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A Comparison of Defense and Plaintiff Expert Witnesses in Orthopaedic Surgery Malpractice Litigation

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Background: According to the American Academy of Orthopaedic Surgeons (AAOS) Standards of Professionalism, the responsible testimony of expert witnesses in orthopaedic surgery malpractice lawsuits is important to the public interest. However, these expert witnesses are recruited and compensated without established standards, and their testimony can potentially sway court opinion, with substantial consequences. The objective of this study was to characterize defense and plaintiff expert orthopaedic surgeon witnesses in orthopaedic surgery malpractice litigation.

Methods: Utilizing the WestlawNext legal database, defense and plaintiff expert witnesses involved in orthopaedic surgery malpractice lawsuits from 2013 to 2017 were identified. Each witness's subspecialty, mean years of experience, involvement in academic or private practice, fellowship training, and scholarly impact, as measured by the Hirsch index (h-index), were determined through a query of professional profiles, the Scopus database, and a PubMed search. Statistical comparisons were made for each parameter among defense and plaintiff expert witnesses.

Results: Between 2013 and 2017, 306 expert medical witnesses for orthopaedic cases were identified; 174 (56.9%) testified on behalf of the plaintiff, and 132 (43.1%) testified on behalf of the defense. Orthopaedic surgeons who identified themselves as general orthopaedists comprised the largest share of expert witnesses on both the plaintiff (n = 61) and defense (n = 25) sides. The plaintiff witnesses averaged 36 years of experience versus 31 years for the defense witnesses (p < 0.001); 26% of the plaintiff witnesses held an academic position versus 43% of the defense witnesses (p = 0.013). Defense witnesses exhibited a higher proportion of fellowship training in comparison to plaintiff expert witnesses (80.5% versus 64.5%, respectively, p = 0.003). The h-index for the plaintiff group was 6.6 versus 9.1 for the defense group (p = 0.04). Two witnesses testified for both the plaintiff and defense sides.

Conclusions: Defense expert witnesses held higher rates of academic appointments and exhibited greater scholarly impact than their plaintiff counterparts, with both sides averaging >30 years of experience. These data collectively show that there are differences in characteristics between plaintiff and defense witnesses. Additional study is needed to illuminate the etiology of these differences.

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Medical malpractice litigation is necessary to protect patients, serve justice, and ensure standards of care. However, the United States is highly litigious; medical malpractice claims constituted nearly \$4 billion in payments in 2016, and there are a substantial number of unreported claims that are settled out of public court¹. Within the surgical subspecialties, 80% of surgeons will be named in ≥ 1 malpractice claim by the age of 45 years². Orthopaedic surgery ranks fourth in malpractice claim prevalence, with an annual risk of 13% compared with an overall average of 7%².

Orthopaedic surgeon expert witnesses are critical in malpractice litigation because these proceedings often debate highly specialized knowledge, and the defendant's reputation and financial resources are at stake³. As malpractice is, in part, defined as a deviation from the standards of care, medical malpractice lawsuits often utilize plaintiff expert testimony to testify if a deviation has occurred. The American Academy of Orthopaedic Surgeons (AAOS) Standards of Professionalism consider expert witness testimony a vital service in the public interest, with expert witnesses who are actively practicing orthopaedic surgeons, who are knowledgeable of current orthopaedic care, and who testify based purely on objective data without bias⁴. The compensation for expert witness testimony is highly lucrative: the national average for an orthopaedic surgery witness is \$570 per hour to review a case and \$970 per hour for trial testimony⁵. As such, there exists a concern that driving forces that are ulterior to the pursuit of justice may contribute to the recruitment of expert witnesses and to the eventual decision to testify as an expert witness.

Given the considerable financial, psychological, and reputational effects of malpractice lawsuits, expert testimony can impart substantial consequences. Therefore, the judicious and effective use of medical experts is crucial to malpractice litigation. Prior studies in other specialties have shown disparities regarding the characteristics of medical experts who testify on behalf of the plaintiff or the defense⁶⁻¹⁰. The aim of this study is to characterize the differences between plaintiff and defense orthopaedic surgeon expert witnesses.

