Next Steps: Advocating for Women in Orthopaedic Surgery

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ABSTRACT

Orthopaedic surgery is the least diverse of all medical specialties, by both sex and race. Diversity among orthopaedic trainees is the lowest in medicine, and growth in percentage representation is the lowest of all surgical subspecialties. Women comprise only 6% of orthopaedic surgeons and 16% of orthopaedic surgery trainees. This extreme lack of diversity in orthopaedics limits creative problem-solving and the potential of our profession. Women in orthopaedics encounter sexual harassment, overt discrimination, and implicit bias, which create barriers to training, career satisfaction, and success. Women are underrepresented in leadership positions, perpetuating the lack of diversity through poor visibility to potential candidates, which impedes recruitment. Correction will require a concerted effort, as acknowledged by the American Academy of Orthopaedic Surgeons leadership who included a goal and plan to increase diversity in the 2019 to 2023 Strategic Plan. Recommended initiatives include support for pipeline programs that increase diversity of the candidate pool; sexual harassment and implicit bias acknowledgement, education, and corrective action; and the active sponsorship of qualified, capable women by organizational leaders. To follow, women will lend insight from their diverse viewpoints to research questions, practice problems, and clinical conundrums of our specialty, augmenting the profession and improving patient outcomes.

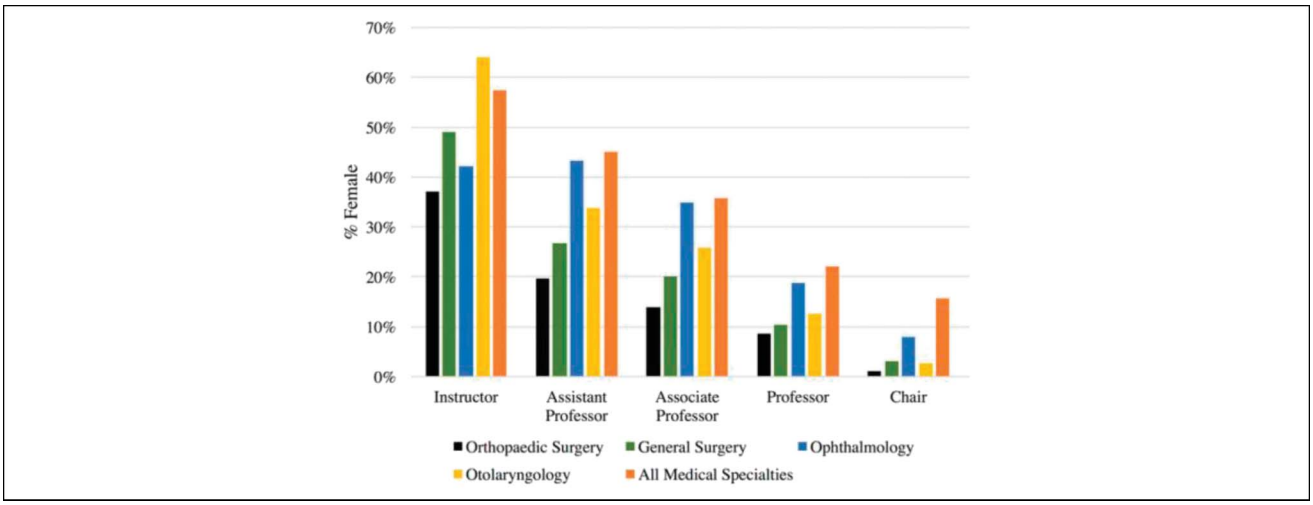
None of the following authors or any immediate family member has received anything of value from or has stock or stock options held in a commercial company or institution related directly or indirectly to the subject of this article: Scerpella, Spiker, Lee, Mulcahey, and Carnes.

