

Research Article

Association between Social Media Activity and Patient Ratings in Sports Medicine Surgeons

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Introduction

Physician rating websites (PRW) have grown to be an integral tool for the modern healthcare consumer to find physicians. As the United States healthcare system continues to shift towards a quality-centered reimbursement structure, PRWs have a higher likelihood of impacting the economics and livelihoods of physicians and their practices. Recent studies have found that the presence of a social media page (Facebook, Instagram, and Twitter) correlates with higher ratings on PRWs among orthopedic surgeons. However, there is a paucity of research regarding social media activity (i.e., frequency of posting, number of likes, comments, and post content). The purpose of this study is to examine whether physician social media activity impacts PRWs.

Methods

The American Orthopaedic Society for Sports Medicine (AOSSM) physician directory was used to identify sports medicine surgeons in the United States. An original program written in Python was used to search the first page of Google for Facebook, Instagram, and Twitter profiles. Physician ratings were collected from Healthgrades, Google reviews, and Vitals. The surgeons were divided into two groups: social media group (SMG) and non-social media group (NSMG). The association of social media use with online physician ratings was evaluated using simple and multiple linear regression.

Results

A cohort of 1,919 surgeons were identified, and 17.9% (n=344) were social media users. Social media users had significantly higher ratings on Vitals ($p<0.001$) and Google ($p<0.001$). Furthermore, having a Twitter profile was associated with higher ratings on Healthgrades ($p=0.001$) and Vitals ($p=0.001$). Having a greater number of Twitter followers was associated with higher ratings on Vitals ($p=0.037$), and increased Twitter post frequency was associated with greater ratings on Healthgrades ($p<0.001$). Being a Facebook user was associated with higher ratings on Vitals ($p=0.008$). Furthermore, higher numbers of Facebook followers were associated with greater ratings on Google ($p=0.033$) and Healthgrades ($p=0.018$). Lastly, Instagram users had higher ratings on Vitals ($p=0.037$). Other factors such as average number of likes per post, average comments per post, and post content posts had no impact on physician ratings across all PRWs.

Conclusion

Social media facilitates direct communication between physicians and patients, which may correlate with higher patient satisfaction. However, while the average ratings improved across all PRWs with social media use, so did the number of ratings. Therefore, social media use may inflate the number of reviews with either social media fans or by attracting a larger patient population.

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INTRODUCTION

The internet has become a fundamental way for patients to connect to the healthcare system (LaGrant et al. 2021). With the emergence of physician review websites (PRWs) such as Healthgrades, Vitals, and Google Ratings, patients can rate physicians online. Furthermore, PRWs have grown to be an integral tool for the modern healthcare consumer to find physicians (Gao et al. 2012a). This contrasts with traditional methods of finding physicians, namely word of mouth or referral from a primary care physician; although the former may still be a popular avenue of finding a Sports Medicine physician (Greif et al. 2022; Segal et al. 2012; Okike et al. 2016). In a study by Hanauer et al., 37% of patients stated that they avoided a physician due to poor online ratings, and 35% of patients selected physicians with favorable ratings (Hanauer, Zheng, Singer, et al. 2014). Furthermore, 28.1% of patients strongly agreed that a positive review from a PRW alone highly influenced them to seek care from that particular physician (Burkle and Keegan 2015).

As the United States healthcare system continues to shift towards a quality-centered reimbursement structure, PRWs have a higher likelihood of impacting the economics and livelihoods of physicians and their practices (Squitieri, Bozic, and Pusic 2017a; Swayne 2005). In the field of orthopedics, 38.4% of patients reported that the internet highly influenced their choice of physician and 18.26% reported using PRWs to select an orthopedic surgeon (Duymus et al. 2017a; Curry et al. 2014; Frost and Mesfin 2015; Syed et al. 2019; Bakhsh and Mesfin 2014; Donnally et al. 2019). As the importance of PRW's grows, research directed towards marketing tools such as social media is being done (Damodar et al. 2019).

Recent studies have found that the presence of a social media page (Facebook, Instagram, and Twitter) was correlated with higher ratings on PRWs in orthopedic surgeons (Damodar et al. 2019; Sama et al. 2021). Furthermore, sports medicine physicians have the fastest growing social media usage compared to other orthopedic subspecialties (Curry et al. 2014). Although it has been demonstrated that PRWs are more influential than social media presence in a patient's efforts to select a sports medicine physician, the correlation between social media activity and quality of online reviews may inextricably link these two avenues (Greif et al. 2022). There is a paucity of research regarding social media activity (i.e. frequency of posting, number of likes, comments, and post content) and its relationship to PRWs. The purpose of our study is to examine whether physician social media activity impacts PRWs. We hypothesize that surgeons with more social media activity will have higher physicians' ratings on PRWs.

