Publication Rates of Podium Versus Poster Presentations at the Arthroscopy Association of North America Meetings 2008-2012

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Purpose: To analyze the publication rate of poster and podium presentations at Arthroscopy Association of North America (AANA) annual meetings from 2008 to 2012. **Methods:** An online search using PubMed and Google Scholar for all published manuscripts associated with abstracts presented from 2008 to 2012 AANA annual meetings was performed. Abstracts were classified by presentation type (poster vs podium), and the journal and publication date were recorded for all published abstracts. Descriptive statistics, logistic regression, and Fisher's exact tests were performed, with $P < .05$ considered significant. **Results:** A total of 1,508 abstracts were submitted to AANA annual meetings from 2008 to 2012, with 976 abstracts accepted for presentation (65% overall acceptance rate). There were 328 podium (22% acceptance rate) and 648 poster (43% acceptance rate) presentations. Of the 976 accepted abstracts, 479 (49%) were published within 3 years in peer-reviewed journals. The overall publication rates for podium and poster presentations were 59% (n = 193) and 44% (n = 286), respectively. Podium presentations were significantly more likely to be published within 3 years compared with poster presentations ($P < .0001$; odds ratio 1.8095, confidence interval 1.3826-2.3682). There were no differences in time to publication between podium and poster presentations (1.3 ± 1.2 vs 1.1 ± 1.3 years, $P = .0633$). Over the 5-year study period, the overall abstract acceptance rate ($P < .0001$) and the rate of abstracts accepted for poster presentation ($P < .0001$) increased significantly over time, whereas there was no increase in the rate of abstracts accepted for podium presentation ($P = .5638$). The most common journals of publication were *Arthroscopy* (n = 157, 32.7%) followed by *American Journal of Sports Medicine* (n = 93, 19.4%). **Conclusions:** The overall publication rate of abstracts presented at AANA annual meetings is 49%, with podium presentations 1.8 times more likely to be published than poster presentations. The overall abstract acceptance rate and the rate of abstracts accepted for poster presentation increased significantly over time, whereas there was no significant increase in the rate of abstracts accepted for podium presentation. **Clinical Relevance:** The publication rates of abstracts presented at the AANA annual meetings demonstrate the meetings' impact and importance to the advancement of the scientific literature.

Research presentations at scientific meetings allow for new and developing information to be presented to large audiences in an efficient manner. These meetings allow for the distribution of novel information to be presented, discussed, and debated, influencing clinical decision-making, and stimulating ideas for future research endeavors. The information presented at these meetings may impact clinical practice,

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emphasizing the necessity for sound and accurate abstract information. Before presentation, abstracts undergo a rigorous screening and review process by a select group of committee members for the specific meeting, and depending on the meeting, many abstracts never get selected for presentation. Further, even among those abstracts that are selected for presentation, not all are eventually published in peer-reviewed journals. Across a variety of orthopaedic subspecialties, publication rates of completed manuscripts after presentation of abstracts at national meetings range from 36% to 67%, with the majority published within 3 years of presentation.[1-8]

One method for assessing the quality of presentations at annual meetings is to determine the publication rate of accepted abstracts. Certainly, the manuscript publication process is multifaceted, with a variety of factors determining if a given submission will ultimately become published. Because of the difficulty and competitiveness of the manuscript publication process, abstracts that are selected for meeting presentation and ultimately for manuscript publication likely represent strong research projects that peer reviewers believe will impact the literature. Thus, there is likely a correlation between abstract presentation, manuscript publication, and meeting quality. Further, it is often easier for an abstract to be accepted for a poster presentation as opposed to a podium presentation, suggesting that abstracts presented as podiums are stronger than those presented as posters. Interestingly, over the past decade, there has been a shift in many major meetings from traditional print posters to electronic posters (e-posters), namely due to decreased cost and improved convenience of poster viewing. This transition to an electronic format of presentation has made it possible for more abstracts to be accepted as poster presentations for a single meeting, if for no other reason than that these posters do not take up physical space in the meeting forum. The overall quality and ultimate publication rates of abstracts presented as print posters versus electronic posters, however, are unclear.

