Most Faculty Members at the Top Orthopaedic Sports Medicine Fellowship Programs Trained at Many of the Same Programs

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Purpose: To determine the proportion of faculty members at the top orthopaedic sports medicine fellowship programs who completed a fellowship at one of these programs themselves, how many remained at their fellowship training programs as an attending (institutional loyalty), where they most commonly completed residency and medical school, and to characterize their research productivity. **Methods:** The fellowship programs of current orthopaedic sports medicine fellowship faculty members at each of the top 10 orthopaedic sports medicine fellowship programs (based on a recent study) were determined by searching program websites or contacting program coordinators. For each program, we determined the proportion of faculty members who completed fellowship at one of these top 10 programs and the proportion who remained at their fellowship program as an attending. Residency and medical school information was found for faculty members on their professional websites. To determine research output, each faculty member's name was searched within the Scopus database and the number of publications was recorded. **Results:** Data were obtained from each of the top 10 sports medicine fellowship programs. Fifty-eight of 82 (70.7%) fellowship faculty members completed fellowship at a top 10 program. Regarding institutional loyalty, 36 of 82 (43.9%) fellowship faculty members remained at the program where they trained, with one program led entirely by alumni. The average number of publications per faculty member was 130.6, with a range among the 10 programs of 23-355.8. **Conclusions:** Most orthopaedic sports medicine fellowship faculty at the top perceived training programs completed a fellowship at one of these same programs and maintain high research productivity. **Clinical Relevance:** Orthopaedic surgery trainees who wish to become faculty members at one of the top orthopaedic sports medicine training programs should aim to match into one of these top programs when applying for fellowship.

The pursuit of orthopaedic fellowship training is increasingly common. From 2003 to 2013, the percentage of fellowship-trained applicants taking the American Board of Orthopaedic Surgery Part II examination increased from 76% to 90%.[1] As this number has increased, greater attention is being focused on characteristics of these fellowship programs and their directors. This is especially relevant for those aspiring to be an attending at a fellowship program, to ascertain how they can maximize their chances of attaining this role. The trainee's fellowship program may be a factor influencing their likelihood of becoming a faculty member at a prestigious institution.

In addition to fellowship training, previous studies have also sought out demographic characteristics of fellowship faculty as well as research productivity among fellowship program directors (PDs). Research productivity may be illustrated by the presence of

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dedicated research assistants and/or at least 25 annual publications per program (the maximum publication threshold used in this survey-based study).[2] A recent study determining characteristics of orthopaedic sports medicine fellowship PDs demonstrated that the mean total number of publications across 88 PDs was 90.0 ± 91.6 and mean total number of citations was 2773.9 ± 3962.9.[3] In another study characterizing fellowship PD demographics, 97.5% of leaders were male and 84.15% were White.[4] Additionally, 7 residency programs and 7 fellowship programs stood out as producing the most future fellowship directors.[4] Kamalapathy et al.[5] found that among 87 active orthopaedic sports medicine fellowship programs, 2 programs, Hospital for Special Surgery and The Steadman Clinic (Vail), stood out as the most frequently attended training locations for current fellowship directors.

The purpose of this study was to determine the proportion of faculty members at the top orthopaedic sports medicine fellowship programs who completed a fellowship at one of these programs themselves, how many remained at their fellowship training programs as an attending (institutional loyalty), where they most commonly completed residency and medical school, and to characterize their research productivity. The authors hypothesized that institutional loyalty would be prevalent, that a high proportion of faculty members completed medical school, residency, and fellowship training at top programs, and that these faculty members maintain high research output.

Methods

The programs included in the present study were the top 10 orthopaedic sports medicine fellowship programs based on a recent study[6] (Table 1). The training programs of the current faculty members were determined by searching program websites or contacting program coordinators. For each program, we determined the proportion of faculty members who completed a fellowship at one of these top programs. We also calculated the proportion of faculty members who are now attendings at the same program where they completed a fellowship. The residency and medical school programs of faculty members were identified on each attending's professional website.

