

Basic Research

# What Proportion of Women Who Received Funding to Attend a Ruth Jackson Orthopaedic Society Meeting Pursued a Career in Orthopaedics?

Sravya Vajapey MD, Lisa K. Cannada MD, Julie Balch Samora MD, PhD

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## Abstract

**Background** Orthopaedic surgery has the lowest percentage of women residents and faculty of any medical and surgical specialty. Diversity in medicine has been shown to improve patient outcomes and satisfaction. Although some scholarships are designed to increase the exposure of women medical students to orthopaedic surgery, the impact of those scholarships is largely unknown.

**Questions/purposes** To determine the proportion of medical students who received a scholarship to attend the

Ruth Jackson Orthopaedic Society (RJOS) annual meeting and later pursued a career in orthopaedic surgery.

**Methods** The RJOS scholarship was advertised through the RJOS website, current members, and newsletters. Any RJOS medical student member in good standing was eligible to receive the award. Eighty-one scholarship winners were selected from 2003 to 2016. From 2003 to 2010, there were two awards each year. Starting in 2011, 10 students were selected yearly, and these numbers increased annually secondary to increased industry financial support. Recipients received a check for USD 1500 and were able to attend both the RJOS and American Academy of Orthopaedic Surgeons annual meetings. We collected the names of all RJOS medical student scholarship winners from 2003 to 2016, and one author performed an internet search to determine whether these individuals are currently in an orthopaedic residency program or are orthopaedic surgeons. Secondary confirmation was performed to ensure accuracy by the RJOS administrative staff and the other two authors, independently, after the initial results were tabulated.

**Results** Of the 81 scholarship winners, 65 women (80%) now either practice orthopaedic surgery or are in an orthopaedic surgery residency program. Of the applicants who were not selected as scholarship recipients from 2014-2016, 44.9% went on to pursue a career in orthopaedics.

**Conclusions** The RJOS scholarship may have helped young women decide to pursue careers in orthopaedic surgery, although it is also possible that some scholarship winners were inclined to do so before receiving the funding. Based partly on these results, the RJOS continues to award this scholarship. Future studies evaluating the impact of such scholarships and comparing them with alternative recruitment methods such as summer camps might

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Each author certifies that his or her institution approved or waived approval for the reporting of this investigation and that all investigations were conducted in conformity with ethical principles of research.

This work was performed at Nationwide Children's Hospital, Columbus, OH, USA.

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S. Vajapey, J. Balch Samora, Department of Orthopedics, The Ohio State University, Columbus, OH, USA

L. K. Cannada, Jacksonville, FL, USA

J. Balch Samora, Department of Orthopedic Surgery, Nationwide Children's Hospital, Columbus, OH, USA

J. Balch Samora (✉), Nationwide Children's Hospital, Department of Orthopaedics, T2E-A2700, 700 Children's Drive, Columbus, OH 43205, USA, Email: Julie.samora@nationwidechildrens.org

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be useful in determining the most effective way of increasing minority representation in orthopaedics, a factor that has been shown to be clinically relevant and one that can contribute to patient satisfaction.

*Level of Evidence* Level IV, therapeutic study.

## Introduction

Orthopaedic surgery is the least diverse surgical specialty [1, 2, 10]. It falls behind general surgery and neurological surgery in representation of minorities and women in residency training, physician faculty, and full professorships. In 2006, 12.4% of orthopaedic surgery residents in the United States were women, compared with 30.7% of general surgery residents. Hispanics comprised 3.8% of orthopaedic surgery residents across the United States compared with 7.6% of general surgery residents [12]. Only 1.2% of full professors in orthopaedic surgery are black, although 7.1% of medical school graduates are black [12]. Although 14.9% of orthopaedic residents are women, this is the lowest percentage of women in any medical specialty [10]. These numbers illustrate the lack of diversity in orthopaedic surgery. There have been some successful initiatives to recruit women and underrepresented minorities to pursue orthopaedic surgery, including pipeline programs, early mentorship, scholarships, and required exposure to surgical specialties in medical school [18, 20, 22, 23]. The mission of the Ruth Jackson Orthopaedic Society (RJOS) is to promote the professional development of and for women in orthopaedics throughout all stages of their careers. The strategic domains include professional development, membership, research, and organizational excellence, with diversity serving as an essential component. Each year, the RJOS supports the growth and leadership of current and prospective women orthopaedic professionals by offering multiple grants and scholarships. One of the scholarships is the Medical Student Annual Meeting Scholarship, which reimburses the medical student's travel expenses to attend the annual meetings of the RJOS and American Academy of Orthopaedic Surgeons. The scholarship winner is also assigned an RJOS member mentor.