METHODS

PHYSICIAN SELECTION AND IDENTIFICATION

This is a cross-sectional study investigating how social media usage, follower engagement, and content impacts on-

line physician ratings. The 'Find a Physician' directory search tool on the American Orthopedic Society of Sports Medicine (AOSSM) website was queried to identify fellowship trained sports medicine orthopedic surgeons. AOSSM members that were actively practicing orthopedic surgeons in the United States with an MD or DO degree were included in this study. Conversely, members who did not have an MD or DO degree, were not currently practicing medicine, or had incomplete PRW data were excluded. Further information was gathered through Google to confirm each physician's credentials (MD vs DO), location of practice (West, Midwest, Southwest, Southeast, and Northeast), age, and sex. Additionally, physician ratings and total number of reviews were obtained from Google Reviews, Healthgrades, and Vitals. The AOSSM website was used to determine the surgeon's sport specialization.

SOCIAL MEDIA SEARCH TOOL

An original program modeled after Busheme et al. was written in Python (version 3.11, Python Software Foundation, Delaware, US) designed to search the first page of Google (first fifteen results) for input search terms. The search terms were physician name-degree combinations (e.g., "John Doe, MD") and the outputs retrieved by the program were links to each physician's Facebook, Instagram, and X/Twitter profiles. These outputs were used to collect the number of social media platforms associated with each surgeon and the specific types of social media platforms used (X/Twitter, Facebook, and/or Instagram) (Busheme et al. 2024). The outputs from the program were manually checked for accuracy by the authors.

DATA COLLECTION AND CLASSIFICATIONS

Each social media profile was sampled for number of followers, the 'likes' and comments on the third, sixth, ninth, twelfth, and fifteenth most recent posts. These posts were further analyzed based on content type. The posts were categorized as primarily text, media, or both. For X/Twitter, specifically, a retweet (post type) was classified separately because the follower engagement on a retweet reflects the initial poster, not the social media engagement of the physician posting the retweet. For Instagram, post type was not collected because all posts are media by default. Instagram stories were excluded from all analyses due to their transient nature and risk of confounding variables based on time of data sampling.

Posting frequency was determined by calculating the days between the first and tenth, tenth and twentieth, and twentieth and thirtieth most recent posts. Additionally, the ten most recent posts were categorized as either professional or personal for each social media platform. A professional post was content pertaining to surgery, practice as a sports physician or surgeon, academic pursuits, relevant educational posts, or generic holiday postings from the office of the physician. Posts were classified as personal if they were not pertinent to an orthopedic practice or patient care.

STATISTICAL ANALYSIS

Data was further organized and checked for appropriate descriptive statistics, including medians. Percentages (%) were also computed for all variables. Chi-squared or Fisher exact tests were then calculated to compare the categorical variables by social media usage. Continuous variables were analyzed using Mann-Whitney U tests. Associations between physician ratings and physician demographic characteristics (including social media use) were evaluated using simple and multiple linear regression models. In the linear regression models, physicians without social media were classified as having “0” followers, ‘likes’, comments, and posts. Data was analyzed using Statistical Package for the Social Science (SPSS) Version 25 (IBM Corp., Armonk, NY, USA). The results were analyzed as absolute differences with 95% confidence intervals. All tests were two-tailed and $p < 0.05$ was considered statistically significant.

RESULTS

DEMOGRAPHICS

Using the AOSSM database, 2,902 physicians were identified. After exclusion criteria was applied, a total of 1,919 sports medicine surgeons remained for analysis. Of the 1,919 physicians included, 17.9% ($n=344$) had at least one form of social media use identified (SMU), while 82.1% ($n=1,575$) had no identifiable social media use (NSMU). Of those physicians included, 93.17% ($n=1,788$) were males and 6.83% were females ($n=131$), and the average age was 52.4 (range: 28-83). The female physicians were significantly more likely to be SMU (27.48%) than their male physician (17.17%) colleagues ($p = 0.003$). Younger surgeons were more likely to be SMU ($p < 0.001$). The average age for SMU was 49.9 (range: 33-73) compared to 53.1 (range: 28-83) in the NSMU group (Table 1). Furthermore, younger surgeons received significantly more positive ratings ($p = 0.043$). However, the number of reviews were independent of physician age ($p = 0.562$). The most popular social media platform was Facebook (10.8%), followed by Twitter (9.3%), with Instagram being the least utilized (7.2%) (Table 2). Social media use was not significantly influenced by geographic region or degree type (MD vs DO) (Figures 1-3).

