Characteristics of Orthopaedic Sports Medicine Fellowship Directors

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Background: No study in the orthopaedic literature has analyzed the demographic characteristics or surgical training of sports medicine fellowship directors (FDs). Objective determinations as to what makes a physician qualified for this leadership position remain unclear; thus, it is important to identify these qualities as future physicians look to fill these roles.

Purpose: To illustrate characteristics common among sports medicine FDs.

Study Design: Cross-sectional study.

Methods: The 2020 Accreditation Council for Graduate Medical Education Fellowship Directory was used to identify the FDs for all orthopaedic sports medicine fellowship programs in the United States. The characteristics and educational background data for FDs were gathered by 2 independent reviewers from up-to-date curricula vitarum, Web of Science, and institutional biographies and consolidated into 1 database. Data points gathered included age, sex, residency/fellowship training location and graduation year, name of current institution, length of time at current institution, time since training completion until being appointed FD, length of time in current FD role, and personal research H-index.

Results: We identified 90 current orthopaedic sports medicine FDs. The mean Scopus H-index was 24.1 (median, 17). The mean age of FDs was 55.4 years; 87 of 90 (96.7%) were male and 3 (3.3%) were female; and 79/90 (87.8%) were White and 3/90 (3.3%) were African-American. The mean time to complete residency was 5.1 years (range, 5.0-6.0 years), and the most attended residency programs were the Hospital for Special Surgery (n = 9), the Harvard Combined Orthopaedic Residency Program (n = 5), and Duke University Medical Center (n = 4). The mean time required to complete a fellowship was 1.1 years (range, 1.0-2.0 years), and the fellowship programs that produced the most future FDs were the American Sports Medicine Institute (n = 11), the Steadman Hawkins Clinic (Vail) (n = 8), the Kerlan-Jobe Orthopaedic Clinic (n = 7), and the Hospital for Special Surgery (n = 7). The mean time from completion of fellowship to appointment as a FD was 12.8 years (range, 1-39 years).

Conclusion: Women and minority groups are largely underrepresented among leadership positions in the field of orthopaedic sports medicine.

Keywords: sports medicine fellowship; medical education; orthopaedic surgery; orthopaedic fellowship; orthopaedic leadership

Many physicians aspire to leadership positions in their practice, department, research, and academic communities. These highly regarded and influential positions are often filled by remarkably qualified individuals with particular abilities to manage the associated responsibilities. While the qualities typically demonstrated by this population are known, the objective determinations as to what qualifies an individual for a particular leadership role remain less clear. In the context of orthopaedic surgery, and more specifically in the division of sports medicine, there is a lack of information available to help guide physicians in training who aspire to attain leadership roles.

In the past decade, studies[1,7,9,10,14] analyzing trends in the professional landscape of orthopaedic surgery have investigated a variety of interesting areas including the selection process for applicants to orthopaedic surgical residency and fellowship programs and the evaluation guidelines that program directors use to identify strong candidates. The skills and specific training required to become physician leaders in surgical fields,[3,8,11] predictors of physician leaders,[2] and the role of characteristic variations in position selection and specialty representation have also been explored in the context of orthopaedics.[6,12,13] Recently, a cross-sectional study identifying leadership trends in spine surgery fellowships demonstrated that fellowship directors (FDs) are more likely to have graduated from certain residency and fellowship programs.[4] While these trends have been identified in orthopaedic spine surgery, there is no current literature describing these trends in sports medicine or any other orthopaedic subspecialty.

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The purpose of this study was to illustrate characteristic trends among sports medicine FDs.

METHODS

Data Collection

The Accreditation Council for Graduate Medical Education (ACGME) Fellowship Directory for 2020 was utilized to identify the FDs for all orthopaedic sports medicine fellowships in the United States. The characteristics and educational background data for FDs were gathered by 2 independent reviewers (J.W.B., C.P.L.) from up-to-date curricula vitarum (CVs), Web of Science, and/or institutional biographies and consolidated into 1 database. The characteristic information included age, sex, residency/fellowship training location and graduation year, name of current institution, length of time at current institution, time since training completion until being appointed FD, length of time in current FD role, and personal research H-index, which is an author-level metric that attempts to measure both the productivity and citation impact of the physician's publications. The Scopus database (Elsevier) was used to determine the H-index for FDs. Its search engine feature allows for an extensive review of the scientific literature with a citation-tracking component, which was used to retrieve the H-index for every FD included in this study.

Statistical Analysis

Statistical analyses were performed using R software Version 3.6.1 (R Foundation for Statistical Computing).

