semester of the final year of residency. The Graduate Program Director informs residents of the impending examination at least 6 weeks prior to the examination. Thereafter, each examinee is allowed to query examiners as to the main topics that will be covered during the examination. The student’s performance is evaluated independently by each examiner using the rating scale below. The program director compiles the evaluation data and reports the final grade to the resident.

UNC Graduate Periodontology - Oral Competency Evaluation			
Resident:	Date:		
	Faculty:		
Topic	Above Expectations (Honors)	Met Expectations (Pass)	Inadequate (Fail)
Epidemiology			
Physiology			
Histology			
Microbiology			
Immunology			
Pharmacology			

Failure to pass either of the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program.

5. Evaluation of Progress of Students

See General Curriculum Overview.

Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, a comprehensive examination and performance reviews. The Academic Performance Committee (APC) meets biannually per ADA accreditation requirements to discuss the progress of each graduate student and consists of all full-time faculty members. Twice a year, each faculty member completes a “Resident Clinical Performance Evaluation Sheet” (available on site) for every resident. On this form, faculty rate the residents’ clinical performance, professionalism and time management on a scale of Honors, Pass, Low Pass and Fail. Additionally, clinical staff assesses residents’ interactions with staff, patients and colleagues, organizational skills and punctuality on a different form, the “Resident Clinical Evaluation Sheet” (available on site). While clinical staff members provide input in this process, they are not part of the APC.

Following submission of all data and review by the APC, a meeting with the Program Director and one faculty member is scheduled to discuss the results. Progress, accomplishments and concerns are discussed. The student is provided with a copy of the evaluation summary.

Informal evaluations take place during conferences, clinics, lectures and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination.

Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student’s transcript

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The global outcomes assessments and program improvements as submitted to the Southern Association of Colleges in January 2015 are given below.

Curriculum

Assessment: Faculty and staff evaluations of graduate students

Frequency: Biannually

Outcome: Overall didactic and clinical performance and progress of each student is evaluated by the Academic Performance Committee using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July.

Pass Rate – 2012-2015 100% Pass Rate

Action: Continue assessment method. Students performing below a satisfactory level are given an educational enhancement plan. If the educational enhancement plan is successfully completed, the student is allowed to proceed in the program but may be required to stay in the program for an extended time.

Assessment: Semester course and clinic evaluations by students

Frequency: Fall and Spring Semester.

Outcome: Course meets goals and expectations; faculty are available and effective instructors.

Action: Based on student evaluations, recommendations are made to modify/update course content, clinic activities, clinic and research schedules.

Assessment: Departmental meetings / Retreats

Frequency: Periodic departmental meetings are held year- round and departmental intensive retreats (one-day) are held every one to two years.

Outcome: The Program Director communicates with the graduate students, as changes in the program or curriculum are made based on departmental meetings.

Action: None. Minutes of the departmental meeting are maintained on file in the department

Patient Care

Assessment: Clinical case submissions

Frequency: (a) Weekly in Clinical Case Review Seminars

(b) By the end of the program. Each graduate student must submit six comprehensive clinical cases who have completed comprehensive periodontal treatment for faculty evaluation. These are submitted in written form with accompanying clinical documentation.

Outcome: (a) Immediate feedback given by participating faculty both informally and formally.

(b) The assigned faculty evaluator assesses the case diagnosis, treatment plan, documentation, clinical image quality and discussion, and gives an overall grade.

2012-2014: approximately 20% of submitted cases were unsatisfactory and a retake was required. 100% of all cases were eventually approved.

Action: Deficiencies must be resolved and resubmitted.

Assessment: Periodic case audits and record reviews

Frequency: Biannually

Outcome: A faculty preceptor audits each clinical case with the graduate student to assure timeliness, appropriateness and quality of care per postdoctoral (Advanced Education Program in Periodontics Manual) and institutional guidelines

Action: Deficiencies must be resolved. If deficiencies are noted, additional audits are performed to evaluate compliance during the next semester.

Educational Goals

Assessment: Exit Interviews

Frequency: Spring semester 3rd year

Outcome: Students' assessment of strengths and weaknesses of the program including didactic courses, clinics, facilities, staff and faculty.

Action: Findings are reviewed in detail by faculty and recommendations made to departmental administration.

Assessment: Written Comprehensive Examination (American Academy of Periodontology In- Service Examination)

Frequency: Spring semester 2nd year

Outcome: Graduate students are expected to score at or above the median (50%) national score.

2012-2014: all residents met expectations

Results are discussed with each student and students are counseled as to their strengths and any opportunities for improvement.

Action: As of 2014, students are required to take this exam and to retake the exam if score is below the national median. Student results are reviewed to identify opportunities for enhancement in program emphasis as well as to reaffirm areas of program strengths.

Assessment: Oral comprehensive examination

Frequency: Spring semester 3rd year

Outcome: The examination evaluates the student's depth and breadth of knowledge on fundamental topics that include but are not limited to: microbiology, immunology, inflammation, connective tissues, wound healing, epidemiology and evidence-based decision making. Open-ended questions are framed within the context of a clinical case or problem.

Faculty examiners complete individual evaluation forms regarding the graduate student's performance. The examiners discuss their appraisals and reach a consensus on the student's overall performance: strengths and weaknesses.

2012- 2014: all residents have taken and successfully passed the exam

Action: Student whose performance is unsatisfactory is given an educational enhancement plan and retakes the examination.

Assessment: Mock board examinations following the oral examination format of the American Board of Periodontology.

Frequency: Spring semester 3rd year as component of the Case Review Seminar

Outcome: Graduate students successfully pass the mock board examination.

2012- 2014: 100% of the residents successfully completed this requirement. One resident successfully passed the exam after sessions of educational enhancement.

Action: A student must repeat the mock board examination after appropriate educational enhancement with the faculty if performance is judged unsatisfactory.

Assessment: Alumni Surveys

Frequency: Every 5 years

Outcome: Alumni surveys are used to gain feedback from the program's graduates about their perceptions of our strengths and opportunities for improvement.

Action: Findings are reviewed in detail by faculty and recommendations made to departmental administration. Alumni survey will be distributed in 2015.

Assessment: American Board of Periodontology Diplomate Status

Frequency: Alumni Survey

Outcome: Diplomate status

2012-2014: 100% passed Part I of the ABP board to become board eligible. 40% passed Part II of the ABP board. Graduates have several years after graduation to take Part II.

Action: None

Research

Assessment: Research Progress; Oral Defense; Thesis submission; Research presentations, Manuscript publications, awards and scholarships

Frequency: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate School (Appendix W – UNC-CH Graduate School Handbook).

Outcome: Graduate student research culminating in a presentation, award scholarship and/or publication is documented in graduate student/resident or alumni files with the department.

2012-2014: 100% graduated on time

2013: 2 students received external research funding; 1 national research award

2012-2014: 5 peer reviewed publications

Action: Research progress will be evaluated each semester that a student is enrolled in PERI 993 by the student's research mentor.

C. Faculty

Eight full-time faculty members, listed below, serve as the core faculty for the graduate students. Three are board-certified in the specialty of Periodontology and Diplomates of the American Board of Periodontics and five have PhDs or DMSc (Massachusetts). Bio-sketches for full-time faculty are found on the flash drive.

1. Research Activities

The Department of Periodontology has many lines of research, several of which are being developed in the University of North Carolina Center for Oral and Systemic Diseases (COSD). The COSD hosts a team of clinicians, scientists, and educators conducting basic, translational, and clinical research designed to further understand how oral health impacts overall general health. The COSD conducts research in areas of cardiovascular diseases, obesity and diabetes, periodontal diseases, kidney disease and pregnancy problems.

Clinical trials and studies in the Department of Periodontology and COSD are conducted in the General and Oral Health Center (GO Health or GOHC) at the University of North Carolina School of Dentistry. The GO Health Center is affiliated with the Clinical Translation Research Center located in the School of Medicine and is part of the UNC TraCs Institute.

Recently, the Department of Periodontology has expanded its research portfolio to include efforts to culture the uncultivated and unrecognized segment of the oral microbiome and to study the association between the oral microbiome and carcinogenesis. Another recent line of research added to the Department was the study of the interplay between subgingival polymicrobial biofilms and mediators of the immuno-inflammatory host response *in situ* and the study of biomarkers of periodontal disease progression. Other active and exciting areas of research include genetics of periodontal diseases, epigenetic modifications of periodontal tissues, and functional genomics.

In addition to the lines of research described above, which are primarily funded by federal grants from the NIH and NIDCR, the Department of Periodontology also conducts several research projects in partnership with industry. Private partners that over the years have collaborated with the department include Johnson & Johnson, OraPharma, Philips and Zimmer Implants. The scope of these industry funding projects vary from testing new oral hygiene products such as toothpastes and local drug delivery devices to treat peri-implant infections to examining the bone transcriptome during osseointegration.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

Faculty Joint Appointment

No Periodontology Graduate Program have joint appointments.

2. Teaching Distribution

All faculty teach in both the DDS and graduate courses and clinics. Distribution of DDS and Graduate Course/Clinic teaching loads during the most recently completed academic year was based, first, on the amount of time each faculty member was contracted to spend teaching. The Faculty worked as a group to distribute teaching responsibilities for each semester within and between graduate and DDS classes based on several factors: the current needs of the department, the expectations of the faculty member, his/her role in the department, and his/her expertise. The Chair makes the final determination on Faculty teaching loads and the distribution within and between graduate and DDS courses and clinics.

3. Teaching Evaluation

The quality of course and clinic teaching is evaluated in several ways: informal feedback from students to the faculty member or the Program Director; feedback from the chief resident during departmental monthly meetings; and during exit interviews.

The department also looks to its students' performance on mock boards, comprehensive oral exams and weekly clinical case seminars to determine the quality of departmental teaching. Department curriculum meetings also address faculty performance and curriculum needs. Annually the department chair conducts a comprehensive review of each faculty member. This review process evaluates both teaching and administrative performance of faculty and includes self-evaluations, evaluation and feedback from the chair and evaluation and feedback from the Dean.

The department is looking to institute an online formal evaluation system that will not only address course and clinic teaching.

4. Teaching Innovation

The department has recently expanded the number of student/faculty one-on-one surgical experiences which has significantly raised the quality and depth of our clinical training program.

5. Faculty Mentoring/Support

See General Faculty Overview.

Department faculty in general and the Department Chair in particular, serve as mentors to both students and junior faculty. Faculty members also have their own development committees charged with advising the faculty member's professional development.

