

Research Article

Social Media Usage by Orthopaedic Sports Medicine Journals: An Analysis of Impactful Practices

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Objective

Social media continues to grow in popularity and its utility as a tool for dispersing information has gained attention in healthcare. There is currently a paucity of literature evaluating the use of social media in orthopaedic surgery. Even less studied is the relationship of orthopaedic sports medicine journals' traditional bibliometrics such as impact factor (IF) with newer social media metrics such as the Altmetric Attention Score

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(AAS). The purpose of the present study is to examine correlations between the traditional bibliometric score of impact factor (IF) with alternative metrics like AAS.

Methods

The social media engagement and attention of seven top orthopaedic sports medicine journals were collected. Attention was measured using two calculated scoring systems, SparkToro's SparkScore and AAS, and engagement was measured by the number of followers, likes, and posts for each account. Yearly IFs were identified and compared to correlate bibliometric factors with social media engagement and attention.

Results

All seven (100%) journals had both Facebook profiles and Twitter accounts at the time of data collection (November 2021), and four of the seven journals (57%) had Instagram accounts. There was no correlation between journal IF or Instagram followers and average AAS; however, there was marginal correlation between average AAS and number of Twitter followers ($p < 0.058$) and number of Facebook followers ($p < 0.076$).

Conclusion

Based on the results of this study, traditional social media sites such as Facebook and Twitter are the most used platforms by orthopaedic sports medicine journals, with newer applications such as Instagram, Snapchat, and TikTok having minimal to no engagement. The marginal correlation between markers of attention and number of both Twitter and Facebook followers suggests that increasing follower counts in these applications may be beneficial to increasing the reach of orthopaedic sports medicine journals.

INTRODUCTION

Social media is currently one of the most popular online activities, with the global social media usage rate surpassing 49 percent (Statista 2021b). There were over 3.6 billion people using at least one form of social media in 2020, and this is projected to increase to almost 4.41 billion by 2025 (Statista 2021b). One particular social media site, Facebook, was reported to be the first to surpass one billion users, and currently has upwards of 2.89 billion active users (Statista 2021a). Other platforms currently reporting over a billion active users include YouTube, Instagram, and the newer video sharing application, TikTok (Statista 2021a). A commonly used social media site, Twitter, currently has approximately 290.5 million monthly active users worldwide (Statista 2022). Another very popular photo and video sharing platform used, Instagram, boasts over 1.21 billion monthly active users, making up roughly 28% of the world's internet users (Statista 2025). Though social media has traditionally been viewed as a means of entertainment, its utility as a tool for disseminating information has only recently gained attention in healthcare (Saud, Traboco, and Gupta 2021).

The coronavirus disease 2019 (COVID-19) pandemic has contributed to the everchanging landscape of healthcare, and one notable shift has been advancing the ability to share information, collaborate, and disseminate knowledge from remote locations (Department of Clinical Immunology and Rheumatology, Sanjay Gandhi Postgraduate Institute of Medical Sciences Lucknow India et al. 2020). Medical professionals have recognized that social media can be a useful platform for reaching a broad audience (Saud, Traboco, and Gupta 2021). However, the constant and rapidly expanding availability of information to the general public

is increasingly of lower-quality due in part to unregulated and inaccurate websites (Zade et al. 2020). As patients are increasingly likely to be on social media platforms, it is helpful to have a catalog of available reputable information sources for them to access.

Physician usage of social media has been shown to improve the patient experience. Patient satisfaction with their physician is associated with physician presence and utilization of social media accounts: higher patient ratings have been correlated with physician utilization of both YouTube and Twitter (Lamano et al. 2022). Further, an increase in patient engagement without a corresponding increase in physician involvement can allow for more cost-effective patient care (Sculco et al. 2017). These results have been reinforced specifically for physicians in surgical fields: having any social media presence has been significantly correlated with higher physician ratings on the websites [Healthgrades.com](#) and [Google.com](#) (Donnally et al. 2020).

There is a paucity of literature evaluating the use of social media in orthopaedic surgery. Subhash et al described US orthopaedic surgeons as currently lacking dominance over their online presence, with third-party websites being more predominantly featured when performing an online search, similar to other fields like neurosurgery and radiology (Subhash et al. 2021). However, they followed up by stating that in contrast to the other fields, orthopaedic surgeons showed a solid presence on the first page of a search through their social media pages, representing 20.6% of the links. Other studies, including those by Cole et al and Checketts et al, describe the current utility of social media as it relates to orthopaedic residents, both in the application process and as an educational tool during residency (Cole et al. 2021; Checketts et al. 2021). Both studies describe social media as a powerful platform, facilitating bet-

ter collaboration and connection with peers, with Checketts et al concluding that 77.8% of orthopaedic surgery residency applicants believe that programs should have social media accounts, namely Instagram (Checketts et al. 2021).

