Barriers to Women Entering the Field of Orthopedic Surgery

Emily K. Miller, BA; Dawn M. LaPorte, MD

The movement toward official academic training for medical professionals in the 12th and 13th centuries led to the exclusion of women from professional health care because they were excluded from universities.1-3 Although women were barred from the practice of surgery, they were able to fill roles as bonesetters. The treatment of musculoskeletal conditions was largely the domain of bonesetters in the centuries before the 1850s. After the advent of anesthesia and antibiotics, the profession of orthopedic surgery developed rapidly, and the bonesetters slowly disappeared.

After passage of the 1972 Education Amendments to the Civil Rights Act in the United States, including Title IX4 on sex-based discrimination, the number of female graduates from medical schools began increasing at a steady rate, tripling by 1980.5 However, the percentage of women in surgery lagged behind that in medicine: in 1980, 12% of physicians, but only 2% of surgeons, were women.6 Notably, the percentage of female residents in orthopedic surgery grew at a slower rate than that in other surgical subspecialties (Table 1).6,7

This editorial takes a historical perspective to investigate the key barriers to attracting women to the field. We distributed a survey that focused on exposure to orthopedic surgery to all members of the Ruth Jackson Orthopaedic Society. Of the 777 members, 267 (34%) female orthopedic surgeons and residents responded (Table 2). This represents approximately 20% of all female orthopedic surgeons. Seven personal oral history interviews were conducted with Drs Liebe Diamond (who completed residency in the 1950s), Michelle James (1980s), Mary O’Connor (1980s), Beth Shubin Stein (1990s), Dawn LaPorte (2000), Casey Humbyrd (2010s), and Julia Smart (2010s).

Previous research has shown that women’s performance in orthopedic residency programs equals that of men,8 and that women are accepted into orthopedic surgery residency programs at the same rate as men.9 However, women are more underrepresented in orthopedics than in any other specialty.

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Table 1

<table>
<thead>
<tr>
<th>Specialty</th>
<th>1970a</th>
<th>2001a</th>
<th>2010b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthopedic surgery</td>
<td>0.61%</td>
<td>8.97%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>0.90%</td>
<td>10.59%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Urology</td>
<td>0.27%</td>
<td>12.69%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>0.64%</td>
<td>18.55%</td>
<td>32.3%</td>
</tr>
<tr>
<td>General surgery</td>
<td>2.36%</td>
<td>23.74%</td>
<td>36.2%</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>3.69%</td>
<td>32.41%</td>
<td>41.4%</td>
</tr>
<tr>
<td>Obstetrics and gynecology</td>
<td>4.79%</td>
<td>71.41%</td>
<td>81.4%</td>
</tr>
</tbody>
</table>

aAs reported by Blakemore et al.6
bReported as percentage of Accreditation Council for Graduate Medical Education residents and fellows.7

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The authors are from the Department of Orthopaedic Surgery, The Johns Hopkins University, Baltimore, Maryland.
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Correspondence should be addressed to: Dawn M. LaPorte, MD, Department of Orthopaedic Surgery, The Johns Hopkins University, 601 N Caroline St, Fl 5, Baltimore, MD 21205 (editorialservices@jhmi.edu).
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Lack of exposure to orthopedic surgery before and during medical school is one of the most commonly cited reasons women do not apply to orthopedic residencies. A 2012 analysis reported on medical students’ motivations to enter specific fields. Only 15% (76 of 495) of students not pursuing orthopedics cited experiences before medical school as the most influential, compared with 27% (34 of 125) of those pursuing orthopedics. However, women pursuing orthopedics had influences similar to those of medical students pursuing other fields, with only 15% (3 of 20) citing previous exposure and 80% (16 of 20) citing experiences during the clinical years of medical school. In our survey, 76% of respondents had some exposure to orthopedic surgery before medical school. Although prior exposure to orthopedic surgery is important for generating initial interest, experiences during medical school are even more influential for women who pursue orthopedic surgery.

Unfortunately, musculoskeletal education in medical school has historically been deficient. Seventy-five percent of survey respondents reported having less required exposure to orthopedic surgery in medical school compared with other specialties like otolaryngology. Required instruction in musculoskeletal medicine was associated with a 12% higher rate of application to orthopedic surgery residency programs among all students and a 75% higher rate among women. In schools with limited or no required musculoskeletal education, prior exposure to orthopedic surgery is essential for students to take the initiative and seek out experiences in orthopedic surgery.

