Archives of Orthopaedic and Trauma Surgery (2023) 143:269–276
https://doi.org/10.1007/s00402-021-04052-2

ORTHOPAEDIC SURGERY

Orthopaedic surgery and its allied associations on social media: an observational study

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Received: 16 September 2020 / Accepted: 1 July 2021 / Published online: 14 July 2021

Abstract

Background The use of social media in orthopaedic surgery and its allied associations has not been studied. There are various associations which are actively engaged in social media platforms to enhance their impact with their users across the globe. We evaluated the social media presence and extent of involvement of orthopaedics journals and their publishing companies, orthopaedics organizations, orthopaedics device firms, and health organizations.

Materials and methods We compiled a global list of orthopaedics journals and publishing companies, orthopaedics organizations, orthopaedics device firms and health organizations affiliated to orthopaedics (USA) through the internet and their reliable online links. All the categories and their contents were screened on various social media networking sites (Facebook, Twitter, and LinkedIn) in terms of their membership, likes, followers and active participation. Comparable variables were selected and compared.

Results Orthopaedics journals corresponding to sports and health were more notable than others on social networking platforms, i.e., British Journal of Sports Medicine and American Journal of Sports Medicine. Medscape, Lancet, and Elsevier being the multispeciality health and information publishing companies have remarkable participation on Facebook, Twitter and LinkedIn. Medtronic has maximum followers on all discussed social networking sites. Mayo Clinic Rochester, Minnesota and Cleveland Clinic, Cleveland, Ohio were more admired than other orthopaedics hospitals on Facebook and Twitter in USA. American Academy of Orthopaedic Surgeons was the most popular society on Facebook and LinkedIn while American Orthopaedics Society for Sports Medicine was most talked about on twitter.

Conclusions Although the active involvement of orthopaedics journals and their publishers is lower than multispecialty publishing companies but increasing trends were found recently. Orthopaedics organisations and device firms were actively involved on social networking while orthopaedics multispeciality health organizations associated with renowned universities have huge likes or followers. The social networking has the potential to flourish these journals and organisations in the near future as large populations over the globe have been actively participating and growing in their numbers exponentially

Keywords Social networking · Facebook · Twitter · LinkedIn · Altmetric · Orthopaedics journals · Orthopaedics organizations · Orthopaedics device firms

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Introduction

More than half of the world is connected to social media through the internet and are communicating in different forms of networks including web pages, social media apps, and personal sites, etc. There has been enormous growth of social networking through internet in the last 10 years with easy availability of smartphones and network accessibility worldwide even in developing countries [1]. There are a number of available social media platforms including social networking sites, social review sites, image sharing sites, video hosting sites, community blogs, discussion sites and sharing economy networks for different kind of activities and professions [2, 3]. Facebook, YouTube, WhatsApp, Facebook Messenger, Twitter, Instagram and LinkedIn are some of the topmost social networking portals and these have hundreds of millions of active users worldwide [4]. Table 1, incorporates the list of the largest social networking services, in descending order by number of active users or followers, as of a recent report published by Statista [4]. Facebook has the highest number of active users around 2498 million followed by YouTube and WhatsApp with 2000 million global monthly active users in each network. [4].

Many health care specialities and associated businesses, their marketing companies and related academic agencies, professional medical associations are now engaging their subscribers and active users to social media networks to enhance access and reach across the globe. [5, 6]. An individual or any representative of society and industry or organisation can easily share information by creating account in social networking sites [6]. Thus, anyone can disseminate or publicises their own assets and goods through these portals very efficiently and cost-effectively than traditional means of communications.

The use of social medial in the field of orthopaedics has been hardly studied. Most of the previous publications have discussed the presence of orthopaedic surgeons on social media platforms [7–9]. The present study evaluated and analysed the presence of various orthopaedics journals, orthopaedics device firms, orthopaedics organisations (non-profit), publishing companies and topmost orthopaedics hospitals (USA) on social media (Facebook, Twitter and LinkedIn) in reference to their followers/active members.

Table 1 List of top most social networking services worldwide, ranked by number of active users

S N	Social networking services	Active users (Millions)
1	Facebook (FB)	2498
2	YouTube	2000
3	WhatsApp	2000
4	FB Messenger	1300
5	WeChat	1165
6	Instagram	1000
7	TikTok	800
8	QQ	731
9	QZone	517
10	Sina Weibo	516
11	Reddit	430
12	Kuaishou	400
13	Snapchat	398
14	Twitter	386
15	Pinterest	366
16	Douban	320
17	LinkedIn	310

The following is a list of the largest social networking services, in order by number of active users, as of April 2020, as published by Statista (figures for Douban and LinkedIn are from October 2019)

Materials and methods

Various orthopaedics journals, which were publishing currently and were listed on SCImago journal rankings as on 15th June 2020 were searched for their social media activities [10]. Journals were extracted using the following search strategy: medicine (subject), orthopaedic (subject), all countries, 2020 (year) with minimal citations. These journals were then searched individually on Facebook and Twitter. The popularity of their account was quantified by likes on Facebook and number of followers on Twitter and tabulated in descending order according to their social media popularity.