RESULTS

A total of 90 FDs were identified, 87 (96.7%) of whom were men, while 3 (3.3%) were women. Of FDs, 79 (87.8%) were White, 3 (3.3%) were African American, 2 (2.2%) were Asian American, 2 (2.2%) were Indian, 1 (1.1%) was Greek, 1 (1.1%) was Middle Eastern, and 1 (1.1%) was Hispanic. The mean age for all FDs was 55.4 years (range, 37-81 years), and the median Scopus H-index was 17 (range, 1-79). The most impactful FD in research had a Scopus H-index value of 79, while the 10th most impactful FD in research had a Scopus H-index value of 44 (accessed January 21, 2020). The mean time from completion of fellowship training to becoming a FD was 12.8 years (range, 1-39 years), and the mean time spent in the role as FD was 9.3 years (range, 1-42 years) (Table 1).

TABLE 1
Demographic and Training Characteristics of Sports Medicine Fellowship Directors (FDs)

	n (%) or mean (range), y
Male	87 (96.7)
Female	3 (3.3)
Age, y	55.4 (37-81)
FD Scopus H-index	21.4 (1-79)[a]
Years from completion of fellowship training to hiring as an FD	12.8 (1-39)
Years spent in current FD role	9.3 (1-42)

[a]The median Scopus H-index was 17 (range, 1-79).

The residency programs that produced the highest number of future FDs were the Hospital for Special Surgery (n = 9), the Harvard Combined Orthopaedic Residency Program (n = 5), Duke University Medical Center (n = 4), UCLA Medical Center (n = 4), and the University of Rochester Medical Center (n = 4). These residency programs produced approximately 29% of FDs (Figure 1).

The sports medicine fellowship programs that produced the highest number of FDs were the American Sports Medicine Institute (n = 11), the Steadman Hawkins Clinic (Vail) (n = 8), the Kerlan-Jobe Orthopaedic Clinic (n = 7), the Hospital for Special Surgery (n = 7), and the University of Pittsburgh Medical Center (n = 3). These fellowship programs produced approximately 40% of FDs (Figure 2).

Any fellowship program at which 3 or more current FDs trained was assessed for program productivity by dividing the number of current FDs who trained in a given program by the total number of fellows positions available per year in that respective program. This analysis provided a better understanding of which programs were more likely to produce FDs when standardized for program size. The most productive sports medicine fellowship program, in terms of its likeliness to produce future FDs, was the American Sports Medicine Institute (Figure 3).

The Scopus H-indices for FDs were separated in ranges that included 1 to 15 (n = 39), 16 to 29 (n = 25), 30 to 43 (n = 13), 44 to 57 (n = 6), 58-71 (n = 2), 72-85 (n = 2), and 86-99 (n = 0) (Figure 4).

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Ethical approval was not sought for the present study.

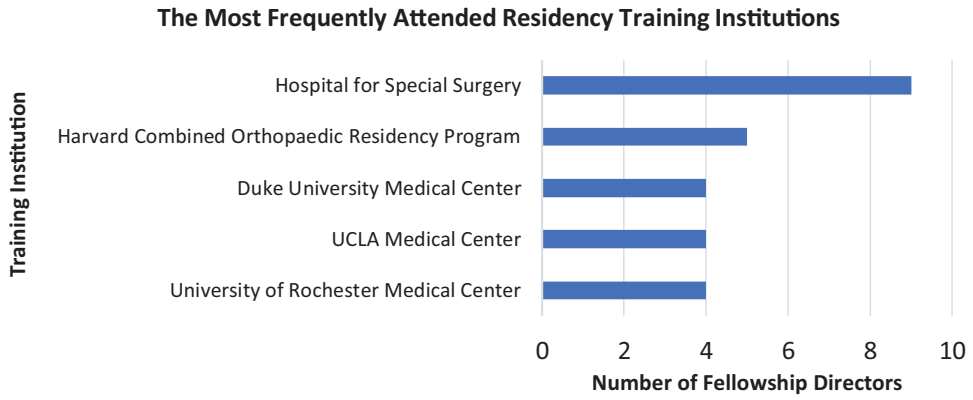

Figure 1. A summary of the most attended residency training programs among current sports medicine fellowship directors.