The Altmetric Attention Score (AAS) is an indicator of how much online attention an article has received (Citrome 2015). The score is calculated by factoring in online mentions of the article from news sources as well as blogs, social media, and other sources. It is important to note that the AAS is not a measure of the quality of an article, but rather a metric of its popularity. And as such, the AAS can show the attention received from an article, but is unable to determine anything about the quality of an article itself (Elmore 2018). However, a study by Kunze et al demonstrated that, in randomized controlled trials in total joint arthroplasty literature, a higher AAS was associated with higher methodologic quality and limited study bias (Kunze, Richardson, et al. 2020). AAS is able to track both positive and negative attention, and can be used to measure early reaction to articles since topics on social media can be discussed more rapidly than would be noticed via traditional citations through IF (Elmore 2018). It is important to note, however, that TikTok is not included in the calculation of the AAS, thus a study gaining traction on TikTok would not be reflected in its AAS, despite the potential for widespread online discussion. Impact factor is a traditional measure describing the frequency with which a journal has been cited in a specific year, using the average article (Chicago UoI, n.d.). This aims to measure the importance of that journal by calculating its number of citations, using a two-year time period and dividing the number of times articles were cited by the number of articles that able to be cited (Chicago UoI, n.d.). Less examined in the current literature is the relationship of orthopaedic sports medicine journals' traditional metrics like Impact Factor (IF) with newer online alternative metrics like the AAS. In one study, Kunze et al assessed the extent that altmetrics correlated with traditional bibliometrics and demonstrated that AAS had a significant positive association with citation rates in five high-impact orthopaedic journals (Kunze, Polce, et al. 2020). However, Collins et al examined fifteen orthopaedic journals with the highest impact factor and found that AAS and traditional bibliometrics were currently not strongly correlated (Collins et al. 2021). One similar field that has yet to be examined is the presence of orthopaedic sports medicine journals on social media. It would be useful to ascertain the online presence of journals from both varying viewpoints of the traditional metric of IF and the newer metric of AAS in order to potentially further study the ways in which journals could ultimately improve patient experience and ratings. The purpose of this study was to characterize the presence of orthopaedic sports medicine journals on social media platforms and identify any correlations between the traditional bibliometric score of IF with alternative metrics like AAS.

METHODS

Data were collected with the goal of assessing two major aspects of social media accounts: engagement and attention. Data from the social media accounts of the following seven orthopaedic sports medicine journals with high Impact Factors were selected for inclusion:

- American Journal of Sports Medicine (AJSM)
- The Journal of Arthroscopic and Related Surgery (Arthroscopy)
- Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
- Journal of Shoulder and Elbow Surgery (JSES)
- Orthopaedic Journal of Sports Medicine (OJSM)
- Sports Health
- Journal of the International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine (JISAKOS)

Two calculated scoring systems were used in the analysis. The SparkScore is a Twitter metric based on the number of lists an account is on, the number of followers, whether an account is verified, the average number of likes, and the average number of retweets that is available for select accounts through SparkToro. The AAS is a more comprehensive online score calculated from a weighted algorithm based on the amount of attention a source receives via multiple channels, with the most common sources given the following weights in the algorithm: Twitter (weighted at 0.25), news outlets (weighted at 8), Facebook (weighted at 0.25), blogs (weighted at 5), and Wikipedia (weighted at 3).

Engagement data were collected on a single date (November 13, 2021). Data were collected by social media platform, including total number of likes and followers for Facebook accounts; date of first post, number of posts per day, total number of posts, and followers/following for Instagram accounts; and followers/following for Twitter accounts.

Attention data were collected for articles published between July 1, 2021, and October 31, 2021. Data collected included the journal's IF, number of articles published monthly, SparkScore, and AAS. SparkScore was calculated on November 13, 2021. The AAS was recorded for each article published in the journal's issue and then averaged by total number of articles published over the month of publication. Non-article publications such as letters to the editor, society news, and memorials were only included in AAS calculations if they were available on PubMed. Both *AJSM* and *JSES* published two issues in July 2021, which were averaged together for AAS analysis. Journals such as *Sports Health* and *JISAKOS* that do not have monthly publications were included in analysis on months they were present and were excluded in months between publication cycles.