The Department's contributions to faculty development in teaching and research are many and can be ascertained by the successful track record of grants awarded to its junior and mid-career faculty. For instance, Dr. Thiago Morelli has recently been awarded a Mentored Patient-Oriented Research Career Development Award (K23) from the NIDCR to study the clinical relevance of minor allelic variants of the genes IL28B and IL29 with the expression of chronic periodontitis. This award will support the development of Dr. Morelli, a Clinical Assistant Professor in our department, into an independent clinical researcher. Under this award, Dr. Morelli will have 75% of his time protected for the development of his research project and to obtain additional training as a research clinician.

As another example, Dr. Julie Marchesan, a post-doctoral trainee in the department, was given full Department support in her application for a NIDCR Dentist Scientist Pathway to Independence Award (K99/R00), which has been recently resubmitted. Several senior members of the Department volunteered time and effort to mentor Dr. Marchesan during this application and, hopefully, will continue to act as mentors after the award is granted, including Dr. Steven Offenbacher (her primary mentor), Dr. Ricardo Teles and Dr. Silvana Barros, members of her mentoring team.

During annual reviews of the progress of the individual members of the department, the faculty meets in a private session with the chair of the department, Dr. Steven Offenbacher, when they provide their self-evaluation and a progress report of the activities in the previous academic year. During this interview, faculty members are encouraged to voice their plans for their career development and brainstorm about the best approaches to pursue their academic goals, including the pursuit of the next research grant and opportunities for additional training in teaching. The faculty is constantly encouraged to seek help from the many resources available to them through the University's Center for Faculty Excellence and the UNC TraCs Institute.

6. Faculty Teaching/Professional Awards (recognition) for FY 2010-2011 thru FY 2014-2015

Thiago Morelli

- 2014 The Educator Award - American Academy of Periodontology
- 2013 The Teaching Fellowship - American Academy of Periodontology Foundation
- 2013 American Academy of Periodontology Foundation Fellowship to the ADEA/AAL Institute for Teaching & Learning in the Health Professions
- 2010 The Abram and Sylvia Chasens Teaching and Research Fellowship – American Academy of Periodontology

Antonio Moretti

- 2010 AAP Award for Outstanding Teaching and Mentoring in Periodontics, American Academy of Periodontology

Steven Offenbacher

- 2013 W.R. Kenan, Jr., Distinguished Professorship

Jonathan Reside

- 2015 AAP Award for Outstanding Teaching and Mentoring in Periodontics, American Academy of Periodontology
- 2013 Richard F. Hunt Memorial Award for Excellence in Predoctoral Teaching, UNC School of Dentistry
The most prestigious teaching award given at the UNC School of Dentistry. The recipient is nominated and selected entirely by dental students.
- 2013 Certificate of Appreciation, UNC DDS Class of 2014
Award recipient selected by dental students within the Third-Year DDS Class to acknowledge appreciation of faculty efforts within the previous school year.

Ricardo Teles

- 2014 OraPharma Distinguished Professorship

7. Faculty Advising/Mentoring of Students

In addition to the school wide graduate orientation, periodontology residents receive specific student orientation within the department from the beginning of their training. The Program Manual (available on site) is reviewed in detail, students also receive training in intra-oral photography, and a two-day calibration training on how to obtain periodontal indices.

New residents are exposed to potential topics, areas of study and possible committee members in a research orientation session with the chair.

Faculty mentor students through various situations throughout their training. The resident's room encourages frequent impromptu and planned formal meetings between faculty and residents, where residents receive feedback and guidance for clinical, didactic and even research orientation. One on one surgical procedures are a hallmark of the program. The resident receives full and undivided attention in the caring of the patient with a focus on specific advanced techniques such as sinus grafting, multiple implant placement or soft tissue grafting. This allows for an in-depth professional mentoring relationship between faculty and residents.

Table 1. Faculty participation in Advising / Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-2011 thru FY 2014-2015

		<i>MS</i>	<i>MS</i>	<i>PhD</i>	<i>PhD</i>	<i>Non-MS</i>
		#Mentor	#Committee Member	#Mentor	#Committee Member	#Mentor
Barros, Silvana	Assoc. Prof.	4	3	3	2	0
Morelli, Thiago	Clin. Assist. Prof.	0	1	0	0	0
Moretti, Antonio	Clin. Assoc. Prof.	1	8	0	0	0
Offenbacher, Steven	Distinguished Prof.	1	6	2	5	
Reside, Jonathan	Clin. Assist. Prof.	0	2	0	0	0
Teles, Flavia	Res. Assoc. Prof.	1	0	1	0	1
Teles, Ricardo	Distinguished Prof.	1	0	7	1	0

** DDS/Short-Term Training/Other UNC degree program

8. Graduate Teaching Assistants

All graduate students in the Department of Periodontology serve as graduate teaching assistants (GTAs). All residents are trained to provide clinical instruction (as clinical teaching assistants) to predoctoral students. At the beginning of their specialty training, both the graduate program director and the predoctoral program director meet with the first-year residents to provide orientation in how to perform clinical instruction, consults, and dental emergencies. First year residents also receive a significant clinical calibration experience (which lasts approximately 12 hours) on periodontal indices such as (1) probing depth, (2) attachment loss, (3) plaque index, and (4) gingival index at the UNC SOD Go-Health Center and therefore are prepared to instruct DDS students in clinic. On average, each second and third year resident supervises the predoctoral clinic ½ day per week. First year residents are involved in predoctoral coverage to a lesser degree and usually with DDS 2 class. All residents are evaluated at the end of each semester in the same manner that the regular faculty members are evaluated via on-line course evaluation conducted and managed by the UNC SOD Academic Affairs. All dental students are encouraged to express their experiences with both the GTAs and faculty members. The evaluation reports are given to the graduate program director and then distributed to the residents twice-a-year. The dental student evaluations are part of the overall performance evaluation that the residents receive from the program director throughout the training.

Summer Orientation – Year 1		
Course	Direction	Duties/Goals
3-hour Orientation Session	Both DDS and Graduate Program Directors (Drs. J. Reside and A. Moretti)	Provide an overview of clinical teaching experiences and responsibilities throughout the program. Examine teaching approaches and philosophies.
12-hour Periodontal Indices Calibration	UNC SOD Go-Health Center Dr. Sally Mauriello	Train and calibrate residents on basic periodontal measurement records with live patients.

Fall Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

Spring Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

Summer Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

YEARS 2 and 3:

Fall Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

Spring Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

Summer Semester		
Course	Direction	Duties/Goals
DENT 236, 336, 436 Clinical Periodontology	Dr. Jonathan Reside and the department faculty members	Coverage of Pre-Doctoral Periodontology Clinics for: (1) periodontal diagnoses of diseases and conditions and (2) non-surgical periodontal therapy.

9. Faculty Strengths and Areas of Concern

Graduate faculty assessment is carried out in an Annual Faculty Review process, in weekly meetings between the chair and the program director, and in yearly faculty retreats. The Annual Faculty Review includes a comprehensive self-evaluation by each faculty member and corresponding evaluation by the chair. The chair meets with each faculty member, reviewing strengths and weaknesses, performance on goals, finalizing evaluation scores and setting goals for the coming year. The Chair presents the evaluation outcomes of each faculty member to the Dean and other Chairs for their review, comments and advice. Each faculty member is then presented with this feedback.

The Chair, along with the faculty, ensures that the strength and expertise of each member of the department is taken into consideration when assigning responsibilities, including graduate and predoctoral courses, clinic coverage, research responsibilities and service.

One of the greatest strengths of this department is that the faculty represents a mixture of the most talented clinicians and researchers in the field. Our students are exposed to a rich and full spectrum of educational experiences.

Another great strength is the collegial relationships among faculty, staff and residents.

D. Students

1. Admissions

A committee of seven full-time faculty members screens all the applications for admission to the graduate program. Approximately twenty candidates are invited for an interview with all faculty and graduate students. Criteria used for an offer of an interview are academic record, leadership record, letter of recommendation and personal statement. We accept individuals with a DDS or DMD from accredited dental schools in the US and highly regarded international dental schools. When the candidate is trained in an American or Canadian school, we look at those who have high GPA's and class rank (when available), and who have passed the National Dental Boards. For foreign trained dentists, we concentrate on the school they have attended and their recommendations. In general, preference is given to candidates with leadership qualities, scholarly accomplishments and with clinical, research or post-doctoral experiences. The admissions committee strives to admit classes representing a balance with regard to history and interests.

2. Academic Environment

The graduate program is very rigorous and demanding. Therefore, we strive to make students feel welcome and treat them as peers and future colleagues. In addition to the school wide events such as ice cream socials, Halloween parties, Dean's Holiday Breakfasts, and a number of diversity enrichment and inclusiveness activities, seminars, and other events, the department organizes social gatherings outside the SOD that are open to all members of the department, including faculty, students and staff. One takes place in the summer, when new residents join the department and another close to the holiday season.

It is the policy of the department to provide students with all the support needed for their transition into the new environment, particularly those who come from outside the state of NC and the country. Residents are provided a comfortable residents' room where they each have a private desk and can meet with relative privacy. Students are encouraged to help each other throughout the program, including assisting each other in various clinical and non-clinical activities. For instance, third-year residents help first- and second-year students with intra-venous sedation cases. The chief resident is charged with being the representative of all residents and attends monthly department meetings in this role.

Specific additions to the residents' room include

- Implementation of full scale digital implantology including implant surgery planning software in resident's room.
- Residents' room with TV and computers for shared use, lectures, seminars, discussions.
- Digital literature fully available via remote and mobile devices.

3. Alumni

Since 2010, the program has graduated 14 residents with a Master in Periodontology, two residents with a Master in Public Health, four residents with a PhD in Oral Biology, and one with a Certificate in

Periodontology. Out of these 21 graduates, nine are serving in full-time academic positions, and six are serving in part time or volunteer academic positions.

a.) Research and Professional Awards Received by Alumni FY 2010-2011 thru FY 2014-2015

FY2014-2015	Shaoping	Zhang	AAP Educator Scholarship
	Roger	Arce	AAP Educator Scholarship recipient
FY 2012-2013	Shaoping	Zhang	Balint Orban Award

b.) Publications of students (1st or co-author) in FY 2010-11 thru FY 2014-15. Students' names are in bold.