PHYSICIAN RATING WEBSITES (PRW)

SMU had significantly higher ratings on Vitals ($p < 0.001$) and Google ($p < 0.001$) compared to NSMU. No significant difference was seen on Healthgrades ratings ($p = 0.869$). Furthermore, younger surgeon age was associated with increased overall average ratings for Google ($p < 0.001$) and Vitals ($p < 0.001$), but not for Healthgrades ($p = 0.352$). Physicians in the southwest states had higher Healthgrades ratings compared to other regions ($p = 0.005$). Sport specialization also impacted physician ratings on PRWs. Surgeons who specialized in rugby ($p = 0.004$) and tennis ($p = 0.015$) had higher Healthgrades ratings compared to other sports.

Additionally, physicians who specialized in martial arts had higher Vitals ratings ($p = 0.073$) (Table 3).

There were no significant differences in overall average ratings across all PRWs based on gender. A greater number of reviews was associated with higher ratings for Google ($p < 0.001$) and Vitals ($p < 0.001$), but not for Healthgrades ($p = 0.588$). Furthermore, a higher number of social media platforms used by a physician is associated with increased Vitals ratings ($p < 0.001$). Furthermore, social media use increased the number of reviews on Google ($p < 0.001$) and Vitals ($p < 0.001$).

TWITTER

Being a Twitter user was associated with higher ratings on Healthgrades ($p = 0.001$) and Vitals ($p = 0.001$). Additionally, surgeons who used Twitter had higher Google Ratings ($p = 0.059$). Furthermore, having a greater number of Twitter followers was associated with higher ratings on Vitals ($p = 0.037$). Increased Twitter post frequency was associated with greater ratings on Healthgrades ($p < 0.001$), but not with Google ($p = 0.137$) or Vitals ($p = 0.836$). Other factors such as average number of likes per post, average comments per post, post content, and greater percentage of professional posts had no impact on physician ratings across all PRWs (Table 4 and 5).

FACEBOOK

Being a Facebook user was associated with higher ratings on Vitals ($p = 0.008$), but not Healthgrades ($p = 0.710$) or Google ratings ($p = 0.579$). Furthermore, higher numbers of Facebook followers were associated with greater ratings on Google ($p = 0.033$) and Healthgrades ($p = 0.018$). However, it did not impact Vitals ratings ($p = 0.075$). Other Facebook usage factors such as number of likes per post, number of comments per post, post frequency, post content, and greater percentage of professional posts did not impact physician ratings across all PRWs.

INSTAGRAM

Being an Instagram user was associated with higher ratings on Vitals ($p = 0.037$). However, having an Instagram profile did not impact Google ($p = 0.872$) or Healthgrades ($p = 0.729$) ratings. Furthermore, Instagram usage metrics including number of followers, total number of Instagram posts, average likes per post, average comments per post, post frequency, and greater percentage of professional posts did not impact physician ratings.

DISCUSSION

This study examined how social media use impacts PRWs. We found that social media use significantly improves physician ratings. Furthermore, physicians who had more followers on social media had higher ratings. However, while patients seemed to prefer physicians who used social media, other factors such as average number of likes per post, average comments per post, and post content posts

Table 1. Associations between Physician Ratings and Physician Characteristics Amongst Social Media Users (N=344)

