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Clinical Studies

What are the academic and demographic characteristics of orthopaedic spine surgery division chiefs?☆



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ABSTRACT

Background: To our knowledge no analysis of academic orthopedics division chiefs (DC) exists in the current orthopedic literature. Serving as a Division Chief may be a career milestone or an opportunity to lead and transition to additional leadership roles. Our objective is to answer the following questions (1) Are there academic characteristics common to Spine divisions chiefs? (2) Are there demographic characteristics common to Spine division chiefs? (3) Do most Spine division chiefs train at certain fellowships?

Methods: Allopathic residency program websites were used to locate DC and Division Co-Chiefs (DCC). Academic characteristics evaluated included: H-index, academic rank, number of degrees, additional leadership titles, the availability of fellowship training and service as past/current society president and participation in travelling fellowships. Demographic characteristics including gender and race were collected. Years since completions of fellowship and which fellowship program the DC/DCC trained at were collected.

Results: 102 DC/DCC were identified and had an average H-index of 22.1. The majority (48%) had an academic rank of Professor, 29% Associate Professor, 16% Assistant Professor and 8% rank could not be identified. 45% had additional leadership positions within their department and 18% had additional graduate degrees. Two institutions had designations of co-chiefs. The majority (57%) offered spine fellowships at their institution. The majority of DC were males (99%) and White (72.5%). On average the DC/DCC were 19.5 years past their fellowship completion. 19% participated in at least one travelling fellowship and 14% served as a president of a Spine or Orthopaedic Society.

Conclusions: Spine surgery division chiefs are 99% male, with a rank of Professor and trained at select fellowship programs. Nearly half of spine surgery division chiefs held concurrent administrative roles in the department and 14% have served as President of a spine or Orthopaedic society. There is room to Improve on the gender and ethnic/racial diversity of spine surgery division chief leadership.

Introduction

Spine surgery is an integral part of Orthopaedic surgery departments. In addition to elective care, the division of spine surgery is often responsible for spine trauma coverage. Spine surgery division

are often a part of a multi-disciplinary spine center including non-operative and operative providers [1,2]. The division chief of spine surgery may serve as a coleader of a spine center along with a non-operative provider or a Neurosurgeon. Education of residents and spine fellows is also commonplace. To date there is minimal research on academic or demographic characteristics of orthopaedic surgery division chiefs and none on characteristics of spine surgery division chiefs. A prior study evaluated the academic demographics of spine surgery Fellowship Directors [3]. A study of Division Chiefs is important as these individuals frequently transition to Vice-chair or Chair of Orthopaedic departments. Other specialties including cardiology, plastic surgery, cardiothoracic surgery and vascular surgery have evaluated the characteristics and demographics of their respective division chiefs [4–8].

Our objectives were to answer the following questions: (1) Are there demographic characteristics common to Spine division chiefs? (2) Are there academic characteristics common to Spine divisions chiefs? (3) Do most Spine division chiefs train at certain fellowships?

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* Summary sentence: Spine surgery is an integral part of Orthopaedic surgery departments. The authors aim to evaluate both academic and demographic characteristics of Orthopaedic Spine Division Chiefs.

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Patients and methods

Allopathic orthopedic residency programs affiliated with an academic center were identified [9]. In April 2020, academic program websites were used to identify Division Chiefs (DC) and Division Co-Chiefs (DCC). Inclusion criteria were: academic programs with a spine division, if a spine division was not present but a spine surgeon was listed as full-time faculty member then that spine surgeon was included. Exclusion criteria were: academic programs without spine faculty listed on their website, osteopathic programs, military programs. Using the individual DC/DCC’s academic profile web page, sex, race, academic rank, additional leadership position(s), additional degree(s), fellowship institution, and years since completion of fellowship were determined. The Hirsch index (h-index), defined as a researchers’ number of publications cited $\geq h$ times, was used to measure academic productivity [10]. The use of this index has been previously reported in the Orthopaedic literature [11,12]. Using the Scopus database, each DC/DCC’s current h-index as of April 2020 was recorded.

