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Time to publication for orthopaedic surgery peer-reviewed journals: A cross-sectional bibliometric analysis

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ABSTRACT

Background: The dissemination of research and evidence-based medicine is critical to advancing science and improving clinical practice. The purpose of this study was to evaluate the timing and associated factors of the publication process for the most influential orthopaedic surgery research journals.
Methods: After analyzing 25 orthopaedic surgery journals with the highest impact factors, 14 journals provided the necessary information for data analysis. A minimum of three consecutive issues per journal from 2021 were collected for review. Within each issue, all articles were included except for reviews, commentaries, replies, letters to the editor, and invited articles. The publication times for received to accepted (RA), received to published in press (RP1), and received to published in print (RP2) were retrieved and compared. Journal impact factor, specialty, and article level of evidence were recorded.
Results: A total of 1040 articles were included with a mean number of 74.3 ± 38 (range, 35–182) articles analyzed per journal. The mean impact factor for the 14 journals was 3.6 ± 1 (range, 2.5–5.8). The overall median duration of time for RA, RP1, and RP2 were 119 (IQR, 78–165) days, 157 (IQR, 102–216) days, and 291 (IQR, 243–378) days across all 14 journals, respectively. *Journal of Arthroplasty* demonstrated the shortest median duration of time for RA and RP1, while *International Orthopaedics* demonstrated the shortest median duration of time for RP2. *Clinical Journal of Sport Medicine* demonstrated the longest median duration of time for RA and RP2, while the *American Journal of Sports Medicine* demonstrated the longest median duration of time for RP1. Level three studies, which included retrospective case-control and cohort study designs, demonstrated the shortest publication times, while sports medicine journals demonstrated the longest publication times for all periods.
Conclusion: There was substantial variation in publication times across orthopaedic surgery journals which may impact accessibility to clinical insights.

1. Introduction

Research and the subsequent dissemination of evidence based-medicine are critical to advancing science, practicing orthopaedic surgery, and influencing clinical policy. One of the most common avenues to increase access to evidence in the field of orthopaedic surgery involves the peer review and publication process. This process not only translates into a scientific publication which shares ideas and potentially changes clinical practice, but also facilitates success for various stages of an academic career including residency and fellowship match, faculty advancement, and financial bonuses. Many factors contribute to which journal an author or authors decide to submit their work. Specialty, readership, impact factor, and speed of publication may all factor into the journal selection process. Notably, for studies that aim to improve clinical practice, the timing related to the process of publication is important.

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Researchers have estimated that it takes around 17 years for research to translate into tangible changes in standard clinical practice.[1–4] Ioannidis et al.[5] demonstrated a delay of 1.7–3 years between study completion and publication in a review of AIDS trials. Other studies demonstrated substantial time lags in the publication of cost utility analyses, which has implications when attempting to utilize reliable economic data and inform policy.[6] Evaluating the time to review and publish articles in ophthalmology journals, Chen et al.[7] demonstrated in 2013 that the median peer review time was 133 (IQR: 100.5–171.5) days and the median publication time (from acceptance to advance online publication or publication in print) was 100 (62.9–166.3) days.

However, publication speed may be modifiable and can also be a double-edged sword. An example of this is demonstrated by the COVID-19 pandemic.[10] Gazendam et al.[8] described the term 'infodemic' to characterize the substantial number of publications released in a short time period related to COVID-19. Khalifa et al.[9] investigated the peer review process and timing related to orthopaedic surgery publications related to COVID-19. While 51% of the included studies were review articles, 29% of the studies were original research and the mean peer review time (from submission to acceptance) was 14.3 ± 15.8 days. This change in publication speed during the COVID-19 pandemic may be attributed to both the immense stress faced by journals from managing an unprecedented upsurge in article submissions and the additional pressure from the scientific community to disseminate crucial findings swiftly. Even with their editorial capacity being overwhelmed, journals adapted to the challenges of maintaining integrity and quality of the peer-review process during the pandemic.

While the debate continues over acceptable timing and rigor for the peer review process, publications remain critical to the advancement of science, evidence-based medicine, and clinical policy decisions in addition to career advancement. As such, this study aimed to evaluate the timing of the publication process for the top orthopaedic surgery journals and describe factors that impact publication speed.