Variable	Twitter			Facebook			Instagram			Social Media Average		
	β^a	(95% CI)	P	β^a	(95% CI)	P	β^a	(95% CI)	P	β^a	(95% CI)	P
Age	-3.736	(52.253, 53.302)	<0.001*	-2.591	(52.218, 53.286)	0.001*	-4.791	(52.272, 53.309)	<0.001*	-3.792	(52.59, 53.69)	<0.001
Location												
Northeast	--	--	0.925	--	--	0.728	--	--	0.834	--	--	0.232
Southwest	--	--	0.740	--	--	0.349	--	--	0.578	--	--	<0.001*
West	--	--	0.496	--	--	0.279	--	--	0.570	--	--	0.132
Southeast	--	--	0.762	--	--	0.671	--	--	0.629	--	--	0.140
Midwest	--	--	0.762	--	--	0.671	--	--	0.569	--	--	0.247
Sex												
Female	--	--	0.002*	--	--	0.259	--	--	0.210	--	--	0.003*
Male ^b	--	--	--	--	--	--	--	--	--	--	--	--
Degree												
MD	--	--	0.883	--	--	0.065	--	--	0.169	--	--	0.166
DO ^b	--	--	--	--	--	--	--	--	--	--	--	--
Google Averages	0.098	(4.486, 4.548)	0.059	0.028	(4.492, 4.554)	0.569	0.009	(4.495, 4.556)	0.872	0.027	(4.487, 4.551)	0.246
Google #	8.796	(35.61, 41.556)	0.707	14.28	(35.699, 41.391)	0.001*	4.359	(36.974, 42.569)	0.413	1.779	(37.089, 42.750)	0.014*
Healthgrade Averages	0.048	(4.106, 5.045)	0.951	-0.274	(4.136, 5.083)	0.710	-0.306	(4.138, 5.066)	0.729	-0.099	(4.123, 5.091)	0.776
Healthgrade #	6.579	(35.273, 40.06)	0.010*	13.08	(34.462, 39.275)	<0.001*	3.204	(35.683, 40.417)	0.477	10.28	(38.967, 33.948)	0.001*
Vitals Average	0.169	(4.204, 4.265)	<0.001*	0.148	(4.203, 4.265)	0.002*	0.120	(4.211, 4.272)	0.036*	0.083	(4.199, 4.261)	<0.001*
Vitals #	3.217	(29.893, 33.762)	0.319	11.16	(28.979, 32.868)	<0.001*	5.234	(29.839, 33.663)	0.150	6.090	(28.985, 33.046)	0.013*

a: Unstandardized β coefficient

b: Reference Category

*: Statistical significance

Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania

Southwest: Arizona, Oklahoma, New Mexico

West: Alaska, California, Colorado, Hawaii, Idaho, Wyoming, Utah, Montana, Nevada, Oregon, Washington

Southeast: Alabama, Arkansas, Washington DC, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, West Virginia, North Carolina, South Carolina, Tennessee, Mississippi

Midwest: Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Minnesota, Ohio, South Dakota, Wisconsin

Table 2. Social Media Platforms Used by Physicians (N=1,919)

Variable	n (%) or median (Range)
Number of Social Media Platforms Used	
0	1575 (82.1%)
1	207 (10.7%)
2	93 (4.8%)
3	44 (2.3%)
Social Media Platform Used	
Twitter	179 (9.3%)
Facebook	207 (10.8%)
Instagram	138 (7.2%)
Number of Social Media Followers	
Twitter (n=176)	458 (1-10,700)
Facebook (n=207)	414 (0-18,286)
Instagram (n=138)	642 (6-67,466)

had no impact on physician ratings across all PRWs. One of the many downstream effects that widespread use of the internet has had on the patient-physician relationship is the ability to Google, rate, like, and even follow medical providers. Patient review websites (PRWs) such as Healthgrades, Vitals, and Google reviews are utilized by a substantial portion of patients to pick a provider (Gao et al. 2012b; Hanauer, Zheng, Singer, et al. 2014; Holliday et al. 2017). With the growing emphasis on quality driven reimbursement, these ratings may become increasingly important to a physician's practice (Gross et al. 2022; Squitieri, Bozic, and Pusic 2017b; Schwartz et al. 2020). Social media has skyrocketed ("Social Media Fact Sheet" 2024) and has become a platform by which to interact with healthcare providers (Duymus et al. 2017b). Although social media has not replaced word-of-mouth referrals, online reviews, and online ratings (Greif et al. 2022), the growing use of social media in orthopedics underscores the need to investigate the impact it has on physician ratings (McCormick et al. 2021; Sama et al. 2021; Gross et al. 2022). The purpose of our study was to examine whether physician social media activity impacts PRWs.

Our study echoes previous literature demonstrating that social media does have a significant impact on PRWs. Although limited, the association between SM use and PRW statistics has been investigated within various orthopaedic subspecialties including hand, spine, shoulder and elbow, and hip and knee (Sama et al. 2022; Donnally et al. 2018; McCormick et al. 2021; Damodar et al. 2019; Sama et al. 2021). The majority of these recent studies found an association between social media use and an increased number of ratings on PRWs, but not overall average rating (Donnally et al. 2018; McCormick et al. 2021; Damodar et al. 2019). Notably, however, there have been a few smaller studies found that social media not only increases the number of ratings but also improves online ratings (Sama et al. 2022; Garofolo et al. 2020). For example, a study of 246 spine surgeons practicing in New Jersey and Pennsylvania found that surgeons with SM not only had a greater number of ratings