TABLE I Frequencies of Plaintiff and Defense Witnesses by Orthopaedic Specialty

Specialty	Plaintiff	Defense	Total
General orthopaedics	61	25	86
Spine	24	23	47
Hip/knee	21	19	40
Sports	21	16	37
Hand	16	14	30
Foot/ankle	18	11	29
Trauma	3	8	11
Shoulder/elbow	1	10	11
Oncology	5	3	8
Pediatrics	4	3	7
Total	174	132	306

TABLE II Frequency of Experts Who Gave >1 Testimony from 2013 to 2017

No. of Testimonies	Plaintiff	Defense
≥ 6	1	0
5	0	0
4	3	1
3	6	1
2	14	15
Total	24	17

Materials and Methods

Information pertaining to orthopaedic surgery medical malpractice lawsuits between January 2013 and May 2017 was collected utilizing WestlawNext (Thomson Reuters) in order to identify orthopaedic expert witnesses for both the plaintiff and the defense. WestlawNext is a comprehensive online legal database with publicly available legal documents, and its search engine has been utilized within the medical literature⁶⁻¹⁰. The database reports publicly available court documents with searches, yielding cases that went to trial and court arbitration. Privately settled cases are not captured in this database. "Orthop (a)edic surgeon" or "orthop(a)edic" and "malpractice" were used within the search field to identify cases of interest. Each case that was identified from this search was analyzed for expert witness testimonies by orthopaedic surgeons. Names of the orthopaedic expert witnesses were extracted from the case files. An online search using the names obtained from the cases allowed the acquisition of several key variables. Following the data acquisition of key variables, expert witness names were de-identified and excluded from subsequent analyses.

The names of expert witnesses were verified as those of orthopaedic surgeons through online searches of their practice or academic profile, and were cross-referenced using the Doximity medical network (www.doximity.com) in order to obtain information regarding graduation year, location, academic affiliation, fellowship training, and subspecialty. With regard to academic affiliation, subjects were included as academic if they held a current appointment at an academic institution; there was no discernment between clinical, part-time, or full-time academic appointments. Mean years of experience were calculated by determining the number of years from medical school graduation to the present. Using the Scopus database (www.scopus.com; Elsevier), the Hirsch index (h-index) was determined. For those with an unknown h-index, an additional search utilizing PubMed was completed to manually calculate the h-index. In cases where neither publications nor an h-index were found, a 0 was applied to the witness's h-index status. Cases with published verdicts as well as plaintiff and defense orthopaedic expert witnesses were analyzed to determine if a higher h-index was associated with a favorable outcome. The prevalence of medicolegal or expert witness advertisement of services also was determined through analysis of

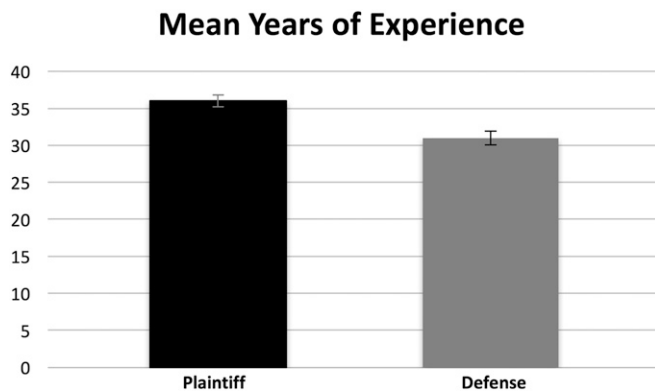


Fig. 1

Fig. 1 The mean (and standard deviation) experience was 36 years for the plaintiff expert witnesses and 31 years for the defense expert witnesses ($p < 0.001$).

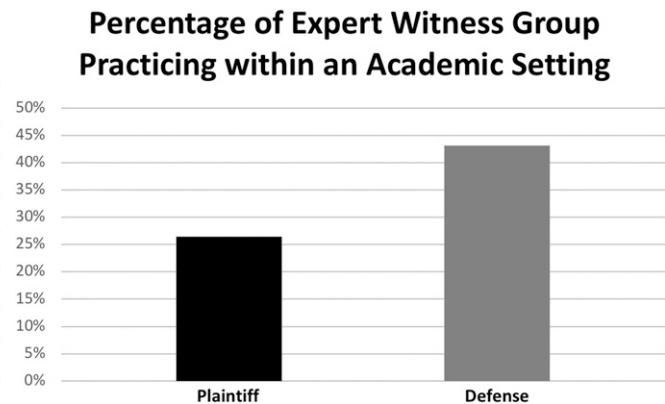


Fig. 2

Fig. 2 The percentage of expert witnesses who practice within an academic setting grouped by the plaintiff and defense sides; 26% and 43% of plaintiff and defense witnesses, respectively, practiced in an academic setting ($p = 0.013$).