2. Methods

A list of orthopaedic surgery journals was obtained on March 26, 2021 from the Institute for Scientific Information (ISI), which is available online from Clarivate Analytics.[11] Using a previously described technique, the 2019 (most recent year available) impact factor of each journal from the InCites Journal Citation Report[12,13] was collected. After excluding six physical and occupational therapy, biomechanics, gait, and basic science journals, the top 25 journals with the highest impact factors were included for review.

Two researchers (AC and LS) independently reviewed a minimum of the first three monthly issues published in 2021 or the most recently published three consecutive issues for data extraction if a journal did not publish monthly issues. Each author collated the title and abstract of all the articles from the issue. Articles that were classified as review articles, commentaries, replies, letters to the editor, invited articles, and level V studies were excluded. The following data was extracted from each journal: journal name, impact factor, journal specialty, type of journal (general interest/specialty journal), specific journal issue, number of issues per year, and number of articles per issue. The following data was extracted from each journal article: article title, level of evidence, and study design. Level of evidence was classified according to the most recent *Journal of Bone and Joint Surgery* guidelines.[14] Studies that did not clearly have an identified level of evidence were classified as "N/A," which consisted of biomechanical, cadaveric, animal, model validation (ie: machine learning, convolutional neural network, natural language processing), quality improvement, and survey studies. The following dates (when available) were collected for each journal article: date of submission/receipt, date of acceptance, date of online publication (in advance or in press), and date of in print publication. When date information for a specific journal article was not available, the respective editorial manager was contacted through email to retrieve the missing information.

Descriptive statistics were used to compare medians, interquartile ranges (IQR), ranges (minimum/maximum), and percentages between variables based on the non-parametric population distribution assessed using the Shapiro-Wilk test. Analysis outcomes were two-tailed, with a significance level set at α of 0.05. All analyses were performed with IBM SPSS Version 25.0 (IBM Corporation, Armonk, NY).

3. Results

3.1. Journal characteristics

Out of the 25 orthopaedic surgery research journals that were selected based on impact factor and journal relevance, 14 journals provided the necessary information for data analysis. The mean journal impact factor was 3.6 ± 1 (range, 2.5–5.8) and number of issues published per year varied by journal with eight (57.1%) journals publishing 12 issues annually. The first three monthly issues published in 2021 were included for 11 journals. Since journals such as *Acta Orthopaedica* and *Journal of Orthopaedics and Traumatology* published less than three issues in 2021 at the time of data extraction, the three most recently published issues were selected. Since *Spine* published bimonthly, the first six issues were selected to maintain an appropriate quantity of articles to analyze. After excluding review articles, commentaries, replies, letters to the editor, invited articles, and level V studies, 1040 articles were selected across all journals and the mean number of articles analyzed per journal was 74.3 ± 38 (range, 35–182) articles (Table 1). All 14 of the journals published online (in advance or in press) and 13 (93%) of the journals published in print (Table 2).

3.2. Publication times

The median time intervals and interquartile ranges for time between received and accepted, received and published in press, and received and published in print were reported for all 14 journals (Table 2). The overall median time between received and accepted was 119 (IQR, 78–165) days across all journals with a range of one to 1362 days. *Journal of Arthroplasty* and *International Orthopaedics* demonstrated the shortest duration of time between received and accepted with a median of 73 (IQR, 54–93) and 96 (IQR, 65–145) days, respectively. Both *Arthroscopy* and *Clinical Journal of Sport Medicine* demonstrated the longest duration of time between received and accepted with a median of 174 (IQR, 151–202) and 175 (IQR, 147–246) days, respectively (Fig. 1).

The overall median time between received and published in press was 157 (IQR, 102–216) days across all journals with a range of 10 to 1371 days. *Journal of Arthroplasty* and *International Orthopaedics* demonstrated the shortest duration of time between received and published in press with a median of 78 (IQR, 61–98) and 116 (IQR, 80–164) days, respectively. Both *Clinical Journal of Sport Medicine* and *American Journal of Sports Medicine* demonstrated the longest duration of time between received and published in press with a median of 251 (IQR, 201–352) and 257 (IQR, 213–288) days, respectively (Fig. 1).