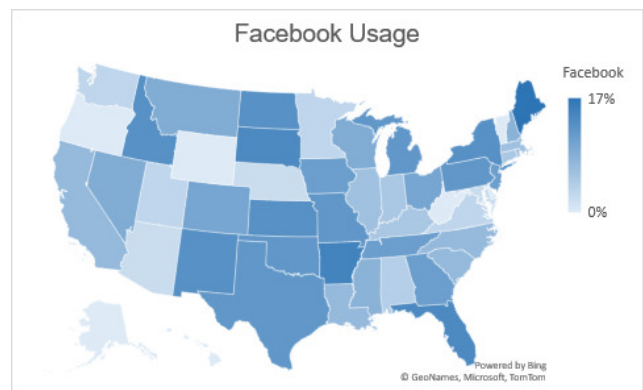


Figure 1. Map of the United States with representation of the percentage of sports medicine surgeons with Facebook accounts.

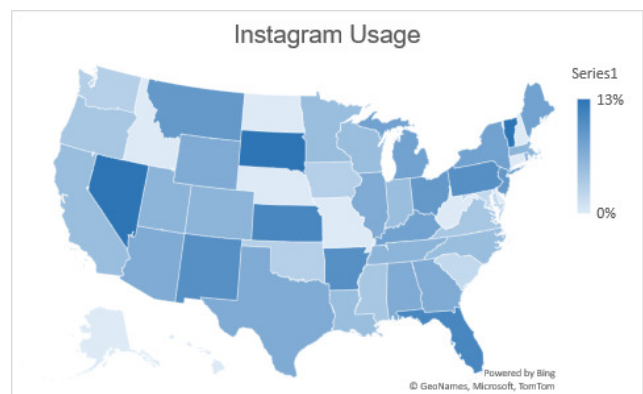


Figure 2. Map of the United States with representation of the percentage of sports medicine surgeons with Instagram accounts.

and comments on PRWs but also significantly higher average ratings (Sama et al. 2022). Additionally, in a study of 116 hand surgeons nationally, a more robust digital identity

Table 3. Relationship between physician ratings and age, location, sex, degree, social media user, and sports specialty

Variable	Google Ratings				Healthgrades Ratings			Vitals Rating		
	n	β^a	(95% CI)	P	β^a	(95% CI)	P	β^a	(95% CI)	P
Age	52.429	-0.009	(4.785, 5.165)	<0.001*	-0.03	(2.861, 9.550)	0.352	-0.006	(4.380, 4.743)	<0.001*
Location										
West	369 (19.23%)	-0.012	(4.495, 4.561)	0.764	-0.318	(4.144, 5.139)	0.582	0.018	(4.214, 4.279)	0.624
Midwest	441 (22.98%)	-0.049	(4.504, 4.571)	0.169	-0.382	(4.159, 5.177)	0.481	0.013	(4.214, 4.281)	0.709
Southwest	196 (10.21%)	-0.014	(4.496, 4.559)	0.774	2.092	(3.895, 4.837)	0.005*	0.026	(4.217, 4.278)	0.592
Southeast	468 (24.39%)	0.035	(4.484, 4.551)	0.316	-0.220	(4.119, 5.148)	0.678	-0.015	(4.220, 4.287)	0.666
Northeast	445 (23.19%)	0.029	(4.485, 4.553)	0.402	-0.192	(4.114, 5.137)	0.722	-0.027	(4.224, 4.290)	0.438
Sex										
Male ^b	1788 (93.17%)	--	--	--	--	--	--	--	--	--
Female	131 (6.83%)	-0.075	(4.458, 4.731)	0.435	-0.290	(4.136, 5.063)	0.749	0.039	(4.218, 4.278)	0.504
Degree										
MD	1829 (95.31%)	-0.074	(4.460, 4.733)	0.298	0.831	(2.734, 6.860)	0.831	-0.054	(4.168, 4.437)	0.439
DO ^b	90 (4.69%)	--	--	--	--	--	--	--	--	--
Social Media										
User	343 (17.87%)	0.086	(4.478, 4.543)	0.029*	-0.098	(4.104, 5.091)	0.869	0.153	(4.191, 4.255)	<0.001*
Nonuser ^b	1576 (82.13%)	--	--	--	--	--	--	--	--	--
Sports Specialty										
None Listed	267 (13.91%)	0.019	(4.492, 4.555)	0.663	-0.265	(4.135, 5.099)	0.687	0.003	(4.219, 4.281)	0.932
Baseball/Softball	1159 (60.40%)	-0.005	(4.482, 4.576)	0.875	0.309	(3.683, 5.104)	0.507	0.018	(4.193, 4.285)	0.542
Basketball	1265 (65.92%)	0.010	(4.469, 4.570)	0.747	0.268	(3.638, 5.169)	0.577	-0.014	(4.210, 4.310)	0.644
Cheerleading	745 (38.82%)	-0.023	(4.497, 4.573)	0.449	0.540	(3.799, 4.942)	0.248	-0.027	(4.224, 4.298)	0.374
Dance	542 (28.24%)	-0.010	(4.494, 4.564)	0.449	0.795	(3.828, 4.883)	0.117	0.024	(4.209, 4.278)	0.469
Field Hockey	406 (21.16%)	0.013	(4.490, 4.556)	0.718	-0.334	(4.147, 5.154)	0.549	0.042	(4.209, 4.274)	0.244
Football	1484 (77.33%)	0.009	(4.457, 4.581)	0.803	0.310	(3.401, 5.279)	0.569	0.025	(4.170, 4.292)	0.480
Golf	735 (38.30%)	0.010	(4.484, 4.560)	0.743	0.554	(3.799, 4.934)	0.237	-0.007	(4.216, 4.290)	0.810
Gymnastics	634 (33.04%)	-0.025	(4.498, 4.570)	0.441	0.687	(3.807, 4.899)	0.157	-0.002	(4.216, 4.287)	0.943
Hockey	825 (42.99%)	-0.002	(4.488, 4.566)	0.959	-0.410	(4.164, 5.348)	0.373	0.007	(4.209, 4.286)	0.813
Lacrosse	700 (36.48%)	-0.035	(4.502, 4.576)	0.262	0.336	(4.185, 5.307)	0.336	-0.007	(4.217, 4.290)	0.811

