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AOA Critical Issues

The Orthopaedic Workforce Is Not as Diverse as the Population It Serves: Where Are the Minorities and the Women?

AOA Critical Issues Symposium

Melvyn A. Harrington, MD, E. Anthony Rankin, MD, Amy L. Ladd, MD, and Bonnie S. Mason, MD

Abstract: The lack of sex and racial diversity of the physicians within the specialty of orthopaedic surgery was recognized decades ago, and formal steps to address these issues began in 1983 with the founding of the Ruth Jackson Orthopaedic Society and the J. Robert Gladden Orthopaedic Society. Despite the efforts of these organizations, the work of other interested groups, and the growing diversity in medical student demographics, physician diversity in orthopaedic surgery remains disproportionately poor relative to the populations that we serve as a specialty.

It has been well documented that the United States is becoming more diverse. Racial minorities currently compose more than one-third of the U.S. population, with projections that this number will exceed one-half of the U.S. population in the next few decades¹. While racial diversity of the students in medical schools has marginally increased over the past several decades, it still lags substantially behind that of the general population. Unfortunately, the field of orthopaedic surgery lags even further behind. Orthopaedic surgery is also one of the least diverse medical specialties in terms of sex. Despite current medical school classes being split evenly by sex, the percentage of women in orthopaedic surgery residencies has remained fairly constant (between 13% and 15%) for the past decade. The goal

of this symposium was to investigate the causes of these racial and sex disparities in the orthopaedic workforce and to develop practical solutions regarding how to address them.

Historical Perspective

The concept of diversity in the specialty of orthopaedic surgery, like medicine in general, has been slowly evolving, yet it appears that our specialty has the least progress to show in terms of increasing the numbers of underrepresented minorities and women orthopaedic surgeons when compared with other surgical specialties. Historically, minorities have been disadvantaged educationally (e.g., the vestiges of centuries of enslavement in the case of African Americans, followed by a century of segregation with an

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attendant lack of economic and educational opportunities). The plight of Native Americans is well known, and with Hispanic/Latino and other minorities, there has been a slow assimilation into the American melting pot. Although the enlightened Quakers established the first Women's Medical College in Pennsylvania in 1850, few American medical schools during that time allowed a woman to obtain a degree. Throughout the 1960s, only 5.5% of medical students were women. A gradual although steady increase followed the passage of Title IX in 1972, which prohibited discrimination on the basis of sex for educational programs that receive federal funding.

In 2008, *The Journal of the American Medical Association* featured a landmark article entitled "African American Physicians and Organized Medicine, 1846-1968: Origins of a Racial Divide." The article states, "Like the nation as a whole, organized medicine in the United States carries a legacy of racial bias and segregation that should be understood and acknowledged...The effects of this history have been far reaching for the medical profession...US medicine's legacy of segregation and racism is linked to the current paucity of African American physicians...and contemporary health disparities."

At the medical school level, the demographics are changing, particularly for women. In December 2017, the Association of American Medical Colleges (AAMC) reported that for the first time, there were more women than men enrolled in U.S. medical schools in 2017³. The AAMC also noted that from 2015 to 2017, enrollment of African Americans increased by 12.6% and enrollment of Hispanics and Latinos increased by 15.4%. Despite these recent trends, the AAMC pointed out that the 2014 AAMC Facts and Figures showed that the U.S. physician workforce diversity remained consistent with prior years, with just 8.9% of physicians identifying as African American, Native American, Alaska Native, and Hispanic or Latino⁴.

The American Academy of Orthopaedic Surgeons (AAOS) census⁵ reported that women constituted 2.7% of orthopaedic surgeons who were working full or part-time in 2000. This number rose in 2016: 6.6% of the active AAOS Fellows were women. The AAOS census did not address race until 2004, when 89% of orthopaedic surgeons reported as Caucasian and 9% reported as a minority race. Asian American members have the highest minority representation in the AAOS. In the 2016 census (the most recent census), 86.6% of orthopaedic surgeons reported as Caucasian, 6.7% reported as Asian, 1.7% reported as Hispanic or Latino, 1.5% reported as African American, 1.2% reported as multiracial, 1.7% reported as other, and 0.4% reported as Native American.

