Research expectations, surgical exposure, and team coverage in orthopaedic sports medicine fellowship programs

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Abstract

Background:

Sports medicine is one of the most competitive orthopaedic subspecialties. Determining the most appropriate fellowship program is difficult for residents, due to limited information regarding research expectations, team coverage, and surgical exposure.

Participants:

An anonymous survey was distributed to the fellowship PDs of all Accreditation Council for Graduate Medical Education (ACGME)-accredited orthopaedic sports medicine fellowships in the United States. A complete list of accredited programs was obtained from the American Orthopaedic Society for Sports Medicine (AOSSM) website.

Results:

Thirty-eight of 95 PDs responded (40%). Twenty-three of the 38 programs (60.5%) were university-based, 6 (15.8%) were private practice, and 9 (23.7%) responded as “other”. Research manuscript submission by the fellows is required at 28 of the 38 (73.6%) fellowship programs. Knee and shoulder arthroscopy were the most common areas of surgical exposure, with average scores of 9.18 and 9.08, respectively. Ankle arthroscopy had the lowest score (3.05), indicating minimal exposure in most programs. Non-athletes were the most common group treated, representing 25-50% of the patient population in 25 of 38 programs (65.8%) and 75-100% of patients seen in 7 of...
the 38 programs (18.4%). All programs reported that they treat professional athletes. College athletes accounted for 0-25% of the patient population in 81.6% of programs. With respect to team coverage, all programs covered football, while 21 out of 37 (56.8%) programs covered basketball.

Conclusion

There is variability among orthopaedic sports medicine fellowship programs with regard to research expectations, strength of surgical exposure, demographics of the patient population, and team coverage requirements. Most sports medicine fellowship programs are university-based, require some form of research with minimum publication submission, provide extensive exposure to shoulder and knee arthroscopy, and treat mostly non-athletes or high school athletes. This information may provide residents with a better understanding of some important components of orthopaedic sports medicine fellowship programs.

Keywords: orthopaedics, sports medicine, fellowship, fellow education, research exposure

Introduction

Over the past ten years, sports medicine has been one of the most popular subspecialties among orthopaedic surgery residents. In 2015, over 90% of orthopaedic surgery residents planned to pursue a fellowship. It is difficult for residents to determine the most appropriate fellowship program due to limited information regarding research expectations, team coverage, and surgical exposure. In 2002, O'Neil et al. surveyed orthopaedic department chairs and sports medicine fellowship program directors to determine the threshold for minimal proficiency for performing common surgical techniques, such as diagnostic knee arthroscopy, meniscectomy, anterior cruciate ligament (ACL) reconstruction, shoulder arthroscopy, and subacromial decompression. The procedure with the lowest number of cases required for proficiency (i.e. experienced enough to perform the procedure without supervision), was a diagnostic knee arthroscopy, with 45 cases being identified as the minimum number necessary to attain this level of competency. Residents may not have the opportunity to reach the minimum number of cases until fellowship, especially if a surgical procedure requires a higher number of repetitions to reach proficiency, such as ACL reconstruction (61 cases). A survey of orthopaedic surgeons by Yin et al., suggested that orthopaedists benefit significantly from fellowship training. Surgeons that had completed a fellowship in sports medicine felt better prepared to make decisions on common surgical treatment of the knee and shoulder, including ligament reconstruction, selecting an appropriate graft type, and determining the most appropriate treatment for articular cartilage defects. Residents may therefore want to consider areas of deficiency or gaps in knowledge when deciding which type of subspecialty training to pursue.

Research involvement is considered fundamentally important for physicians to gain the ability to properly evaluate literature and produce their own research for the benefit of their respective field. The Accreditation Council for Graduate Medical Education (ACGME) requires fellowship programs to provide designated research time for fellows. A 2016 survey by Cvetanovich et al., found that 74% of all U.S. orthopaedic sports medicine surgical faculty practice in an institution associated with an academic center. Those surgeons affiliated with an academic center had more publications and works cited than surgeons who were not affiliated with an academic center. Orthopaedic residency programs with formal research opportunities have reported an increase in the overall productivity of research measured through Institutional Review Board (IRB) submissions and total publications. The research requirements and opportunities at an institution may influence an applicant's decision to interview at and/or rank a particular fellowship program. There is a paucity of information in the literature regarding research requirements for orthopaedic sports medicine fellowship programs, the logistics of available research time, and
emphasis on academic productivity.