The number of division chiefs/co-chiefs who served as Presidents of an academic spine society was queried using each society’s website. Societies included were the Cervical Spine Research Society (CSRS), Scoliosis Research Society (SRS), Lumbar Spine Research Society (LSRS), International Society for the Advancement of Spine Surgery (ISASS), and the North American Spine Society (NASS). We also evaluated DC/DCCs that served as the presidents of the American Orthopaedic Association and the American Academy of Orthopaedic Surgeons (AAOS). Traveling Fellowships that each DC/DCC participated in were also evaluated. The American Orthopaedic Association (AOA) website was queried for DC/DCC that participated in the North American Traveling Fellowship (AOA-NATF), Japanese Orthopaedic Association (AOA-JOA), American-British-Canadian (AOA-ABC), and the Austria-Switzerland-Germany (AOA-ASG). The CSRS website and SRS websites were evaluated for DC/DCC that participated in the SRS and CSRS Travelling Fellowships.

Statistical analysis in the form of student t-tests was used to compare the means between two groups, $p < 0.05$ was considered significant. Descriptive statistics of Division chief demographics and academic characteristics are reported as number and percentage. Statistical analysis was performed using GraphPad Prism version 8.0, (GraphPad, La Jolla, California, USA).

Results

Demographics

Information on 102 DC/DCCs who met our inclusion criteria were collected and 57 of these divisions offered Spine Fellowship training and two programs had Co-Chiefs leading the spine division. These 102 DC/DCC consisted of 99% male and 1% female faculty, 74 (72.5%) of the DC/DCC were White, 23 (22.5%) Asian, and 2 (2%) Black. There were 2 (2%) DC/DCC identified as Hispanic while 100 (98%) identified as Not Hispanic.

Academic productivity

The mean h-index was 21.7 ± 19.1 (Fig. 1) and the mean number of years since spine fellowship completion was 19.5 ± 8.1 . The majority (48%) held an academic rank of Professor (Fig. 2). A total of 45 (44.1%) of the DC/DCC held additional leadership positions within the orthopaedic department, within the hospital, or in the spine division. Of these 45, 9 (20%) served as chair of the department, 13 (12.7%) as director or associate director of spine fellowship, and 9 held other various leadership positions. Few of the DC/DCC held additional degrees, 5 (4.9%) had a Ph.D., 6.8% had a master’s degree, and 4.9% had an MBA.

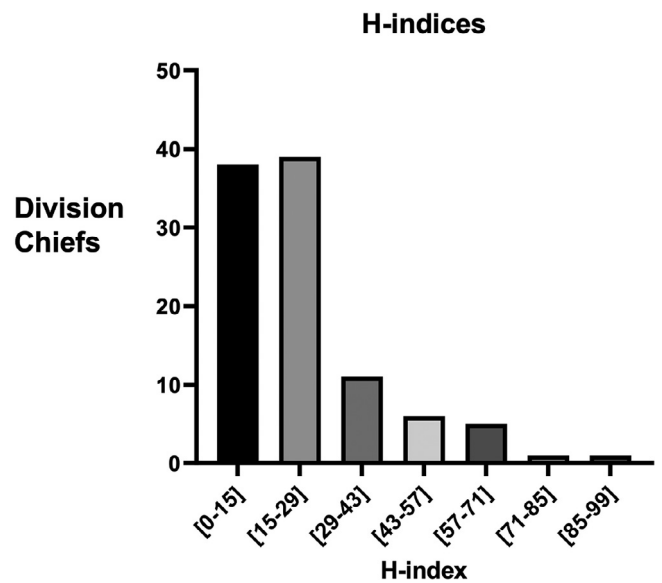


Fig. 1. H-index of spine division chiefs.

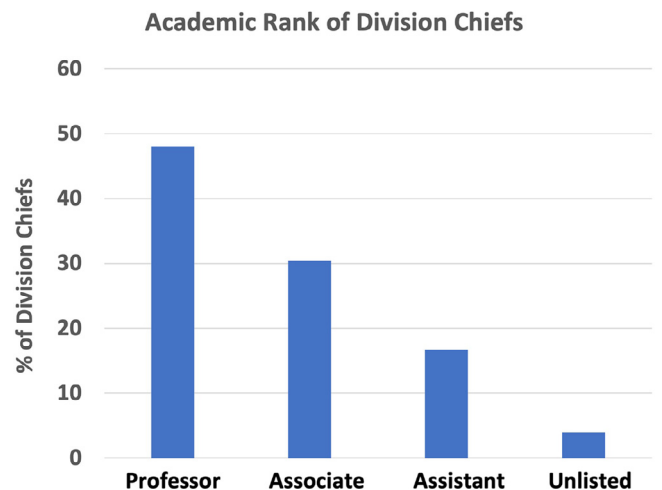


Fig. 2. Academic rank of spine division chiefs.