online surgeon profiles and search engine queries of major expert witness directories (www.seak.com; www.lexvisio.com). Finally, the prevalence of AAOS Expert Witness Affirmation Statement fulfillment was determined by searching for members who have signed this statement (<http://www7.aaos.org/member/expertwitness/MemberSearch.aspx>).

Statistical analyses were calculated using Stata 14 software (StataCorp). The Student t test was used to analyze all of the continuous variables, with significance set at $p < 0.05$. The Pearson chi-square test was utilized to compare categorical variables, with the significance level set at $p < 0.05$.

Results

A total of 306 cases from January 2013 to May 2017 met the inclusion criteria, with 174 and 132 orthopaedic surgeon expert witnesses testifying on behalf of the plaintiff and the defense, respectively. Both the plaintiff and defense expert witnesses were predominantly general orthopaedists ($n = 86$), followed by spine surgeons ($n = 47$) (Table I). Among the 306 cases, an expert witness with a Doctor of Medicine (MD) degree testified in 297 cases, and an expert witness with a Doctor of Osteopathic Medicine (DO) degree testified in 9 cases. With respect to repeat testimony, there were 41 individual repeat witnesses, and the overall rate was 14% and 13% for the plaintiff and defense sides, respectively. Only 2 witnesses testified on behalf of both the plaintiff and defense sides of litigation. Over the 4.5 years analyzed, 10 witnesses testified more than twice for the plaintiff side, including 3 witnesses who testified 4 times and 1 witness who testified in 6 cases, whereas only 2 witnesses testified more than twice on behalf of the defense (Table II).

Statistical comparisons between the plaintiff and defense orthopaedic surgeon expert witnesses were undertaken with respect to years of experience, the proportion who had academic appointments, and the average h-index. The overall mean years of experience was 34 years. Expert witnesses for the plaintiff group averaged 36 years of experience, whereas the witnesses for the defense averaged 31

years of experience ($p < 0.001$) (Fig. 1). Academic appointments were held by 43% of the expert witnesses for the defense compared with only 26% of those testifying for the plaintiff ($p = 0.013$) (Fig. 2). Defense expert witnesses (80.5%) exhibited a higher proportion of fellowship training in comparison to plaintiff expert witnesses (64.5%; Pearson chi-square test, $p = 0.003$). The average h-index for expert witnesses representing the plaintiff group was significantly lower than that of the expert witnesses testifying for the defense (6.6 versus 9.1, $p = 0.04$) (Fig. 3).

Of the 306 cases, 56 had published verdict outcomes and had an orthopaedic expert witness on both the plaintiff and defense sides. When comparing plaintiff and defense h-index scores among those serving as orthopaedic expert witnesses on opposing sides, 56% of cases resolved in favor of the defense when the defense had a higher h-index. Conversely, 67% of the cases resolved in favor of the plaintiff when the plaintiff possessed a higher h-index; however, these findings were not found to be significant (Pearson chi-square test, $p = 0.62$).

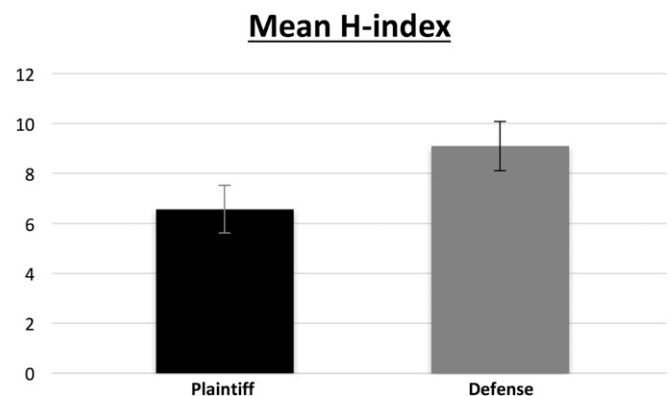


Fig. 3

The mean (and standard deviation) h-index was 6.6 for the plaintiff expert witnesses and 9.1 for the defense expert witnesses ($p = 0.04$).