J Am Acad Orthop Surg 2022;30:377-386

DOI: 10.5435/JAAOS-D-21-00932

Two decades into the 21st century, women comprise slightly more than 50% of medical students, 46% of resident trainees, and 36% of the physician workforce in the United States but less than 6% of all practicing orthopaedic surgeons, who remain overwhelmingly white men.[1,2] When considering either sex or race, orthopaedic surgery is the least diverse of all surgical subspecialties, ranking dead last in both categories. The proportion of women in orthopaedic surgery has grown very little in the past 30 years, increasing just over three percentage points from 2.5% in 1990. Moreover, female orthopaedic surgeons seldom rise to positions of power and influence, giving them a small podium presence at national meetings and

Figure 1



Bar chart showing academic titles as a total for surgical subspecialties with available data. In all specialties, especially orthopaedic surgery, women hold lower ranking academic titles than their male counterparts. Reprinted with permission Chambers CC, Ihnow SB, Monroe EJ, Suleiman LI: Women in orthopaedic surgery: Population trends in trainees and practicing surgeons. *J Bone Joint Surg Am* 2018;100:e116.

inadequate committee and leadership representation in national organizations.[3] Women account for only 18% of full-time orthopaedic surgery faculty and hold disproportionately lower academic titles than men[4] (Figure 1). Women faculty are more often appointed to education-based positions as program directors than to leadership positions as chair, vice chair, or chief of service.[5] Only nine women have been named orthopaedic department chairs—all since 2015, and only two before 2020. One female orthopaedic surgeon has been the president of the American Academy of Orthopaedic Surgeons (AAOS) and eight have been the president of one of the 23 AAOS Board of Specialty Societies (excluding the Ruth Jackson Orthopaedic Society, comprised predominantly comprised of female orthopaedic surgeons). The paucity of women and their poor visibility reinforces the perception of orthopaedic surgery as a specialty for men, contributing to the low recruitment of additional women to the field and, ultimately, lack of change.

The low representation of women in our specialty has been coupled with a high frequency of harmful, improper, and even illegal treatment. In a survey of a representative sample of the AAOS membership, published in 2020, 81% of female orthopaedic surgeons reported discrimination, bullying, sexual harassment, or harassment.[6] Recently, women in orthopaedic surgery joined the #MeToo movement with their own social media campaign, SpeakUp Ortho.[7] Here, women recount workplace mistreatment by other orthopaedic surgeons, both historic and current. In addition to causing personal harm, sexual harassment creates significant barriers to the achievement and advancement of women.[8] Acknowledgement of these stories and the anger, sadness, disenfranchisement, discrimination, and abuse that they convey marks the first, crucial step toward correction of this blight on our profession.

In recognition of the significant lack of women and underrepresented ethnic/racial minorities (URM) in our profession, AAOS leadership included a goal focused on increasing diversity within the organization in the 2019 to 2023 Strategic Plan.[9] Specifically targeting Board membership and volunteer structure, the Diversity Advisory Board of the AAOS was charged with providing tactics to achieve this goal, including support for a transparent volunteer and leadership selection process with training in diversity and implicit bias, promotion of a culture that embraces diversity, inclusion and equity for AAOS membership, and connection with orthopaedic specialty societies that focus on underrepresented and female orthopaedic surgeons (Figure 2). Recruitment has focused on work with partner societies such as Ruth Jackson Orthopaedic Society, J. Robert Gladden Orthopaedic Society, and American Association of Latino Orthopaedic Surgeons to identify opportunities for collaboration and to promote AAOS committee participation for female and URM members. The committee selection process was made transparent, with annual statistics on composition and selection provided on the Diversity Advisory Board

Figure 2

Illustration showing that the AAOS Diversity Advisory Board is charged with developing tactics in each of the four noted areas for the purpose of increasing diversity within the organization.[9]

dashboard on the AAOS website. More than 90% of AAOS leadership and staff liaisons have completed diversity, inclusion, and implicit bias training, and this training is now included in the onboarding instruction for all committee members. Training was developed to promote leadership competencies for AAOS members, focusing on URM and women. The Workplace Culture Survey will be repeated in the near future for the purpose of monitoring discrimination, bullying, sexual harassment, or harassment among AAOS members. These initiatives constitute excellent next steps in a broad approach to promote diversity in our society and profession. The rationale and application of these solutions and others are discussed here in greater detail further.