The purpose of this study was to determine the percentage of women who received a scholarship to attend the RJOS annual meeting who later pursued a career in orthopaedic surgery.

## Materials and Methods

This retrospective study involved surveying departmental websites to ascertain the employment status of women who

received the RJOS scholarship between 2003 and 2016. This study did not require institutional review board approval.

The RJOS scholarship was advertised through the RJOS website, current members, and newsletters. Any RJOS medical student member in any year of medical school and in good standing (that is, not on probation) was eligible to receive the award. Although we recorded the applicant's current institution in the application review process, we did not collect any information about other family members with a background in orthopaedics, socioeconomic status, or heavily RJOS-affiliated institutions. However, many medical student applicants were informed of the opportunity by RJOS members.

The RJOS Research Committee members reviewed all of the applications individually, providing each applicant with a score based on academics (1-10), essays (1-5), letters of recommendation (1-5), and extracurricular activities (1-5), with the highest possible score of 25. The top-rated composite scores were then reviewed as a group, and a cutoff was made based on the amount of funding available that year. The scholarship monies were provided by Zimmer-Biomet. The amount of funding per awardee varied based on available funds each year, but the mean amount was USD 1500, and the RJOS and American Academy of Orthopaedic Surgeons meeting expenses were covered by the RJOS as part of or in addition to the USD 1500.

Eighty-one scholarships were awarded from 2003 to 2016 with increasing numbers each year because of increased industry funding. From 2003 to 2010, there were only two awards each year. Starting in 2011, 10 students were selected, and these numbers increased annually. The number of applications increased alongside the increasing number of available scholarships, maintaining the overall level of competitive rigor.

The senior author (JS) performed an internet search to determine if the former scholarship winners were either current orthopaedic surgery residents or had graduated from orthopaedic surgery residency and were practicing surgeons. All authors and RJOS staff members performed a secondary confirmation to ensure the accuracy of the data collected.

For individuals who did not pursue orthopaedic surgery, we recorded the fields they chose to pursue. For women who pursued orthopaedic surgery, the institution they attended for residency was noted.

To determine if there was a difference between scholarship winners and non-winners in the pursuit of orthopaedic surgery, we evaluated the 2014, 2015, and 2016 applicants who did not receive the medical student scholarship (the only information available on non-winners). All three authors performed a similar internet search for these candidates.

**Results**

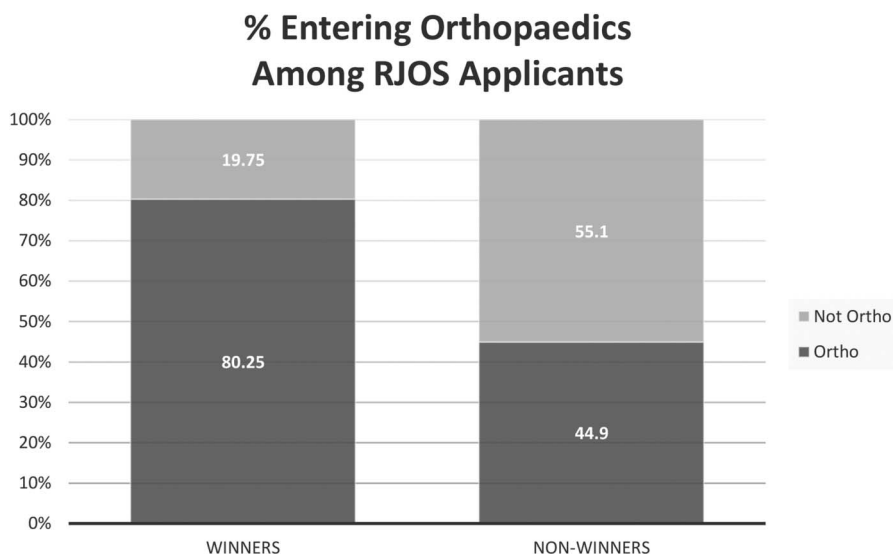
Of the 81 scholarship winners from 2003 to 2016, 65 women (80%) now either practice orthopaedic surgery or are currently in an orthopaedic surgery residency program. The students matched at orthopaedic surgery residency programs across the country, without any apparent geographic predilection or any trend towards public university or private university programs. Among the students who did not pursue orthopaedic surgery, the most common specialties chosen were anesthesia and physical medicine and rehabilitation, with three students going into each of these fields. Five students chose other surgical specialties: plastic surgery, general surgery, obstetrics and gynecology, urology, and vascular surgery. Two students chose pediatrics and one chose family medicine (Table 1). Two could not be tracked.