As a percentage of their respective plaintiff and defense cohorts, 21.8% of plaintiff and 3.88% of defense expert witnesses were found to advertise expert witness services, either on their own online profiles or on the major expert witness directories (Pearson chi-square test, $p < 0.001$). With regard to the AAOS Expert Witness Affirmation Statement, 45.0% of defense witnesses and 36.8% of plaintiff witnesses had registered their affirmations (Pearson chi-square test, $p = 0.15$).

Discussion

Medical malpractice lawsuits hinge on the testimony of expert witnesses for the plaintiff, which is often necessary to identify deviations from standards of care. Expert witness testimony is especially important in orthopaedic surgery given that these proceedings often debate highly specialized knowledge and there is a high prevalence of orthopaedic malpractice claims². This study sought to ascertain the differences in characteristics of those serving as defense and plaintiff expert witnesses.

The overall mean years of experience of both plaintiff and defense expert witnesses was 34 years, with a mean of 36 and 31 years for the plaintiff and defense, respectively ($p < 0.001$). At this level of years of experience, one may conclude that these expert witnesses are in the latter part of their career, which may serve as an indication of expertise to the courts. Although witnesses testifying for the plaintiff were generally more senior, a difference of 5 years within the fourth decade of practice between the plaintiff and defense witnesses may have a minimal marginal effect upon the expertise of these witnesses. Orthopaedic surgeons in their fourth decade of practice may have more time to provide their services to the courts; however, no formal evidence of the maintenance of medical education, which would ensure an up-to-date awareness of standards of care, is necessary.

The comparisons made with respect to the proportion of witnesses with academic appointments and the mean h-index indicate that defense expert witnesses are more academically inclined. Furthermore, defense expert witnesses were more often fellowship-trained compared with their plaintiff counterparts (80.5% versus 64.5% respectively, $p = 0.003$). The proportion of orthopaedic surgeons with academic appointments testifying on behalf of the defense and plaintiff was 43% and 26%, respectively ($p = 0.013$). Although we were unable to discern the clinical, part-time, and full-time statuses of these witnesses, it is possible that any academic appointment may serve as an indication of expertise to the courts. There exist distinct differences between academic and nonacademic contexts of practice, including referral of a higher number of patients, seeing patients with more complex pathology, and the expectation of academic productivity for those in academic settings^{11,12}. Therefore, an academic practice setting may be an indicator of expertise to the courts. The h-index is a quantified measure of scholarly impact that takes into account the number of academic works one has published as well as the number

of times that those works are cited. The h-index of defense and plaintiff expert witnesses was 9.1 and 6.6, respectively, indicating greater scholarly impact on the part of defense expert witnesses ($p = 0.04$).

Defense expert witnesses exhibited higher proportions within academic practices and had greater mean h-index scores. Potential explanations for these findings may be biases in witness selection on behalf of the legal team, biases in expert witness case selection on behalf of the physician, or “political” pressure to protect colleagues in the academic environment. In this analysis, the number of repeat expert witnesses who were involved in >2 cases was heavily skewed for the plaintiff, with 10 witnesses testifying for the plaintiff compared with 2 for the defense (Table II). Only 2 witnesses testified on behalf of both the plaintiff and defense sides over the study period, a low number among the 41 individuals who served as an expert witness more than once. Similar disparities also were seen in other specialty analyses of defense versus plaintiff expert witnesses in which the ethics of such repeat expert witness testimony were called into question⁷. Additionally, there was a disparity in the amount of “advertisement” on the part of the plaintiff and defense witnesses, with potentially varying implications regarding the motivating factors of expert witnesses. Another possible driving force of these disparities includes the stigma within the medical community with regard to testifying on behalf of the plaintiff, which may affect the ultimate recruitment of expert witnesses⁶⁻¹⁰. Although the root causes of these disparities are beyond the scope of this study, they do raise questions regarding the recruitment of witnesses and about the agreement to testify as an expert witness.

When comparing the orthopaedic defense and plaintiff expert witnesses who were involved in the same case in which an outcome was reported, there were no correlations between the h-index and a favorable lawsuit outcome. This metric was studied in an ophthalmology expert witness study, and a higher h-index was found to correlate with a favorable outcome for that witness's side⁸. Although we did not find a significant correlation in our study, it is possible that the data were insufficient to show this relationship because only 56 cases with outcomes that had orthopaedic expert witnesses on both sides of the case were available.