Unpaired t-tests were used to compare the journals' IFs and number of followers to average AAS scores per publication. Significance was defined as $p < 0.05$ and marginal significance as $p < 0.10$.

Table 1. Social Media Platforms of Sports Medicine Journals

	Facebook	Instagram	LinkedIn	Snapchat	TikTok	Twitter	YouTube
AJSM	X	X	-	-	-	X	-
Arthroscopy	X	X	X	-	-	X	-
KSSTA	X	X	X	-	-	X	-
JSES	X	-	-	-	-	X	-
OJSM	X	-	-	-	-	X	-
Sports Health	X	-	-	-	-	X	-
JISAKOS	X	X	X	-	-	X	-

AJSM: American Journal of Sports Medicine, KSSTA: Knee Surgery, Sports Traumatology, Arthroscopy, JSES: Journal of Shoulder and Elbow Surgery, OJSM: Orthopaedic Journal of Sports Medicine, JISAKOS: Journal of International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

Table 2. Engagement Data of Sports Medicine Journals

	Facebook		Instagram					Twitter	
	Number of likes	Number of followers	Date of first post	Posts per day	Total posts	Followers	Following	Followers	Following
AJSM	27,100	30,537	8/5/2020	0.467	219	2,914	27	38,452	152
Arthroscopy	7,699	8,129	9/2/2019	1.416	1,143	14,700	22	16,191	129
KSSTA	1,853	2,245	2/1/2020	0.365	239	3,567	4	2,140	35
JSES	4,782	5,218	-	-	-	-	-	1,544	4
OJSM	25,911	30,662	-	-	-	-	-	2,626	72
Sports Health	4,375	5,593	-	-	-	-	-	13,470	239
JISAKOS	4,436	5,252	9/4/2019	0.391	315	5,800	17	3,377	116
Total	76,156	87,636 (0.076)			1916	26,981 (0.156)	70	77,800 (0.058)	747

Parentheses include p values when correlated with Average Altmetric Attention Score Per Article Overall

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RESULTS

Facebook, Instagram, and Twitter were the platforms most utilized by orthopaedic sports medicine journals (Table 1). *AJSM* had the highest number of total accumulated Facebook likes ($n = 27,100$) and *OJSM* the highest number of Facebook followers ($n = 30,662$) (Table 2). *Arthroscopy* was the first journal to begin posting on Instagram and had the highest average number of posts per day (1.4), total posts ($n = 1,143$), and followers ($n = 14,700$). *AJSM* had the highest number of Twitter followers ($n = 38,452$) followed by *Arthroscopy* ($n = 16,191$) and *Sports Health* ($n = 13,470$).

The greatest number of articles were published in July 2021, with *OJSM* having the highest number of articles published ($n = 205$) (Table 3). The highest single average AAS score across all journals was seen in October in *Sports Health*. The overall highest average AAS score per article was in *Sports Health* and the overall highest average AAS score per article for a journal publishing every month across all four months was in *AJSM* (Table 3). The highest scoring article, titled “Effects of Face Mask Use on Objective and

Subjective Measures of Thermoregulation During Exercise in the Heat,” was published in *Sports Health* and resulted in an AAS score of 164 (Table 4). Four of the top ten highest scoring articles were published in *AJSM* (Table 4). Distribution of AAS per article are presented in Table 3. SparkScores were only available for two journals, *AJSM* and *Arthroscopy*, with scores of 39 and 30 respectively (Table 3) (SparkToro, n.d.).

There was no correlation between journal IF and average AAS per article overall ($p = 0.430$) or in each individual month (July $p = 0.783$; August $p = 0.568$; September $p = 0.834$; October $p = 0.797$) (Table 3). There was marginal correlation between average AAS and number of Twitter followers ($p = 0.058$) and number of Facebook followers ($p = 0.076$), but no correlation of average AAS with Instagram followers in the journals holding Instagram accounts ($p = 0.156$) (Table 2).