From 2014 to 2016, 49 applicants did not receive the medical student scholarship. Twenty-two of these applicants went on to pursue a career in orthopaedics (44.9%) and 27 went on to pursue a different career pathway (55.1%) (Figure 1).

**Discussion**

Lack of diversity in orthopaedic surgery is a longstanding problem. Women and underrepresented minorities comprise a small fraction of orthopaedic surgeons across the United States. Women faculty represent 12% of all orthopaedic faculty [1], while black and Hispanic faculty

members constitute only 5% [2], falling behind all other specialties. The lack of representation of these groups in orthopaedic surgery is concerning because the benefits of diversity are well documented [5-7, 9, 12, 14-16, 19, 26]. Physicians from underrepresented minority groups are more likely to care for disadvantaged individuals and minority populations, and more likely to practice in underserved areas [17]. A study from the UK found that patients treated by women surgeons were less likely to die, have hospital readmission, or have complications within 30 days of surgery than those treated by surgeons who were men [25]. Another study found that Medicare patients treated by women internists had lower 30-day mortality rates than those treated by men internists [24]. The results of these studies suggest that a diverse workforce results in improved patient care. Recruiting more physicians from underrepresented minority groups to orthopaedic surgery would benefit the field as a whole. Therefore, the RJOS started awarding a scholarship in 2003 to encourage more young women to enter orthopaedic surgery, and the current study evaluated the early career path of the first 81 recipients. We found that 80% of scholarship winners (65 of 81 women) entered orthopaedic surgery. We acknowledge that women who applied for the scholarship may be more inclined towards a career in orthopaedic surgery. However, matching into a residency is a competitive process. According to 2018 National Residency Matching Program data, there were 1017 applicants for 742 positions in orthopaedic surgery (73% match rate) [21]. Our review demonstrates that we are successful in choosing applicants who are more likely to match.



**Fig. 1** The percentage of applicants entering orthopaedics among RJOS Medical Student Scholarship winners (from 2003-2016) and non-winners (from 2014-2016) is shown.

One major limitation of the study is confounding factors. We acknowledge that the scholarship winners may have had a baseline interest in orthopaedic surgery that preceded attendance at the RJOS annual meeting. Perhaps to some winners, the award was an achievement to list on their resumé. This confounding factor is difficult to eliminate in a retrospective study because any attempt to discern these scholarship recipients' interest in orthopaedics before the scholarship award would be predisposed to recall bias. Because 44.9% of the applicants who were not awarded a scholarship still pursued a career in orthopaedics, it appears as though many of the applicants were already "primed" to this specialty. However, 55.1% of non-recipients versus 20% of recipients pursued a career in a specialty other than orthopaedics. This finding could suggest that applicants who did not receive a scholarship were either not as strong a candidate (both for the RJOS scholarship and for orthopaedic residency positions), or it could suggest that the RJOS scholarship solidified the recipients' decisions to pursue this career.

Perhaps another comparative study in a prospective format could determine the differential benefit of the RJOS scholarship and other awards similar to it in encouraging minority interest in orthopaedics. Future studies will need to compare different approaches to achieving the overall goal of increasing the number of women in orthopaedics.

The mission of the RJOS is to promote the professional development of and for women in orthopaedics throughout all stages of their careers. One approach targeting professional development at the earlier stages has been the administration of the RJOS Medical Student Annual Meeting Scholarship, which we studied here. Between 2003 and 2016, 65 (80%) of its recipients were either practicing orthopaedic surgeons or were in an orthopaedic surgery residency program. Perhaps both the exposure to orthopaedic surgery through attendance at the RJOS annual meeting as well as the assignment of a mentor and access to a woman role model in orthopaedic surgery contributed to this result.

In a white paper on the recruitment and retention of women in neurosurgery, another field with traditionally few women, some of the barriers were found to be limited exposure to neurosurgery during medical school, lack of women role models, and few women in leadership roles [3, 4, 8, 11, 13]. The Women in Neurosurgery group has offered resident travel scholarships to the national meetings for several years, and more recently added a Speaker's Bureau to expose women medical students to neurosurgery. Similar to the RJOS, the Women in Neurosurgery group has a mentoring program that matches students and residents to practicing women neurosurgeons. It is difficult to know if women's attending the orthopaedic annual meeting (which has an associated cost) or pairing them with a woman

orthopaedic surgeon mentor (which has no direct financial requirement) was more important in achieving the desired outcome. Other studies have shown that mentorship alone influences career choice [3, 8, 11, 13]. Perhaps the mentorship provides the "biggest bang for the buck."

Nonetheless, these results are promising because they show that with more outreach, mentorship, and perhaps scholarship opportunities, some of the barriers to entry could be overcome for traditionally underrepresented groups, providing a path for more diversity in these historically homogeneous fields.

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