Daniels et al., in a survey of 152 orthopaedic residency programs (with a 53% response rate), reported that the percentage of women in orthopaedic residency had nearly doubled since 1995⁶. However, there was only a modest increase in the numbers of African American, Asian/Pacific, and Hispanic orthopaedic residents. More recently, Sobel et al. surveyed 143 programs (with a 93% response rate) and found that women constituted 14% of physicians in orthopaedic residency programs⁷. They noted a greater percentage of women in programs that had more female faculty, more women in leadership roles, a

women's sports medicine program, and the option to do a research year.

Why Is a Diverse Orthopaedic Workforce Important?

Many believe that a diverse orthopaedic workforce may be a key to addressing health disparities and inequities. In a May 2016 commentary, the Editor of *The Journal of Bone & Joint Surgery* stated: "The orthopaedic community has been aware of racial disparities in care delivery for two decades. The phenomenon has been most clearly elucidated in joint replacement surgery, but in the May 18, 2016 edition of *The Journal*, Dy et al. confirm that the issue is also at play in hip fracture care."⁸ Dy et al., in a review of 200,000 New York State residents who had hip surgery for fracture between 1998 and 2010, found that African American patients were at significantly greater risk for delayed surgery, a reoperation, readmission, and 1-year in-hospital mortality than white patients⁹.

The U.S. Census Bureau predicts that Asians, African Americans, Hispanics, and Latinos will soon compose 30% of the population, and by 2042, will be >50% of the population. Minority physicians continue to provide the majority of care for underserved and non-English-speaking populations. Orthopaedic diversity efforts over the past several decades have made some progress in increasing the numbers of women in the specialty but very little progress in increasing underrepresented minorities. It remains a challenge to continue to attract more women to the specialty as well as increase the effort to train more orthopaedic surgeons from underrepresented minorities.

Root Cause Analysis of the Problems with Sex Diversity

The representation of women orthopaedic surgeons has remained stagnant over many decades. When Dr. C. McCollister Evarts gave the 1990 American Orthopaedic Association (AOA) Shands Lecture (Dr. Evarts has long been the champion of women as contributors to the breadth and excellence of our specialty), few women chose a career in orthopaedic surgery. In 1990, women represented 5.4% of orthopaedic residents and 8.4% of faculty at a time when 40% of medical students were women¹⁰. At that time, urology, long the purview of male urogenital dysfunction, attracted men just as obstetrics and gynecology logically attracted women. The rigor and duration of training that could carve into the critical childbearing

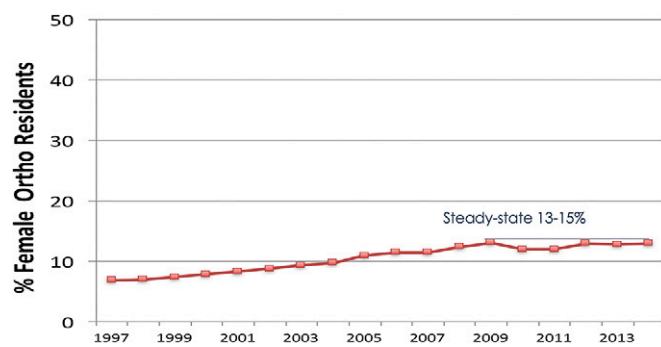


Fig. 1 The stagnant slope of women orthopaedic surgeons in training¹².

TABLE I Percentage of Women Residents by Specialty in 2003 and 2013²⁸

| Surgical Specialty | 2003 | 2013 |
|---------------------|------|------|
| Ophthalmology | 33% | 45% |
| General surgery | 26% | 38% |
| Otolaryngology | 22% | 35% |
| Urology | 16% | 25% |
| Neurosurgery | 11% | 16% |
| Orthopaedic surgery | 10% | 14% |

years explained why more men than women chose surgical specialties.

In recent years, when slightly more women than men have matriculated as medical students, the 2015 AAMC data indicated that the percentage of active women orthopaedic surgeons remained low at only 5%¹¹. Even after the representation of women in orthopaedic residency bumped past the 10% mark, the last decade has seen no change; it currently hovers around 13% to 14% (Fig. 1). One-third of orthopaedic residency programs have trained few women (<10% in recent years) or no women at all¹². Neurosurgery, urology, otolaryngology, general surgery, and ophthalmology have surpassed and lapped orthopaedic surgery as women have chosen rewarding surgical careers in these specialties¹³ (Table I). Half of these last male bastions among surgical specialties have 30% women in their ranks.