The overall median time between received and published in print was 291 (IQR, 243–378) days across all journals with a range of 61 to 1582 days. *International Orthopaedics* and *Journal of*

Table 1
Article and issue selection for 14 orthopaedic surgery research journals.

Journal Name	Journal Type	Impact Factor	Number of Issues per Year	Number of Issues Selected	Number of Original Articles Selected, n (%)
American Journal of Sports Medicine	Sports Medicine	5.81	14	3	86 (8%)
Osteoarthritis and Cartilage	General Orthopaedics	4.793	12	3	35 (3%)
Clinical Orthopaedics and Related Research	General Orthopaedics	4.392	12	3	43 (4%)
Arthroscopy	Sports Medicine	4.325	12	3	82 (8%)
Journal of Orthopaedic Translation	General Orthopaedics	3.986	Variable	3	47 (5%)
Journal of Arthroplasty	Arthroplasty	3.709	12	3	182 (18%)
The Spine Journal	Spine	3.191	12	3	50 (5%)
Knee Surgery Sports Traumatology Arthroscopy	General Orthopaedics	3.166	12	3	108 (10%)
Clinical Journal of Sport Medicine	Sports Medicine	3.165	Variable	3	42 (4%)
Acta Orthopaedica[a]	General Orthopaedics	2.965	6	3	63 (6%)
International Orthopaedics	General Orthopaedics	2.854	12	3	78 (8%)
Journal of Orthopaedics and Traumatology[b]	Trauma	2.767	1	3	55 (5%)
Spine[c]	Spine	2.646	Variable	6	102 (10%)
European Spine Journal	Spine	2.458	12	3	67 (6%)

[a] Issue 6 from 2020 and issues 1 and 2 from 2021 were selected for *Acta Orthopaedica*.
[b] The 2019, 2020, and 2021 issues were selected for *Journal of Orthopaedics and Traumatology*.
[c] The first 6 issues for *Spine* were selected.

Table 2
Level of evidence and publication times for 14 orthopaedic surgery research journals.

Journal Name	Level of Evidence (Number of Articles, (%))					Time between Received and Accepted (Median Days, [IQR])	Time between Received and Published In Press (Median Days, [IQR])	Time between Received and Published In Print (Median Days, [IQR])
	I	II	III	IV	N/A			
American Journal of Sports Medicine	5 (6%)	7 (8%)	34 (40%)	18 (21%)	22 (26%)	137 [114–163]	257 [213–288]	301 [260–360]
Osteoarthritis and Cartilage	3 (9%)	4 (11%)	5 (14%)	1 (3%)	22 (63%)	165 [125–237]	205 [168–262]	289 [244–342]
Clinical Orthopaedics and Related Research	3 (7%)	2 (5%)	24 (56%)	5 (12%)	9 (21%)	135 [107–173]	168 [135–215]	462 [287–621]
Arthroscopy	11 (13%)	9 (11%)	27 (33%)	26 (32%)	9 (11%)	174 [151–202]	195 [167–233]	316 [287–346]
Journal of Orthopaedic Translation	2 (4%)	1 (2%)	5 (11%)	5 (11%)	34 (72%)	123 [87–162]	197 [136–239]	329 [268–362]
Journal of Arthroplasty	11 (6%)	18 (10%)	114 (63%)	11 (6%)	28 (15%)	73 [54–93]	78 [61–98]	240 [216–259]
The Spine Journal	5 (10%)	9 (18%)	25 (50%)	3 (6%)	8 (16%)	111 [79–143]	117 [85–150]	253 [220–305]
Knee Surgery Sports Traumatology Arthroscopy	4 (4%)	11 (10%)	44 (41%)	32 (30%)	17 (16%)	138 [92–191]	117 [85–150]	253 [220–305]
Clinical Journal of Sport Medicine	3 (7%)	15 (36%)	8 (19%)	8 (19%)	8 (19%)	175 [147–246]	251 [201–352]	1020 [955–1085]
Acta Orthopaedica	7 (11%)	6 (10%	30 (48%)	9 (14%)	11 (17%)	107 [77–138]	152 [115–182]	309 [274–353]
International Orthopaedics	6 (8%)	12 (15%)	34 (44%)	17 (22%)	9 (12%)	96 [65–145]	116 [80–164]	228 [175–289]
Journal of Orthopaedics and Traumatology	2 (4%)	3 (5%)	24 (44%)	25 (45%)	1 (2%)	137 [92–231]	161 [115–260]	—[a]
Spine	5 (5%)	13 (13%)	46 (45%)	27 (26%)	11 (11%)	104 [77–140]	174 [141–210]	270 [243–303]
European Spine Journal	3 (4%)	6 (9%)	32 (48%)	10 (15%)	16 (24%)	139 [107–189]	150 [120–204]	311 [256–386]

