Orthodontic Graduate Program

Introduction and Mission

In 1926 the College of Dentistry Department of Orthodontics became the first orthodontic program in the United States to be recognized by a graduate college, and our Program has been an integral part of The University of Iowa Graduate College ever since. The University of Iowa graduate program in orthodontics is regarded nationally as being in the top tier of orthodontic advanced educational programs, and its mission embraces the academic values of a university as well as the ethical responsibilities implicit in the education of future members of a health care profession. Our mission rests upon a tripartite foundation reflecting the full spectrum of collegiate activity:

1. Education of general dental practitioners and orthodontic graduate students as specialists in the treatment of malocclusions and dentofacial deformities.

2. Research into all aspects of normal and abnormal facial growth, development, and evolution; investigation into the determinants of biological, biomechanical, and surgical correction of abnormal facial, jaw, and dental development; and collaboration with associated disciplines including: all dental specialties, radiology, pediatrics, otolaryngology, genetics, anthropology, and biomedical engineering.

3. Service to the community, state, profession, and specialty.

The purpose of the graduate program in orthodontics is to provide students with a balanced academic and clinical experience in the domain of orthodontics and dentofacial orthopedics in order to develop comprehensive scientific competence in orthodontics and dentofacial orthopedics. Our objectives are to provide students with an in-depth education in the biological, biomechanical, and surgical treatment principles related to orthodontics; provide students with a comprehensive understanding of the knowledge base of the specialty and related disciplines; instill in our students the ability to critically assess the literature of orthodontics and related disciplines; provide students the opportunity to complete a scientific study which will add significantly to the literature of the specialty or related specialties; and to teach students to diagnose, treatment plan, and deliver comprehensive orthodontic health care service and to cultivate service skills in students.

Emphasis on research is a tradition in the Iowa Department of Orthodontics. We have received competitive research funds at the national, specialty, collegiate, and corporate levels. Faculty regularly publish in peer-reviewed journals, and our research efforts have resulted in national awards and special mention by journal editors. The majority of our students' thesis research projects are published in peer-reviewed journals.

Admission Processes and Recruitment

Table 1 shows applications, offers and admittance for the Orthodontic program between 2001 and 2009. There is intense competition for entry into the Orthodontic program with 5% or less of those applying being offered a position. The program participates with the majority of other United States and Canadian orthodontic programs in the National Matching Service – so the number of candidates offered positions equals the number who enter training.

Admission is based on academic criteria, including dental school grade point class rank, GRE scores and a personal interview. Graduate College data for entering orthodontic students 1996-2007 indicates an average GPA of 3.48, slightly above that for all health sciences (3.43) and the overall UI average (3.36). Graduate College data for entering orthodontic students indicates an average GRE from 1996-04 (V-Q-A) of 1893 and from 05-07 (V-Q) of 1673 exceeding the average for all health sciences by 200 points and for overall UI by 60 points.

Funding and financial commitments to the Orthodontics program

Orthodontic graduate students receive a Fellowship both years of their program which is funded entirely by Departmental patient revenue.
Table 1  Orthodontic Applicants

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<tbody>
<tr>
<td># Individuals who have formally applied for postdoctoral training</td>
<td>130</td>
<td>145</td>
<td>142</td>
<td>140</td>
<td>144</td>
<td>101</td>
<td>115</td>
<td>100</td>
<td>129</td>
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<tr>
<td># offered admission</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<td>5</td>
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<tr>
<td># who entered training</td>
<td>5</td>
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Trainee Characteristics
Table 2 shows summary data for academic achievement (grade point) diversity and outcomes in terms of degree completion and placement for the students in the MS program. MS students are predominantly male (74%) and white (94%).

Program Outcomes
Of the 50 students in the program between 1999 and the present, all 50 graduated. The average GPA of graduates is very high (3.98) and the time to completion is stable (2 yrs). On graduation, 48 of the graduates (96%) went into private practice which is not surprising considering the debt these individuals have incurred in school (up to $250,000-$300,000) and the strong demand for orthodontic care in North America. 1 graduate entered academics, and 1 graduate entered the military.