Presidents of spine and orthopaedic societies

A Total of 14 (13.7%) DC/DCC served as past president of Spine and Orthopaedic Societies, 7 DC/DCC served as President of CSRS, 4 as President of SRS, 2 as President of LSRS, and 1 each as president of AOA, ISASS, and NASS. There were 3 DC/DCC who served as President of 2 different societies (Fig. 4). DC/DCC who served as past President of spine/orthopaedic societies on average had higher academic ranking ($p < 0.001$). They also had a significantly higher H-indexes, (41), compared to DC/DCC who did not serve as a society president (18.4), $p = 0.007$.

Travelling fellowships

A total of 19 (18.6%) DC/DCC participated in at least one Traveling Fellowship and 4 were awarded multiple traveling fellowships (Fig. 5). These included 8 that completed the SRS Travelling Fellowship, 5 AOA-NATF, 4 AOA-JOA, 4 AOA-ABC, 1 CSRS Travelling Fellowship, and 1 AOA-ASG. DC/DCC who completed a traveling fellowship had a significantly higher academic ranking at their institution ($p < 0.001$) and a significantly higher H-index (42.1) compared to DC/DCCs who did not participate in Traveling Fellowships (17.5), $p < 0.001$.

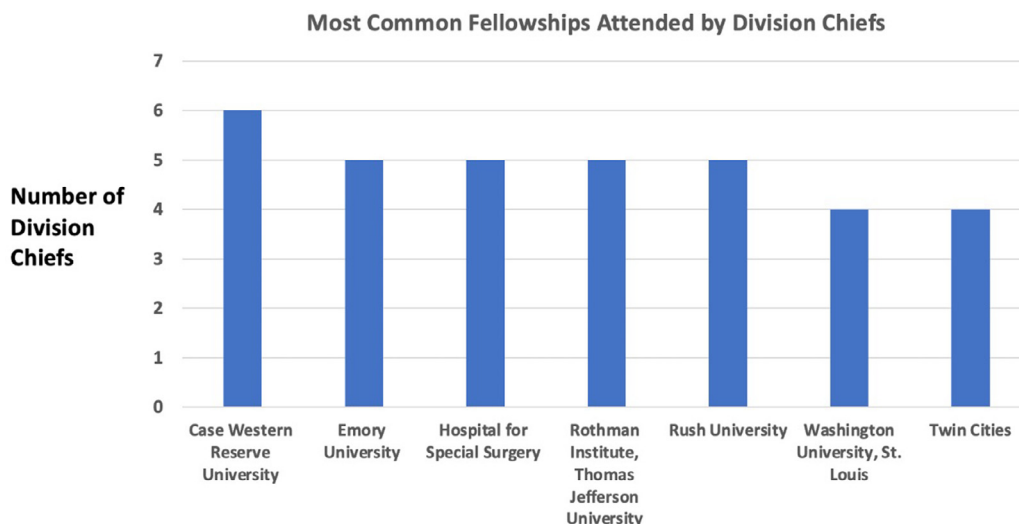


Fig. 3. Most common spine surgery fellowship attended by spine division chiefs.

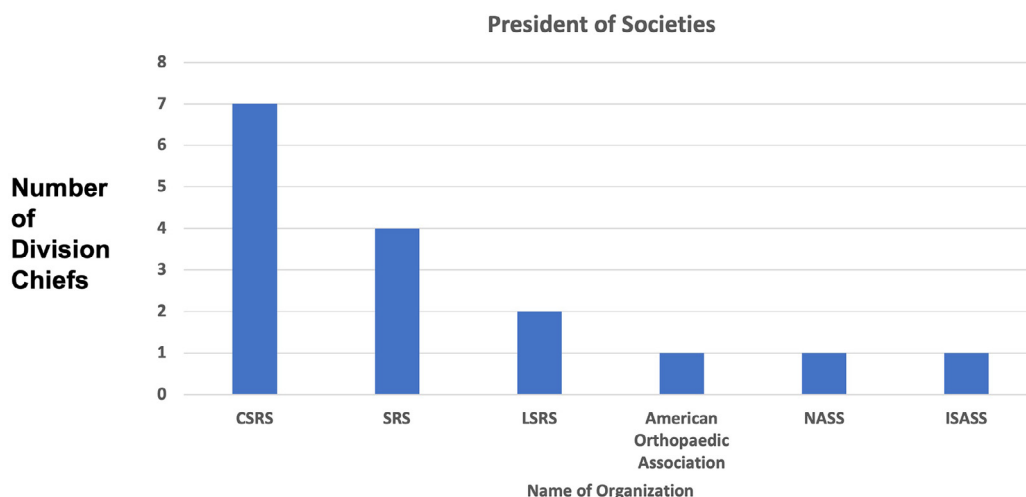


Fig. 4. Spine division chiefs who served as presidents of spine and orthopedic societies.