Although the publication rate of presentations at many major orthopaedic meetings has been established, no data are available with respect to Arthroscopy Association of North America (AANA) annual meetings.[1-9] Therefore, the purpose of this study was to analyze the publication rate of poster and podium presentations at AANA meetings from 2008 through 2012. The authors hypothesized that podium presentations would more likely result in manuscript publication compared with poster presentations.

Methods

This study was exempt from our university's institutional review board. An internet-based search was performed for all abstracts presented at AANA annual meetings from 2008 through 2012. Digital copies of each meeting's abstract booklet as well as overall submission rates were obtained courtesy of AANA. These years were selected to allow for the analysis of publication rates over a 3-year period after each meeting. Next, a comprehensive internet-based search incorporating PubMed and Google Scholar was assessed for all published manuscripts associated with abstracts presented at AANA annual meetings during the study period. Search strategies included abstract titles, key words, and author names. Using similar methodology as previously published studies, any similarity between published manuscripts and abstracts presented at the AANA annual meeting with respect to title, authorship, study design, and/or abstract details indicated a possible match and were included for initial analysis.[1,2,10] If the initial search did not reveal a publication, the search was expanded to cross-reference the last names of every author on the abstract with key words from the abstract until a match was found. To minimize missing any publications, 2 investigators (M.J.C., T.A.A.) independently repeated these searches in every case in which a publication could not be initially found.

Abstracts were categorized according to presentation type (podium vs poster) and by meeting year. Authors may submit abstracts for podium presentation, poster presentation, or both; however, it is up to committee members to decide what presentation type the abstract is accepted for. When a successful match was found, data collected included publication journal, publication date, time to publication from presentation at the annual meeting, and publication title (if it differed from the title at the AANA presentation). Data were analyzed using descriptive statistics, including means, standard deviations, and percentages. Logistic regression was used to predict outcomes (i.e., publication status) based on predictor variables (i.e., presentation type, year). Fisher's exact tests were used to analyze trends in acceptance and publication over time. A P value of $\leq .05$ was considered statistically significant. Statistical analysis was performed using SPSS v.20 (International Business Machines, Armonk, NY).

Results

A total of 1,508 abstracts were submitted to the AANA annual meetings from 2008 to 2012, with 976 abstracts accepted for presentation (65% overall acceptance rate). There were 328 podium (22% acceptance rate) and 648 poster (43% acceptance rate) presentations. Of 976 accepted abstracts, 479 (49%) were published within 3 years in peer-reviewed journals. The overall publication rates for podium and poster presentations were 59% (n = 193) and 44% (n = 286), respectively. Podium presentations were significantly more likely to be published within 3 years compared with poster presentations ($P < .0001$; odds

Table 1. Podium Versus Poster Presentations Comparison, 2008-2012, Arthroscopy Association of North America Meetings

Type of Presentation	Published, n (%)	Unpublished, n	Total, n	Odds Ratio (95% Confidence Interval)	*P* Value
Podium	193 (58.8)	135	328	1.8095 (1.3826-2.3682)	<.0001
Poster	286 (44.1)	362	648		

ratio 1.8095, confidence interval 1.3826-2.3682, Table 1).

There were no differences in time to publication between podium and poster presentations (1.3 ± 1.2 vs 1.1 ± 1.3 years, $P = .0633$). Over the 5-year study period, the overall abstract acceptance rate ($P < .0001$) and the rate of abstracts accepted for poster presentation ($P < .0001$) increased significantly over time, whereas there was no increase in the rate of abstracts accepted for podium presentation ($P = .5638$, Figs 1 and 2). The most common journal for publication (32.7% of publications, Table 2) was *Arthroscopy*. Changes in 3-year publication rates throughout the study period were analyzed, and showed no significant change in publication rates over time (total presentations: $P = .5803$, podium presentations: .6160, poster presentations: .7504).