Table 2  Orthodontic Program Characteristics  1999-present

<table>
<thead>
<tr>
<th>Number of students</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Average GPA on graduation</th>
<th>Average time to graduation</th>
<th>Placement on graduation</th>
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<tbody>
<tr>
<td>50</td>
<td>M 37</td>
<td>F 13</td>
<td>white 46 black 0 hispanic 3 asian 1</td>
<td>(range) 3.98 (4.0-3.96)</td>
<td>Private practice 48 2 (2 -2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(range)</td>
<td>Academic 1 Other (e.g. military) 1</td>
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Honors and awards
Over the past 10 years 60% of our research theses, an average of three of five masters theses completed each year, have been published in peer-reviewed scientific journals. Recently, one of our graduate students won the top craniobiology research award, the Sarnat Award, at the AADR/IADR 2005 meeting and the top AAO orthodontic research award, the Milo Helman Award, at the AAO 2006 national meeting for her research investigating the craniofrontonasal dysplasia syndrome. Another student won the 2008 Milo Helman Award for her work in craniofacial biology. Although there is no national ranking of dental graduate programs, the University of Iowa Orthodontic Program has a strong reputation, nationally and internationally.

Program Characteristics
Faculty profile
All full-time faculty are prominent figures within the orthodontic community and regularly publish. All are regularly asked to make scientific presentations. And most hold, or have held, national offices within the specialty. All full-time faculty are tenured and have received certification by the American Board of Orthodontics. This same depth and breadth of experience is reflected in our faculty's teaching. The material that they draw from during course development is extensive, accumulated over many years of research and patient care.
Departmental size
The Department has four full-time faculty who are primarily devoted to the graduate program educational and research mission. They teach the graduate level courses and direct/mentor/participate in the graduate student research projects. The Department has two full-time faculty who are primarily (80%) devoted to genetics (cleft lip and palate) research. One of those is primarily supported by NIH. These faculty members teach graduate level courses within the Department and mentor PhD research.

Challenges and opportunities
The major future Departmental challenge is recruitment and retention of orthodontic educators. Due to the extreme differential in salaries (300-500%) existing between orthodontists in private practice and those in academics, recruitment and retention of future faculty is problematic. This same situation is seen throughout orthodontic programs across North America and is referred to in the orthodontic community as the crisis in orthodontic education.

There were previously 5.4 FTEs within the Department and 1 FTE orthodontist at UIHC. During the past year, two female orthodontists (2 FTEs) left the University to enter private practice. Three of the remaining faculty are approaching retirement. The Department Chair is making every effort to recruit part-time orthodontic faculty to bridge the anticipated long-term faculty shortage. As current faculty leave, additional full-time faculty will be recruited.

A bright spot on our graduate program's horizon is that interdisciplinary research collaborations have dramatically increased for us. The Department is taking a leadership role and has formed a team of researchers from radiology, anthropology, oral and maxillofacial surgery, genetics, and veterinary surgery (Iowa State University) in pursuing our understanding of human and mammalian facial growth and evolution. Members of the Department are actively engaged in groundbreaking research regarding the genetic basis of various craniofacial anomalies (e.g. craniofrontal dysplasia). Others are heavily investigating the use of skeletal orthodontic anchorage and collaborating with members of the Biomedical Engineering Department. Traditional areas of research, including orthodontic and orthognathic surgical treatment outcomes, materials studies, disease prevention, and growth prediction continue to be actively pursued.

The Department recently assumed responsibility for providing orthodontic care to all of the craniofacial anomalies patients previously seen at UIHC. This offers the opportunity for dramatic expansion of the interaction between our two orthodontists/geneticists and this pool of patients.

Conclusions
The University of Iowa Department of Orthodontics has a reputation as a top-tier educational graduate program. Excellent faculty and support resources combined with modern research and clinical facilities allow the Department to provide students with an outstanding educational experience as well as the ability to conduct a full spectrum of orthodontic research projects. The interdisciplinary research aspect of the program will continue to grow and foster discovery. The weakness of the program is found in recruitment and retention of faculty.