Numbers

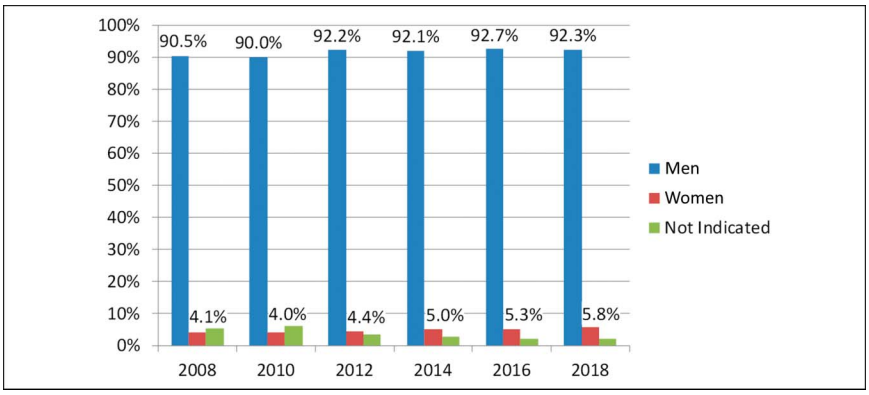
Data from the AAOS 2019 census show little growth in the percentage representation of women in orthopaedic surgery over the past decade (Figure 3).[10] In 2008, 4.1% of all orthopaedic surgeons were women; 10 years later, representation had grown to only 5.8%. Almost 16% of orthopaedic surgeons younger than 40 years are women, with declining representation in each older decade, reflecting the very low percentages of women trainees 15, 20, and 30 years ago (Figure 4).[10] Although this trend indicates an uptick in historical growth, the growth in rate of entry for women into orthopaedic surgery training programs remains the lowest of all surgical specialties. Other traditionally underrepresented specialties such as neurosurgery (11.1% in 2005) and thoracic surgery (10.7% in 2005) have surpassed orthopaedic surgery by fostering 56.8% and 111.2% increases in female resident representation between 2005 and 2016, whereas orthopaedic surgery increased only 27.3% during that time, from 11.5% to 14.5% female representation (Figure 5).[4] Current percentage representation (14.5%) remains lower than any other surgical specialty.[2] Nearly half of all medical students and half of all resident trainees are women, yet female orthopaedic surgery residents represent <1% of the total number of female resident trainees (2016 to 17).[4] The low percentage of women in orthopaedic surgery is not related to their ability to perform, as female and male trainees achieve similar scores on the Orthopaedic In-Training Examination and on both Part I and II of the American Board of Orthopaedic Surgery Examination.[11,12] Furthermore, between 2000 and 2014, female residents had a higher fellowship match rate than their male counterparts (96% vs. 81%, $P < 0.001$).[12] It seems that women are well-qualified to be orthopaedic surgeons, but only small numbers choose to actualize their abilities in this profession. Clearly, our specialty is failing to attract a large share of the best and brightest candidates.[13]

Solutions (or Next Steps)

Recruitment—The Action of Finding New People to Join an Organization.

In contrast to orthopaedic surgery, general surgery, through concrete actions, leads all the surgical specialties in both growth and current proportion of female trainees (42%).[14] Evidence suggests that a significant factor in closing the gender gap in entry to general surgery training programs was the use of a holistic lens to evaluate applications, placing more weight on experiences and personal attributes than on standard academic metrics of board scores, grades, and honors society status alone.[15]

Figure 3

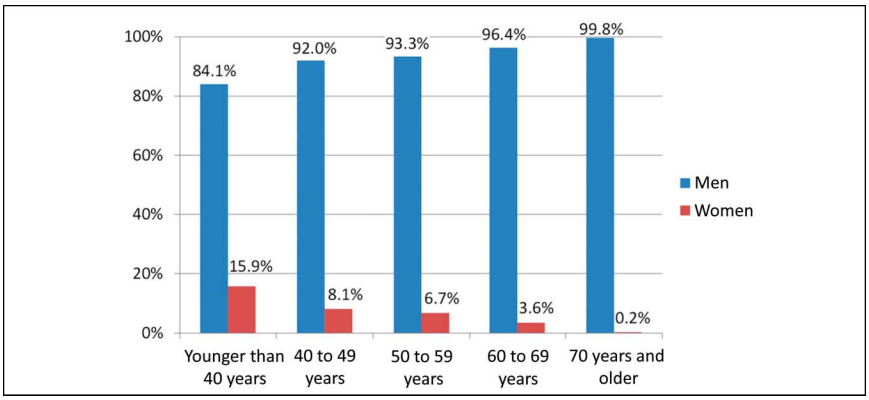


Bar chart showing percentage representation of female and male orthopaedic surgeons from 2008 to 2018 (from the AAOS 2019 Census).[10]