Several factors are important to sports medicine fellowship applicants when selecting programs including case composition and volume, research opportunities, and patient demographics. The purpose of this study was to survey orthopaedic sports medicine fellowship program directors (PDs) to characterize various aspects and expectations of the fellowship programs.

Methods

Institutional Review Board (IRB) approval was obtained at our institution (Protocol #1701005083). Furthermore, this study followed the principles of the Declaration of Helsinki. An anonymous survey was distributed electronically (via Surveymonky, San Mateo, CA) to the fellowship program directors (PDs) of all ACGME-accredited orthopaedic sports medicine fellowship programs in the United States.

Results

Of the 95 orthopaedic sports medicine fellowship PDs surveyed, 38 responded (40%). There was a wide geographic distribution of respondents, with the highest percentages being from West B (7 of 38; 18.4%), Midwest A (6 of 38 programs; 15.8%), and South A (6 of 38 programs; 15.8%) (Table 1). The type of practice and the research requirements for fellowship programs varied. Twenty-three of the 38 programs (60.5%) were university-based, 6 (15.8%) were private practice, and 9 (23.7%) responded as "other". Five of the 38 programs (13.2%) that responded to "other" considered themselves university- and private practice-based, while two programs (5.2%) were community hospital-based, and three programs (7.8%) defined themselves as hospital based. All programs required that their fellows submit a manuscript during the fellowship year, while 1 program required 10-15 submissions per fellow annually. Dedicated research time was offered weekly by 28 of the 38 programs (73.7%). Fellows were required to complete a specific type of project at 7 of the 38 programs (18.4%). PDs' specifications for a distinct type of project included a "peer reviewed project" (1 of 38, 2.6%), "clinical and biomechanical" project (1 of 38, 2.6%), "publication quality project" (1 of 38, 2.6%), an "original study" (1 of 38, 2.6%), and "one original research and one review" (2 of 38, 5.3%).

| Orthopaedic Sports Medicine Fellowship Respondents by Region |
|-------------------------------------------------------------|
| Northeast A- (CT, ME, MA, NH, RI, VT)                        | 8% |
| Northeast B- (NJ, NY, PA)                                   | 10%|
| Midwest A- (IN, IL, MI, OH, WI)                             | 16%|
| Midwest B- (IA, KS, MN, MO, NE, ND, SD)                     | 11%|
| South A- (DE, DC, FL, GA, NC, SC, VA, WV)                   | 16%|
| South B- (AL, KY, MS, TN)                                   | 5% |
| South C- (AR, LA, OK, TX)                                   | 8% |
| West A- (AZ, CO, ID, NM, UT, NW, WY)                        | 8% |

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Table 1. Geographic location of respondents’ fellowship program.

| Extent of Surgical Exposure | Knee arthroscopy | Shoulder arthroscopy | Shoulder arthroplasty | Hip arthroscopy | Knee arthroplasty | Trauma | Ankle arthroscopy |
|----------------------------|------------------|----------------------|-----------------------|----------------|------------------|--------|------------------|
| Average Extent of Exposure | 9.18             | 9.08                 | 7.27                  | 6.16           | 3.75             | 3.13   | 3.05             |
| Rank                       | 1                | 2                    | 3                     | 4              | 5                | 6      | 7                |

Table 2. Strength of surgical exposure at orthopaedic sports medicine fellowship programs. Scored on a scale from 1-10 (1-minimal; 10-extensive).