Table 3. Attention Data of Articles Posted on Social Media

	Impact Factor	Number of Articles JUL – OCT 2021	SparkScore	Average AAS Per Article				Average AAS Per Article Overall
				JUL	AUG	SEPT	OCT	
AJSM	6.2	160	39	5.6	10.4	11.7	4.4	8.3
Arthroscopy	4.8	182	30	4.9	5.5	6.4	3	5.0
KSSTA	4.3	170	-	1.9	5.3	4.1	1.8	3.3
JSES	3.0	165	-	2.5	1.3	1.7	1.5	1.8
OJSM	2.5	205	-	7.1	4.5	1.7	0.95	3.6
Sports Health	3.8	27	-	-	4.3	-	18.4	11.4
JISAKOS	0.72	21	-	1.1	-	2.3	-	1.7
Mean	3.62	132.86	34.5	3.85 (0.783)	5.22 (0.568)	4.65 (0.834)	5.01 (0.797)	5.01 (0.430)

Parentheses include p values when correlated with Impact Factor

AJSM: American Journal of Sports Medicine, KSSTA: Knee Surgery, Sports Traumatology, Arthroscopy, JSES: Journal of Shoulder and Elbow Surgery, OJSM: Orthopaedic Journal of Sports Medicine, JISAKOS: Journal of International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine, AAS: Altmetric Attention Score

Table 4. Articles with Highest AAS

Journal	Month	Article Title	AAS	AAS Sources
Sports Health	OCT	Effects of Face Mask Use on Objective and Subjective Measures of Thermoregulation During Exercise in the Heat	164	Picked up by 19 news outlets, blogged by 1, Linked by 21 Tweets, on 2 Facebook pages
AJSM	SEPT	Effectiveness of Adding a Large Dose of Shoulder Strengthening to Current Nonoperative Care for Subacromial Impingement: A Pragmatic, Double-Blind Randomized Controlled Trial (SExSI Trial)	150	Linked by 243 Tweets, on 4 Facebook pages, on 1 video
OJSM	JULY	Clinical and Radiographic Outcomes of Total Shoulder Arthroplasty with a Nonspherical Humeral Head and Inlay Glenoid in Elite Weight Lifters: A Prospective Case Series	95	Picked up by 14 news outlets
KSSTA	AUG	Hydrodilatation with Corticosteroids is the Most Effective Conservative Management for Frozen Shoulder	88	Tweeted by 123, on 3 Facebook pages
AJSM	AUG	Scapular Dyskinesis Is Not an Isolated Risk Factor for Shoulder Injury in Athletes: A Systematic Review and Meta-analysis	87	Tweeted by 132, on 6 Facebook pages
Arthroscopy	JULY	Multimodal Nonopioid Pain Protocol Provides Equivalent Pain Versus Opioid Control Following Meniscus Surgery: A Prospective Randomized Controlled Trial	70	Picked up by 9 news outlets, tweeted by 9, on 1 Facebook page
Arthroscopy	AUG	Infographics Are More Effective at Increasing Social Media Attention in Comparison With Original Research Articles: An Altmetrics-Based Analysis	62	Tweeted by 93, on 1 Facebook page
AJSM	SEPT	Hip Muscle Strength Explains Only 11% of the Improvement in HAGOS with an Intersegmental Approach to Successful Rehabilitation of Athletic Groin Pain	50	Tweeted by 81, on 2 Facebook pages
AJSM	JULY	The Anterior Cruciate Ligament Can Become Hypertrophied in Response to Mechanical Loading: A Magnetic Resonance Imaging Study in Elite Athletes	47	Tweeted by 67, on 2 Facebook pages, on 1 video
JSES	JULY	Can Adhesive Capsulitis of the Shoulder be a Consequence of COVID-19? Case Series of 12 Patients	41	Picked up by 3 news outlets, tweeted by 17

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DISCUSSION

This study demonstrates that orthopaedic sports medicine journals have an established presence on social media, specifically Facebook, Instagram, and Twitter, with Facebook and Twitter being the most commonly utilized platform by all studied journals. While *AJSM* had the highest number of total accumulated Facebook likes ($n = 27,100$), *OJSM* had the highest number of Facebook followers ($n = 30,662$). None of the journals included in the study had accounts for any of the newer social media platforms (e.g., Snapchat and TikTok), nor did any of them have accounts on the video sharing website, YouTube. *Arthroscopy* was the first orthopaedic sports medicine journal in our study to create an Instagram account, had the highest number of followers ($n = 14,700$), and highest rate of average posts per day (1.416).