			Google Ratings		Healthgrades Ratings			Vitals Rating		
<i>Martial Arts</i>	224 (11.67%)	-0.058	(4.502, 4.564)	0.215	-0.202	(4.128, 5.079)	0.776	-0.083	(4.229, 4.291)	0.073
<i>Rowing</i>	109 (5.68%)	-0.018	(4.497, 4.558)	0.780	-0.392	(4.142, 5.063)	0.691	-0.099	(4.226, 4.286)	0.122
<i>Rugby</i>	206 (10.73%)	0.072	(4.487, 4.550)	0.137	2.104	(3.882, 4.826)	0.004*	0.031	(4.216, 4.278)	0.524
<i>Skiing/Snowboarding</i>	285 (14.85%)	0.007	(4.493, 4.557)	0.860	-0.284	(4.138, 5.107)	0.658	0.037	(4.213, 4.276)	0.372
<i>Soccer</i>	789 (41.12%)	0.019	(4.480, 4.557)	0.537	0.563	(3.766, 4.930)	0.224	0.003	(4.211, 4.287)	0.918
<i>Swimming</i>	243 (12.66%)	0.067	(4.486, 4.549)	0.136	-0.153	(4.121, 5.078)	0.824	-0.006	(4.220, 4.282)	0.887
<i>Tennis</i>	258 (13.44%)	-0.031	(4.499, 4.562)	0.473	1.622	(3.882, 4.842)	0.015*	-0.052	(4.226, 4.289)	0.228
<i>Track and Field</i>	266 (13.86%)	-0.050	(4.501, 4.565)	0.250	-0.322	(4.143, 5.106)	0.625	-0.004	(4.220, 4.282)	0.919
<i>Volleyball</i>	263 (13.71%)	-0.045	(4.500, 4.564)	0.299	-0.389	(4.152, 5.114)	0.557	0.005	(4.218, 4.281)	0.907
<i>Wrestling</i>	163 (8.49%)	-0.044	(4.499, 4.561)	0.414	-0.340	(4.140, 5.076)	0.678	-0.020	(4.222, 4.282)	0.704
<i>Other</i>	169 (8.81%)	-0.057	(4.500, 4.562)	0.280	-0.440	(4.151, 5.087)	0.584	-0.059	(4.225, 4.286)	0.264

a: Unstandardized β coefficient

b: Reference Category

*: Statistical significance

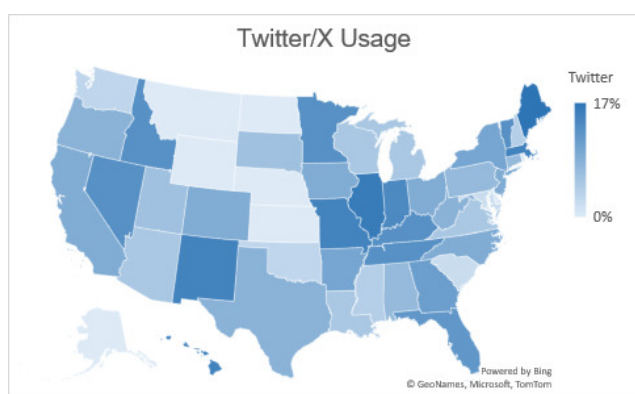


Figure 3. Map of the United States with representation of the percentage of sports medicine surgeons with Twitter/X accounts.

