

Advanced Orthodontic Education Program The Indiana University School of Dentistry Division of Orthodontics

RIYAD AL-QAWASMI, D.D.S., PH.D, M.S.D.

Introduction

The goal of the orthodontic program at the Indiana University is to provide residents with an education of the highest quality that will enable them to render proficient orthodontic care to their patients throughout their professional careers. The program is one of the few two-year, mandatory masters degree programs in the country. The program begins in July 1st of each year and finishes off with a Master's degree awarded upon completion of the required didactic and clinical competency program and a research project, including successful defense of a thesis or. Submitting a manuscript for publication is a popular option in lieu of a bound thesis.

Orthodontics is a division of the Department of Oral Facial Development that also includes the divisions of Pediatric Dentistry, Oral Facial Genetics and Craniofacial Anomalies. This diverse environment within the department allows the orthodontic residents at the Indiana University to interact with related specialties that helps in their maturation at the both the clinical and research levels.

Didactic Program

Because of the high academic standards expected for the didactics, research and clinical practice, the Indiana University orthodontic graduate program is designed for inquisitive, self-motivated students. Through a series of formal courses, seminars and demonstrations, the very diverse faculty guides this educational process. However, each resident gains confidence and skills with this program through the responsibility for his/her own achievement in meeting

the established educational criteria. Successful completion of the curriculum fully prepares the resident with all the educational requirements for eligibility to take the American Board of Orthodontics Phase II examination.

Research Program

Research is an integral part of the graduate orthodontic educational process beginning shortly after the first few weeks of the program. The four established major research missions of the department are studies of biomechanics, musculoskeletal physiology, oral-facial genetics and orthodontic dental materials. The residents have a wide range of topics to research from these missions. Some students elect to do research work outside of the orthodontic department with appropriate liaison to departmental faculty. This provides the resident a more extensive experience in research and basic science and requires an in-depth original research project leading to a defended thesis or published paper.

All Indiana University School of Dentistry orthodontic residents are required to complete all of the Indiana University School of Dentistry requirements for the M.S.D. degree in addition to all of the didactic and clinical requirements in order to receive a Certificate in Orthodontics.

Oral Facial Genetics (OFG) is one of the research areas that has become a popular MSD research subject for the orthodontic residents. It is also possible for a resident to pursue combined Ph.D. in Dental Science and orthodontic certificate. This requires application to and acceptance by both

the Indiana University Graduate School and the graduate orthodontics program. Also through the IU Graduate School it is possible to obtain a Ph.D. in Dental Science without earning the certificate in orthodontics. This educational pathway does not require a dental degree, but does require admittance into the Ph.D. in Dental Science program.

The focus of the Oral Facial Genetics Division has evolved from syndrome delineation and research into the etiology of craniofacial anomalies to the study of the interaction of genetic and environmental factors that influence non-syndromic craniofacial growth and development, and the response to orthodontic treatment. OFG research led to the first identification of inbred strains of mice that have disparate root resorption associated with orthodontic force, and the first specific genetic factor that contributes to EARR associated with orthodontic treatment in humans. Another area of interest is the influence of genetic factors on the response to functional orthodontic appliances.

Another area of research interest to residents is in biomechanics. The focus of the Bio-Mechanics Research Laboratory (BMRL) is on the mechanical engineering aspects of dentistry; namely areas of biomechanics and biomaterials. Examples of projects include:

- Non-biological
 - Orthodontic bracket bond-strength testing protocols
 - Resin composite polymerization shrinkage
 - Mandibular kinematics and occlusion

- Biological
 - Mechanisms of tooth eruption
- “Hybrid”
 - Mechanics of dental implant support
 - Mechanics of orthodontic tooth movement

Clinical Program

The orthodontic residents treat patients in a 21-chair clinic housed in Orthodontic Department of the School of Dentistry and are devoted exclu-



Residents practicing the various aspects of orthodontics in a state-of-the-art clinical facility.

sively to providing orthodontic patient care. Immediately adjacent to the clinic are craniofacial anomalies clinic, laboratories and two seminar rooms, one of which is used as a shared office space for residents.

The clinical experience reflects a private practice format. Each incoming (junior) resident is paired with a senior resident. Together they use a team approach to record collection, data analysis and treatment planning of each patient. While the highest concentration of cases is started during the fall semester of the first year, cases are continuously started throughout the program. Each resident starts approximately 60 new cases. The goal of 10 new patients with a discrepancy index (DI) >7 are prepared by the previous class and are ready to start in August of the first year of the program. As part of the graduation requirement, six cases with

a DI >7 (started and finished by the resident) will be presented for the ABO Mock Board Examination conducted shortly before graduation. The new case starts, plus transfer cases from the senior resident upon graduation, offers a challenging clinical experience.

The length of the program is a minimum of 24 months which most students are able to complete on time.