Hughes et al described the use of Twitter by trauma and orthopaedic surgery journals and compared IF with social media factors like Klout Scores and Altmetric scores (Hughes, Hughes, and Murphy 2017). In 2016, 22 (44%) journals had a dedicated Twitter account and journals with dedicated Twitter accounts had higher IFs than those without. A greater number of Twitter followers and a higher AAS was correlated with higher IF. Finally, a higher number of retweets was correlated with a higher IF. One difference from Hughes et al was in their finding that Twitter was the most used social media platform by orthopaedic trauma journals, whereas the present study found Facebook to be used by all journals as well. One potential explanation for the contrast in results from Hughes et al, done in 2016, to the present study is the overall increased popularity of social media by all journals. Hughes et al reported 44% of journals having a dedicated Twitter account, and thus the effect size was much smaller, so the correlations between followers, AAS, and IF may have been amplified. Whereas in the present study, all journals had a larger social media presence, thus potentially diluting the effect and thus decreasing the correlation (Hughes, Hughes, and Murphy 2017).

AJSM had the highest number of Twitter followers ($n = 38,452$) and the highest IF (6.2), as reported in 2021. *Arthroscopy* had the next highest IF (4.8) and the third highest number of Twitter followers ($n=7,699$). Contrary to the previous study by Hughes et al, the present study found no significant correlation between IF and AAS for any of the examined journals. One explanation for this deviation could be the period examined to calculate the AAS: the present study evaluated AAS from the four-month period of July 2021 through November 2021, while the previous group examined the relationship throughout the years of both 2015 and 2016. Further explaining this difference could be the ways the journals and the general public use and engage with Twitter: Twitter's popularity and utility has likely shifted with time as values like follower counts and Tweet volumes have evolved.

While examining the variances in popularity between the journal articles, several articles stood out as having high AAS, with some noticeable themes setting them apart.

The article with the highest AAS, published during October 2021 in *Sports Health*, entitled "Effects of Face Mask Use on Objective and Subjective Measures of Thermoregulation During Exercise in the Heat," had an AAS of 164 and was picked up by 19 news outlets, blogged by 1, Tweeted by 21, and was posted on 2 Facebook pages (Yoshihara et al. 2021). It is notable that during this three-month span, the article with the highest AAS was covering the topic of COVID-19, and the medium through which it received the most attention was broadcasting by news outlets. Using this knowledge of potential trends, future studies should be done to further analyze the relationship between the AAS of sports medicine articles and the current news landscape to determine whether topical pieces continue to be most notable with the highest AAS.

There are several limitations to this study. The journal data studied were published in close proximity to the time of collection and analysis of the present study. This presents some challenges, as recent data have had less time to be exposed to social media and thus fewer opportunities to accrue the various markers factored into the AAS algorithm. Two of the seven journals, *Sports Health* and *JISAKOS*, had fewer than thirty articles each within the time span studied, and as such had less data factoring into their respective averages. Further, *Sports Health* did not publish any articles during the months July and September 2021. It is important to keep this in mind when considering that *Sports Health* received the highest calculated average AAS score per article for all journals studied. If the current study expanded the data set to include all articles published across a broader period, the results could potentially vary as a result of the increased article count. Similarly, a limitation is the proximity of time between publication and the data collection of the current study, which may lead to inherent and potentially significant selection bias. Another limitation is the use of AAS to track data on Twitter: Altmetric is unable to track Tweets that do not contain a direct link to an article; the site considers other Tweets to be "second-order citations" and will not keep a log of this. Therefore, AAS potentially excluded a number of Tweets referencing articles from the journals examined that did not directly link the article. A further limitation to this study is the inability to collect data of metrics on Twitter and Instagram, including number of likes per individual post or Tweet and "Retweets" on Twitter. Previously, the website Klout existed as a tool for collecting data on Twitter user's engagement potential, until the site shutdown in 2018. At present, there is no available software to aggregate such data from either platform, which would be helpful in drawing more accurate conclusions of statistical significance between social media engagement and AAS. Finally, a limitation to this study is the state of social media is always changing, thus the sites that are popular at present may become obsolete and newer sites may affect metrics more dramatically.

CONCLUSION

Based on the results of this study, traditional social media sites such as Facebook and Twitter are currently the most popular platforms used by orthopaedic sports medicine journals, with newer applications such as Snapchat and TikTok having minimal engagement. Marginal correlation between markers of attention and number of both Twitter and Facebook followers suggests that increasing follower

counts in these applications may be beneficial to increasing the reach of orthopaedic sports medicine journal articles. By further delineating the relationship between social media use with journal article attention, this study may allow orthopaedic sports medicine journals to tailor their social media presence with effective evidence-based practices.

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