Table 1. The Top 10 Orthopaedic Sports Medicine Fellowship Programs as Ranked by Fellowship Applicants

Rank	Program
1	Steadman Philippon Research Institute Program
2	Rush University Medical Center Program
3	Hospital for Special Surgery/Cornell Medical Center Program
4	OrthoCarolina Sports Medicine, Shoulder & Elbow Program
5	Cedars-Sinai Kerlan-Jobe Orthopaedic Clinic Program
6	American Sports Medicine Institute (St. Vincent's) Program
7	University of Pittsburgh/UPMC Medical Education Program
8	Steadman Hawkins Clinic of the Carolinas Program
9	Steadman Hawkins Clinic – Denver Program
10	Duke University Hospital Program

Data obtained from previous study.[6]

Table 2. Top 10 Fellowship Program Representation and Institutional Loyalty Among Orthopaedic Sports Medicine Fellowship Faculty

Program*	Proportion of Faculty Members Who Completed Fellowship at a Top 10 Program	Proportion of Faculty Members Who Exhibited Institutional Loyalty
1	3/3	3/3
2	5/10	2/10
3	4/8	2/8
4	9/13	9/13
5	3/5	0/5
6	6/9	3/9
7	6/7	2/7
8	4/4	2/4
9	5/6	2/6
10	13/17	11/17
Total	58/82 (70.7%)	36/82 (43.9%)

*Program numbers in this table do not necessarily correspond to those listed in Table 1.

To determine research output, each faculty member's name was searched within the Scopus database (Scopus.com). This database compiles peer-reviewed literature and organizes it to provide information by individual author such as statistics on total number of publications and total number of citations. It also allows verification of institutional affiliation when searching author names, offering access to individualized data more easily. After confirming the correct identity of each author by verifying his/her institutional association, the number of publications associated with the faculty member was recorded. These documents included manuscripts published in scientific journals, books, and conference proceedings.

Statistical Analysis

Descriptive statistics were used to report the proportion of faculty members who completed a fellowship at a top 10 program, the proportion of faculty members who are now attendings at the same program at which they completed a fellowship, where they attended residency and medical school, and their research productivity.

Results

Data were obtained from each of the top 10 orthopaedic sports medicine fellowship programs. Fifty-eight of 82 (70.7%) faculty members completed fellowship at a top 10 program (Table 2). Two of the 10 programs had 100% of faculty trained at top 10 fellowship programs. When we looked at institutional loyalty, 36 of 82 (43.9%) faculty members remained at the program

Table 3. Fellowship Subspecialties Other Than Sports Medicine Represented by Fellowship Faculty Members at the Top 10 Orthopaedic Sports Medicine Fellowship Programs

Fellowship Subspecialty	n
Shoulder and Elbow Surgery	7
Shoulder Surgery	1
Foot and Ankle	1
Hand and Upper Extremity	1
Knee and Shoulder Reconstruction	1
Sports Medicine and Knee Arthroplasty	1

where they trained, with one program led entirely by alumni. Thirteen of 82 (15.9%) faculty members completed 2 fellowships, and 1 completed 3 fellowships. Of those who did not complete a top 10 sports medicine fellowship, 11 of 24 (45.8%) completed a fellowship other than sports medicine. The additional fellowship subspecialties are represented in Table 3, with 7 physicians completing a shoulder and elbow surgery fellowship.

The most commonly attended residency program by fellowship faculty members was the Hospital for Special Surgery, with 22 of 82 attendings (26.8%) graduating from this program. The most commonly attended medical school was Duke University by 7 of 82 physicians (8.5%) (Table 4). Overall across all 10 programs, the average number of publications per faculty member was 130.6 ± 154.7, with the program-specific average ranging from 23 to 355.8 (Table 5).