However, this completion is dependent upon adequate progress in clinical achievement and completion of the research project to IUSD and Orthodontic program standards. Required clinical achievements are: 1) to start and finish six cases which the Mock Board Panel feels would pass the ABO Phase III Clinical Examination, 2) appropriately manage the orthodontic care of all patients, new starts and transfers in the practice, 3) start the active treatment of at least 50 patients, and 4) finish at least 40 patients with as high a standard as possible. The goal is that 50% of finished cases should of sufficient quality to pass the ABO phase III exam.

Clinical practice is about 50% of the scheduled time that is carried out in a state-of-the-art clinical facility with digital radiographic system. In the clinic, the residents are taught multiple techniques such as edgewise, segmented, lingual, Tweed, functional appliances and implant anchorage by qualified faculties. Furthermore, the residents get to interact with their joint-program colleagues in the program (Ortho/Perio, Ortho/Pedo, Ortho/Prosthodontics and Ortho/PhD). Teaching in the predoctoral program is required and participation falls during the second year, one day per week during the first semester and two days in the second semester. This experience helps the residents to:

1. Learn to effectively interact with

- general practitioners
2. Follows the natural progression in education - “Watch, do and teach”
3. Provides exposure to “limited” orthodontic problems

The clinical program also involves a Craniofacial Anomalies Program, which is part of the Department of Oral Facial Development at the Indiana University School of Dentistry. Approximately, 400 patients, mostly children, are seen as outpatients at the orthodontic clinic. Approximately 50% of patients are treated for cleft lip and palate malformations while 30% have a recognized craniofacial syndrome such as Apert, Crouzon, Treacher Collins, Hemifacial Microsomia, Cleidocranial Dysplasia and the remaining 20% of patients have medical complications that involve such problems as ventilatory obstruction, non-oral feeding, cerebral palsy, autism and muscular dystrophy. The multidisciplinary Craniofacial Team at Riley Children’s Hospital is one of the three largest teams in North America and is on the campus of the Indiana University Medical Center. The Children’s Hospital is also the site for weekly joint examinations, consultations and recall appointments. Approximately 2000 active craniofacial patients are seen annually among 14 doctors from specialty areas of pulmonary and developmental pediatrics to neurosurgery and plastic surgery. Over 30 intracranial procedures are performed each year, many involving LeFort III distraction osteogenesis with a new transport system developed by Dr. Havlik of Plastic Surgery and Dr. Hathaway (J of Craniofacial Surgery, Nov. 2004). There is a Craniofacial Fellowship position available each year in Orthodontics and one in Plastic Surgery. Joint conferences, multiple weekly treatment planning responsibilities, model surgery and splint fabrication duties are combined with learning in the clinics and in the operation room. The educational mission extends to

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EDUCATION PROGRAM

the world as exemplified by the previous two fellows in craniofacial orthodontics who are currently serving as Chiefs of Craniofacial and Surgical-Orthodontic hospital programs in the US and abroad.

Faculty



Several of the IU orthodontics faculty.

An internationally renowned orthodontics faculty teaches multiple clinical techniques including lingual appliances, segmented arch mechanics and dedicated implant anchorage mechanics (Figure 2). In this two-year, mandatory masters degree program the multidisciplinary faculties are educationally qualified in anatomy, bone physiology, biomechanics, mechanical engineering, epidemiology, medical genetics, growth and development, orthodontic diagnosis and treatment planning and management of temporomandibular disorders. They include:

Fulltime

W. Eugene Roberts DDS, PhD, DHC (Med), (Program Director); Creighton University and University of Connecticut. Board certified
James K. Hartsfield, Jr., DMD, MS, MMedSci, PhD, (Director of Oral Facial Genetics); Medical University of South Carolina, Indiana University, Harvard University, and the University of South Florida. Board certified in orthodontics and medical genetics
William F. Hohlt, DDS, (Director of the Predoctoral Orthodontics Program);

Indiana University. Board Certified
Ronald R. Hathaway, DDS, MS, (Director of the Craniofacial Anomalies);
University of Iowa and University of Detroit Mercy
Thomas R. Katona, DMD, PhD;
University of Pennsylvania
Riyad A. Al-Qawasmi, BDS, MSD, PhD; Jordan University and Indiana University

Part time

James J. Baldwin, DDS, MS, MSD; Yale University, Indiana University. Board Certified (Masters in Physics)
Serkis Isikbay, DDS; Indiana University (orthodontist and prosthodontist)
Jeffery A Dean, DDS, MSD; Indiana University. Board Certified (Orthodontist and

Pedodontist)

Charles Pritchett, DDS, MSD; Indiana University and University of Kentucky
O.H. Rigsbee, DDS, MS; Indiana University and University of Illinois: Board Certified
Jennifer A. Russell, DDS, MSD; Indiana University
James C. Shanks, MS, PhD; Michigan State and Northwestern (Speech Pathologist)
Jie Chen, PhD; Shanghai Second Medical College, Drexel University (Mechanical Engineer)