Fellowships programs that trained DC/DCC

Seven fellowship programs were identified as having trained four or more DC/DCCs. These included Case Western Reserve University (n=7), Emory University (n=6), Hospital for Special Surgery (n=6), Rothman Institute/Thomas Jefferson University (n=5), Washington University in St. Louis (n=4) and Twin Cities Spine Center (n=4) (Fig. 3).

Discussion

This is the first study, to our knowledge, investigating the academic and leadership characteristics of spine surgery division chiefs. Division leadership provides the opportunity to influence the future of the field, through the creation of unique clinical, research, and educational programs. Fourteen (13.7%) of the division chiefs served as past presidents of spine and orthopaedic societies. Nineteen (18.6%) of the division chiefs completed either an AOA or Spine Society (SRS/CSRS) specific traveling fellowships. The role of division chiefs in Orthopaedic surgery has been understudied. This omission is surprising since the career trajectory of division chiefs can include becoming a Department Chair or Vice-Chair. As demonstrated in our study, 8.8% of divisions chiefs also served as Department Chair and 7.8% as Vice-Chair.

Demographics of spine division chiefs were as follows; the majority (99%) were males and mostly White (72.5%) and Asian (22.5%). Division chiefs were on average 19.5 years past fellowship completion. There are lower percentages of women holding the role of division chief than in other specialties including academic cardiology (5%), cardiothoracic surgery (4.8%), vascular surgery (10%) and plastic surgery (8.7) [4-8].

Regarding academic productivity, on average spine division chiefs had an H-index of 22.1. A prior study evaluating academic productivity of spine surgeons affiliated with orthopaedic residencies noted the average H-index to be 12.4 [13]. It is not surprising that the spine division chiefs H-indexes is higher. Furthermore, the results demonstrated that division chiefs who had higher H-indexes were more likely to have served as past society presidents, were more likely to have participated in traveling fellowships, and were more likely to have a higher academic ranking (48% were Professors). Forty-four percent of spine division chiefs held additional leadership positions within the Orthopaedics department, within the hospital, or in the Spine division. These additional leadership positioned included Department Chair (8.8%), Vice-chair (7.8%) and Director or Associate Director of spine surgery fellowship (12.7%). This illustrates additional administrative roles that spine surgery division chiefs are serving. Although not evaluated in this study, future studies could evaluate the full time equivalent (FTE) that division

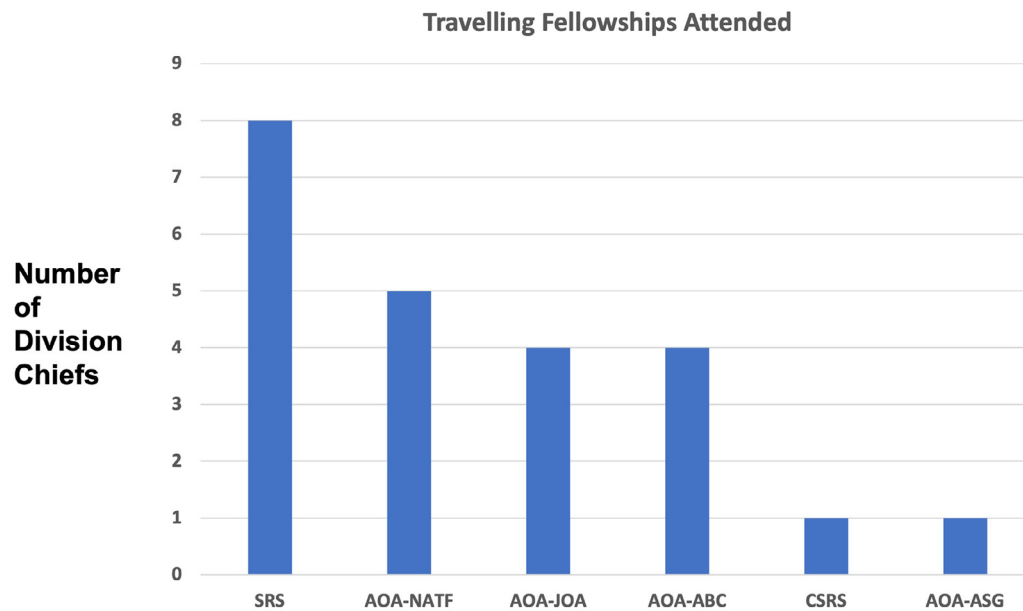


Fig. 5. Traveling fellowships awarded to spine division chiefs.

chiefs of spine surgery are allocated and whether the FTE decreases with increased administrative roles.