To assess the popularity and impact of social networking on orthopaedics device firms, we analysed the sales reported for their most recent fiscal year (2019) and their number of followers or likes or both on Facebook, Twitter and LinkedIn sites and then correlated their social links with their sales [11].We also screened orthopaedics-centred professional associations worldwide on internet and banked all relevant data from all the three social networking sites (Facebook, Twitter and LinkedIn) with their likes or numbers of followers. After including all major associations, additional associations were retrieved by searching the official associations of peer reviewed orthopaedic journals and checking the follower list of each of them [12]. Similarly, medical literature publishing companies (multidisciplinary or orthopaedics subject only) were searched out for their social media popularity within all the three networks and arranged accordingly.

We also pooled social networking data of topmost orthopaedics affiliated hospitals (USA) on social media in reference to their followers or likes and accounted for their popularity and impact of these [13].

To enrol maximum social information of orthopaedics organisations and journals, we also searched social media links of special orthopaedics diseases or researchers associated with these. Search criteria included social information regarding chronic diseases including cerebral palsy, sports medicine and arthroscopy, arthroplasty, deformity, trauma and reconstruction, spine disease and bone cancer, etc., as advance searching title, which increased accessibility of orthopaedics societies.

Data were collected and analysed by two independent reviewers (P.K.S. and S.M.). All the findings and relevant data of social networking related to the mentioned parameters were summarized and documented in commercially available spreadsheets application of Microsoft excel software (Microsoft, Redmond, Washington) and were analysed accordingly. Parameters were categorized according to social popularity and were arranged in descending order. Social popularity was determined by the number of likes or followers on Facebook or the number of followers on Twitter and the number of members or followers on LinkedIn network.

Results

Around 270 academic journals were listed in the SCImago Journal Ranking (SJR) of orthopaedics speciality and allied subjects according to their journal ranking [10]. All were screened for their social media network links. More than 50% of journals were enrolled on Facebook and more than 50% of journals were present on Twitter. The top ten academic journals and their social popularity are documented in Table 2. The journal most liked or followed on Facebook and Twitter was the British Journal of Sports Medicine (101 K and 71.3 K) followed by the American Journal of Sports Medicine (26 K) [14–16]. Orthopaedics device firms with their reported sales for their most recent fiscal year (2019) and their number of followers or likes or both on Facebook, Twitter and LinkedIn sites are tabulated in Table 3. Medtronic was linked with maximum social popularity among all the three social networks (Facebook; 105 K, Twitter; 71.7 K, LinkedIn; 885764) while calculated sales were maximum for Stryker, which also have huge social popularity on these networking sites [17–19].

When assessing publishing web/companies, we found that Medscape (722 K) has the highest popularity on Facebook followed by Elsevier (283 K), while the Lancet (485 K) followed by BMJ (383 K) has maximum followers on Twitter [20–23]. LinkedIn has maximum followers of Elsevier (303 K) and Informa (93 K) in the category of health information and publishing web/companies as shown in Table 4 [24, 25]. Mayo Clinic (1.1 M) and Cleveland Clinic (2 M) have maximum followers and likes on Facebook and Twitter, respectively, when screened for the top 21 hospitals active on social media and is tabulated in Table 5 [26, 27].

Among various professional orthopaedic association, AAOS (American Academy of Orthopaedic Surgeons) has maximum social popularity on Facebook (17457) and LinkedIn (26 K) whereas the American Orthopaedics

Table 2 List of top most Orthopedics and multispeciality journals, ranked according to active members on social networking