Beginning in January 2022, Step 1 board scores will be reported as pass/fail; this change was made partly to promote a more holistic consideration of residency applicants across all specialties. However, based on the extremely high competition for residency positions, it is most likely that orthopedic surgery training programs will simply shift reliance to Step 2 scores, which show no male-female difference for orthopaedic surgery applicants or matched candidates.[16] Thus, attempts to close the gender gap with a more holistic application process, used successfully in general surgery, are less likely to be effective in increasing the entry of women into orthopaedic surgery.

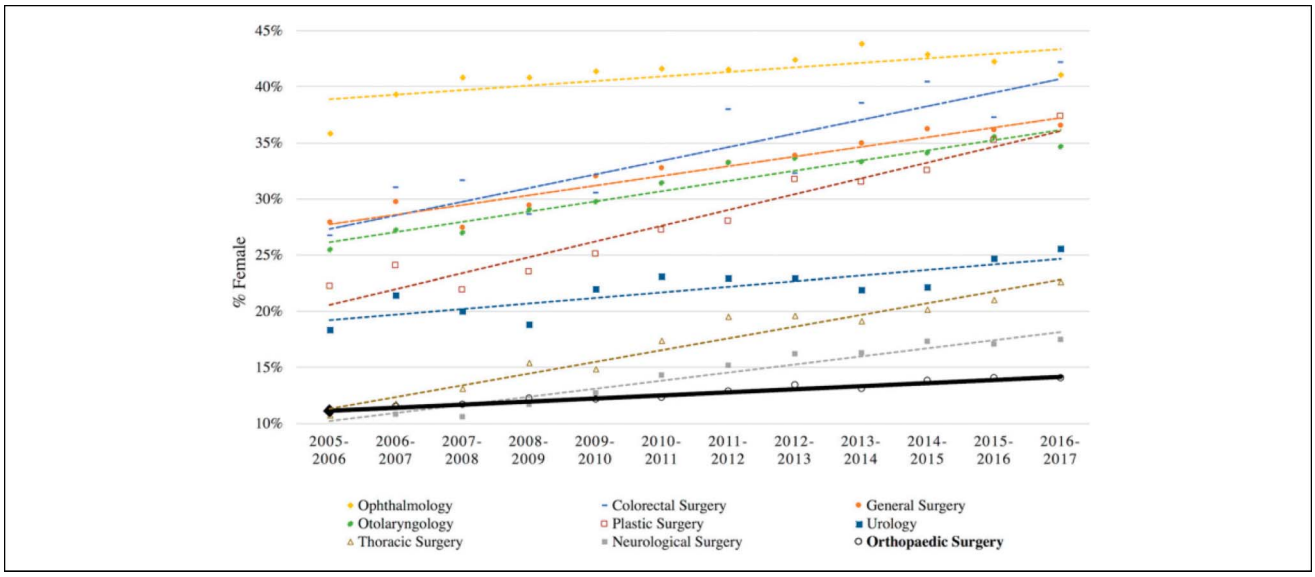
It is abundantly clear that efforts to increase the proportion of diverse trainees in orthopaedic surgery must begin before the decision for specialization occurs, recruiting qualified candidates to expand the applicant pool. Early exposure and hands-on experience garner interest and encourage students to pursue a field they may not have otherwise considered because of stereotypical representation and concerns regarding fit.[17-19] Evidence indicates that women are less likely to choose a specialty that is not part of the medical school core clinical curriculum, which is often the case for musculoskeletal medicine.[20,21] This factor and the finding that women, more than men, are positively influenced in their decision to enter orthopaedic surgery by exposure to a role model of the same sex or ethnicity highlight the critical importance of the pipeline programs.[22] These programs, Nth Dimensions and Perry Initiative, aim to increase the exposure of women and URM to orthopaedic surgery early in their medical, undergraduate, or even high school education. Moreover, these programs provide exposure to role models and potential mentors within orthopaedic surgery for those who may have no other means of interfacing with an orthopaedic surgeon who looks like them. Implementation of early exposure programs that include not only internship and hands-on experience but also professional development and longitudinal mentorship