Discussion

Based on the results of this study, we found that for each of the top 10 orthopaedic sports medicine fellowship programs, the majority of the fellowship faculty members completed a sports medicine fellowship at one of these top programs. Regarding institutional loyalty, more variability was involved, with 0% to 100% of fellowship faculty members working at the institution where they completed fellowship training. One program stood out as having the highest average number of publications by faculty members, at 355.8. Three programs were above the overall top 10 fellowship program average, and 6 programs had averages of less than 100 publications.

As found in this study, it is not uncommon for orthopaedic sports medicine faculty members to work at the same institution as where they completed their fellowship training. This is corroborated by similar results from other studies. Moore et al.[3] found that the most commonly attended sports medicine fellowship training institutions among current fellowship PDs were the Hospital for Special Surgery, The Steadman Clinic (Vail), the American Sports Medicine Institute, and the Kerlan-Jobe Orthopaedic Clinic, with 27.3% of fellowship PDs leading programs at their fellowship training location. Additional studies came to similar conclusions regarding certain fellowship programs producing greater numbers of fellowship PDs.[4,5,7]

The results of our study also may be related to the practice of "pipelining" exhibited by some fellowship programs. A recent study characterized how certain fellowship programs will often match residents from the same residency programs, a phenomenon referred to as "pipelining."[8] The authors of this previous study found pipelining to be highly prevalent at one of the top orthopaedic sports medicine fellowship programs, with 4 additional programs also demonstrating evidence of this practice. The practice of pipelining may also be prevalent among prospective attendings, not just prospective fellows. We presume this is because many of the top programs are likely to feel more comfortable with maintaining a good reputation by selecting attendings who completed a "top" fellowship, thereby leading to correlations between faculty members' fellowship programs and current institutional faculty positions. Therefore, sports medicine surgeons who wish to join practices at one of the perceived top programs should aim to match into one of these fellowship programs.

Overall, there is a paucity of sex and racial diversity among orthopaedic sports medicine fellowship PDs. One study found that among 88 fellowship programs,

Table 4. Most Commonly Attended Residencies and Medical Schools by Fellowship Faculty Members at the Top 10 Fellowship Programs

Residency		Medical School	
Program	Number of Faculty (n = 82)	Program	Number of Faculty (n = 82)
Hospital for Special Surgery	22 (26.8%)	Duke University	7 (8.5%)
Duke University	11 (13.4%)	Weill Medical College of Cornell University	5 (6.1%)
Harvard Combined	5 (6.1%)	Harvard Medical School	5 (6.1%)
University of Pittsburgh Medical Center	5 (6.1%)	Columbia University	4 (4.9%)

Data are presented as n (% of all faculty members).

Table 5. Average Number of Publications by Fellowship Faculty Members at the Top 10 Orthopaedic Sports Medicine Fellowship Programs

Program*	Average Number of Publications per Faculty Member
1	23.0
2	28.8
3	37.6
4	48.8
5	73.3
6	80.7
7	122.2
8	179.6
9	196.8
10	355.8
Overall average	130.6

*Program numbers in this table do not necessarily correspond to those listed in Tables 1 or 2.

there was only 1 female PD and less than 10% of PDs were non-White.[3] Similarly, women comprised only 16% of orthopaedic surgery residents and 5.8% of practicing orthopaedic surgeons in 2019.[9,10] This indicates that the disparities among orthopaedic surgeons in general extend into fellowship leadership, where there is significant room for improvement. Future studies should aim to determine why either a high proportion of female residents do not practice orthopaedics after residency training, or why there is a delay in female representation among orthopaedic attendings.

Limitations

The limitations of the study should be noted. The "top 10" programs are a subjective list based on recent applicant perception in a single study.[6] The top fellowship programs now are not the same as they were several years ago, and we could not account for these changes in perceived reputation. In addition, although the Scopus database was used for its efficient publication tracking, it may not by completely accurate and comprehensive. Finally, the specific reasons for the variability across programs regarding institutional loyalty could not be ascertained.

Conclusions

Most orthopaedic sports medicine fellowship faculty members at the top perceived training programs completed a fellowship at one of these top programs themselves and maintain high research productivity.

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