S.N	Facebook		Twitter	
	Journal	Likes Followers	Journal	Followers
1	British Journal of Sports Medicine	101 K 107 K	British Journal of Sports Medicine	71.3 K
2	American Journal of Sports Medicine	26 K 27 K	Sports Medicine	46 K
3	The Orthopaedic Journal of Sports Medicine	23,953 24,921	Journal of Sports Sciences (JSS)	40.6 K
4	Journal of Bone and Joint Surgery—Series A	22,818 23,860	Journal of Bone and Joint Surgery—Series A	29.8 K
5	Clinical journal of sports medicine	13,315 13,980	Clinical Journal of Sports Medicine	18.3 K
6	Bone and Joint Journal	13,111 13,571	Bone and Joint Journal	13,571
7	Journal of Sports Sciences and Medicine (JSSM)	11,264 11,848	Bone and Joint Research (BJR)	12.8 K
8	Journal of Orthopaedic Case Report	10,833 11,063	Arthroscopy—Journal of Arthroscopic and Related Surgery	12.3 K
9	Clinical Orthopaedics and Related Research	8450 8620	Clinical Orthopaedics and Related Research	9385
10	Arthroscopy—Journal of Arthroscopic and Related Surgery	6214 6452	Journal of Orthopaedic Trauma	9066

Table 3 List of top most ten global orthopaedics device firms according to calculated sales reported for their most recent fiscal year (2019)

S.N	Facebook		Twitter		LinkedIn	
	Orthopaedic device firms	Likes Followers	Orthopaedic device firms	Followers	Orthopaedic device firms	Followers
1	Medtronic	105 K 110 K	Medtronic	71.7 K	Medtronic	885,764
2	Ossur orthotic and prosthetic services	65,421 67,339	Smith Nephew	10.5 K	Stryker	637,074
3	Zimmer Biomet	30,321 30,094	Zimmer Biomet	9148	Smith Nephew	291,213
4	Stryker	15,912 16,350	Ossur orthotic and prosthetic services	7116	Zimmer Biomet	224,670
5	NuVasive	12,580 12,766	DePuy Synthes	6006	DePuy Synthes	104,995
6	Smith Nephew	12,471 13,205	Stryker	4550	NuVasive	67,000
7	DePuy Synthes	8080 8471	NuVasive	2454	Integra Life Sciences	63,173
8	Wright Medical	2693 2879	Wright Medical	1825	Wright Medical	44,468
9	Globus Medical	1195 1319	Integra Life Sciences	1584	Globus Medical	32,951
10	Integra Life Sciences	358 397	Globus Medical	876	Ossur orthotic and prosthetic services	29,974

Table 4 List of top most ten health and information services publishing web/companies, ranked according to active members on social networking

S.N	Facebook		Twitter		LinkedIn	
	Health and information services/publishing company	Likes Followers	Health and information services/publishing company	Followers	Health and information services/publishing company	Followers
1	Medscape	722 K 741 K	The Lancet	485 K	Elsevier	303 K
2	Elsevier	283 K 287 K	BMJ	381 K	INFORMA	93 K
3	ELSEVIER INDIA	255 K 253 K	Medscape	195 K	SPRINGER NATURE	87,055
4	The Lancet	234 K 243 K	Elsevier	77.4 K	WILEY	76,746
5	BMJ	95,879 100 K	BMC	65.7 K	WOLTERS	34,268 (Health)
6	BMC	85,076 86,993	SPRINGER NATURE	35.5 K	SAGE PUBLISHING	33,203
7	WOLTERS	25,260 27,012	WOLTERS	15.5 K	BMJ	24,983
8	THIEME MEDICAL	19,230 19,253	Elsevier Orthopaedics	11.3 k	Medscape	24,175
9	SPRINGER NATURE	14,552 15,952	SAGE PUBLISHING	8455	The Lancet	19,746
10	SAGE PUBLISHING	12,429 13,208	INFORMA	6396	BMC	7860

Table 5 List of top most ten Hospitals in USA, ranked according to active members on social networking

S.N	Facebook		Twitter	
	Orthopaedics hospitals and allied universities	Likes Followers	Orthopaedics hospitals and allied universities	Followers
1	Mayo Clinic Rochester, Minnesota	1.1 M 1.1 M	Cleveland Clinic, Cleveland, Ohio	2 M
2	Santa Monica UCLA Medical Centre and Orthopaedic Hospital	310 K 309 K	Mayo Clinic Rochester, Minnesota	1.9 M
3	UCSF Medical centre San Francisco	247 K 248 K	The Johns Hopkins Hospital, Baltimore, University	167 K
4	Hospital for Special Surgery NY	99.1 K 99.8 K	Duke Medicine (Duke University Hospital), Durham, N.C University	86.5 K
5	Rush University Medical Centre/System for Health Chicago	74 K 74 K	UCSF Medical Centre San Francisco	63.9 K
6	Barnes- Jewish Hospital/ Washington University	72.7 K 72.2 K	Hospital for Special Surgery NY	46.2 K
7	Brigham and Women's Hospital Boston	66.7 K 68.3 K	Brigham and Women's Hospital Boston	45.6 K
8	Cedars-Sinai Medical Centre- Los Angeles, Calif	65 K 67 K	Cedars-Sinai Medical Centre- Los Angeles, Calif	24.4 K
9	Beaumont Hospital Royal Oak, Mich	44 K 45 K	Rush University Medical Centre/System for Health Chicago	23.5 K
10	Hospital for Joint Diseases, NYU Langone Medical Centre, N Y	39.9 K 41.9 K	University of Pittsburgh Medical Centre	20.5 K