Figure 4



Bar chart showing representation of men and women in orthopaedic surgery divided by age group (from the AAOS 2019 Census).[10]

Figure 5



Graph showing the percentage of female residents within the surgical subspecialties between 2005 and 2016. Female representation is consistently lowest in the orthopaedic surgery. Reprinted with permission Chambers CC, Ihnow SB, Monroe EJ, Suleiman LI: Women in orthopaedic surgery: Population trends in trainees and practicing surgeons. *J Bone Joint Surg Am* 2018;100:e116.

increase the odds of women applying to orthopaedic surgery.[23]

Finally, research suggests that messaging and imaging portraying orthopaedic surgeons may provide an effective method to challenge current stereotypes about the field.[24,25] Careful attention on the part of orthopaedic societies, departments and training programs in this regard can demonstrate an inclusive culture where prospective trainees envision themselves thriving and belonging without necessarily embodying current male-gendered stereotypes.[26]

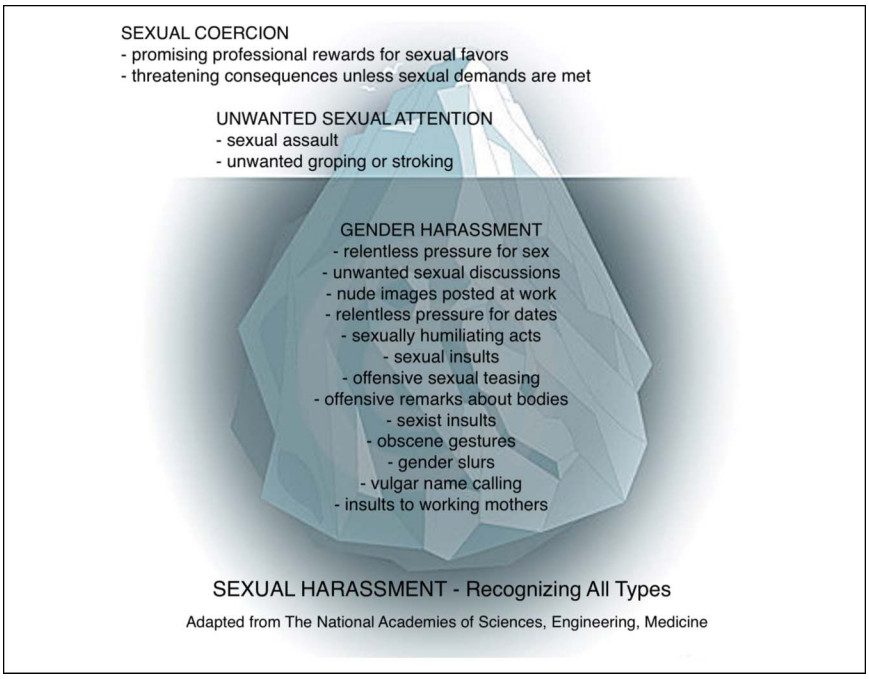
Sustainment—the Support or Maintenance of Someone or Something

The issues of bias and other barriers to achievements of women in academic medicine, science, and engineering were carefully studied over the past decade. Spawned by a landmark report, released in 2006, "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering," a series of 14 R01 grants were funded by the NIH to investigate causal factors and test solutions.[27] More than 100 manuscripts resulted from this initiative, and a grassroots collaborative statement of work, detailing the summative results of the investigations, was published in 2019.[28] Noting that women in these fields contend with sexual harassment, stereotype threat, implicit bias, and a lack of parity in compensation and resource allocation, principal investigators concluded that cultural transformation is required to address the barriers to career advancement for women and that strategies must address barriers at the individual, interpersonal, institutional, academic, and policy levels.[28] These findings are particularly pertinent in orthopaedic surgery where progress toward equity and inclusion is less than in any other medical specialty.