observed significantly higher patient satisfaction scores on Healthgrades specifically (Garofolo et al. 2020). Only one study to our knowledge has specifically investigated the impact of SM use by sports medicine surgeons on PRW metrics, finding that AOSSM members practicing in Florida who utilized social media had significantly higher overall online physician ratings across all review websites with similar trends in regards to number of ratings and comments (Sama et al. 2021). Our study expands on prior literature, depicting an association of social media usage and activity with PRW metrics for AOSSM members nationwide. This is a significant contribution given sports medicine patients have been found to have higher social media usage compared to other orthopaedic services (Curry et al. 2014).

It is important to consider that social media use may inflate the number of reviews with either social media fans or by attracting a larger patient population. However, many prior studies found social media use increases the number of ratings, but not the overall score, suggesting that a social media presence may encourage more online interaction but doesn't necessarily improve patients' perceptions. It is likely that the way social media is being utilized determines the kind of impact social media may have on PRW metrics. Our study answers this question in part, demonstrating that among Facebook users, those with greater professional content had higher ratings on two of the three PRWs. Similarly, Twitter users with more followers and likes per post had higher average ratings across all sites. This suggests that the content of social media posts and overall activity matter. Perhaps personal or professional traits that afford a physician success in face-to-face interactions are the same traits that drive a physician to create a successful social media account. This is supported by a study in 2014 that showed that, although 51% of new patients referred to a major academic orthopedics center used a social media account, only 18-26% had used a PRW, and only 2% had ever posted a review on one (Curry et al. 2014).

Additionally, it is important to note that the information gathered on PRWs comes from a variety of public and private resources. For example, Healthgrades gathers its data from the National Provider Identifier (NPI) Registry, patient surveys, government claims, and from information that

Table 4. Social media usage metrics

	Average
Twitter	
# Followers	1049.966
Avg # Likes	1451.801
Avg # Comments	30.526
Avg Post Frequency	230.638
% Professional	74.246%
Facebook	
# Followers	716.891
Avg # Likes	14.491
Avg # Comments	1.829
Avg Post Frequency	322.250
% Professional	82.908%
Instagram	
# Followers	2471.713
Avg # Posts	102.860
Avg # Likes	105.665
Avg # Comments	5.715
Avg Post Frequency	209.552
% Professional	66.615%
# of Social Media Platforms	0.243
# of Reviews	40.993

came directly from the physician's practice ("Healthgrades" 2024). Similarly, Vitals states that it gathers information from state medical boards, federal websites, hospital and doctors' offices, patient surveys, and third-party affiliates ("Vitals" 2024). Despite its accessibility, PRWs do not gather information from physicians' social media accounts.

Furthermore, our study found that only 7.57% of surgeons were using social media, compared to much higher percentages (37% to 74%) reported in prior literature (Gross et al. 2022; Feroe et al. 2024; Sama et al. 2022). However, as current trends would suggest continued increase in the utilization of social media, it is vital to understand the ways in which social media can impact patients' perceptions of physicians and the care they provide.

Our study is limited by the scope of our investigation which focused on specific social media platforms and the sport medicine specialty. The physicians were gathered from the AOSSM website. However, this fails to include physicians not on the website and physicians abroad, thus limiting the generalizability of this study. Additionally, we intentionally did not include professional websites and [LinkedIn.com](https://www.linkedin.com) given these platforms have distinct professional and networking purposes compared to newer forms of social media such as Facebook, Instagram, and Twitter which are more dynamic, interactive platforms with direct user communication. Importantly, this allowed us to consider the content and activity level of surgeons on their social media accounts. Additionally, the Python program utilized to identify physician social media platforms was previously published by Busheme et al., but it lacks valida-

Table 5. Associations between Physician Ratings and Types of Social Media Platforms Used (N = 344)