Ranking system based on factors such as a hospital's U.S. News and World Report rank, whether a hospital was mentioned by both U.S. News and Women's Choice Award, and whether a hospital's staff included one or more of the top ranked orthopedic doctors in the country. Based on those findings, the Active Times published the 21 best orthopedic hospitals in the U.S.

Society for Sports Medicine (AOSSM) has maximum popularity on Twitter (21.7 K) as briefed in Table 6 [28–30].

Discussion

The recent era has been involved very firmly with social media and health industry is very naïve to its representation in it [4]. Facebook, WhatsApp, and YouTube are some of the giant mediators to communicate and share information among worldwide population, especially related to entertainment as mentioned earlier and documented in Table 1. Nowadays there is parallel increasing trends of altimetric or alternative metrics for published literature access and users through social media networking in different forms as mentioned previously [1, 5, 6]. Traditionally there are various measurement tools to evaluate the impact or quality of journal in form of citations and impact factor, but some of these metrics have been criticized in recent years. This is due to the fact it is difficult to prove their uniformity worldwide and they also do not reveal the negative impact or criticism [31–34]. Moreover, these indexes can be manipulated by the journals themselves.

In this study, we attempted to demonstrate various multispeciality health and information service publishers, orthopaedics journals and orthopaedics organizations and orthopaedics device firms and non-profit orthopaedics organizations, who are actively participating on social networking portals. As shown in our results only few orthopaedics journals and societies are active on social media platforms, so there is a huge opportunity for them to expedite commercialization and to exploit educational potential of these cost-effective social media networks.

Social networking on Facebook and Twitter has tremendously enhanced access of academic materials and even new techniques to orthopaedic surgeons in the form of sharing special issues of the journals, online full articles, short commentary or letter to editor for published material, study protocols and etc. Different kinds of lectures and techniques can be shared through webinars, group discussion and recorded or live videos on YouTube, Facebook, Twitter etc. All the content can be retrieved immediately or easier than traditional portals by viewers who can also post feedbacks to improve or critic real one. Access to the table of contents as a subscriber might dramatically surge the view of scientific journals as such [1, 35]. Moreover, social liking is not an absolute criterion for reverence of a journal or society as many of them which are not among the topmost have a huge following on social media networks. Medscape, The Lancet and Elsevier have maximum followers/likes or members on Facebook (741 K followers, 722 K likes), Twitter (485 K followers) and LinkedIn (305 K followers) as shown in Table 3.

Table 6 Popular orthopaedics non-profit organizations, ranked according to active users on social networking

S.N	Facebook		Twitter		LinkedIn	
	Orthopaedics societies or non-profit associations	Likes and followers	Orthopaedics societies or non-profit associations	Followers	Orthopaedics societies or non-profit associations	Followers
1	AAOS (American Academy of Orthopaedic Surgeons)	17,457 18,591	American Orthopaedics Society for Sports Medicine (AOSSM)	21.7 K	AAOS	26 K
2	Spondylitis Association of America	24,109 24,313	BOA (British Orthopaedic Association)	15.8 K	AO Foundation	19 K
3	AO (Arbeitsgemeinschaft fur Osteosynthesefragen) Trauma	17,442 17,828	AAOS	14.7 K	NASS (North American Spine Society)	8.4 K
4	Orthopaedic Trauma Association (OTA)	14,819 15,308	American Orthopaedics Association (AOA)	13.6 K	Biological Orthopaedic Society	7.8 K
5	Scoliosis Research Society, Wisconsin	13.1 K 13.6 K	OTA	12.8 K	AO Trauma	7.6 K
6	Arbeitsgemeinschaft fur Osteosynthesefragen (AO foundation)	11,252 11,172	NASS (North American Spine Society)	8728	OTA	7 K
7	Paediatric Orthopaedics Society of North America (POSNA)	10.1 K 10.5 K	Int Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS)	8553	BOA	6.8 K
8	Pan Arab Orthopaedic Association	9831 9816	AOFAS	7860	AOFAS	6.59 K
9	American Orthopaedics Society for Sports Medicine (AOSSM)	6212 7485	AO Foundation	7490	AO Spine	6.2 K
10	AOFAS (American Orthopedic Foot and Ankle Society)	5800 6299	AANA (Arthroscopic Association of North America)	7186	Australian Orthopedic Association	6.12 K
11	American Society for Surgery of the Hand (ASSH)	5019 5482	AO Trauma	6070	EFFORT (European Federation of National Associations of Orthopaedics and Traumatology)	6 K

These publishing companies publishes many orthopaedics and multispeciality journals which also reflect their popularity on viewers of their concerned journals.