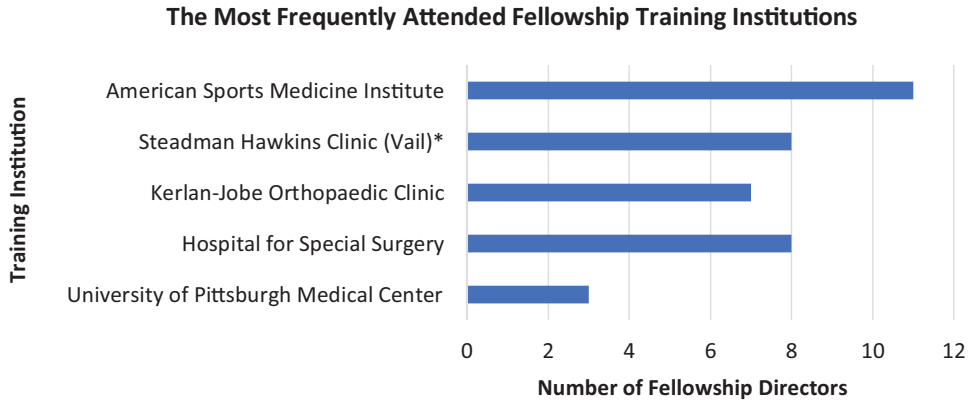

Figure 2. A summary of the most attended fellowship training programs among current sports medicine fellowship directors. *The Steadman Hawkins (Vail) is now known as The Steadman Clinic.

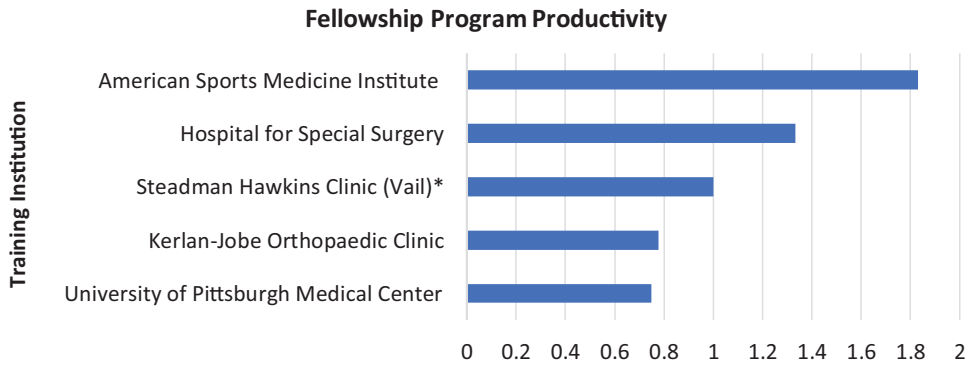

Figure 3. An analysis of fellowship-program productivity based on yearly number of available fellowship positions and likeliness of producing a future fellowship director. Only programs where 3 or more current fellowship directors trained were included in the analysis. *The Steadman Hawkins Clinic (Vail) is now known as The Steadman Clinic.

DISCUSSION

While this review does not answer with certainty the objective determinations that qualify a physician for particular leadership roles, it produced numerous interesting observations. One of these trends is that certain residency and fellowship programs train future sports medicine FDs at a higher rate than others. The residency programs that produced the greatest number of FDs were the Hospital for Special Surgery, the Harvard Combined Orthopaedic Residency Program, Duke University Medical Center, UCLA Medical Center, and the University of Rochester Medical

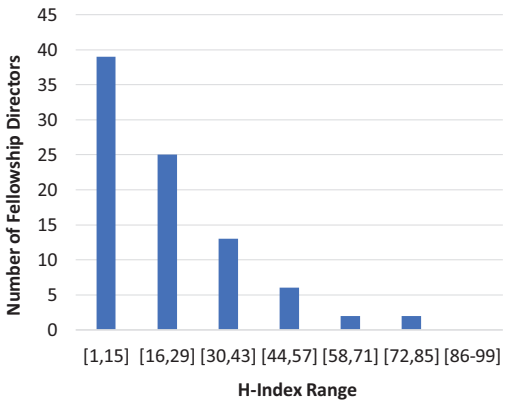

Figure 4. A representation of the Scopus H-indices of all sports medicine fellowship directors. H-indices were unavailable for 3 fellowship directors.