Survey respondents commonly mentioned the following previous exposures to orthopedics: athletics-related patient experiences (31%), non–athletics-related patient experiences (21%), experience in a related occupation (8%), and having a family member or close friend who is an orthopedic surgeon (5%) (Figure 1). The relationship between athletic involvement and orthopedic surgery is multifaceted. Medical students who have participated in athletics are more likely to have previous exposure to orthopedics than are their nonathlete classmates. Additionally, athletes may be more interested in the mechanics of the body and movement and, therefore, may be more likely to be drawn to the field. The historical exclusion of women from sports participation put women at a disadvantage in terms of orthopedic surgery exposure through athletics. Before the enactment of Title IX, boys’ participation in high school sports was approximately 50%, whereas girls’ participation was only 3.7%. Now, the percentage of girls participating in high school sports has increased to 40%. In our survey, 84% of female orthopedic surgeons responded that they had played sports in high school and/or beyond (Figure 2), and 46% stated that athletics influenced their decision to enter orthopedic surgery. This percentage increased with the year that respondents finished residency, with 28% (8 of 28) of those finishing in the 1980s and 55% (68 of 123) of those finishing after 2010 confirming that athletics influenced their decision to apply in orthopedic surgery.

### Table 2

<table>
<thead>
<tr>
<th>Year of Residency Completion</th>
<th>0%-4%</th>
<th>5%-9%</th>
<th>10%-14%</th>
<th>15%-19%</th>
<th>≥20%</th>
<th>Unanswered/Unclear, No.</th>
<th>Total, No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-1979</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0 (0%)</td>
<td>1 (25%)</td>
<td>0 (0%)</td>
<td>4 (1.5%)</td>
</tr>
<tr>
<td>1980-1989</td>
<td>2 (7%)</td>
<td>8 (28%)</td>
<td>8 (28%)</td>
<td>3 (11%)</td>
<td>7 (25%)</td>
<td>0 (0%)</td>
<td>28 (10.5%)</td>
</tr>
<tr>
<td>1990-1999</td>
<td>3 (7%)</td>
<td>11 (26%)</td>
<td>11 (26%)</td>
<td>7 (16%)</td>
<td>8 (19%)</td>
<td>3 (7%)</td>
<td>43 (16.1%)</td>
</tr>
<tr>
<td>2000-2009</td>
<td>10 (16%)</td>
<td>19 (30%)</td>
<td>13 (21%)</td>
<td>5 (8%)</td>
<td>13 (21%)</td>
<td>2 (3%)</td>
<td>62 (23.2%)</td>
</tr>
<tr>
<td>2010-2016</td>
<td>5 (4%)</td>
<td>18 (14%)</td>
<td>22 (17%)</td>
<td>32 (25%)</td>
<td>45 (35%)</td>
<td>8 (6%)</td>
<td>130 (48.7%)</td>
</tr>
</tbody>
</table>

*Of survey respondents.

![Figure 1](image1.png)  
*Figure 1: Survey respondents reported the context in which they first were introduced to the field of orthopedic surgery. Patient experiences, both related to athletic activity and not, were the majority of responses.*
surgery. B. Shubin Stein, MD, noted in her practice, “I have had lots of young women who have had injuries and surgeries with me who have come back and chatted with me as students who clearly have an interest in going into the field now because of their injury” (oral communication, October 2012).

Another major historical barrier to women entering the field of orthopedic surgery is gender bias. Although overt bias plays less of a role now than in the past, unconscious bias continues to be an obstacle. C. Humbyrd, MD, explained that women in orthopedics are often held to a higher standard, or hold themselves to a higher standard, because when there are only 1 or 2 women in a program, each woman is seen as a representative for her entire sex: “When a woman doesn’t do well, it’s like the whole sex is taking a hit, whereas when a guy isn’t doing well—well, that guy sucks” (oral communication, July 2012). This phenomenon may diminish as programs increase their percentages of women.

In addition, women were far more likely to cite the importance of a role model of the same sex and/or of similar ethnicity than were their male counterparts. This was strongly supported in oral histories. All interviewees were able to pinpoint specific female mentors or role models who influenced their choice of orthopedic surgery as a specialty. An approximate threshold of 30% has been defined as the level of visibility necessary to avoid appearing to be a male-dominated profession. Unless women see other women in the specialty, they are less likely to choose it.

Furthermore, there are 3 major assumptions about orthopedic surgery that contribute to discouraging female applicants: (1) the uncontrollable and busy lifestyle intrinsic to the specialty; (2) the necessity of enormous physical strength; and (3) the overwhelming “jock and fraternity” culture and the majority of female orthopedic surgeons (84%) reported having played competitive sports. Survey respondents reported less exposure to orthopedics in medical school than to other specialties, which may be an important barrier to the recruitment of women. Lack of sufficient female role models in the field also impairs recruitment. One possible way to overcome the previously cited barriers and combat the misconceptions about orthopedic surgery is to provide medical students with opportunities to identify people in the field to whom they can better relate while simultaneously providing practitioners the opportunity to contradict misperceptions about orthopedic surgery.

REFERENCES