Wehmeyer MM, Kshirsagar AV, Barros SP, Beck JD, Moss KL, Preisser JS, Offenbacher S. *AM J Kidney Dis*. 2013 Mar, 61(3): 450-8.

Wehmeyer MM, Corwin CL, Guthmiller JM, Lee JY. The impact of oral health literacy on periodontal health status. *J Public Health Dent*. 2014 Winter; 74(1):80-7.

Wang Y, Cui CB, Yamauchi M, **Miguez, P** et al. Lineage restriction of human hepatic stem cells to mature fates is made efficient by issue specific biomatrix scaffolds. *Hepatology*, 2011 Jan; 53 (1): 293-305.

Mendonca DB, **Miguez PA**, Mendonca G, Yamauchi M, Aragao FJ, Cooper LF. Titanium surface topography affects collagen biosynthesis of adherent cells. *Bone* 2011 Sep; 49 (3):463-72.

Yamauchi N, Nagaoka H, Yamauchi S, Teixeira FB, **Miguez P**, Yamauchi M. Immunohistological characterization of newly formed tissues after regenerative procedure in immature dog teeth. *J Endod*. 2011 Dec; 37(12): 1636-41.

Perri R, Nares S, **Zhang S**, Barros SP, Offenbacher S. MicroRNA modulations in obesity and periodontitis. *J Dent Res* 2012 Jan; 91(1):33-8.

Kumarswamy A, Moretti A, Paquette D, Padilla R, Everett E, Nares S. In vivo assessment of osseous wound healing using a novel bone putty containing lidocaine in the surgical management of tooth extractions. *Int J Dent* 2012; 2012: 894815.

Reside J, Everett E, Padilla R, **Arce R**, Miguez P, Brodala N, De Kok I, Nares S. In vivo assessment of bone healing following piezotome ultrasonic instrumentation. *Clin Implant Dent Relat Res* 2015 Apr;17(2) 384-94.

Roger JM, **Wehmeyer MM**, Millliner MS. Reflections on academic career by current dental school faculty. *J Dent Educ* 2008 Apr; 72 (4):448-57.

Arce, Roger - In Vivo Assessment of Bone Healing following Piezotome® Ultrasonic Instrumentation. *Clin Implant Dent Relat Res* 2013 Jun 13. Epub 2013 Jun 13.

Arce, Roger - Effect of periodontal therapy on the subgingival microbiota in preeclamptic patients. *Biomedica* 2012 Jun;32(2):233-8.

McGuire, Alison - Central and peripheral glucocorticoid receptors are involved in the plasma cortisol response to an acute stressor in rainbow trout. *Gen Comp Endocrinol* 2012 Mar 3;176(1):79-85. Epub 2012 Jan 3.

Zhang, Shaoping - Epigenetic Regulation of *TNFA* Expression in Periodontal Disease; *J Periodontol.* 2013 November; 84(11): 1606–1616.

Zhang, Shaoping - Differential Expression of MicroRNAs in Normal and Inflamed Human Pulp; *JOE* — Volume 38, Number 6, June 2012 746-752.

c.) Employment and Professional Contributions of Alumni FY 2010-11 thru FY 2014-2015

<i>Class</i>	<i>Student</i>	<i>ABP Diplomate</i>	<i>Employment</i>
2010	Craig Dorion	Board Certified	Private Practice, NC
	Cameron Hamidi	Board Certified	Private Practice, Texas; Adjunct UNC-CH
	Meggan Wehmeyer	Board Certified	Assistant Professor, TX
	Imani Lewis	Board Certified	Private Practice, DC
2011	Caleb Corwin	Board Certified	Private Practice NC, Adjunct UNC
	Patricia Miguez	Board Certified	Clinical Assistant Professor UNC
	Romina Perri	Board Certified	Private Practice, Canada; Adjunct, McGill
	Akshay Kumarswamy	Board Certified	Clinical Assistant Professor, ECU, NC
2012	Alice Wu	Board Certified	Private Practice NC, Adjunct ECU
	Andre Paes	Board Certified	Assistant Professor, Case Western, OH
	Jonathan Reside	Board Certified	Clinical Assistant Professor, UNC
2013	Silvana Barros	Eligible	Associate Professor, UNC
	Michael Stella	Eligible	Private Practice, NC; Adjunct UNC
	Roger Arce	Board Certified	Assistant Professor, Georgia Regents
	Abdel-ghany Alsaïdi	Board Certified	Private Practice, MI
2014	Alison McGuire	Board Certified	Private Practice, Canada
	Shaoping Zhang	Board Certified	Post Doc UNC-CH
	Katherine Guilfoyle	Board Certified	Private Practice, NY
2015	Acela Martinez	N/A	Strauman Fellow, UNC
	Mais Sweidan	N/A	Private Practice, Canada
	Benjamin Thomas	N/A	Private Practice, Canada

E. Leadership and Support

See General Leadership and Support overview.

1. Administrative Support

Department of Periodontology faculty and the Center for Oral and Systemic Diseases are housed in the Koury building, including Dr. Offenbacher's laboratory and the laboratory of Dr. Ricardo Teles and Dr. Flavia Teles.

2. Facilities

Adequate.

F. The Future

Program Size

The Department plans to maintain between ten and eleven graduate students at any given time.

Student Resources

Adequate

Curricular Changes

- Review of the Classic Literature Seminar Series – implementation in 2015-16
- Review of the Implant Literature Seminar Series – implementation in 2016-17
- Review of the Current Literature Seminar Series - implementation in 2016-17
- An overall restructuring of curriculum to close gaps and reduce redundancy
- The adoption of a basic textbook for new students as a guide of expected knowledge of the field

Quality Improvement of Graduate Education

While the graduate program is strong in most areas, we have identified several goals

- Enhance resident recruitment strategies with the goal of attracting “best-fit” applicants
- Strengthen the curriculum in practice management
- Offer more diversity in implant systems taught
- More guidance to students in assuming their roles as educators

Student Qualifications

Students with high academic qualifications are likely to receive multiple offers. The level of support for students, stipend and tuition remission, must be maintained or increased for UNC to remain competitive in attracting the best of the best.

Racial, ethnic, and gender diversity in the graduate program

The program is already very diverse. For the last several years, we have attracted residents of various ethnic backgrounds and nationalities. Our application pool allows us to consider a wider range of applicants than some other programs are able to do.

Quality of Mentoring

The School of Dentistry has a well-established faculty to faculty mentoring program in which we participate. The focus has been on junior faculty, for example Dr. Reside and Dr. Morelli. Expanding this program to all faculty would be beneficial.

Additionally, we could formally establish mentoring opportunities from faculty with expertise in teaching or research for those who want to develop in either of those areas.

From exit interviews, we know that our faculty resident ratio and program design ensures that residents develop close professional learning relationships with each faculty member. Similarly as for faculty, we could formally establish a program to provide more mentoring guidance for our residents as they assume their responsibilities as teachers with dental students.

Reference

Waldman HB, Chaudhry RA. Update on changing numbers and distribution of periodontists. *J Periodontology* 2009 May; 80(5):711-8.

University of North Carolina at Chapel Hill
School of Dentistry

Program Specific Self-Study Report
PROSTHODONTICS



Graduate School Review Site Visit
September 8-10, 2015



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PROSTHODONTICS

A. Program Overview

1. Program Background

The dual specialty certificate and MS degree educational program involves a 36-month course of study involving clinical, didactic, and research activities to prepare each student for entry into clinical practice limited to Prosthodontics or initial appointments as educators with clinical and or research focus in Prosthodontics. Select students may choose to combine Advanced Education in Prosthodontics with additional education in the Oral Biology PhD program. The program emphasizes clinical management of a diverse patient population requiring restoration or replacement of teeth, treatment of edentulism and rehabilitation of orofacial/craniofacial defects. Graduates of this program are eligible for and encouraged to challenge specialty certification examination by the American board of Prosthodontics.

2. Program's Mission, Goals, and Objectives

The mission of the University of North Carolina's Advanced Education Program in Prosthodontics is to improve the oral health and condition of all patients requiring Prosthodontic treatment, irrespective of functional and physical complications, by training clinicians to diagnose and treat to a level of clinical excellence in order to maintain patient oral health for a lifetime; and to educate dentists to be leaders that will address the oral health problems of individuals and of society affected by dental/orofacial deformity, partial or complete edentulism and their causes through Prosthodontic patient care, Prosthodontic education and related fields of research or service.

The goal of this program is to train dental specialists as clinicians who can (1) correctly assess individual Prosthodontic patient oral health needs, (2) provide Prosthodontic treatment to a level of clinical excellence irrespective of functional and physical complications, (3) maintain and manage Prosthodontic patient oral health for a lifetime, and (4) identify and solve related problems through research and teaching.

We embrace the American Dental Association's definition of the specialty: *“Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and / or oral and maxillofacial tissues using biocompatible substitutes.”* (Adopted April 2003)

At completion of the Prosthodontics graduate program, the graduate will possess qualifications that satisfy or exceed the standards for the specialty and include the following:

1. Knowledge of the biomedical sciences related to oral health and disease and particularly related to fixed, removable, implant, and maxillofacial Prosthodontics to guide comprehensive oral health care for all patients with oral conditions requiring Prosthodontic treatment.
2. Knowledge of oral pathology including immunology and oral microbiology, risk assessment of oral disease, infection control and wound healing required to provide and maintain Prosthodontic treatment.
3. Knowledge of craniofacial development, patient growth and aging to guide the comprehensive treatment of a diverse array of Prosthodontic patients.
4. Knowledge and skills to utilize interpret and understand diagnostic radiology and imaging including related emerging technologies for the Prosthodontic patient.