Discussion

The principal findings of this study show that (1) in the 5-year period from 2008 to 2012, abstracts presented at the AANA annual meeting have an overall publication rate of 49%, (2) podium presentations were significantly more likely to be published within 3 years compared with poster presentations, and (3) over time, the overall abstract acceptance rate and the rate of abstracts accepted for poster presentation increased significantly, whereas there was no significant increase in the rate of abstracts accepted for podium presentation.

The 3-year publication rate of abstracts presented at the AANA annual meeting is similar to the rates reported in several recent studies of other orthopaedic meetings. Hamlet et al.[4] analyzed presentations at the American Academy of Orthopaedic Surgeons (AAOS) annual meeting from 1990 to 1992, reporting a publication rate of 46%. One year later, Murrey et al.[11] reported a publication rate of 44% for the same meeting. Subsequent years revealed publication rates of 34% from the 1996 meeting and 49% from the 2001 meeting. Interestingly, the publication rate of abstracts presented at the American Orthopaedic Society for Sports Medicine (AOSSM) from 2006 to 2010 was higher than the rates of both the AANA and AAOS meetings, with an overall publication rate of 67%.[1]

It is important to note that AAOS and AANA have only one meeting per year, whereas AOSSM accepts abstracts for both their specialty day and annual meeting. AANA has other meetings; however, the AANA specialty day and fall course are invited presentations only. The number of meetings held in a given year for a specific organization may impact the amount of abstracts that are submitted, accepted, and subsequently published by the organization.

This study found a significant difference in the publication rates of abstracts accepted for podium presentations (59%) and poster presentations (44%) ($P < .0001$). Overall, abstracts from podium presentations at the AANA annual meeting were 1.8095 (95% confidence interval 1.3826-2.3682) times more likely to be published than poster presentations. Similarly, in the Kinsella et al.[1] study analyzing publication rates of abstracts presented at AOSSM annual meetings, podium presentations were 2.08 times more likely to be published than poster presentations. Recently, there has been a trend to accept more poster presentations, often in the form of e-posters, at annual meetings (Figs 1 and 2). This trend has made it easier for abstracts to be accepted as poster presentations, which are significantly less likely to be published than podium presentations.

Our study reports a relatively high rate of 3-year abstract presentation to manuscript publication. Many studies have cautioned against citing information presented at annual society meetings. Recently, Bhandari et al.[12] reported that between 53% and 63% of chapters of major orthopaedic textbooks contain citations to abstracts presented at national and/or international meetings. However, because of the nature of abstract submission requirements, often with word or character restrictions, the typical orthopaedic abstract does not always contain the information necessary to be used as a stand-alone reference for a given topic.[2,3,13] Multiple authors have shown differences between the information presented in abstracts and/or meetings and the information ultimately published in the final manuscript.[12,13] Therefore, it is important for clinicians attending scientific meetings to take caution in deciding how to interpret the information presented at meetings. Further, authors are often given constructive criticism by their peers during the discussion sessions after abstract presentation, and may proceed to revise and/or augment their study in an effort to strengthen it before manuscript submission for consideration of publication.

Interestingly, we discovered that from the year 2008 through the year 2012, the rate of overall abstract acceptance increased significantly ($P < .0001$), as did the rate of abstracts accepted specifically for poster presentation ($P < .0001$). However, the rate of abstracts accepted for podium presentation did not show a similar increase over this time period. The increase in the