Sexual Harassment

Overt sexual harassment represents the proverbial tip of the iceberg (Figure 6[29]). A relatively small number of the most egregious acts, such as sexual coercion and assault, lie above the waterline and are both more visible and less condoned than the majority of sexual harassment behaviors. By contrast, the immense body of the iceberg, lying beneath the waterline and often invisible to observers, represents the large quantity of incidents and behaviors that include everyday slights, microaggressions, and invisible hoops through which women must jump because of their sex. This is accentuated in the profession of orthopaedic surgery because of the severe underrepresentation of women in the field. In fact, 68% of female orthopaedic surgeons reported having been victims of sexual harassment during residency training, with no difference in percentage between past and current trainees.[30] It should not be necessary to state that harassment, as reported in the #SpeakUpOrtho movement, is improper, unethical, and

Figure 6



Representation of sexual harassment and abuse as an iceberg. A small percent of the most egregious acts, the tip of the iceberg, lie above the waterline, where they are most visible; the much larger percentage of insidious, subtler, and relentless abuses lie below the waterline, where they often go unnoticed. Adapted from the National Academies of Sciences, Engineering, and Medicine. Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Siences, Engineering, and Medicine. Washington, DC, The National Academies Press. 2016. Available at: https://doi.org/10.17226/24994. Adaptations are themselves works protected by copyright. So in order to publish this adaptation, authorization must be obtained both from the owner of the copyright in the original work and from the owner of copyright in the translation or adaptation.

often illegal. Institutions, organizations, and practices must adopt a zero-tolerance policy for this behavior, and those who persist must be held accountable. Moreover, where harassment is witnessed, bystanders–other orthopaedic surgeons–must speak up. The elimination of these most egregious behaviors makes it more likely that subtler, insidious issues, such as implicit bias, stereotype threat, and lack of sponsorship, all significant barriers to the attainment of equity, will be identified and addressed.

Implicit Bias and Stereotype Threat

The term implicit bias, conceptualized in the 1980s by social scientists, refers to the manner in which the existence of cultural stereotypes leads to preformed mental associations that can affect what we say and do, unwittingly and unintentionally, and may even contradict our conscious beliefs.[28,31] The ramifications are large and ubiquitous, and implicit bias is implicated in such wide-ranging problems as the high-profile shootings of Black men by police and the lack of appropriate medical treatment for Black patients. The role of implicit bias within the profession of medicine has received little attention. Yet, clearly, the predominance of White men in specialties such as orthopaedic surgery makes implicit bias a driver in the continued lack of diversity and inclusion in these specialties. Stereotype-based assumptions influence the decisions of those in power regarding who to fund, mentor, admit, or hire. Orthopaedic surgery is a male-typed occupation—stereotypes regarding the field and associated with success in the field align with male-gendered stereotypes, and are incongruous with female-gendered stereotypes.[26] The resultant gender bias operates both implicitly and explicitly in personal interactions, institutional cultures, and evaluation processes to subtly but systematically favor men while excluding and disadvantaging women.[26,32-34] Yet, research suggests that through the gradual, purposeful unlearning of biases, durable change can be achieved, and even the most pervasive patterns of discriminatory behavior may be altered and eventually eliminated from an institution.[31]

Analogous to the more familiar imposter syndrome, stereotype threat is a social-psychological factor defined as the fear of confirming a negative stereotype about a group to which one belongs.[35] Even when negative stereotypes are neither accurate nor endorsed, the

perception that one may be judged in light of them may have consequences that include increased stress and poor performance for individuals in the stereotyped group. Not surprisingly, based on strongly held, historical stereotypes regarding surgeons, stereotype threat is more prevalent among female surgical versus nonsurgical trainees.[36] A recent randomized controlled trial in surgical residents showed that women with high susceptibility to stereotype threat scored significantly lower on a surgical skills test when that test was preceded by a stereotype threat trigger (reading two abstracts that reported inferior laparoscopic skills in women).[37] Conversely, men with high susceptibility to stereotype threat showed a nonsignificant trend toward improved surgical skills performance when presented with the same abstracts, demonstrating the unfortunate phenomenon of stereotype lift—a performance boost that occurs when downward comparisons are made with a denigrated outgroup.[38] Evidence suggests that mental health suffers in the face of this chronic stressor: female surgical trainees with higher degrees of stereotype perception have poorer psychological health than their male or nonsurgical counterparts.[36].