5. Knowledge and skills to diagnose and plan appropriate therapy in an organized and understandable manner resulting in a comprehensive dental treatment plan.
6. Knowledge and skills in materials science and ability to manage the laboratory aspects of Prosthodontic rehabilitation of edentulous, partially edentulous, and dentate patients, including the ongoing exposure, use, and prescription of new and emerging technologies.
7. Knowledge and skills to diagnose, plan, coordinate and provide complex dental rehabilitation using fixed Prosthodontics, using removable Prosthodontics, using endosseous dental implants and using adjustable articulators to develop an integrated occlusion for opposing arches.
8. Ability to effectively collect, organize and interpret diagnostic data; establish a diagnosis; develop a treatment plan and related prognosis; execute; and critically evaluate the Prosthodontic rehabilitation for a variety of patients within the range of clinical variation identified by the Prosthodontic Diagnostic Index for edentulous, partially edentulous, and dentate patients.
9. Knowledge and skills needed to manage Prosthodontic therapies involving the diagnosis, treatment planning, placement (or referral for placement) and restoration of dental implants.
10. Knowledge and skills to recognize and manage maxillofacial/craniofacial deformities and defects using appropriate interaction with medical specialists, oral and maxillofacial surgeons and, where needed, referral to maxillofacial Prosthodontics.
11. Knowledge and skills to recognize and manage the pre-prosthetic Oral Surgical, Orthodontic, Endodontic, Periodontal and sedation needs of the Prosthodontic patient.
12. Knowledge and skills in the recognition and management of oral medicine disorders, oral pathology (including oral/head/neck cancer screening) for Prosthodontic patients.
13. Knowledge and skills in the recognition and management of patients with temporomandibular disorders and/or oral facial pain, and sleep disorders.
14. Knowledge and skills in the Prosthodontic treatment and management of patients with a wide variety of cognitive and physical impairments.
15. Knowledge and skills to prevent and manage medical emergencies that occur during dental treatment in the dental office setting.
16. Exposure to interdisciplinary health care team in both outpatient and hospital environments.
17. Ability to critically evaluate the scientific literature including the understanding of the principles of evidenced –based dentistry.
18. Knowledge and application of the research methodology including research design, an understanding of statistics and an appreciation for these disciplines as applied to problem solving, and instruction in the principles of effective scientific writing.
19. Knowledge and ability to organize and deliver scientific presentations and educational lectures and presentations, including the ability to utilize of computer technology, digital media and electronic databases for patient care and presentation, education, or research
20. Ability to communicate and teach in a clinical setting.
21. Knowledge to principles of Prosthodontic dental practice management and matters of ethics.
22. Knowledge of regional and national issues that influence the overall health of the Prosthodontic patient and familiarity of the Specialty’s role in improving the overall health of the Prosthodontic patient.
23. Knowledge and skills necessary to communicate effectively with other professionals and laypersons regarding overall oral health Prosthodontic patients.

These curricular objectives were revised in response to changes in the CODA standards (2008) following a review by the Department of Prosthodontics. These objectives were reviewed in January 2013 in a Graduate Prosthodontic Faculty and Resident retreat.

Mechanisms for Assessing Program Mission

See General Program Overview.

3. Demand/Need for Program

Tooth replacement using tooth, tissue and implant-supported prosthesis is required by a broad segment of the population. NC is the 10th largest state and its estimated 2014 population of 9,950,000 people (Quickfacts.census.gov) represent remarkable diversity in age, race and economics. The UNC Graduate Prosthodontics Program provides the *only* training program in NC that provides for unique combinations of implant and restorative specialty care needed to address a) congenitally missing teeth in adolescent and adult patients, b) congenital defects of the alveolar bone and face, c) orofacial rehabilitation of trauma, cancer, and congenital defects, and d) comprehensive treatment of the edentulous patient. Twenty-five percent of North Carolina's population is over the age of 65 years and that cohort presents with greater than 25% edentulism which is even higher in rural and poor communities. Notably, persons 65 years and over represent >14% of the population (compared with 23% under the age of 18; quickfacts.census.gov). It should be noted that in NC there is a higher percentage of persons living below the poverty level than the national percentage. Thus, providing care through our graduate program within the educational setting is an important resource for a large percentage of the state's population.

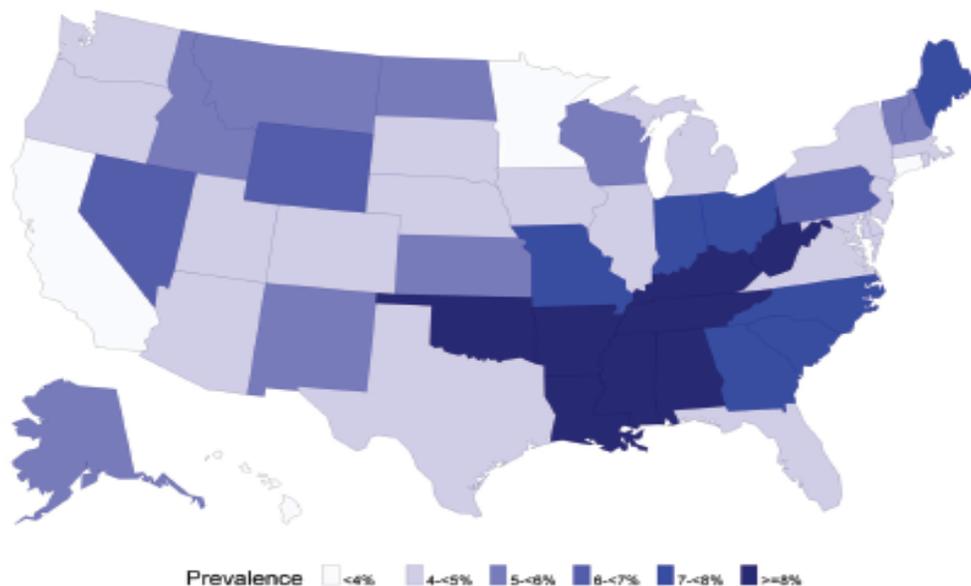


Figure 2: Age-standardized edentulism prevalence among adults aged ≥ 25 yr, U.S. states, 2010.

Source: 2010 Behavioral Risk Factor Surveillance System for the 50 states and the District of Columbia; $n = 420,307$ participants aged ≥ 25 yr [Centers for Disease Control and Prevention, 2010a]. Age-standardized prevalence in the District of Columbia was 3.0%.

North Carolina has a high burden of edentulism as indicated in the accompanying figure (Slade et al J. Dent Res, 2015). Additionally there is a high incidence of oral cancer (12.3/100,000 population; SCHS.state.nc.us). This is now higher than the rate of 10.6/100,000 published in 2005 (Elter et al 2005) and underscores Elter's conclusion that NC continues to have a high oral cancer incidence with 'substantial racial disparities.' Our Maxillofacial service is *essential* to the well-being of this state's population.

Among the 180,000 dentists in the US, approximately 3,000 are board-eligible or certified prosthodontists. UNC Graduate Prosthodontics is among one of 47 programs that train 150 graduate specialist prosthodontists annually. We train three or four of these specialists annually. Importantly, the strong combination of clinical and basic science education at UNC provides the nation with a resource for future educators. In the past five years alone, we have graduated two of the nation's 27 graduate program directors and other educators.

Each year, this program is highly subscribed by applicants. Over the past five years we have received 80 to 110 applications for our three-to-four available positions. The students applying and accepted come from the top quartile of their classes and are highly sought after among different programs nationally. The attraction of this program may be attributed to: a) the quality of faculty and their research productivity, b) the quality and quantity of the patient population supporting the program clinical activity, c) the structured didactic curriculum related to the MS program and its independent research requirement, d) the relatively high quality of peers within the many graduate programs, and e) strong interdisciplinary nature of the education program.

4. Interdisciplinary Activities

Students within the Graduate Prosthodontics program share didactic education with peers among the other represented specialties. This is particularly significant with regard to oral pathology, dental implant therapies, and maxillofacial surgery. The intensive clinical program and high patient load of the UNC graduate prosthodontic clinic and its maxillofacial clinic preclude rotations to remote clinical sites. However, interactions with oral maxillofacial surgery, hospital ENT and head and neck cancer services, periodontology and pediatric dentistry are routine and common.

5. Interinstitutional Perspective

The UNC Graduate Program in Prosthodontics is the only CODA-accredited program in North Carolina and South Carolina. We compete nationally for the best of candidates. While our program does not offer GME-level stipends, we are able to enroll the most talented of students due to the strong research component and underlying Oral Biology Program, the infrastructure, the patient base, and the community. Our graduates have proven successful in both practice (demonstrated by establishment of independent practices in communities nationwide) and in academics (demonstrated by holding full time faculty positions in dental schools nationwide).

B. Curriculum

1. Course review and Development

Review and development of program specific courses is an ongoing process. Students have the opportunity and are encouraged to evaluate courses and course instructors of the preceding semester. Students are also encouraged on an ongoing basis to provide comments and suggestions regarding courses and the curriculum. Program review and development takes place during faculty meetings and faculty retreats. Input parameters include student feedback, changes in School of Dentistry requirements, changes

in CODA requirements, and other developments in dentistry and Prosthodontics. The courses are also reviewed in the context of the Alumni Survey results and review of annual program exit surveys.

2. Course Sequence and Description

Summer	Title
1st Year	
DENG 707	Regional Anatomy
DENG 720	Applied Pharmacology
OBIO 720	Topics in Oral Biology
Fall	
1st Year	
DENG 701	Introduction to Research Design
DENG 704	Interdisciplinary Care Conference
OBIO 721	Directed Studies in Oral Biology - Inflammation
OBIO 722	Directed Studies In Oral Biology - ECM Component
OPER 736	Graduate Dental Biomaterials I
PERI 820	Introduction to Implants
PROS 702	Introduction to Prosthodontic Literature
PROS 722	Prosthodontic Principles, Diagnosis, and Treatment Planning - Fixed and Removable
PROS 732	Prosthodontic Diagnosis and Treatment Planning
PROS 801	Advanced Clinical Fixed and Removable Prosthodontics
2nd Year	
DENG 703	Applied Dental Research Methods
DENG 704	Interdisciplinary Care Conference
ORPA 762	Oral and Maxillofacial Pathology Seminar
PROS 702	Introduction to Prosthodontic Literature
PROS 722	Prosthodontic Principles, Diagnosis, and Treatment Planning - Fixed and Removable
PROS 732	Prosthodontic Diagnosis and Treatment Planning
PROS 751	Maxillofacial Prosthodontic Principles, Diagnosis, and Treatment
PROS 801	Advanced Clinical Fixed and Removable Prosthodontics
PROS 851	Clinical Maxillofacial Prosthodontics
3rd + Year	
PROS 993	Master's Research and Thesis
Spring	
1st Year	
DENG 702	Biostatistics

DENG 704	Interdisciplinary Care Conference
OBIO 723	Directed Studies in Oral Biology - Neuroscience
OBIO 724	Directed Studies in Oral Biology - Oralfacial Pain Conditions
OPER 736	Graduate Dental Biomaterials II
ORAD 706	Advanced Oral Radiology
PERI 820	Clinical Implantology
PROS 702	Introduction to Prosthodontic Literature
PROS 722	Prosthodontic Principles, Diagnosis, and Treatment Planning - Fixed and Removable
PROS 732	Prosthodontic Diagnosis and Treatment Planning
PROS 801	Advanced Clinical Fixed and Removable Prosthodontics
2nd Year	
DENG 704	Interdisciplinary Care Conference
ORPA 763	Oral and Maxillofacial Pathology Seminar
PROS 702	Introduction to Prosthodontic Literature
PROS 722	Prosthodontic Principles, Diagnosis, and Treatment Planning - Fixed and Removable
PROS 732	Prosthodontic Diagnosis and Treatment Planning
PROS 752	Maxillofacial Prosthodontic Principles, Diagnosis, and Treatment
PROS 801	Advanced Clinical Fixed & Removable PROS
PROS 853	Clinical Maxillofacial Prosthodontics
3rd + Year	
PROS 993	Master's Research and Thesis

The Graduate Program in Prosthodontics enrolls three or four students per year, maintaining a program of 9-10 residents annually. Typically, one student enrolls in the PhD track. In 2007 and 2013, Dr. Juanli Guo and Dr. Ghadeer Thalji completed their dual training in Prosthodontics and Oral Biology. In 2015, Dr. Lauren Katz will begin a dual degree (specialty/PhD) course of study. The course directors for the program-specific courses have been relatively stable over the past five years, and the number of enrolled students per course varies only slightly from year to year since the number of students in each year of the program is very stable.