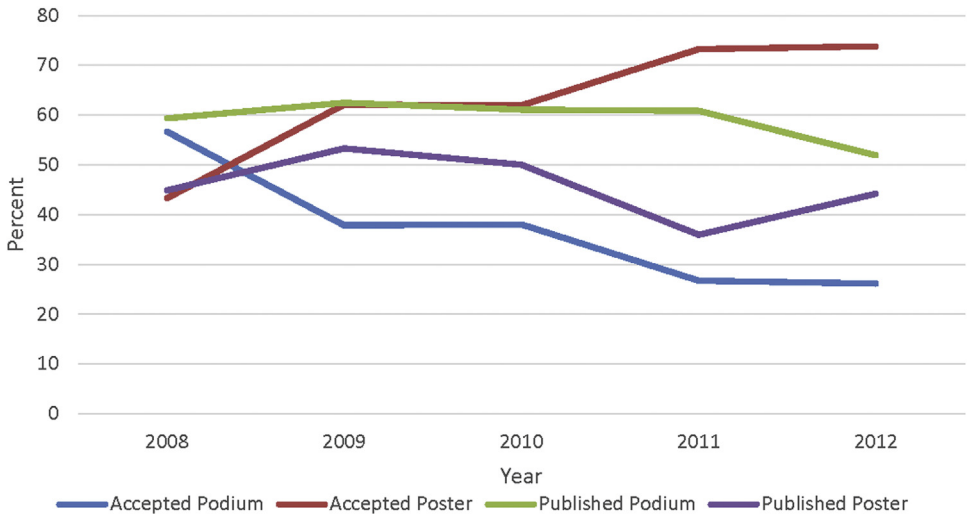

Fig 1. Presentation and publication rates of abstracts presented at Arthroscopy Association of North America Annual Meetings from 2008 to 2012.

amount of submitted as well as accepted abstracts shows the increased volume of research being performed every year. In addition, it represents the desire researchers have to present new and exciting research findings at annual meetings. Importantly, despite the progressively increased number of abstracts accepted for presentation over time, the overall publication rate did not change significantly during the course of the study, indicating that the quality of accepted abstracts at the AANA meeting did not diminish because more abstracts were accepted (3-year publication rate of all presentations: $P = .5803$, 3-year publication rate of podium presentations: $P = .6160$, 3-year publication rate of poster presentations: $P = .7504$).

Various policies exist for research presented at national meetings, which likely has an influence on where scientific abstracts get published. The *American Journal of Sports Medicine* is the official publication of AOSSM, and as a result of this relationship, AOSSM has mandated that all papers presented at AOSSM meetings be submitted to the journal for first rights of refusal. Although AANA does not have a formal policy requiring accepted abstracts to be submitted to the *Journal of Arthroscopy*, our results show that more than 30% of accepted abstracts are published by the *Journal of Arthroscopy*. The journal with the next closest percentage of published abstracts was the *American Journal of Sports Medicine* at 19%. This information suggests that scientific societies may have a higher preference in publishing research presented at their own annual meetings versus research presented elsewhere.

Overall, the presentation of research at scientific annual meetings is a fast and important method of delivering results of research projects. These meetings inspire future development and create a venue to share new thoughts and ways to further enhance patient

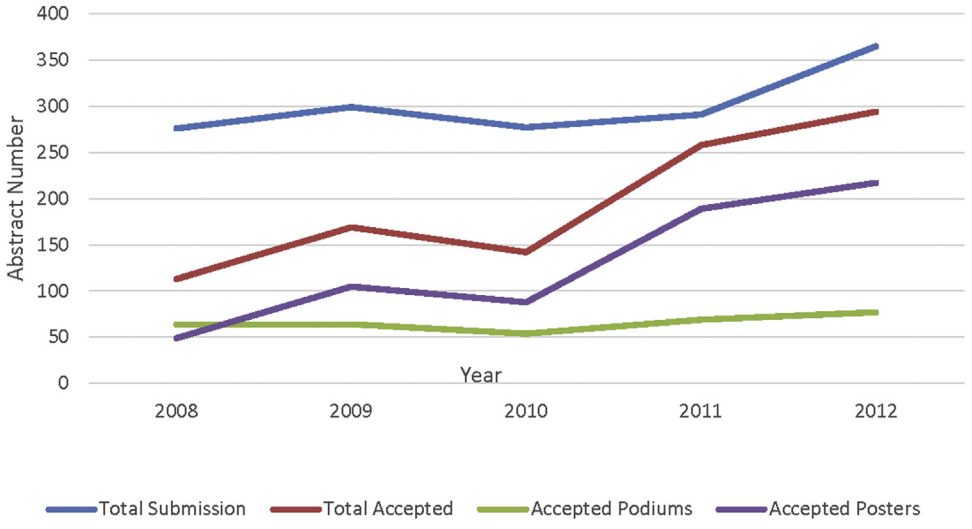

Fig 2. Submission and acceptance rates of abstracts presented at Arthroscopy Association of North America Annual Meetings from 2008 to 2012.