Center. The fellowship programs that produced the greatest number of FDs were the American Sports Medicine Institution, the Steadman Hawkins Clinic (Vail), the Kerlan-Jobe Orthopaedic Clinic, and the Hospital for Special Surgery. While these residency and fellowship programs tend to produce a significant proportion of future of FDs, the majority of FDs come from many different institutions. There are several potential explanations as to why these programs tend to train the largest numbers of future FDs. These residency and fellowship programs are simply some of the largest, with the most common fellowship programs having a range of 4 to 9 fellowship positions each year. Despite this, however, these fellowship programs have also demonstrated an ability to produce future FDs when standardized for program size. This may be explained in part by the fact that these programs may attract applicants with higher levels of ambition and leadership qualities. The curriculum for these residency and fellowship programs may provide more focused training to attain skills that are necessary and attractive to effectively lead a sports medicine fellowship program. Additionally, it is possible that these programs possess and utilize close connections with institutions, alumni, and individuals responsible for developing and hiring eventual FDs.

Despite the increasing presence of women and minority ethnic groups in medicine, sex inequality and ethnic continue to affect academic leadership, particularly in the context of surgery. A 2019 review on sex differences in 14 surgical specialties demonstrated a significant negative correlation between subspecialty compensation and percentage of female FDs ($r = -0.62$; $P = .04$).[6] This study indicated that the only specialty in which women held the majority of FD positions (65%) was breast surgery. Interestingly, the female representation among sports medicine FDs is currently only 3.3%, which is similar to that of orthopaedic spine surgery FDs (4.0%). It is clear from both this review and others like it that women and minority groups are underrepresented among surgery FDs, especially in orthopaedics. Although it remains unclear what factors most contribute to this discrepancy, this trend needs to be recognized and more closely investigated. In 2019, the Association of American Medical Colleges reported that women made up the majority of students in US medical schools for the first time at 50.5%. While this suggests that representation may in fact be equalizing, it merely sheds more light on the uneven distribution of men and women in orthopaedic sports medicine leadership positions. Perhaps the fact that the majority of professional and Division I head team physicians are White men is a primary detractor for women and minorities alike considering a career in this specialty. Regardless, more work needs to be done in order for these groups to be better represented in the field of orthopaedic sports medicine.

There are several strategies that could be meaningful in increasing the representation of these groups across the orthopaedic sports medicine community. Intentional recruitment of women and minorities should be more intentionally adopted by individuals responsible for position appointment. Mentoring programs might also prove useful in attracting individuals with a wider variety of characteristics who apply for leadership roles by enhancing the level of personalization involved in the positions that typically lead to these specific roles. Term limits should also be considered. Currently, the unlimited time frame that individuals are allowed to serve in FD roles makes it difficult to cycle new individuals through leadership positions within the orthopaedic sports medicine community; however, term limits may help diversify overall representation.

Another interesting observation is that the median Scopus H-index of FDs was 17, with the top 10 FDs evaluated in the study having a Scopus H-index of at least 44 and a maximum of 79. In comparison, 1 study[5] determined that the median H-index for orthopaedic surgeons is approximately 5. This finding suggests that sports medicine fellowships select directors with strong research qualifications and reputations for contributing to the academic advancement of the field. Interestingly, H-indices of FDs who attended 1 of the top 5 residency or fellowship programs did not significantly differ from the H-indices of FDs who did not attend 1 of these programs ($P > .05$). FDs who attended 1 of the top 5 residency programs had a mean H-index of 23.0, compared with a mean H-index of 20.8 for FDs who did not attended a top 5 residency program. FDs who attended 1 of the top 5 fellowship programs had a mean H-index of 20.9, compared with a mean H-index of 21.9 for FDs who did not attended a top 5 sports medicine fellowship. The mean time between completing fellowship training and becoming a FD was 12.4 years. Furthermore, there seems to be a low position turnover rate as the mean time spent as FD was 9.3 years.

There are several limitations to this study. To begin with, the data that were not available in the ACGME Fellowship Directory was obtained from publicly available CVs, Web of Science, and/or institutional biographies. As a result, some information could be inaccurate. Also, it is possible that some institutional biographies were not up-to-date or contained errors. Furthermore, online institutional biographies and personal webpages are frequently self-reported. Another limitation of this study is its cross-sectional nature. As a cross-sectional study, this research establishes

characteristic trends of sports medicine FDs at 1 point in time. Results may highlight different findings if this information were to be followed and trended over the course of several years or decades. Finally, the gathering and analysis of the data included in this study is entirely objective in nature. There are many subjective factors that influence an individual's decisions on where and for how long to practice throughout his or her career, as well as qualities that may contribute to a more effective and productive leader, such as people skills and networking, which are not captured in this review.

CONCLUSION

Women and minority groups are largely underrepresented among leadership positions in the field of orthopaedic sports medicine, as 96.7% of sports medicine FDs are men and 87.8% are White. Additionally, the median Scopus H-index for all FDs was 17.

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