PROS 702 Introduction to Prosthodontic Literature
(1Credit) Fall and Spring Semesters 1st and 2nd Yr
Course Director: Cooper

Course is designed to review early and classic prosthodontic literature common to fixed and removable prosthodontics. Additionally, upon entry to the program, students are provided with a literature set of approximately 150 articles divided among 5 topical areas of prosthodontics. It is intended that these are read over the summer session in preparation for entry into the clinics in the fall of the first year.

PROS 722 Prosthodontic Principles, Diagnosis, and Treatment Planning
(2 credits) Fall and Spring Semesters 1st, 2nd, 3rd (Audit) Yr

Course Director: Cooper

Principles of diagnosis and treatment relative to the prosthodontic patient are covered in depth in this seminar series. The course relies on readings of classic and contemporary literature with seminars that involve discussions and critiques of readings. The course prepares the student for the Comprehensive Written Examination of the ABP and provides an evidence based approach to clinical decision making.

PROS 732 Prosthodontic Diagnosis and Treatment Planning
(1 credit) Fall and Spring Semesters 1st and 2nd Yr

Course Director: Cooper

This course is required of all students for 1–1.5 hours/week each Fall and Spring Semesters for 2 years; third year residents audit this course. This course provides the prosthodontic student with adequate knowledge in fixed and removable prosthodontics to promote continued lifelong learning, offer quality treatment to a diverse population with various needs using fixed prosthesis, manage complications and failures of fixed prostheses, and to challenge the ABP examination. It emphasizes case presentation skills and presentation development.

PROS 801 Advanced Clinical Fixed and Removable Prosthodontics
(3 credits) Fall, Spring, Summer Semesters 1st, 2nd and 3rd Yr

Course Director: Cooper

This course is required of all students during all semesters. This clinical offering is designed to permit the graduate student dentistry to experience all phases of advanced patient management in fixed and removable prosthodontics. Development and presentation of a clinical portfolio is required.

Pros 751 Maxillofacial Prosthodontic Principles, Diagnosis, and Treatment
(1 credit) Fall and Spring Semesters 2nd and 3rd Yr

Course Director: Minsley

First year students audit this course. Principles of diagnosis and treatment relative to maxillofacial prosthodontic patients are covered in depth in this seminar series.

Pros 851 Clinical Maxillofacial Prosthodontics
(2 credits) Fall, Spring, Summer Semesters 1st, 2nd and 3rd Yr

Course Director: Minsley

This course is required of all students during all semesters. This clinical offering is designed to permit the graduate student to manage the comprehensive prosthodontic care of congenital and/or acquired maxillofacial defects in both the dental school and hospital.

Pros 993 Masters' Research and Thesis
(3 credits) Fall and Spring Semesters 3rd Yr

Course Director: Research mentor and thesis committee members

Completion of thesis for Master of Science degree. Students are required to follow the prospective course requirements, develop and submit a proposal, complete the goals of the institutionally-approved research proposal and defend in a public and private oral examination setting their findings. The project is intended to lead to a thesis of sufficient quality to meet requirements for the Master of Science degree in Dentistry.

3. Course Evaluation

See General Curriculum Overview. The courses are reviewed at the end of each year in the context of the faculty evaluations. All students have input into this process. Additionally, the courses are also evaluated in the context of the Alumni Survey results and annual review of program exit surveys.

4. Requirements for Degree

See General Curriculum Overview. The Prosthodontic curriculum requires that each student participates in all seminar courses with full attendance. Students must take the comprehensive annual mock American Board of Prosthodontics examination annually each January. Residents must also provide annual clinical portfolios to the Graduate Program Director for review. Additionally, residents must review clinical progress with the patient care coordinator bi-annually. Students must complete the described minimal patient care satisfactorily.

A comprehensive oral examination is administered to students in an open forum at the completion of the three-year program. The attending faculty (minimally three) are permitted to utilize ‘open-ended’ questions to obtain insight regarding the student’s fundamental knowledge of biological and prosthodontic principles, clinical decision making, thought process (problem solving) and clinical skills. Residents must demonstrate accepted clinical principles in clinical management of the patient, acceptable clinical skill as demonstrated in the case presentation, and an evidenced-based knowledge of the treatment modalities involved. Faculty record the examination as a pass or fail grade. A student is deemed to have passed the comprehensive examination if a majority of the examiners record the examination as a pass. Failure to pass any part of the comprehensive examinations on the first attempt will lead to the development of an educational enhancement plan and an opportunity to re-take the examination. Failure to pass the Comprehensive Examination a second time will result in dismissal from the Program.

5. Evaluation of Progress of Students

See General Curriculum Overview. Student evaluation is performed at various levels and in various formats, including informal evaluations, course grades, clinical portfolio content, comprehensive examination, and performance reviews (Table 1).

Informal evaluations take place during conferences, clinics, lectures and seminars. Feedback is immediate and progress is monitored. Informal evaluations are used to determine course grades in courses that have no formal examination. Formal evaluations include course grades, comprehensive examinations, oral thesis defense, and successful submission of the thesis. Grades for graduate courses are submitted to the Graduate School at the end of each semester and these become part of the student’s transcript.

The Academic Performance Committee (APC) meets biannually per ADA accreditation requirements to discuss the progress of each graduate student and consists of the graduate program director, the department chair, and one graduate prosthodontic faculty member teaching during the semester in question. Following submission of all data and review by the APC, a meeting with the Program Director and faculty members are scheduled to discuss the results. Progress, accomplishments and concerns are discussed. The student is provided with a copy of the evaluation summary.

**Table 1. Graduate Resident Evaluation Form
Individual Didactic Instruction and Clinical Skills**

5= Excellent 4= Above Average 3= Average 2= Below Average 1= Poor 0= N/A

1. Organization of instructional material	5	4	3	2	1	0
2. Interaction during seminars/lectures	5	4	3	2	1	0
3. Management of seminars/lectures	5	4	3	2	1	0
4. Utilization of assignments, instructional materials, etc.	5	4	3	2	1	0
5. Demonstration of didactic knowledge in patient care	5	4	3	2	1	0
6. Management of patients	5	4	3	2	1	0
7. Diagnostic evaluation	5	4	3	2	1	0
8. Treatment planning	5	4	3	2	1	0

9. Clinical Skills						
A. Fixed Prosthodontics	5	4	3	2	1	0
B. Removable Prosthodontics	5	4	3	2	1	0
C. Implant Prosthodontics	5	4	3	2	1	0
D. Maxillofacial Prosthetics	5	4	3	2	1	0
10. Clinical Judgment						
A. Fixed Prosthodontics	5	4	3	2	1	0
B. Removable Prosthodontics	5	4	3	2	1	0
C. Implant Prosthodontics	5	4	3	2	1	0
D. Maxillofacial Prosthetics	5	4	3	2	1	0

6. Learning Assessments

Learning outcomes assessment is a continuous process that constantly evaluates student progress, the effectiveness of courses, and the quality of teaching. The outcomes assessments below were submitted to the Southern Association of Colleges in January 2015.

Curriculum

Assessment Methods: Course examinations

Frequency of Assessment: Fall and spring semester

Outcomes(s): Satisfactory (Pass) grade on all courses

Actions Taken or Planned: Program Director tracks progress of students in each course. Remediation is offered on a course-by-course basis if needed. Course content is updated annually.

Assessment Methods: Departmental meetings and annual retreats

Frequency of Assessment: Periodic departmental meetings are held year-round and departmental intensive retreats (one-day) are held every year

Outcomes(s): The Program Director communicates with the graduate students as changes in the program or curriculum are made based on departmental meetings.

Actions Taken or Planned: None. Minutes of the departmental meeting are maintained on file in the department.

Patient Care

Assessment Methods: Clinical portfolio Review

Frequency of Assessment: Bi-annually

Outcomes(s): Program Director reviews summary presentation of individual resident's clinical activities and progress by portfolio.

Actions Taken or Planned: Student experiences are modified as needed to meet educational goals; improve progression of care; and identify areas of improvement in clinical care

Assessment Methods: Record audits/reviews

Frequency of Assessment: Periodically throughout the program

Outcomes(s): During Diagnosis and Treatment Planning Seminar Series, faculty review clinical cases with each graduate student to assure timeliness, appropriateness and quality of care per per postdoctoral (Advanced Education Program in Prosthodontics Manual) and institutional guidelines

Actions Taken or Planned: Deficiencies must be resolved. If deficiencies are noted, additional reviews may be performed to evaluate compliance during the next semester

Education Goals

Assessment Methods: American Board of Prosthodontics Mock Board Examination

Frequency of Assessment: January of each year

Outcomes(s): Graduate students successfully pass the mock board examination which is preparation of students to successfully complete Part I (written) and Part II,III, and IV (oral examination on case presentations) of the American Board of Prosthodontics examination.

2012-2014: 100% of the residents successfully completed this requirement by the end of the third year

Actions Taken or Planned: Refinement of the existing curriculum and educational program to improve student performance during the three-year program

Assessment Methods: Faculty and staff evaluations of graduate students

Frequency of Assessment: Bi-annually

Outcomes(s): Overall didactic and clinical performance and progress of each student is evaluated by the Academic Performance Committee using course grades and clinical evaluations by faculty. Feedback is shared with each student individually in January and July.