Volunteers

Timothy Alford, DDS, MSD; Indiana University. Board certified
Nelson R. Diers, DDS, MSD; Northwestern University and Indiana University. Board certified
Michael C. Frazier, DDS, MS; University of Missouri, Kansas City, Iowa University. Board certified
J. Courtney Gorman, DDS; Indiana University, Washington University. Board certified
Jerry R. Hickman, DDS; Indiana University. Board certified
James V. Macri, DDS, MSD; Indiana University. Board certified

Robert Stoner, DDS, MS; Indiana University, University of Michigan. Board certified
Mark Turner, DDS, MS; Indiana University, University of Michigan
Manuel Chanavaz, MD, DDS; University of Paris, University of Lille, France

Emeritas

LaForrest D. Garner, DDS, MSD; Indiana University. Board certified

Residents



The graduating class of 2005

Currently seven residents are admitted each year. The class profile usually meets the following criteria: 2-3 experienced clinicians (often includes one military officer), 2-3 new graduates, one foreign graduate and one joint specialty program candidate. Joint specialty programs exist with periodontics, pedodontics, and prosthodontics. This results in a 4-5 year program. There is also a Joint Ph.D. and Orthodontics program that is 5-6 years in length. Successful applicants to the program require outstanding educational accomplishments along with experiences in research and patient care to be competitive. The residents play a role in the selection when it is included with other prerequisites.

Facilities and Support

Excellent research facilities are available through the Indiana University School of Dentistry Histology and Mineralized Tissue Laboratory, and the Division of Oral Facial Genetics Molecular Biology Laboratory. Other specialized laboratories and facilities

are available as needed, including the Indiana University School of Dentistry Bioresearch Laboratory, which is accredited by AAALAC International. Institutional Review Board approved clinical studies are conducted on both orthodontic graduate program clinic and private practice populations.

Another facility is the Bio-Mechanics Research Laboratory (BMRL). The studies conducted in this facility typically involve concurrent mechanical testing and engineering analysis: 1) Mechanical testing is done on an MTS Bionix™ instrument. It is a computer-driven machine that can perform strength tests in tension, compression, and torsion. In addition, the hydraulic-powered machine can apply cyclic fatigue loads. 2) The bulk of the engineering analysis is the application of Finite Element Method (FEM) numerical models for stress/strain calculations. 3) Skyscan 1072 MicroCT machine. Teaching facilities such as the Gorman Room and Jarabak Library are available for residents all year around.



Gorman room: A fully equipped classroom reserved exclusively for the Orthodontics program at IU.

Indianapolis, Indiana

The Indiana University School of Dentistry is located on the main campus of Indiana University/Purdue University in downtown Indianapolis. The location is adjacent to the beautiful White River State Park. This park serves as home for the National Institute for Fitness and Sport, the

national headquarters of the NCAA, the Indiana History Museum, the Eiteljorg Western and Native American Art Museum, the Indiana Historical Society, the Indianapolis Zoo and the White River Gardens. Also, the Indianapolis Natatorium, venue of many national and international swimming events and the RCA tennis facility, home of the international RCA Tournament are located right on the campus.

Indianapolis is a sports minded city. It is home of the Indiana Pacers NBA team, the Indiana Fever WNBA team, and the Indianapolis Colts NFL team. Baseball is represented also with the AAA Indianapolis Indians. And, the most famous of all is the Indianapolis Motor Speedway, home of the Indianapolis 500 Indy car event held on Memorial Day weekend, also home of the Brickyard 400 Nascar event and the Formula 1 race.

Not far from the downtown area are the newly renovated Indianapolis Museum of Art and the Lilly House. Historical places such and the President Benjamin Harrison home, the James Whitcomb Riley home, and the many monuments and war memorials dedicated to military who served in every war. The prestigious walls honoring the recipients of the United States Medal of Honor on the downtown canal walk is another of the interesting sites in the city.

The downtown area is walking distance from the campus and provides a large variety of restaurants from brew pubs and steak houses to classical fine dining. The city provides a classical symphony orchestra, International Ballet, Opera, and has many live theater venues.

The climate is moderate with all four seasons to add the beauty of living and learning in Indianapolis.

President's Report

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who say, "What just happened?" I urge each of you to become involved and have your voice be heard. The future of orthodontics depends upon it.

As my year as GLAO President comes to a close, I am deeply indebted to the Great Lakes Officers, Board of Directors and Council representatives, all who have made this job a pleasure. Special thanks also go to Debbie Nunner and her assistant, Michelle Patrick, who handle the day to day operations of our organization.

I have enjoyed immensely working on your behalf and look forward to seeing you all in Bermuda!

GLAO 2005 - 2006 Ballot Results

President

Robert Portenga

President-Elect

Jeff Berger

Vice President

Mary Barkley

Delegates

<i>John Barbour</i>	<i>Valmy Kulbersh</i>
<i>Mary Barkley</i>	<i>Richard Marcus</i>
<i>Jeff Berger</i>	<i>Robert Portenga</i>
<i>Maria Haas</i>	<i>Chris Roberts</i>

Alternate Delegates

Stephen Belli
Dan George
Walter Schratz
Michael Sherman