Our results also demonstrate that sales of global orthopaedics device firms, may be influenced by active users (related to their company employers, representatives, sales and marketing services and experts) on social networking sites. These device firms frequently participate in various regional and global orthopaedics conferences, CME, online educational activities and other academic activities in form of sponsors of events and publicizes their devices and appliances to orthopaedic world efficiently.

Around 300 orthopaedics and allied associations were screened on social media networking sites with reference to specified internet link (http://www.orthoassociations.com) and other specified links. Around 50 percent of associations were found actively participating on social media and we highlighted the top 10 of these national or international associations. AAOS tops the list of social media presence among other professional association. AAOS has 18,591 followers on Facebook and more than 39,000 actual members. This shows the potential candidates which are yet to be engaged by the association on social media [36]. One of the ways in which these associations can increase their visibility on social media, is to post links of their social media account on their website. Social media toppers like AAOS regularly advertise their social media links in their email or other means. Social networking and virtual media are being highly admired to propagate any seasonal or annual newsletters of society, publicity or to make accessible information regarding annual conferences and meetings, various CME and any special issues among members and followers.

Health care providers and centres are connected to patients individually or in groups by social networking sites. Some of the patients from remote areas can easily access health information and services over these portals created by health care centres [37–40]. In addition, the experiences of clients/patients can be easily accessed on these networks in form of feedback, queries or suggestions. However, subscribers usually publish positive feedback of their services.

It probably constitutes prejudice toward the positive aspect of host services and discredit negative experiences of clients but still dispense distinctive intuition into the patient confrontation or experiences that might be deployed by others. Social media also influences health care delivery in different forms and impacted clinical and para-clinical care through interactive communication between health care providers and patients [38–40]. We screened top orthopaedics allied hospitals in USA on internet in terms of social networking invasion and revealed that multispeciality hospitals and universities allied hospitals were more famous than others. In general, social posts and feedbacks associated with general medicine were more profound than orthopaedics.

In summary, social networking portals have been utilized extensively for publicising and providing information or assistance for individual or patient groups in various forms. It is a cost-effective and time-saving platform for health care providers to disseminate their knowledge while can also be used efficiently for discussion and communication among groups to make consensus or uniformity for debates of common interest. It provides continue streaming of health information through dynamic updating of scientific material published by professional journals and organizations. Although the utilization of social networking has been slower than other but continuous integration of these may address all the concerned issues in future. As last decade trends highlighted the exponential growth in active users related to health information and medical care, this dynamic drive may be utilized adequately to profit or welfare significantly, while this may be a decisive tool to acknowledge different health care societies or organizations for their blooming of future efficiently.

To the best of our knowledge, this is the first study to evaluate the social media presence of orthopaedic journals, orthopaedic professional associations, orthopaedic device firms, health and information service publishing web/companies and hospitals on the different social media platform. Our study has certain limitations, first only accounts in the English were included, which may lead to underestimation of the actual social media presence of various organisations/journals. Second, the evolution of each account with time was not studied, which may have led us to overlook accounts which are emerging. Lastly, although we evaluated the top three social medial platforms, however, other platforms like Pinterest, Instagram, etc., were not studied, which may have left out some accounts.

Conclusions

Even with global intimacy on social networking sites, only a small proportion of orthopaedic journals and associations are active on Facebook, Twitter and LinkedIn at present. There is still a vast majority of potential audience, which can be taped by orthopaedic journals, orthopaedic professional associations, orthopaedic device firms, health and information service publishing web/companies and hospitals. The social networking system has the potential to flourish these journals and organisations in the near future as large populations over the globe have been actively participating and growing in their numbers exponentially. There are several variables who may affect the prevalence of social networking sites and their associations with orthopaedic or medical community, which should be addressed with further studies in future.

Funding None.

Declarations

Conflict of interest None to declare by all authors.

Human and animal rights This study does not contain any involvement with human or animals' participants performed by any of the authors.

Consent Not required.

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