Pass Rate – 2012-2015 100% Pass

Resident's evaluations are maintained in their permanent departmental records

Actions Taken or Planned: Continue assessment method. Students performing below a satisfactory level are given an educational enhancement plan. If the educational enhancement plan is successfully completed, the student is allowed to proceed in the program but may be required to stay in the program for an extended time.

Assessment Methods: Alumni Surveys

Frequency of Assessment: Every 5 years

Outcomes(s): Alumni surveys are used to gain feedback from the program's graduates about their perceptions of our strengths and opportunities for improvement.

Actions Taken or Planned: Findings are reviewed in detail by faculty and recommendations made to departmental administration. Alumni survey will be distributed in February 2015

Assessment Methods: American Board of Prosthodontics Diplomate Status

Frequency of Assessment: Alumni Survey

Outcomes(s): Diplomate status of the American Board of Prosthodontics.

2012-2014: Graduates have several years after graduation to complete the board examinations

Actions Taken or Planned: Students are encouraged to prepare board cases for formal ABP examination during their enrollment at UNC.

Research Goals

Assessment Methods: Research Progress; Oral Defense; Thesis submission; Research presentations, Manuscript publications, awards and scholarships

Frequency of Assessment: Each graduate student completes, orally defends and submits a thesis on an original research problem per guidelines of the UNC Graduate School

Outcomes(s): Graduate student research culminating in a presentation, award scholarship and/or publication is documented in graduate student/resident or alumni files with the department.

2012-2014: 100% graduated on time

2013: 1 student received external research funding; 2 national research award

2014: 1 former student received national research award

Actions Taken or Planned: Research progress will be evaluated each semester that a student is enrolled in PERI 993 by the student's research mentor.

C. Faculty

Seven full-time faculty serve as the core faculty for the graduate students (Table 3). Four are Board certified in the specialty of Prosthodontics and are Diplomates of the American board of Prosthodontists. Two have PhD degrees. Two are dual-trained in Maxillofacial Prosthetics and Prosthodontics. One part-time faculty is a former full-time graduate program director and devotes two days per week in clinical prosthodontic instruction. Bio-sketches for the full-time faculty are on the flashdrive

Faculty Joint Appointments:

- a. Lyndon F. Cooper, DDS, PhD, Stallings Distinguished Professor, Program Director; jointly appointed as professor, Department of Biophysics and Biochemistry, UNC-CH
- b. Sompop Bencharit, DDS, PhD, Assistant Professor; jointly appointed as Assistant Professor, Department of Pharmacology, UNC-CH

1. Research Activities

The Graduate Program in Prosthodontics is tightly integrated into the research mission of the department of Prosthodontics. While the department of Prosthodontics carries much of the responsibility of teaching DDS level clinical dentistry, several research themes have emerged over the past decade. Faculty currently lead research activities in the following areas: educational research (R.W. Wright), salivary proteomics (S. Bencharit), dental implant therapies (S. Bencharit, L. Cooper, I. De Kok), bone biology (L. Cooper), and sensory alterations and sleep apnea (G. Essick). Dental implant therapy research is prominently displayed in the research portfolio and many past and ongoing studies in this arena involve Advanced Education Students in Prosthodontics. The implant-related studies represent investigations of effectiveness, patient-based outcomes, as well as fundamental biology at the cellular and genetic levels.

See **General Faculty Overview (Research)** for a listing of faculty involved in externally funded research.

The faculty of the Department of Prosthodontics published 37 manuscripts in peer-reviewed journals, six book chapters and seven abstracts in the past year.

2. Teaching Distribution

The policy for the distribution of teaching loads is based on a combination of a faculty member's expertise and a reasonable balanced teaching load amongst the faculty in the DDS and graduate programs. Lectures or seminars are conducted by the faculty with most expertise. The chair makes the clinical and didactic teaching assignments to meet the needs of the faculty and programs. The Graduate Program director teaches in the Graduate clinic and is the course director for the majority of program specific courses. The Graduate Program director is assigned administrative time and faculty with funded research are allotted research time to reflect their funding level.

3. Teaching Evaluation

Faculty are anonymously evaluated annually by the graduate students (Table 2). The faculty discuss the results of the survey at the annual review. Programmatic and course changes are made as needed.

Table 2. Faculty Teaching Evaluation

Faculty Teaching Evaluation: Dr. _____

5= Excellent 4= Above Average 3= Average 2= Below Average 1= Poor 0= N/A

- | | | | | | |
|--|-------------|----------|------------|-----|-----|
| 1. Approximately how many hours did you spend with this instructor THIS SEMESTER? | | | | | |
| | 1-5 | 6-10 | 11-20 | 20+ | NA |
| 2. The instructor was enthusiastic towards the subject matter and teaching. | 5 | 4 | 3 | 2 | 1 0 |
| 3. The instructor communicated clearly and logically. | 5 | 4 | 3 | 2 | 1 0 |
| 4. The instructor demonstrated competence in the subject matter. | 5 | 4 | 3 | 2 | 1 0 |
| 5. The instructor treated all students fairly and without bias. | 5 | 4 | 3 | 2 | 1 0 |
| 6. The instructor encouraged you to apply knowledge and skills. | 5 | 4 | 3 | 2 | 1 0 |
| 7. The instructor made you comfortable to ask questions. | 5 | 4 | 3 | 2 | 1 0 |
| 8. The instructor practiced a concept of mutual respect. | 5 | 4 | 3 | 2 | 1 0 |
| 9. The instructor provided feedback and constructive criticism. | 5 | 4 | 3 | 2 | 1 0 |
| 10. The instructor was available when needed. | 5 | 4 | 3 | 2 | 1 0 |
| 11. The instructor provided fair and reasonable evaluation of your performance. | 5 | 4 | 3 | 2 | 1 0 |
| 12. The instructor's overall teaching effectiveness was: | 5 | 4 | 3 | 2 | 1 0 |
| 13. The amount of work required in this course compared to the other dental school courses is: | | | | | |
| | Appropriate | Too Much | Too Little | | |
| 14. <u>Please make comments or suggestions for the faculty member in this space and on back:</u> | | | | | |

4. Teaching Innovation

The UNC Advanced Education in Prosthodontics educational program is based on experiential learning. The cycle of “Plan, Do, Review” is well suited to prosthodontics in that ideal patient management involves a cycle of diagnosis and treatment planning, therapy implementation and post-therapy assessment. The program has built the educational experience around this theme using the PROS 732 course as a focal point for learning. Each week of the year, this course serves to focus on the cycle of learning and builds on ideas, data and information accrued through other didactic courses.

Teaching innovation is represented within the program by development of student clinical portfolios as a basis of evaluation (moving away from competencies) and continuous introduction of novel clinical technologies that require new conceptual frameworks for both planning and implementing patient care. A recent example of this is the merging of digital radiological data (DICOM) for imaging of bone together with the use of digital surface data (STL) for imaging of the oral cavity and teeth that permits novel work flow in dentistry. Not only must students acquire new skill sets, we must develop ways of using this information in teaching concepts and ideas.

5. Faculty Development and Mentoring/Support

Part of the role of School of Dentistry faculty development program is to identify faculty who are eligible for campus, national and international awards. Several of the departmental faculty have received recognition for teaching and service within the school of dentistry. Faculty have been provided opportunities to participate in ADEA and AAL/ITL faculty development programs. Faculty also participate in national American College of Prosthodontists Educator/Mentors symposia in spring and fall of each year. The spring event offers travel stipends supporting one undergraduate and one graduate

faculty member attendance annually. The Department of Prosthodontics has attended this activity annually for the past five years.

Faculty also participate in the many development workshops and other opportunities through local and national venues. Workshops are offered through the School of Dentistry, the UNC campus as well as the American Dental Education Association (ADEA) annual sessions and professional organizations where faculty hold memberships. The department and the Dean's office provide financial support for workshop participation through discretionary funds. In some cases, the Dean provides new faculty financial support for travel to one domestic scholarly/professional development meeting per year for the first two years of employment.

6. Faculty Teaching/Professional Awards for FY 2010-2011 thru FY 2014-2015

Bencharit	2014-2018- Elected Secretary and Treasurer, Salivary Research Group (SRG), International Association of Dental Research (IADR)
Cooper	2015- Chair, American College of Prosthodontics Education Foundation 2013-2016 – Director, Academy of Osseointegration Board of Directors
Duqum	2015- UNC nominee for the OKU Charles Craig National Award for the Best Innovative Dental Educator 2015- Upsilon Upsilon Chapter, Omicron Kappa Upsilon Dental Honor Society, Faculty Member Induction 2015- UNC DDS class of 2015 Spurgeon Faculty of the Year Appreciation Award
Essick	2015- Recipient of the Four Corners Study Club Faculty Mentoring Award
Minsley	2015- Voted Best Prosthodontists for 2015 by Chapel Hill Magazine 2014-2015- President Omicron Kappa Upsilon, Upsilon Upsilon Chapter
Wright	2015- Voted Best Prosthodontists for 2015 by Chapel Hill Magazine 2014- Upsilon Upsilon Chapter of Omicron Kappa Upsilon (OKU)

7. Faculty Advising/Mentoring of Students

Program-specific student orientation is provided by the Program Director. Faculty advisors provide one-on-one guidance and support for a graduate student in the areas of personal activities, academic pursuit, research experience and clinical training throughout the resident's educational duration at UNC with the goal of optimizing the graduate student's educational experience and transition to a successful career in the specialty of Prosthodontics. Specific Duties include: Provide advice regarding academic pursuits and assist in the student's evaluation process, Assist and guide in the exploration of research opportunities and potential research mentors within the academic community, Help maximize the graduate student's clinical experience within the program by discussing cases, Evaluating appropriateness of types and quantity of clinical experiences, Help guide research by assisting in identification of a mentor and adhering to the proscribed timelines, and Serve as a counselor or refer the graduate student to appropriate individuals when personal issues arise.

Each summer session, adjunct faculty from diverse community settings, provide special seminars to residents on the topic of entry into private practice, building an office and establishing their professional role in the community. This year, for example, Dr. Batso, Dr. Chou, Dr. Pin Harry and Dr. Gates participated.