Stereotype threat is not limited to trainees; rather, it is a pervasive problem that follows those who are affected throughout their careers.[39] Evidence suggests that increased anxiety and cognitive load, resulting from stereotype threat, undermine performance and may impede the ascension of women to leadership positions in academic medicine. Fortunately, a growing body of research provides evidence-based strategies for reducing the perceived lack of fit for women in orthopaedic surgery, reducing stereotype-based gender bias and promoting an improved sense of belonging.[40]

The most definitive counter to stereotype threat or implicit bias is to visibly and repeatedly demonstrate that gender has no influence on the competence of orthopaedic surgeons. Although not specific to orthopaedics, a large study, assessing outcomes after a broad range of surgical procedures across specialties in more than 100,000 patients in Ontario, Canada, over an 8-year period (2007 to 15), identified a statistically significant 12% lower 30-day mortality for patients treated by female surgeons versus male surgeons.[41] A recent study performed at a surgical training program in Norway found that female surgical trainees received higher performance scores during real-time laparoscopic appendectomy than their male counterparts.[42] As more women enter specialties across all of medicine, growing evidence affirms that training and experience predict competence in medicine and surgery, not gender.

The Association of Women Surgeons provides a prescription to mitigate the negative effects of implicit bias in surgical departments.[31] All these concepts are equally applicable to orthopaedic surgical professional societies and should be considered and adopted by leadership within each organization. Correction of implicit bias centers on awareness of the problem and desire for change. Leaders must value the eradication of bias and gain buy-in from member constituents (partners, colleagues, and faculty). Bias literacy—uncovering, defining, and understanding implicit bias so it may be made explicit—is a prerequisite to action.[31] To that end, Implicit Association Tests, detecting and measuring implicit bias, should be administered to evaluate bias among team members. Debiasing requires intentional behavioral change that includes conscious thought and repetition.[43] Carnes et al[43] assessed five evidence-based behaviors to overcome gender bias in academic departments: stereotype replacing (with accurate information); positive counterstereotype imaging (a woman in a position usually held by men); perspective taking (what it is like to be in a stereotyped group); individuation (information to prevent stereotyping); and increasing contact with counterstereotypic senior women faculty.[43] A 2.5-hour workshop, focused on understanding and reducing implicit bias using these strategies, was shown to increase self-reported bias-reducing behaviors among participating faculty at 3 months postintervention; it was also associated with improved department climate for all faculty and with recruitment of additional women faculty members 2 to 3 years later.[43] It follows that repeatedly broaching the subject of implicit bias within orthopaedic surgery departments and organizations, acknowledging its existence and providing effective strategies to debias ourselves and our colleagues, is a feasible first step in the right direction.

Combatting bias in hiring, appointment, and promotion requires an introspective evaluation of the institutional environment and implementation of deliberate strategies to identify and elevate deserving candidates from diverse backgrounds.[31] The current gender asymmetry of the orthopaedic workforce allows male applicants the advantage of looking like an orthopaedic surgeon.[44] Bias flourishes when recruitment and evaluation processes are unstructured and informal and is counteracted when recruiting, hiring, and promotion committees establish specific criteria and commit to the value of credentials before evaluating individual applicants.[45] The use of structured questions for interviews and situational questions with benchmark rating scales

reduce bias against women when compared with gathering the same information informally. Use of an inclusion mindset (who on this list of applicants do we want in our program?) versus an exclusion mindset (who do we not want?) when evaluating applicants results in a list that is less likely to be influenced by group stereotypes.[46] Similarly, fairness in performance-reward processes for review or promotion is improved through the use of specific, objective, benchmark criteria that reduce susceptibility to stereotype-based bias.[44,47] Academic training programs and orthopaedic societies should commit to the goal of increasing representation of women and URM groups in leadership positions over the next decade to be at least proportionate with the demographics of our field. We have seen success from explicit initiatives in other fields such as the National Football League after implementation of the Rooney Rule, requiring teams to interview ethnic minority candidates for head coaching positions. The results of these conscious efforts saw the number of Black coaches increase from 6% to 22% over 4 years.[48]

As tested by Carnes et al, counterstereotypic exposure should be provided to department or society members by inviting accomplished women in the field to provide lectures at national meetings and grand rounds or as visiting professors; repeated exposure to high-achieving counterstereotypic individuals builds new associations and combats implicit bias.[31,43] Mentoring and sponsorship should be intentionally provided for junior faculty or early-career society members, providing them with the tools necessary to succeed. Finally, it should be remembered that in a setting not receptive to culture change, even a single individual, committed to countering bias, can make a difference in his or her department, practice, or institution.