In the domains of population dynamics and field science, in order to effect organizational change, 30% is a critical number (Fig. 2). Sometimes known as the Rooney Rule or the Mansfield Rule (Dan Rooney, the Pittsburgh Steelers' president and then owner, cast a wide diversity net in football, and, before him, Arabella Mansfield was a nineteenth century suffragette and legal activist), diverse thought and representation creates useful change^{14,15}. When women constitute a minimum of 30% of a deliberative body (across politics, corporate America, and academics), they become stakeholders who represent constituents, clients, and patients who mitigate homogeneous groupthink^{16–18}. This diverse contribution provides better decision-making, better profits, and better medicine^{16,19}. Unconscious biases that include comments regarding attire, athletic prowess, and fertility often fade away or, alternatively, are actively discouraged when one's appearance, upbringing, and perspective are no longer considered to be the alien traits of an interloper.

So, why hasn't the field of orthopaedics changed? Besides the cultural deterrents of unconscious or conscious bias that are seen firsthand by third and fourth-year medical students¹³, the simplest explanation is lack of exposure to a small field. Few medical schools have concerted musculoskeletal preclinical blocks, and fewer still have mandatory musculoskeletal or orthopaedic clinical rotations²⁰. Most medical students who choose orthopaedics are interested before they matriculate, based on personal experience and exposure to the discipline^{21,22}. Earlier exposure in medical school, a promising way to improve interest in orthopaedics, increases

diverse applicants²². The real impact, however, is made much earlier. The education literature notes the importance of supporting science, technology, engineering and mathematics (STEM) programs in early childhood, as well as the need for an institutional responsibility to target underrepresented minorities²³. Within our own specialty, pipeline programs such as the Perry Initiative²⁴, which targets high school, college, and graduate level students, and Nth Dimensions²⁵, which targets medical students, have a tremendous impact on career decisions and on the match rate of students who ultimately choose orthopaedics as a career^{24,25} (Fig. 3).

In regard to the need for institutional responsibility²³, the impact of women in medicine has, as Dr. Evarts predicted, enhanced and improved how we see, care for, and save the lives of our patients. The patients of female internists die less frequently than those of male internists²⁶, and the patients of female surgeons have fewer complications than those of male surgeons²⁷. Orthopaedic surgery can only improve with a thorough commitment from orthopaedic department chairs, academic institutions, and hospitals to expand the ranks of female surgeons. The payers, the lawmakers, and the AAMC may recognize the importance of having women as the 30% critical mass in our specialty (as demonstrated by the Rooney-Mansfield Rules) before the field of orthopaedics recognizes it, and may mandate the change. Let's be ahead of the curve and ensure that the graph does not remain stagnant.

Innovations in Physician Workforce Diversity

Diversity of the physician workforce alone is insufficient. Diversity must be coupled with inclusion. Inclusion is the act of engaging diverse candidates in a manner that fosters an integrative and embracing culture and creates an environment that is conducive to bidirectional learning and growth. As an analogy, diversity is when you invite someone to a dance; inclusion is when you actually ask the person to dance once he or she arrives.

At an institutional or departmental level, prioritizing the implementation of diversity and inclusion must be a leadership decision. Leadership dictates the culture of any organization; therefore, it is incumbent on the leadership to mandate that a

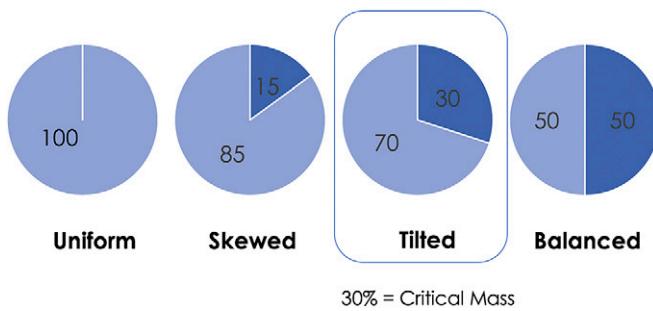


Fig. 2

The 30% critical mass in decision-making: the goal for women in orthopaedic surgery. Source of historical data: Childs and Krook¹⁷. (Courtesy of J. Buckley.)