Table 3. Faculty participation in Advising/Mentoring of Completed MS/PhD and Non-MS Student Projects from FY 2010-11 thru FY 2014-2015

<i>Faculty</i>	<i>Appointment</i>	MS	MS	PhD	PhD	Non MS
		<i># Mentor</i>	<i># Committee Member</i>	<i># Mentor</i>	<i># Committee Member</i>	<i># Non-MS *</i>
L Cooper	Stallings Distinguished Professor	16	4	3	4	5
S Bencharit	Assistant Professor	2	4			
I De Kok	Associate Professor	2	5			
I Duqum	Assistant Professor	2	2			
G Essick	Professor	1	2			
G Minsley	Associate Professor	0	5			
R Wright*	Professor	13	0	2	3	10

* Represents activities at Harvard School of Dental Medicine

8. Graduate Teaching Assistants

All graduate students in the Department of Prosthodontics serve as graduate teaching assistants. The course assignments and teaching evaluations are provided below. These activities are typically reserved for the most senior of residents (typically year 3) and involve both pre-clinical and D.D.S. clinical assignments.

Table 4. Course- and Year-Specific Graduate Teaching Assistant Responsibilities

<i>Course</i>	<i>Semester</i>	<i>Director</i>	<i>Responsibilities</i>
Dent 204	Fall	Dr. Duqum	Serve as instructor, grade practical examination.
Dent 211	Spring	Dr. Duqum	Serve as instructor, grade practical examination
Dent 212	Spring	Dr. Bak	Serve as instructor, grade practical examination
Dent 225	Summer	Dr. De Kok	Serve as instructor, grade practical examination
Dent 320	Fall	Dr. Hopfensperger	Serve as instructor, grade practical examination and written examination. Occasional lecturer
2 nd -3 rd year DDS Clinical Prosthodontics	Fall, spring, summer	Faculty	Serve as graduate teaching assistant /clinical preceptor alongside clinical prosthodontic faculty; aid in planning and assessing patient care provided by DDS student
4 th year General Dentistry Clinic	Fall, spring, summer	Faculty	Serve as graduate teaching assistant /clinical preceptor alongside clinical faculty; aid in planning and assessing patient care provided by DDS student

9. Faculty Strengths and Areas of Concern

The UNC Advanced Education Program in Prosthodontics benefits from a departmental faculty with diverse educational backgrounds that include sub-specialty training in maxillofacial prosthetics and PhD education with expertise ranging from physiology, to pharmacology, to biochemistry. The clinical faculty demonstrate additional interests in educational outcomes research and digital dental technology. The faculty involvement in the Advanced Education program, however, is limited by the large faculty commitment to the undergraduate teaching mission and commitment to patient care. To overcome this, adjunct faculty contribute to one day of teaching per week and bring remarkable clinical knowledge to the program. Additionally, they bring expertise in private practice management to the students. A proximal challenge is the departure of the program director. In the coming months, an interim director will be appointed to permit the time needed to recruit a Director of the UNC Advanced Education Program in Prosthodontics.

D. Students

1. Admission

A committee of three faculty members screens all the applications for admission to the graduate program in pediatric dentistry. Six to eight applicants are invited for an interview with faculty and graduate students. Criteria used for an offer of an interview are academic record, demonstrable clinical skills (typodont evaluation), leadership and teamwork record, letters of recommendation and personal statement. The Advanced Program in Prosthodontics participates in PASS.

2. Academic Environment

The program encourages a collegial environment that reinforces peer to peer learning. The residents are provided shared spaces enabling collaboration. Graduate students are provided with their own workspace in the residents' room. The faculty strive to be approachable by the student. The director is available daily and maintains an open door policy. Students are encouraged to talk with individual faculty members or to all faculty members regarding suggestions, comments, concerns or any other problems. During the 3 year cycle / period of the program, residents and faculty gather to formally review the academic environment, to identify strengths and weaknesses, and develop suggestions for new initiatives.

3. Alumni

a.) Research and Professional Awards Received by Alumni FY 2010-11 through FY 2014-15

Matthew Bryington (2010) - awarded AO/Osseointegration Foundation Research Award; "Osteoblastic and Cytokine Gene Expression of Adherent Cells on Endosseous Implants in Humans"

Matthew Bryington (2011) - awarded the 3rd Place John J Sharry Research Award; "Osteoblastic and Cytokine Gene Expression of Adherent Cells on Endosseous Implants in Humans"

William Day Gates (2011) - awarded the 2nd Place John J Sharry Research Award; "The Impact of Implant Supported Removable Partial Denture Supported by Short Implants on Oral Health Quality of Life"

Bryan Limmer (2012) - awarded the 1st Place John J Sharry Research Award at the Annual Meeting of the American College of Prosthodontics

Bryan Jacobs (2014) - awarded the 2nd Place John J Sharry Research Award at the Annual Meeting of the American College of Prosthodontics; "*Evaluating the Efficacy of Grafting the Facial Gap at Immediately Placed Implants in the Anterior Maxilla: A Systematic Review and Randomized Controlled Trial*"

Ghadeer Thalji (2014) awarded the AO/ Osseointegration Foundation Research Award; “Comparative Assessment of Alternative Macrophage Differentiation in an Early Osseointegration Model in Healthy Non-obese Patients vs. Obese Type II Diabetes”

Emily Batson (2015) - awarded the American Association of Fixed Prosthodontics Student Research Award. “*Clinical Outcomes of Three Different Crown Systems using CAD/CAM Technology*”

Anthony Gragg (2015) -awarded one of six annual American College of Prosthodontics Education Foundation Research Fellow Awards. “Molecular assessment of peri-implant tissues at bone versus tissue level implants”

b.) Publications in print or accepted of students (1st or co-author) in FY 2010-2011 thru FY 2014-2015. Students’ names are in bold.

De Wilde EA, Jimbo R, Wennerberg A, Naito Y, Coucke P, **Bryington MS**, Vandeweghe S, De Bruyn H. The soft tissue immunologic response to hydroxyapatite-coated transmucosal implant surfaces: a study in humans. *Clin Implant Dent Relat Res*. 2015 Jan;17 Suppl 1:e65-74.

Altarawneh S, Limmer B, Reside GJ, Cooper L. Dual jaw treatment of edentulism using implant-supported monolithic zirconia fixed prostheses. *J Esthet Restor Dent*. 2015 Mar-Apr;27(2):63-70.

Bencharit S, Byrd WC, **Altarawneh S**, Hosseini B, **Leong A**, Reside G, Morelli T, Offenbacher S. Development and applications of porous tantalum trabecular metal-enhanced titanium dental implants. *Clin Implant Dent Relat Res*. 2014 Dec;16(6):817-26.

Naito Y, Jimbo R, **Bryington MS**, Vandeweghe S, Chrcanovic BR, Tovar N, Ichikawa T, Paulo G C, Wennerberg A. The influence of 1 α .25-dihydroxyvitamin d3 coating on implant osseointegration in the rabbit tibia. *J Oral Maxillofac Res*. 2014 Oct 1;5(3):e3.

Thalji G, De Kok IJ, Cooper LF. Prosthodontic management of implant therapy. *Dent Clin North Am*. 2014 Jan;58(1):207-25.

Thalji G, Nares S, Cooper L. Gene expression profiles of early implant adherent cells in smokers and non-smokers. *J Oral Implantol*. 2014 Sep 18.

Thalji G, Cooper LF. Molecular assessment of osseointegration in vitro: a review of current literature. *Int J Oral Maxillofac Implants*. 2014 Mar-Apr;29(2):e171-99.

Thalji GN, Cooper LF. Implant-supported fixed dental rehabilitation with monolithic zirconia: a clinical case report. *J Esthet Restor Dent*. 2014 Mar-Apr;26(2):88-96.

Thalji GN, Cooper LF. Implant-supported fixed dental rehabilitation with monolithic zirconia: a clinical case report. *J Esthet Restor Dent*. 2014 Mar-Apr;26(2):88-96.

Bryington M, De Kok IJ, **Thalji G**, Cooper LF. Patient selection and treatment planning for implant restorations. *Dent Clin North Am*. 2014 Jan;58(1):193-206.

De Kok IJ, Thalji G, **Bryington M**, Cooper LF. Radiographic stents: integrating treatment planning and implant placement. *Dent Clin North Am*. 2014 Jan;58(1):181-92.

Bryington M, Mendonça G, Nares S, Cooper LF. Osteoblastic and cytokine gene expression of implant-adherent cells in humans. *Clin Oral Implants Res.* 2014 Jan;25(1):52-8.

Gates WD 3rd, Cooper LF, Sanders AE, Reside GJ, De Kok IJ. The effect of implant-supported removable partial dentures on oral health quality of life. *Clin Oral Implants Res.* 2014 Feb;25(2):207-13.

Vera C, Barrero C, Shockley W, Rothenberger S, Minsley G, Drago C. Prosthetic reconstruction of a patient with an acquired nasal defect using extraoral implants and a CAD/CAM copy-milled bar. *J Prosthodont.* 2014 Oct;23(7):582-7.

Limmer B, Sanders AE, Reside G, Cooper LF. Complications and patient-centered outcomes with an implant-supported monolithic zirconia fixed dental prosthesis: 1 year results. *J Prosthodont.* 2014 Jun;23(4):267-75.

Cooper LF, **Pin-Harry OC**. "Rules of Six"--diagnostic and therapeutic guidelines for single-tooth implant success. *Compend Contin Educ Dent.* 2013 Feb;34(2):94-8, 100-1; quiz 102, 117.

Altarawneh S, Bencharit S, Mendoza L, Curran A, Barrow D, Barros S, Preisser J, Loewy ZG, Gendreau L, Offenbacher S. Clinical and histological findings of denture stomatitis as related to intraoral colonization patterns of *Candida albicans*, salivary flow, and dry mouth. *J Prosthodont.* 2013 Jan;22(1):13-22.

Thalji G, Gretzer C, Cooper LF., Gretzer C, Cooper LF. Comparative molecular assessment of early osseointegration in implant-adherent cells. *Bone.* 2013 Jan;52(1):444-53.

Cooper LF, **Limmer BM**, **Gates WD**. "Rules of 10"--guidelines for successful planning and treatment of mandibular edentulism using dental implants. *Compend Contin Educ Dent.* 2012 May;33(5):328-34.