Interquartile range (IQR).
[a] *Journal of Orthopaedics and Traumatology* is an online journal only and does not publish in print issues.

Arthroplasty demonstrated the shortest duration of time between received and published in print with a median of 228 (IQR, 175–289) and 240 (IQR, 216–259) days, respectively. Both *Clinical Orthopaedics and Related Research* and *Clinical Journal of Sport Medicine* demonstrated the longest duration of time between received and published in print with a median of 462 (IQR, 287–621) and 1020 (IQR, 955-1085) days, respectively (Fig. 1).

3.3. Level of evidence

The most common level of evidence across all the articles was level III (41.9%), which primarily included retrospective case-control and cohort studies. This was followed by the category "N/A" (19.7%), which consisted of biomechanical, cadaveric, animal, model validation, quality improvement, and survey studies. Level

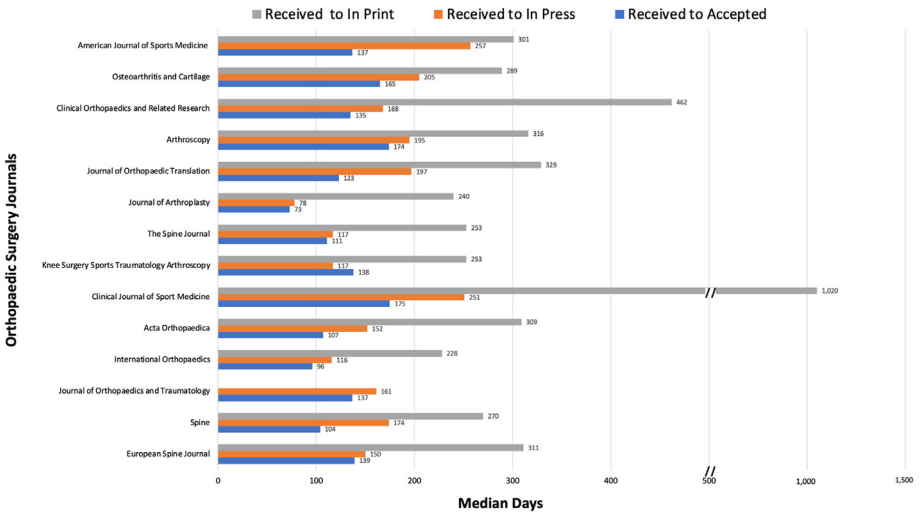

Fig. 1. Received to accepted, received to in press, and received to in print median publication times for 14 orthopaedic surgery research journals.

IV (18.9%) studies were the third most common, which primarily included case series (Table 2).

When stratifying median publication times by level of evidence, level III studies across all journals demonstrated the shortest median duration of time between received and accepted (109; IQR, 74–155 days), received and published in press (140 days; IQR, 88–200), and received and published in print (272; IQR, 233–342 days). Level IV studies demonstrated the longest median duration of time between received and accepted (135; IQR, 81–173 days), while studies classified as "N/A" demonstrated the longest median duration of time between received and published in press (179; IQR, 116–246 days) and received and published in print (306; IQR, 256–400 days) (Table 3).