When reviewing the studies of expert witness characteristics from other specialties, there are notable similarities, which suggests that expert witness testimony characteristics may be generalizable. Including the results presented in this study, all studies reported that the average experience was >30 years and that the proportion of academically practicing expert witnesses was skewed toward the defense. In addition, the studies reported that scholarly impact, as indicated by the h-index, was significantly greater with the defense expert witnesses (Table III). All studies reported higher rates of repeat testimony on behalf of the plaintiff, and the results in our report demonstrate that when considering those witnesses who testified ≥ 3 times, repeat testimony for the plaintiff side was more frequent. These consistent characteristics seen across multiple

TABLE III Summary of Data on Expert Witness Characteristics Among Different Specialties

Authors	Specialty	Mean Experience (yr)	Proportion in Academics	Mean h-Index	Repeat Expert Testimony Rate
Eloy et al. ⁶	Neurosurgery	33.2 (defense), 34.5 (plaintiff), p = 0.35	46.1% (defense), 24.4% (plaintiff), p < 0.001	8.76 (defense), 5.46 (plaintiff), p < 0.001	12.6% (defense), 20.4% (plaintiff)
Eloy et al. ⁷	Otolaryngology	35.4 (defense), 31.8 (plaintiff), p = 0.047	49.3% (defense), 31.7% (plaintiff), p = 0.042	10 (defense), 6.3 (plaintiff), p = 0.02	7.6% (defense), 9.8% (plaintiff)
Huang et al. ⁸	Ophthalmology	32.9 (defense), 35.7 (plaintiff), p = 0.12	75.7% (defense), 56.8% (plaintiff), p < 0.05	8.6 (defense), 8.3 (plaintiff), p = 0.42	11.4% (defense), 12.2% (plaintiff)
Radvansky et al. ⁹	Anesthesia	33.4 (defense), 33.1 (plaintiff), p = 0.76	65.7% (defense), 54.8% (plaintiff), p < 0.04	8.1 (defense), 4.8 (plaintiff), p = 0.02	12.2% (defense), 14.9% (plaintiff)
Sunaryo et al. ¹⁰	Urology	32.2 (defense), 35.7 (plaintiff), p = 0.01	60% (defense), 39% (plaintiff), p = 0.001	10.2 (defense), 6.8 (plaintiff), p = 0.03	14.8% (defense), 17.6% (plaintiff)
Current study	Orthopaedic surgery	31 (defense), 36 (plaintiff), p < 0.001	43% (defense), 26% (plaintiff), p = 0.013	9.1 (defense), 6.6 (plaintiff), p = 0.04	13% (defense), 14% (plaintiff)

specialties suggest that there are inherent selection differences between the defense and plaintiff expert witnesses. Future study elucidating these differences may be of importance for malpractice litigation reform and for the courts to better understand the underlying motivations and biases of expert witness testimony.

Limitations of this study include the debatable metrics of years of practice, the h-index, and the academic practice setting as surrogates for expert witness qualification. Years of practice and academic practice affiliation are indirect measures of one's expertise, at best. The clinical, part-time, or full-time academic appointment of the witnesses was not delineated in this study, which may increase the number of witnesses within the "academic practice" designation. Furthermore, distilling scholarly impact with the h-index is often debated with respect to its validity and meaning. Another limitation of this study includes the unknown number of nonpublicly available cases that were excluded from this analysis, which may constitute a substantial number of settlements. Lastly, the scientific validity of expert witness testimony was not analyzed, which is of consequence to professional societies that have systems in place to review grievances regarding flawed testimony.

In conclusion, expert witness testimony in orthopaedic surgery malpractice lawsuits was consistent with that of other specialties. Expert witnesses were, on average, in the fourth decade of practice. In addition, defense expert wit-

nesses exhibited greater scholarly impact, practiced within academic settings with greater frequency, were more frequently fellowship-trained, and advertised their services less than expert witnesses for the plaintiff. These results indicate that there are inherent differences in the way expert witnesses distribute across the defense and plaintiff sides, the nuances of which may have ramifications on malpractice litigation and court decisions. ■

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