PDs were also asked to comment on the strength of surgical exposure (e.g. shoulder arthroscopy, knee arthroscopy) during the fellowship year, using a scale of 1-10 (1 being minimal exposure and 10 being extensive exposure) (Table 2). Knee and shoulder arthroscopy had the highest average score (9.18 and 9.08, respectively), while ankle arthroscopy had the lowest score (3.05). Other areas of minimal exposure included knee arthroplasty (3.75) and trauma surgery (3.13). Shoulder arthroplasty and hip arthroscopy were found to have moderate to high exposure with a ranking of 7.27 and 6.16, respectively.

All fellowship programs (38 of 38, 100%) reported that they treat professional athletes. Non-athletes accounted for 25-50% of the patient population in 25 of 38 programs (65.8%) and 75-100% of patients seen in 7 of the 38 programs (18.4%) (Table 3). Professional athletes constituted 0-25% of the patient population in 37 out of 38 programs (97.4%). Thirty-one out of 38 (81.6%) programs reported that college athletes accounted for 0-25% of their patient population. All PDs that responded (one PD chose not to respond) indicated that their fellows provided coverage for football, while 21 out of 37 (56.8%) programs covered basketball (Table 4).
Table 3. Breakdown of patient populations cared for in orthopaedic sports medicine fellowship programs.

| Patient Type        | Estimated Percentage of Patient Population |
|---------------------|--------------------------------------------|
|                     | 0-25% | 25-50% | 50-75% | 75-100% |
| High School Athlete | 20     | 15      | 3       | 0       |
| College Athlete     | 31     | 7       | 0       | 0       |
| Professional Athlete| 37     | 1       | 0       | 0       |
| Non-Athlete         | 5      | 25      | 7       | 0       |

Table 4. Types of sports covered by orthopaedic sports medicine fellows

| Sports Coverage | Number of Fellowship Programs |
|-----------------|------------------------------|
| Sport           |                              |
| Baseball        | 20                           |
| Basketball      | 23                           |
| Football        | 37                           |
| Soccer          | 21                           |
| Tennis          | 4                            |
| Hockey          | 14                           |
| Lacrosse        | 10                           |
| Other           | 14                           |

Discussion

All orthopaedic sports medicine fellowships required participation in research. Manuscript submission is obligatory for the majority of programs, although the types and number of projects required vary depending on the program. Most sports medicine fellowship programs provide extensive operative exposure to shoulder and knee arthroscopy, while many include only minimal exposure to hip and ankle arthroscopy. PDs from all fellowships reported that they cover football games and treat associated injuries. Additionally, basketball, baseball, and soccer were the only other sports covered by over 50% of the programs. The largest proportion of patients in sports medicine programs were non-athletes, yet, all programs reported that they care for professional athletes to some extent.
The ACGME requires sports medicine fellows to "participate in basic and or clinical hypothesis based research." Additionally, fellowship programs must provide scheduled time and facilities for fellows to perform research. This study demonstrated that most orthopaedic sports medicine fellowship programs (71.2%) required manuscript submission during the fellowship year. In addition, most programs (67.6%) offered weekly, dedicated research time, although this may differ between private practice and university-based programs. Cvetanovich et al suggests that significantly more research is performed by surgeons with academic employment as compared to non-academic surgeons. Many programs who responded to the survey were university-based (60.5%), which may explain the high percentage of programs requiring manuscript submission and providing dedicated research time.

Case volume and composition are also important factors considered when selecting a fellowship. In 2013 Wyatt et al., performed a cross sectional study that analyzed meniscus repairs in patients undergoing Anterior Cruciate Ligament Reconstruction (ACLR). Current sports medicine fellows and surgeons that had completed a sports medicine fellowship chose to perform a meniscus repair during a greater proportion of ACLR than orthopaedists without sports medicine training (33.6%; current fellows, 28.9%; prior sports medicine training, and 19.8%; no sports medicine fellowship). Additionally, surgeons that performed more than 6 ACLR per year tended to perform more meniscus repairs. These results suggest that fellowship experience is important with regard to surgical confidence and ability. This further supports the notion that the volume of surgical cases is an important part of surgical proficiency and confidence. In our study, most programs provided extensive exposure to knee and shoulder arthroscopy, while there was often minimal exposure to ankle arthroscopy. Residents may consider taking the reported exposure to these surgical techniques into account when choosing a fellowship.