Mentorship, Advocacy, and Sponsorship.

Mentorship refers to the concept of guidance by a wiser, experienced person for another person of less experience. The mentoring relationship is focused on career development of the mentee and increases research productivity, academic promotion, faculty retention, and career satisfaction.[49-51] Mentorship is central to the mission of academic medicine.[52] It capitalizes on the intellectual resources of the institution (the mentors) and seeks to develop leaders in research, patient care, and education (the mentees). It ultimately enhances success in each of these areas and promotes faculty diversity and leadership.

However, in the business world, promotion and progression to leadership positions are more closely tied to the concepts of advocacy and sponsorship than to mentorship. The difference between these roles is clear: a mentor helps one think through the process of navigating his or her career, whereas an advocate creates opportunities for others.[53] By definition, an advocate is an experienced senior leader who takes an active interest in promoting the career of a protégé. The advocate gives advice, enlarges, or stretches the protégés perception of what is possible and, above all, serves as a sponsor. Critically, a sponsor takes action on behalf of his or her protégé, promoting their visibility, advocating for their promotion, and connecting them to career opportunities and senior leaders. The ability of an advocate or sponsor to advance the career trajectory of a protégé is termed the sponsor effect.[53] It is clearly effective in business, where larger percentages of individuals with sponsors ask for raises, accept stretch assignments, and advance at a satisfactory rate.[53]

In medicine, the concept of sponsorship is gaining ground. In a qualitative study from Johns Hopkins University, faculty members confirmed the distinct nature of sponsors and mentors and agreed that sponsorship is critical to career advancement, especially to the highest-level roles.[54] Pointedly, they acknowledged that women are less likely to seek sponsorship but require the support it provides to be successful. However, sponsors and protégés most often look alike; nearly 75% of business executives choose protégés whose race and sex match their own.[55] This is not surprising, but, in orthopaedic surgery, most sponsors—career established, powerful individuals—do not look like women or URMs; there are simply not enough women and minority sponsors to do this job.

A recent publication by two business experts asserts that advocacy is integral to the achievement of gender balance and diversity and suggests a solution for the paucity of female and URM sponsors.[56] The authors contend that men in positions of power must sponsor protégés from a diverse talent pool, provide them with opportunities for development and growth, introduce them to influential leaders, and champion them for recognition. They must identify stretch roles in which their protégés will excel and help them persist against difficulties over the long haul. In this manner, women and URMs may receive the same career opportunities as White men have traditionally been provided. This call to action on an individual level mirrors the goals and initiatives of the AAOS 2019 to 2023 Strategic Plan. To follow, women and URMs will lend the insight and

creativity acquired from their diverse backgrounds to the research questions, practice problems, and clinical conundrums of orthopaedic surgery, improving the profession because they are enfranchised to do so.

Summary

The extreme lack of diversity in orthopaedic surgery limits creative problem-solving and the potential of our profession. Moreover, it is a self-perpetuating problem; the lack of diversity itself creates a significant barrier to the recruitment of diverse trainees and to the career success of women who enter the field. Correction of this problem will require a concerted effort on the part of our academic and society leaders. Acknowledgement and education regarding implicit bias and stereotype threat and corrective action to diminish their effect, increased support for pipeline programs, and the active sponsorship of qualified, capable women by men in power are necessary to change the culture that has allowed orthopaedic surgery to remain the least diverse of all medical and surgical subspecialties. Although we have focused our discussion on the underrepresentation of women in the field of orthopaedic surgery, the underrepresentation of certain ethnic and racial groups and discrimination against individuals from well-represented ethnic/racial minority groups (eg, Asians and individuals from the Middle East) are also important topics. Furthermore, the intersection of gender with race and ethnicity in fostering discrimination is well known and highly problematic.[57] Each of the next steps in recruiting, promoting, advocating for, and sponsoring women in our field should be applied to these groups as well, male or female. Together, we will strengthen our profession through diversification of its membership.

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