Vera C, De Kok IJ, Reinhold D, **Limpiphitanakorn P**, Yap AK, Tyndall D, Cooper LF. Evaluation of buccal alveolar bone dimension of maxillary anterior and premolar teeth: a cone beam computed tomography investigation. *Int J Oral Maxillofac Implants.* 2012 Nov-Dec;27(6):1514-9.

Vera C, De Kok IJ, Chen W, Reside G, Tyndall D, Cooper LF. Evaluation of post-implant buccal bone resorption using cone beam computed tomography: a clinical pilot study. *Int J Oral Maxillofac Implants.* 2012 Sep-Oct;27(5):1249-57.

Offenbacher S, Barros SP, **Altarawneh S**, Beck JD, Loewy ZG. Impact of tooth loss on oral and systemic health. *Gen Dent.* 2012 Nov-Dec;60(6):494-500.

Bencharit S, **Altarawneh SK**, Baxter SS, Carlson J, Ross GF, Border MB, Mack CR, Byrd WC, Dibble CF, Barros S, Loewy Z, Offenbacher S. Elucidating role of salivary proteins in denture stomatitis using a proteomic approach. *Mol Biosyst.* 2012 Oct 30;8(12):3216-23.

Thalji GN, Cooper LF. The role of complete overdentures in esthetic rehabilitation of the adolescent oligodontia patient. A case report. *J Esthet Restor Dent.* 2010 Aug;22(4):213-21.

c.) Employment and Professional Contributions of Alumni FY 2010-2011 thru FY 2014-2015

Name	Year	Current Employment	Faculty Full (FT) Part time (PT)	Board Certification Part 1/ Diplomate	Professional/ Intellectual Contributions
Katie Conard	2010	Practice, Brevard, NC	No	Part 1	
Matthew Bryington	2010	Assistant Professor, West Virginia University	Graduate Program Director	Part 1	
William Day Gates	2010	Practice, Mobile, AL	Adjunct, UNC	Diplomate	Alabama Dental Association – House of Delegates Mobile District Dental Society – Treasurer Mobile Study Club – Director
Carolina Vera	2010	University of North Carolina	Assistant Professor, FT		Director, Mexico Project
Sandra Altarwaneh	2011	Amman Jordan	Assistant Professor, FT	Diplomate	
Astrid Alves Daporta	2011	Practice, Miami, FL			
Oliver Pin Harry	2011	Practice, Burlington Ontario, CA	Adjunct, UNC	Diplomate	Prosthodontics Board Examiner, Ontario CA
Bryan Limmer	2012	Practice, Denver, CO	PT, U Colorado	Part 1	New Graduate Committee member, AO
Edward Givens	2012	US Navy Dentist, Practice, San Diego CA			
Theresa Wang	2012	Practice, Chicago IL			
Thomas Suranyi	2012	US Navy Dentist Practice, South Carolina		Part 1	
Ghadeer Thalji	2012	University of Iowa	Assistant Professor, Graduate Program Director, FT	Diplomate	PhD. AO grant recipient
Prephun Limpiphathanakorn	2013	Practice, Bangkok, Thailand		No	
Emily Batson	2013	Practice, Colorado Springs, CO	Adjunct Faculty, UNC	Part 1, II, IV	
Bryan Jacobs	2013	Practice, Chicago, IL	PT, UIC	Part 1, II, IV	
Austin Leong	2014	Maxillofacial Fellow, Sloan Kettering Hospital New York City, NY	Hospital Staff, Sloan Kettering Hospital NYC	Part 1	
Lida Swann	2014	Implant Fellow UNC	Teaching fellow UNC	No	
Julie Elpers	2014	Practice, Boston, MA		Diplomate	
Mark Ludlow	2015	Director Implant prosthetics, MUSC	Assistant Professor, FT	Part 1	
William Scruggs	2015	Practice, Raleigh, NC	PT; UNC-CH	Part 1	
Nicole Ludein	2015	Practice, Zurich, Switzerland	N/A	No	

E. Leadership and Support

See General Leadership and Support overview.

1. Administrative Support

The Advanced Education Program in Prosthodontics is strongly supported by a complete administrative staff consisting of a) a full-time patient care coordinator, b) a full-time receptionist, c) two full-time dental assistants, and d) a one half-time manager. The Patient care coordinator addresses patient related issues, performs daily chart reviews, conducts bi-annual reviews of resident patient rosters, formal patient correspondences and addresses all risk management matters. The full time receptionist controls patient appointments, manages patient payments, organizes referrals and screening appointments, and assists the director in CODA, PASS, ADEA and ADA correspondences. The two full-time assistants assure that the clinic is a safe and effective environment for patient care and student learning. They maintain equipment, supplies and instruments; assist with patient care.

2. Facilities

The Advanced Education Program in Prosthodontics is housed within a new (2009) clinical environment with 14 chairs for 9–10 students and an implant fellow. Additionally, the clinic has a well-appointed waiting room and reception desk, an office for the patient care coordinator, a dental laboratory and a sterilization room. The clinic contains a sterilization/storage center, two dental operatories equipped for dental implant surgery, peri-apical radiographic capability and digital dental scanners. There is a well-equipped dental laboratory and there is a student office with 16 stations. Each student is assigned his/her own operatory, his/her own office station, and his/her own dental laboratory station. The dental laboratory contains all materials and equipment required to produce dental and maxillofacial restorations. There is a full time dental laboratory technician within the Department of Prosthodontics who assists students with required laboratory tasks. The student offices permit access to the Electronic patient record, digital 3D planning software, imaging and design software, local computers and the web. This is facilitated through personal computers that are encrypted and accessed to work behind HIPAA compliant firewalls. Research is promoted through activities ongoing across the UNC campus. The School of Dentistry's facilities include the Koury Oral Health Sciences Building (KOHS), a well-equipped research facility adjacent to the Department's clinical and administrative facilities.

F. The Future

The UNC Advanced Education in Prosthodontics currently has a rich applicant pool and remarkably talented residents who work and learn within a sufficiently large clinic that has contemporary dental equipment and ample array of contemporary dental supplies and materials. The staff is outstanding and there is a positive, collegial relationship between staff and residents. The patient population is robust both in size and scope. Combined with this program's history of research accomplishment, its strong didactic component, and the positive interdepartmental interactions with other specialty training programs suggest that the present educational environment is strong. As such, the future should focus on maintaining the presently attained goal of providing a contemporary and didactically enriched clinical program for training prosthodontists based on maintaining three fundamental features of our recent success: a) an enriched patient pool, b) a strong didactic program with a core independent research requirement, and c) a contemporary clinic supported by outstanding staff. These features promote a continued, strong stream of applicants from which an outstanding student body is selected. It is important that the department continue to engage students with strong academic career interests able, interested, and willing to pursue a PhD degree in tandem with clinical training.

The future requires maintaining these core features of the program and continuing to maintain a contemporary clinical environment. This is challenging because Prosthodontics is facing changing technologies that require continued capital investment equipment that support a digital workflow. Further, these new technologies require both faculty development and curricular revision. The Department of Prosthodontics and School of Dentistry is committed to assuring that emerging technologies and faculty are in place to maintain the contemporary nature of the UNC Graduate Prosthodontics program.

Program Size

The UNC Advanced Education in Prosthodontics program as configured with 9 -10 student is adequately supported by its configured staff and faculty. Increasing the size of the program with conventional students would be supported by the patient population and the physical clinical setting. Additions to the UNC program by the inclusion of Advanced Education students seeking dual training at the PhD level should be considered. In order to recruit the best and the brightest from our applicant pool, support for tuition and out of state tuition is needed. This has been a barrier in recruiting out of state students and students interested in a combined clinical specialty/PhD track.

Resources

Digital Technology is the current buzz word in Prosthodontics. The UNC Advanced Education in Prosthodontics program has benefited by generous loaning of digital technologies from manufacturers and dental laboratories. Based on research based relationships, we are fortunate to lead in this field. However, these relationships are ever changing and subject to proper scrutiny. The challenge in the near future is to attain sufficient resources to build a functional digital dental laboratory that enables learning and supports clinical education. Some of resources would likely be shared among other affiliated specialty programs. The cost of developing such a laboratory environment ranges from \$50,000 – 150,000 and requires software licenses, updates, and maintenance contracts. Conventional dental procedures are also changing; for example lasers are replacing scalpel blades and electric hand pieces are replacing air turbines used for the past four decades. In order for the UNC Advanced Education in Prosthodontics program to remain contemporary and lead among its peers, adoption of these technologies – again at a cost of approximately \$100,000, is needed. A resource plan should be developed and appropriately funded.

Curricular Changes

There have been no significant curricular changes in the Advanced Educational Program in Prosthodontics over the past five years. The curriculum is well aligned with the CODA standards for Advanced Education in Prosthodontics. That said, each year, the graduate program director meets with third year residents to review the content of the central didactic course (Pros 732) to refine and revise content. New materials are added and course focus is refined to match the changes in the specialty as reflected by the literature and practice. As indicated above, additional clinical information regarding digital dental work flow continues to be integrated into the curriculum.

Quality Improvement of Graduate Education

The Advanced Educational Program in Prosthodontics can improve the quality of its graduate education by developing stronger evaluation mechanisms for residents in both clinical and didactic activities that are both better timed (immediate feedback) and goal (not person) directed. This requires further involvement of a broader number of Prosthodontics faculty. Education can be improved by increasing interactions with other specialties to share emerging information through formal coursework (e.g., interdisciplinary care conferences), shared research responsibilities and informal mechanisms. Students should be continuously exposed to issues beyond the technical scope of the specialty such as social issues of health care, health care policy, ethical issues confronting medicine and dentistry and the changing business and economic landscape of the profession.

Student Qualifications

The Advanced Educational Program in Prosthodontics is challenged by recent changes in reporting requirements established by CODA. Only Pass/Fail grades on the national boards are provided at this time. It is important to gather additional information to assess fully student qualifications.

Racial, Ethnic, and Gender Diversity in the Graduate Program

The UNC Advanced Educational Program in Prosthodontics proudly represents a program that early on embraced diversity and was among the earliest programs to enroll a majority female class in the United States. The program has a far reaching reputation and ethnic diversity has been well represented by our international class members. We continue to support racial diversity in the program applications. However, it is clear that Prosthodontics and the UNC Advanced Educational Program in Prosthodontics must continue to address racial diversity at the earlier stages of undergraduate and dental education to promote application of racial minorities to the specialty of Prosthodontics.

Quality of Mentoring

Mentorship of students requires time. The future success of the program requires that additional faculty are identified as mentors to the residents.