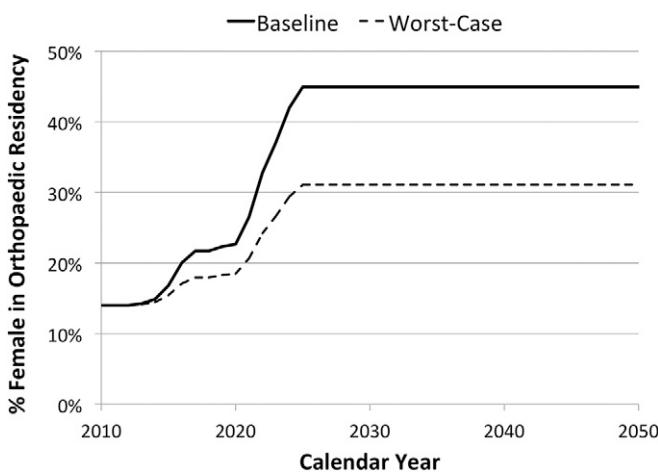


Fig. 3
The impact of the pipeline program, the Perry Initiative, predicting that women will represent 30% of orthopaedic surgeons by 2023, based on the efficacy of matriculation to date and the required institutional commitment. (Courtesy of J. Buckley.)

culture of diversity and inclusion be embraced throughout every level of the organization.

Nth Dimensions has taken an innovative approach to diversifying the physician workforce based on a concept that was modeled from Movement is Life, an organization that promotes a multidisciplinary approach to increasing health equity for Latino and African-American women and underrepresented minorities. With an emphasis on a collaborative stakeholder approach, which engages physician mentors with academic/institutional investment and association/industry support, Nth Dimensions effectively combines mentoring and longitudinal professional development, which has been the backbone of physician workforce development and medical education.

Nth Dimensions was established by an orthopaedic surgeon in response to the great need to create a pipeline for women and underrepresented minorities seeking competitive residency positions in orthopaedics. Nth Dimensions has differentiated itself as a developmental program that provides longitudinal access to orthopaedic surgeons for undergraduate and medical students through its specialized curriculum. Through the first phase of the Nth Dimensions Pipeline Curriculum, student scholars gain early exposure to orthopaedic surgery via clinical correlations and bioskills workshops. The second phase of the curriculum consists of a specialty-specific immersion program, the Nth Dimensions Summer Internship (NDSI) program, which was initiated in 2005. This is a flagship program in which first-year medical students spend 8 weeks shadowing practicing orthopaedic surgeons and being exposed to both clinical and research practices. NDSI scholars are required to complete a research project that will be presented at the National Medical Association's Annual Scientific Assembly. The third phase of the program consists of multiple professional development programs, including a United States Medical Licensing Examination (USMLE) Step-1 board examination preparatory course for each intern. Interns also participate in annual professional develop-

ment activities and programs in conjunction with the J. Robert Gladden Orthopaedic Society (JRGOS), the Perry Initiative, and the Ruth Jackson Orthopaedic Society (RJOS). Collaborative partners include multiple orthopaedic surgery departments along with the AAOS and the Pediatric Research in Sports Medicine Society.

This multiphase programming has proven to be particularly effective in introducing orthopaedics to women. Current outcomes show that 31% of the practicing orthopaedic surgeons and 36% of the current orthopaedic residents who are products of the Nth Dimensions Pipeline Curriculum program are women. These numbers exceed the desired target of 30%, as discussed earlier^{17,18}, and continue to move toward matching the population of women in medical school. Moreover, 65% of the women who have completed the Nth Dimensions Pipeline Curriculum program are minorities, which highlights that sex and racial diversity can be impacted positively.

The impact of Nth Dimensions on recruitment into orthopaedic surgery is evidenced by results that were reported in 2016²⁵. Our data revealed that the likelihood of a female Nth Dimensions summer intern applying to an orthopaedic surgery residency was 45 times greater with completion of the program versus a female applicant who did not participate. Similarly, underrepresented minority student participants were 15 times more likely to apply to an orthopaedic surgery residency program versus minority candidates who had not participated in the program. These efforts led to a 2018 match rate of 89% for the Nth Dimensions scholars who applied to orthopaedic surgery residency programs.