Table 2. Publication of Abstracts Journal Rate, 2008-2012, Arthroscopy Association of North America Meetings

Journal	n	%
Arthroscopy	157	32.7
American Journal of Sports Medicine	93	19.4
Knee Surgery, Sports Traumatology, Arthroscopy	44	9.2
Journal of Bone and Joint Surgery	28	5.8
Journal of Shoulder and Elbow Surgery	25	5.2
The Knee	11	2.3
Orthopedics	10	2.1
Clinical Orthopaedics and Related Research	9	1.9
American Journal of Orthopedics	7	1.5
Journal of Knee Surgery	6	1.3
All other journals*	89	18.5
Total	479	100

*Journals included: *Anesthesia & Analgesia; Archives of Orthopaedic and Trauma Surgery; Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation, and Technology; British Journal of Sports Medicine; Chirurgie de la main; Clinical Anatomy; Clinical Biomechanics; Clinical Journal of Sports Medicine; Clinical Medicine Insights; Clinics in Sports Medicine, Cartilage; Connective Tissue Research; Current Orthopaedic Practice; European Journal of Orthopaedic Surgery and Traumatology; Foot and Ankle International; HSS Journal; Indian Journal of Orthopedics; International Journal of Shoulder Surgery; Iowa Orthopedic Journal; Journal of Hand Surgery; Journal of Orthopaedic Research; Journal of Pediatric Orthopaedics; Journal of Surgical Orthopedic Advances; Journal of the Korean Shoulder and Elbow Society; Journal of Wrist Surgery; New England Journal of Medicine; Orthopaedic Journal of Sports Medicine; Physician and Sportsmedicine; Revista Española de Cirugía Ortopédica y Traumatología; Shoulder & Elbow; Skeletal Radiology; Sports Health; Sports Medicine and Arthroscopy; and Techniques in Shoulder and Elbow Surgery.*

care. The overall rate of publication at national meetings varies widely between specialties and between meetings. At the AANA annual meetings, the rate of abstract publications is 49%, with podium presentations 1.8 times more likely to be published than poster presentations.

Limitations

This study has several limitations. First, publication rates of abstracts presented at the annual meetings were analyzed over a 3-year period, which may have missed any projects published greater than 3 years after presentation at the annual meeting. We chose this 3-year time period based on the methodology of similar published studies because the results from those studies showed that the most abstracts are published within 3 years from presentation.[1,8,14] Fortunately, in the present study, we determined that the average times to publication for podium and poster presentations were 1.3 ± 1.2 years versus 1.1 ± 1.3 years, respectively, and thus on the basis of these standard deviations, we are likely to have captured the most publications. In addition, articles published in journals not accessed by PubMed or Google Scholar were not identified by our search, and thus our publication rates may be falsely low. Although this limitation exists, it follows the methodology used in previously published studies analyzing publication rates, allowing for comparisons between these studies. We attempted to minimize missing articles by having 2 investigators independently perform all searches, and repeating searches with broader search criteria to capture all publications. Lastly, we are unable to conclude that podium and poster presentations are submitted for publication at equal rates. In conjunction with the methodology of previously reported studies, we compared poster and podium presentations as though they were submitted for publication at equal rates.

Conclusions

The overall publication rate of abstracts presented at AANA annual meetings is 49%, with podium presentations 1.8 times more likely to be published than poster presentations. The overall abstract acceptance rate and the rate of abstracts accepted for poster presentation increased significantly over time, whereas there was no significant increase in the rate of abstracts accepted for podium presentation.

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