Google Ratings				Healthgrades Ratings			Vitals Rating		
Variable	β^a	(95% CI)	P	β^a	(95% CI)	P	β^a	(95% CI)	P
Twitter									
User	0.098	(4.486, 4.548)	0.059	0.169	(4.204, 4.265)	0.001*	0.169	(4.204, 4.265)	0.001*
# Followers	0.000	(4.547, 4.768)	0.159	0.000	(4.218, 5.279)	0.765	0.000	(4.363, 4.568)	0.037*
Avg # Likes	0.000	(4.510, 4.704)	0.958	0.000	(4.203, 5.128)	0.765	0.000	(4.311, 4.492)	0.994
Avg # Comments	0.000	(4.510, 4.706)	0.988	-0.001	(4.206, 5.138)	0.720	0.000	(4.319, 4.500)	0.574
Avg Post Frequency	0.000	(4.431, 4.679)	0.137	0.003	(3.334, 4.467)	<0.001*	0.000	(4.279, 4.509)	0.836
% Professional	-0.001	(4.506, 4.948)	0.294	0.005	(3.203, 5.338)	0.476	-0.001	(4.270, 4.685)	0.442
Post Content	-0.023	(4.330, 4.981)	0.771	0.400	(2.295, 5.362)	0.273	-0.034	(4.171, 4.771)	0.635
Facebook									
User	0.027	(4.493, 4.555)	0.579	-0.274	(4.136, 5.083)	0.710	0.028	(4.203, 4.265)	0.008*
# Followers	0.000	(4.507, 4.694)	0.033*	0.000	(4.295, 4.498)	0.018*	0.000	(4.335, 4.512)	0.075
Avg # Likes	-0.002	(4.483, 4.692)	0.254	-0.002	(4.254, 4.480)	0.262	0.000	(4.311, 4.492)	0.995
Avg # Comments	0.004	(4.453, 4.646)	0.729	-0.002	(4.230, 4.439)	0.894	0.006	(4.278, 4.458)	0.560
Avg Post Frequency	0.000	(4.458, 4.673)	0.741	0.000	(4.209, 4.441)	0.834	0.000	(4.317, 4.518)	0.222
% Professional	0.001	(4.177, 4.756)	0.510	-0.001	(4.119, 4.680)	0.762	0.000	(4.130, 4.662)	0.957
Post Content	0.025	(4.142, 4.852)	0.739	0.076	(3.776, 4.533)	0.340	0.117	(3.781, 4.434)	0.088
Instagram									
User	0.009	(4.495, 4.556)	0.872	-0.306	(4.138, 5.066)	0.729	0.120	(4.212, 4.272)	0.037*
# Followers	0.000	(4.423, 4.679)	0.268	0.000	(4.177, 4.440)	0.430	0.000	(4.267, 4.506)	0.290
Avg # Posts	0.000	(4.395, 4.696)	0.705	0.000	(4.162, 4.470)	0.608	0.000	(4.267, 4.506)	0.290
Avg # Likes	-0.001	(4.441, 4.724)	0.114	0.000	(4.193, 4.482)	0.294	-0.001	(4.279, 4.542)	0.164
Avg # Comments	-0.005	(4.414, 4.702)	0.403	0.000	(4.153, 4.445)	0.983	0.002	(4.220, 4.490)	0.790
Avg Post Frequency	0.000	(4.325, 4.656)	0.507	0.000	(4.046, 4.379)	0.115	0.000	(4.148, 4.454)	0.210
% Professional	-0.001	(4.304, 4.943)	0.526	0.000	(4.045, 4.629)	0.900	0.001	(3.958, 4.545)	0.466
# of Social Media Platforms	0.026	(4.487, 4.551)	0.250	-0.099	(4.123, 5.091)	0.776	0.084	(4.196, 4.259)	<0.001*
# of Reviews	0.003	(4.386, 4.455)	<0.001*	0.002	(3.927, 5.046)	0.587	0.003	(4.132, 4.205)	<0.001*

a: Unstandardized β coefficient

*: Statistical significance

tion (Busheme et al. 2024). Furthermore, it was limited to the first 15 Google search results. However, this was imple-

mented to replicate how a patient would search for a physician in real-time. It also lacked the capacity to identify

practice-based accounts. Therefore, this study may have underestimated the number of social media users. Further studies may seek to investigate social media usage in other subspecialties or whether social media use impacts a surgeon's clinical volume. Importantly, future studies should analyze how YouTube and TikTok profiles impact PRWs and the impact of social media by how platforms are being used whether for education, marketing, or patient communication.

CONCLUSION

Social media activity by sports medicine surgeons is associated with PRW metrics. Social media use is associated with

a greater number of reviews and for certain platforms and higher average ratings. Type of content and level of engagement are also associated with higher average ratings on PRWs. Given the role of PRW in selection of provider and the shift in healthcare towards quality-centered reimbursement, this relationship has substantial implications for how physicians choose to incorporate social media in their practice.

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