Spine surgery division chiefs completed their spine fellowship at specific fellowship programs. Six spine fellowship programs trained 36 divisions chiefs (35.3%). The Case Western Reserve University fellowship program produced the most division chiefs (n=7) followed by the Emory University (n=6) and Hospital for Special Surgery (n=6) fellowship programs. Similarly in a study of Cardiothoracic Chairs/division chiefs, two specific fellowship programs trained a large proportion of the division chiefs. The demographic and academic trends among Spine surgery fellowship directors have been previously reported [3]. Donnelly et al. noted spine surgery fellowship directors were more likely to have graduated from selected fellowship programs [3]. This could be a result of the training they receive at these institutions or the institutions' predilection to seek out applicants who are more likely to pursue academic leadership positions.

Other surgical specialties have studied the role of the division chief. Studies on Plastic surgery division chiefs demonstrated these leaders often held an academic rank of professor, were predominantly male, midcareer: average age of 45 at the time of appointment [6]. In vascular surgery, 89.9% of division chiefs were male and had higher H-indexes [4]. A study of cardiovascular surgery division chief/chairs noted 4.2% were female and had an average age of 58 [8]. The literature is lacking in the area of demographic characteristics in Orthopaedics. Maqsoodi et al. published a study on the division chiefs of Orthopaedic Sports Medicine, from 191 programs identified, 96% were male and 86% were Caucasian, which is similar to this current study [20].

Gender and racial disparities exist within orthopaedic surgery and women are underrepresented in number, rank, and academic productivity [14,15]. Moreover, there are few Black (1.9%) and Hispanic (2.2%) orthopaedic surgeons in the United States relative to the general Black and Hispanic population [16]. The number of Black (2%) and Hispanic (2%) spine divisions chiefs is similar to their respective percentage within Orthopaedic surgery. The low number (n=1, 1%) of women as spine surgery division chiefs speaks to the need to evaluate factors that may dissuade women orthopaedic residents from pursuing a spine surgery fellowship. Cannada et al. demonstrated spine fellowships have the lowest rate of women applicants (3%) as compared to 25% for pediatric orthopedic fellowships [17].

Ongoing mentoring and pipeline programs need to continue in order to increase the number of women, Black and Hispanic surgeons entering orthopaedic surgery [18,19]. Moreover, spine societies can consider mentorship programs to increase the number of women orthopaedic residents considering a career in spine surgery. One way that other specialties aimed to increase diversity is by recruiting diverse faculty for leadership positions, such as Division Chief. This may result in potentially higher rates of recruitment and retention of diverse faculty and residents to the department.

There were several limitations to this study. First, we were not able to locate DC/DCC for all the programs identified, as some of the institutions did not have this information available on their public website or did not have a spine surgeon in the department. Second, this is a cross-sectional study, where the demographic characteristic, academic ranking, and research productivity represent trends at one point in time and constantly change. Third, we did not evaluate Spine Division Chiefs not associated with allopathic residency programs, nor did we evaluate Spine Division Chiefs within Neurosurgery departments. Fourth, hospital systems not affiliated with a residency program may have a robust spine program/spine center led by a division chief and future studies can evaluate such programs. Fifth, we did not include military residency programs since information on division chiefs/faculty was not readily available.

Conclusion

In conclusion, several findings are reported in this first paper evaluating the characteristics of the spine surgery division chief. The Orthopaedics Spine Division chief leadership position is a male-dominated role, with an academic rank of Professor. These leaders are likely to have trained at selected Spine Fellowship programs. Additionally, 19.6% of Spine division chiefs have participated in Traveling fellowships and 13.7% have served as President of spine societies. Concurrent roles held by spine division chiefs as chairman, vice-chairs, or fellowship directors demonstrate the multi-tasking involved in this position. Further initiatives should be taken to increase the overall number of Black, Hispanic and women orthopaedic surgeons within leadership roles in spine surgery.

Declarations of Competing Interests

One or more authors declare potential competing financial interests or personal relationships as specified on required ICMJE-NASSJ Disclosure Forms. AM reports consulting fees from Depuy J&J, Stryker, Medtronic. Institutional grants from Globus and AO Spine. The authors do not have any proprietary interests in the material described in the article.

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