3.4. Journal type

Eight (57.1%) journals were categorized as having an orthopaedic subspecialty focus which included arthroplasty (7.1%), spine (21.4%), sports medicine (21.4%), and trauma (7.1%) (Table 2). When stratifying median publication times by journal subspecialty type, *Journal of Arthroplasty* demonstrated the shortest median duration of time between received and accepted (73; IQR, 54–93 days), received and published in press (78; IQR, 61–98 days), and received and published in print (240; IQR, 216–259 days). Collectively, sports medicine journals demonstrated the longest median duration of time between received and accepted (153; IQR, 118–198 days), received and published in press (208; IQR, 162–258 days), and received and published in print (384; IQR, 303–537) (Table 3).

4. Discussion

Performing a bibliographic analysis allows researchers to quantitatively assess a journal's publication speed and relative contribution towards current scientific literature. As the first bibliometric analysis investigating leading orthopaedic surgery journals to date, this study demonstrated median publication times between received and accepted (119; IQR, 78–165 days), received and published in press (157; IQR, 102–216 days), and received and published in print (291; IQR, 243–378 days). Furthermore, level III studies, including retrospective case-control and cohort study designs, demonstrated the shortest publication times, while sports medicine journals collectively demonstrated the longest publication times.

Bibliometric analyses have been previously performed for research journals focusing on various other specialties to quantify publication speeds. Asaad et al.[15] analyzed 1141 articles from the top six plastic surgery journals in 2018 and found median publication times between submitted and accepted (4.6; IQR, 3–6.8 months) and submitted and published in print (10.3; IQR, 8–12.6 months). Chen et al.[7] reviewed 600 articles from 51 ophthalmology journals in 2010 and found median publication times between submitted and accepted (133; IQR 100.5–171.5 days) and submitted

Table 3
Median publication times for 14 orthopaedic surgery research journals stratified by level of evidence and journal type.

		Median Time between Received and Accepted (Median Days, [IQR])	Median Time Between Received and In Press (Median Days, [IQR])	Median Time Between Received and In Print (Median Days, [IQR])
Level of Evidence	I	116 [86–153]	148 [111–199]	298 [259–350]
	II	124 [85–163]	159 [104–206]	301 [244–385]
	III	109 [74–155]	140 [88–200]	272 [233–342]
	IV	135 [81–173]	172 [113–230]	303 [254–422]
	N/A	132 [89–184]	179 [116–246]	306 [256–400]
Journal Type	Arthroplasty (n = 1)	73 [54–93]	78 [61–98]	240 [216–259]
	General Orthopaedics (n = 6)	121 [80–161]	160 [114–205]	293 [241–360]
	Spine (n = 3)	116 [85–157]	154 [120–199]	274 [238–323]
	Sports Medicine (n = 3)	153 [118–198]	208 [162–258]	384 [303–537]
	Trauma (n = 1)	137 [92–231]	161 [115–260]	-*

Interquartile range (IQR).
* *Journal of Orthopaedics and Traumatology* is an online journal only and does not publish in print issues.

and published (published in press and in print) (100; IQR, 62.9–166.3 days). Mohanty et al.[16] analyzed 289 articles across 25 anesthesiology journals in 2018 and found median publication times between submitted and accepted (120; IQR, 83–167 days) and submitted and published in press (186; IQR, 126–246 days). Jain et al.[17] reviewed 517 articles from 14 spine journals in 2019 and found median publication times between submitted and accepted (107; IQR, 66–168 days) and submitted and published (published in press and in print) (175; IQR, 120–313 days). With a median publication time between received and accepted of 119 (IQR, 78–165) days, orthopaedic surgery journals demonstrated a quicker peer review time (time between submitted and accepted) than plastic surgery and ophthalmology journals, a similar peer review time to anesthesiology journals, and a longer peer review time than spine journals. With a median publication time between received and published in print of 291 (IQR, 243–378) days, orthopaedic surgery journals demonstrated a quicker publication time than plastic surgery journals. Although it is evident that the time to publish varies across different journals, orthopaedic surgery journals demonstrate a competitive publication speed for both peer review and publication times.

