

Commentary: Disparities in Gender and Diversity Representation Among Surgical Subspecialties: Are we Losing Momentum?

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Diversity is not an abstract metric of workplace composition — it is a critical element of a healthy workplace environment. In an underrepresented workplace, minority groups are more often the victims of workplace injustice and often experience worse psychosocial and health outcomes when compared to majority groups¹. These disparities in workplace diversity have also been shown to affect patient and hospital-related outcomes². For these reasons, diversity remains a major topic of conversation amongst the surgical community, as all surgical subspecialties continue to underperform compared to other medical specialties in diverse physician representation. There continues to be a significant underrepresented in medicine (URiM) population within our physician workforce, as Caucasians and males make up the majority of the population, even despite an increasing diversity in the general U.S. population³. The 2020 US census data shows that African American, Hispanic, Native American's/Alaskans and Pacific Islanders comprise 12.4%, 18.7%, 1.6% of the US population, respectively; however, these populations represent less than 8% of the physician workforce^{4,5}. In comparison with other surgical subspecialties, orthopedic surgery consistently exhibits the lowest rates of racial diversity, with only 3.2% of currently practicing surgeons identifying as Black/African American and 3.3% of active surgeons identifying as Hispanic⁵. In addition, orthopedic surgery also consistently has the lowest representation of gender diversity, both historically and in recent years. Despite medical school classes comprising 50% or more female students each year, there has been minimal impact on female representation in orthopedic surgery⁶. In 2018, orthopedic surgery had the lowest female representation amongst surgical subspecialties at 15%⁶.

This lack of gender and racial diversity in the field of orthopedics is not a new problem and is equally apparent in other surgical subspecialties. Cardiothoracic surgery has additionally struggled to improve diversity within its specialty. In 2019, 6% of practicing adult cardiac surgeons were female and 17% of cardiothoracic faculty were women^{7,8}. In 2018, only 4% and 5% of trainees in cardiothoracic surgery identified as Black/African American and Hispanic, respectively⁷. Many programs such as the Nth dimensions, Ruth Jackson Orthopedic Society and the Society of Thoracic Surgeons Looking to the Future Scholarship program have been created to promote diversity and mentoring, however their success has not necessarily translated into all scholars and awardees staying within

the surgical subspecialties as residents, fellows, and faculty. It has been noted that while both orthopedic and cardiac surgery are struggling with improving diversity, positive progress within orthopedic surgery has fallen behind at a much higher rate, especially amongst the recruitment of female medical students. Rhodes and colleagues sought to evaluate why women were not pursuing careers in orthopedic surgery. They identified the most commonly reported reasons women were not choosing the specialty included work/life balance, physical strength, and a lack of mentorship⁹. As the field continues to lack representation, we continue to ask whether there has been any significant positive change over recent years.

In a recently published article in the *Journal of Surgical Research*, the authors of this commentary highlight gender and racial diversity time-trends within surgical specialties. The manuscript, "Disparities in Gender and Diversity Representation Among Surgical Subspecialties: Are We Losing Momentum?", aimed to evaluate if diversity representation has improved over time in surgical specialties by analyzing the publicly available data from the Association of American Medical Colleges (AAMC) and National Resident Matching Program (NRMP) from 2018 to 2021. Even though orthopedic surgery was not a major focus of the study, the concerning lack of diversity in the specialty was a particular point that questioned further analysis and commentary. The findings of our prior manuscript showed that orthopedic surgery was the only surgical subspecialty which did not see a rise in trainee diversity over the four-year study period. This trend occurred despite a positive increase in applicant diversity of 7%, which was the highest positive trend in applicant diversity amongst surgical subspecialties. Gender diversity showed similar results. The study found that orthopedic surgery had the lowest representation of female applicants (19.1%), despite a positive increase by 2.8% over the course of 4 years. Furthermore, rates of racial and ethnic diversity remained very low, with only 30% of orthopedic surgery residents who identify as URiM compared to vascular surgery, which had the highest representation at 47%. Diversity within orthopedic surgery actually decreased from 36% to 30% between 2019 and 2021.

As with most large database studies, the limitation of this study is the inability to obtain granular data and elucidate the causation behind the observed trends. For example, it is unclear if the decrease in URiM residents in orthopedic surgery from 2019 to 2021 was due to the COVID-19 pandemic or other factors such as decreased access to mentorship during this timeframe or a drop in URiM standardized test scores. The COVID-19 pandemic exacerbated racial disparities within healthcare, but also highlighted inequities regarding clinical grades, standardized test scores and away rotation opportunities

for URiM students¹⁰. This emphasizes the need for a holistic approach to reviewing residency applications, with greater value placed on the students' overall experience and journey into medicine, and less value on standardized test scores. Additionally, AAMC and NRMP do not release match rates of female and URiM applicants, nor the specifics of their applications. Without this information, inferences can only be made on the data trends that are available. As the match into all surgical subspecialties remains increasingly competitive each year, there would be a benefit in the AAMC and NRMP reporting more granular data on match rates specific to URiM groups.

What is it about the field of orthopedic surgery that remains a barrier to multidimensional representation? Albeit small, other surgical fields have made positive strides in gender, racial, and ethnic diversity over the past four years. Given the five-year residency for orthopedic surgery and the strides in diversity made by both general surgery and its subspecialties, this length of training does not seem to be a major barrier. Overall stress and burnout rates in orthopedic surgery are some of the lowest amongst the surgical specialties¹¹, however, there is evidence that more than half of female orthopedic surgeons in some regions of North America report symptoms of burnout which could be a variable that contributes to the discrepancy of females entering the field¹². Another variable to question is the competitive nature of orthopedic residency positions. Neurosurgery and integrated plastic surgery residency programs, often regarded as some of the most competitive matches nationally, have also seen minor improvements in the diversity of their residents. Plastic surgery had the highest female representation overall with 43% of residents identifying as female in 2021. Neurosurgery saw a 2.8% increase in female residents from 17.6% in 2018 to 20.4% in 2021. While all three of these subspecialties saw about a 2% increase in female residents, orthopedic surgery has remained below 20% for female residents. This indicates that while the competitive nature of orthopedic residency may be playing a role, it does not explain the entirety of the lack of diversity within the field, especially since other competitive matches such as integrated thoracic saw an increase of 3.8% over the course of 4 years while the match rate became increasingly more competitive¹³.

Orthopedic surgery continues to underperform compared to all other surgical specialties in regard to gender, racial and ethnic diversity. As this is likely multifactorial, improving the diversity question will require a multi-faceted approach, including additional mentorship, sponsorship, education and scholarships to support individuals who identify as URiM. Beyond this, regularly collecting and analyzing data on diversity is instrumental in implementing targeted interventions. As stated by Van Heest and colleagues, a goal of 30% representation is the

point at which underrepresented groups are at a critical mass to be incorporated into the specialty as a whole⁶. To achieve this goal, continued efforts within the specialty to mentor and sponsor female and URiM medical students will hopefully continue to impact the representation within orthopedic surgery. Beyond this, retention of female and diverse faculty following training remains a valuable focus as we continue to strive towards increasing representation in orthopedic surgery and other surgical specialties. Further education into how other specialties have promoted diversity in their fields will be beneficial. By collaborating with other specialties such as cardiothoracic surgery, the authors believe that we can all impact and promote diversity together across all specialties. This serves as a call to action to leaders in orthopedic surgery and all surgical subspecialties to collaborate and work together to address this critically important issue.

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