Practical Solutions and Suggestions to Improve Workforce Diversity

Leaders within departments or associations must be intentional about providing leadership opportunities for the female and underrepresented minority attending physicians and trainees within their sphere of influence. Intentional exposure is particularly important to introduce leadership opportunities that these individuals may or may not be aware of. Nominations to national committees, recommendations for traveling fellowships, or even support for an Orthopaedic Research and Education Foundation (OREF) grant application are pathways to increasing inclusivity. Again, the goal is not just to build a more diverse workforce, but also to build a more inclusive one.

In building a diverse workforce, leaders also must add to their inclusion criteria the exceptionality of those candidates who are the first, the only, or different in some way, while assessing evidence of their leadership and their contributions to research, innovation, community advocacy, or technological advances to the specialty. Other qualities that bear consideration include resilience, obstacles that individuals have overcome on their given path, their problem-solving skills, and their creativity. Recognizing these attributes will undoubtedly lead to our diverse workforce being able to solve problems and to survive the changes that are inevitable in this tumultuous health-care environment.

The next steps for leaders who are considering increasing diversity and inclusion are to intentionally build a diverse

workforce while stressing an environment of inclusion for women and those from underrepresented racial backgrounds. It is important to seek collaboration with aligned partners to engage in established diversity and inclusion programs—programs that are absolutely proven to be effective based on outcomes. Ongoing mentorship is as important on the departmental and institutional level as it is on the medical school and residency level. In the long term, leaders must invest adequate resources in order to realize the expected return on investment of human excellence and more equitable health care.

While the U.S. population has become more diverse, the orthopaedic surgery workforce has not kept pace. In fact, there has been little change in the demographics of the orthopaedic workforce over recent decades. Although organizations within the field of orthopaedics (e.g., the JRGOS and the Rjos) have been working toward this goal since the 1980s, substantial progress is still needed to address sex and racial numbers. Efforts will need to be made at the departmental, institutional, and national organization levels. A multipronged approach is necessary. The same approaches may not work for all groups. In terms of sex, there are plenty of potential candidates available now that current medical school classes are half women. The challenge is to get more women to consider orthopaedic surgery as a career. For underrepresented minorities, it remains a numbers game. It is potentially a greater challenge to get a larger number of applicants given the relatively small number of underrepresented minority students.

Pipeline programs such as Nth Dimensions and the Perry Initiative have demonstrated excellent results in increasing the rates of application to orthopaedic surgery residency programs for women and underrepresented minority students. While early exposure can increase the pipeline, there is still a need on the program side for program directors and committees to be receptive and accepting of a more diverse group. A holistic review and consideration of the entire application, rather than focusing solely on board scores, can help broaden the candidate field. It should be noted that there has not been a direct correlation between Step-1 examination scores and successful

integration of diverse applicants within the field of orthopaedic surgery. Therefore, qualified applicants need to be ranked appropriately and competitively to match.

Institutions and programs need to provide support and mentoring for their women and underrepresented minority residents. This leads to the need for diverse faculty, another area where orthopaedic surgery lags other specialties. Once there is a “critical mass” of women and underrepresented residents and faculty in a program, the recruiting process becomes easier. To achieve these goals, we will need support and collaboration from organizations such as the AOA, the Council of Orthopaedic Residency Directors (CORD), the AAOS, the American Board of Orthopaedic Surgery (ABOS), the American Association of Latino Orthopaedic Surgeons (AALOS), the Rjos, the JRGOS, and others. The challenge is daunting given the minimal progress in the past, but with a strong commitment and by working together, we can move the needle. ■

Melvyn A. Harrington, MD¹

E. Anthony Rankin, MD²

Amy L. Ladd, MD³

Bonnie S. Mason, MD⁴

¹Baylor College of Medicine, Houston, Texas

²Howard University, Washington, DC

³Stanford University, Palo Alto, California

⁴Nth Dimensions, Chicago, Illinois

E-mail address for M.A. Harrington: melvynh@bcm.edu

ORCID iD for M.A. Harrington: [0000-0002-6694-5854](https://orcid.org/0000-0002-6694-5854)

ORCID iD for E.A. Rankin: [0000-0003-2240-2759](https://orcid.org/0000-0003-2240-2759)

ORCID iD for A.L. Ladd: [0000-0003-0948-1034](https://orcid.org/0000-0003-0948-1034)

ORCID iD for B.S. Mason: [0000-0002-6785-7266](https://orcid.org/0000-0002-6785-7266)

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