In today's digital era, many journals publish issues and articles online (in press/advanced online publication) to disseminate scientific findings in a timely manner for their readership.[7,18,19] Asaad et al.[15] found that 67% of plastic surgery journals reported online publication dates with a median of 21 (IQR, 13–33) days between accepted and published in press, translating into a median difference of 3.8 months between published in press and published in print. When only analyzing journals that published online, Chen et al.[7] reported that 51% of ophthalmology journals published online with a significantly shorter median time between accepted and published in press (74.3; IQR, 48.3–115 days) compared to the median time between accepted and published in print (170.75; IQR, 101.4–217 days). When comparing anesthesiology journals, Mohanty et al.[16] demonstrated a significantly shorter median time between accepted and published in press (138.5 days) when compared to the median time between accepted and published in print (240 days). All 14 orthopaedic surgery journals (100%) offered an online publication platform, which was the highest out of all the journals from different specialties. When comparing orthopaedic surgery journals, the median publication time between received and published in press (157; IQR, 102–216 days) was shorter than the median publication time between received and published in print (291; IQR, 243–378 days). Publishing articles online has clearly expedited the delivery of evidence-based information for various journals in many specialties, allowing physicians and researchers to evaluate evidence more quickly.

Publication speed influences the timely utilization of evidenced-based medicine, which is the systematic process of locating, evaluating, and incorporating recent research findings to aid clinical decision making.[20] Numerous studies have substantially contributed to orthopaedic clinical practices including recommendations for deep vein thrombosis prophylaxis during hip and knee arthroplasty,[21] timing of hip fracture operations in elderly patients,[22] and surgical management of clavicle fractures.[23] Dijkman et al.[24] found that 62% of 796 orthopaedic surgeons surveyed would change their clinical practice based on the findings of a large, multicenter randomized control trial if a significant improvement in patient outcomes was demonstrated. With an average time lag of 17 years for research evidence to be incorporated into clinical practice, it becomes increasingly important to expedite the scientific dissemination process so that the field of medicine, and orthopaedic surgery, can advance more rapidly.[1–4,25]

Publication speed also impacts the research productivity of surgeons progressing through various academic career stages. In addition to medical education and clinical performance contributions, academic committees evaluate scholarly accomplishments and research productivity as factors when considering faculty promotion.[26–29] Bastian et al.[29] analyzed 2061 faculty members from 120 orthopaedic surgery residency programs and reported that academic ranks increased as research productivity increased for assistant professors, associate professors, professors, and chairs. Ence et al.[30] analyzed 4663 orthopaedic surgeons across 142 academic institutions and reported that research productivity and longer career duration correlated independently with higher academic rank for orthopaedic surgeons. Various orthopaedic academic leadership studies have described the high research productivity of current fellowship directors for subspecialties such as spine,[31] sports medicine,[32] arthroplasty,[33] and pediatrics[34] as a common characteristic.

Although this study provides valuable insight through a bibliometric analysis of more than 1000 articles in leading orthopaedic surgery journals, specific limitations are present. Only journals focusing on orthopaedic care were utilized, with the exclusion of physical therapy, gait, biomechanics, and basic science journals. In order to maintain uniformity, only original articles were included for review. The articles and publication times were analyzed for 14 out of the 25 leading orthopaedic surgery journals and thus the data analysis may be impacted as a result. Additionally, publication speed during the COVID-19 pandemic may have been influenced by the rise in article submissions as well as the pressure to accelerate dissemination of important clinical findings, ultimately overwhelming journals and the peer-review system. Since there is no gold standard publication time for a journal, comparison with other specialty journals was the only way to gauge the publication speed. Despite these limitations, this study is the first to quantify publication speed for orthopaedic surgery journals.

5. Conclusion

There was substantial variation in publication times across orthopaedic surgery journals which may impact clinical practice improvement and accessibility to academic career growth. Further investigation is required to understand better the factors involved in reducing or increasing publication times for various journals.

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Declaration of patient consent form

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Author contributions

Aman Chopra – Roles/Writing - original draft; Writing - review & editing, Lauren Shapiro – Roles/Writing - original draft; Writing - review & editing, Kevin Klifto – Data curation; Formal analysis, Oke Anakwenze – Conceptualization; Investigation; Methodology; Project administration, David Ruch – Conceptualization; Investigation; Methodology; Project administration, Christopher Klifto – Conceptualization; Investigation; Methodology; Project administration.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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