There are several limitations to this study. Our response rate was 40%, which suggests that the results may not reflect the views of the majority of orthopaedic sports medicine fellowship PDs. The sample size is limited to a minority of geographic locations; therefore, the distribution of respondents may not represent geographic locations of all sports medicine fellowship programs. This survey did not attempt to define the level of fellow involvement with sports teams, rather, the survey asked only about the demographics of the patient population. However, level of involvement may be an important factor for some applicants in selecting fellowship programs.

Conclusion

There is variability among orthopaedic sports medicine fellowship programs with regard to research expectations, strength of surgical exposure, demographics of the patient population, and team coverage requirements. Most sports medicine fellowship programs are university-based, require some form of research with minimum publication submission, provide extensive exposure to shoulder and knee arthroscopy, and treat mostly non-athletes or high school athletes. This information may provide residents with a better understanding of some important components of orthopaedic sports medicine fellowship programs.

Take Home Messages

- Manuscript submission is required for the majority of sports medicine fellowship programs.
- The category (i.e. "peer reviewed", "clinical and biomechanical," "original study") and number of projects each program requires vary depending on the program.
Most sports medicine fellowship programs provide extensive operative exposure to shoulder and knee arthroscopy, while many include only minimal exposure to hip and ankle arthroscopy.

In terms of coverage, program directors from all fellowships reported that they cover football games and treat associated injuries.

The largest proportion of patients in sports medicine programs were non-athletes, yet, all programs reported that they care for professional athletes to some extent.

Notes On Contributors

Brett D. Haislup is a medical student at Drexel University College of Medicine.

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Acknowledgements

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Appendices
## Orthopaedic Sports Medicine Fellowship Director Survey

1. Which of the following best describes your program?

- University Based
- Private Practice
- Other (please specify)

2. Are the fellows required to submit a certain number of manuscripts for publication during their fellowship year?

- No
- Yes, Please specify:
  - 0-5
  - 5-10
  - 10-15
  - 15-20
  - More than 20 (please specify)

3. Does your fellowship program offer dedicated research time?

- No
- If yes please specify:
  - Weekly
  - Month long block set aside for research
  - Other (please specify)

4. Are fellows required to complete a certain type of publication (e.g. systematic review, surgical technique)?

- No
- If Yes (please specify)

5. Please rank the strength of exposure within your program for each of the following surgical areas. (1 = minimal exposure, 10 = extensive exposure)

- Shoulder arthroscopy
- Hip arthroscopy
- Ankle arthroscopy
- Shoulder arthroplasty
- Knee arthroplasty
- Trauma
6. What percentage of your patient population is represented by the following groups (please estimate)?

| Group                | 0-25% | 25-50% | 50-75% | 75-100% |
|----------------------|-------|--------|--------|---------|
| High school athlete  |       |        |        |         |
| College athlete      |       |        |        |         |
| Professional Athlete |       |        |        |         |
| Non-athlete          |       |        |        |         |

7. What sports do fellows cover during the fellowship year? Please check all that apply.

- Baseball
- Basketball
- Football
- Soccer
- Tennis
- Hockey
- Lacrosse
- Other (please specify): 

8. Does your fellowship program give fellows an opportunity to work with professional athletes?

- No
- If yes, what sport(s)?

9. In what region is your program located?

- Northeast- New England (CT, ME, MA, NH, RI, VT)
- Northeast- Middle Atlantic (NJ, NY, PA)
- Midwest- East North Central (IN, IL, MI, OH, WI)
- Midwest- West North Central (IA, KS, MN, MO, NE, ND, SD)
- South- South Atlantic (DE, DC, FL, GA, MS, NC, SC, VA, WV)
- South- East South Central (AL, KY, TN)
- South- West South Central (AR, LA, OK, TX)
- West- Mountain (AZ, CO, ID, NM, UT, NV, WY)
- West- Pacific (AK, CA, HI, OR, WA)

Declaration of Interest

The author has declared that there are no conflicts of interest.