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AOA Critical Issues in Education

Use of Social Media in Orthopaedic Surgery Training and Practice

A Systematic Review

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Background: Social media use has grown across healthcare delivery and practice, with dramatic changes occurring in response to the coronavirus (COVID-19) pandemic. The purpose of this study was to conduct a comprehensive systematic review to determine the current landscape of social media use by (1) orthopaedic surgery residencies/fellowship training programs and (2) individual orthopaedic surgeons and the change in use over time.

Methods: We searched 3 electronic databases (PubMed, MEDLINE, and Embase) from their inception to April 2022 for all studies that analyzed the use of social media in orthopaedic surgery. Two reviewers independently determined study eligibility, rated study quality, and extracted data. Methodology was in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Results: Twenty-eight studies were included, of which 11 analyzed social media use by orthopaedic surgery residency and fellowship training programs and 17 examined its use by individual orthopaedic surgeons. Among residency and fellowship programs, Instagram was identified as the most common platform used, with 42% to 88% of programs reporting program-specific Instagram accounts, followed by Twitter/X (20%-52%) and Facebook (10%-38%). Social media was most commonly used by programs for recruitment and information dissemination to prospective residency applicants (82% and 73% of included studies, respectively). After the start of the COVID-19 pandemic, there was a 620% and 177% increase in the number of training programs with Instagram and Twitter/X accounts, respectively. Individual use of social media ranged from 1.7% to 76% (Twitter/X), 10% to 73% (Facebook), 0% to 61% (Instagram), 22% to 61% (LinkedIn), and 6.5% to 56% (YouTube).

Conclusions: Instagram, Twitter/X, and Facebook are the premier platforms that patients, residency applicants, and institutions frequent. With the continued growth of social media use anticipated, it will be critical for institutions and individuals to create and abide by guidelines outlining respectful and professional integration of social media into practice.

Level of Evidence: Level IV.

Introduction

Over the past decade, social media use has grown across healthcare delivery and practice[1-3]. The variety of social media platforms, such as Twitter/X, Instagram, and Facebook, provide individual healthcare professionals and institutions with a means to disseminate health information, advocate for issues in healthcare

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policy, and foster communication with patients, families, trainees, and colleagues[3,4].

There is a variety of literature examining the benefits of social media use in healthcare. When used by hospitals and individual physicians, social media activity has been associated with improvements in patient satisfaction[5,6], patient-physician relationships[7], healthcare utilization[5,8], research collaboration, and productivity[8]. Among medical training programs, social media use has benefited resident and fellow education and recruitment[9,10]. The COVID-19 pandemic accelerated this recent expansion in the use of social media by individuals and institutions alike as digital platforms became the central means of communication amid lockdowns and physical distancing[11]. In March 2020, 30% of US social media users used social media platforms for 1 to 2 hours daily and 38% for more than 2 hours daily[12]. More than 80% of US State health departments today have social media accounts[13]. This trend is similarly observed across residency and fellowship programs for trainee recruitment[14].

Orthopaedic surgery is a technologically progressive field with patients, trainees, faculty, and institutions using digital platforms to acquire knowledge, seek information, and establish connections[15]. Given the rapid adaptation of social media across healthcare, it is important to improve our understanding of its effect on surgical practice, education, and recruitment. The purpose of this systematic review was to (1) identify trends in the use of social media by orthopaedic surgeons and institutions and (2) determine how social media can be effectively used by surgeons and training programs to improve the acquisition and circulation of information, alongside optimization of recruitment.

Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines[16].

Study Eligibility

The following inclusion criteria were used for article selection: English language, original research, and investigation of social media use by (1) US orthopaedic surgery residency and fellowship programs or (2) by individual orthopaedic surgeons. Exclusion criteria included abstracts, conference proceedings, errata, editorials, and commentaries.

Literature Search

An electronic search of all published literature in PubMed, Embase, and MEDLINE databases from January 1, 2000, to April 17, 2022 was conducted (search strategy detailed in Appendix, http://links.lww.com/JBJSOA/A594). A total of 659 studies were identified.

Study Selection and Data Extraction

After the removal of duplicate (n = 282) and nonoriginal research articles (n = 84), the remaining 298 articles were screened based on their titles and abstracts (Fig. 1). The resulting 36 studies underwent full-text review. Ultimately, 28 studies were included in the analysis. All screening was conducted by 2 independent reviewers (L.R.M. and N.M.), and disagreements were resolved after discussion and consensus with A.G.F. and the senior author (M.M.H.).

Quality Assessment of Included Studies

Quality appraisal was conducted for primary outcomes using the Agency for Healthcare Research and Quality[17] (AHQR) checklist to assess the methodology of the included cross-sectional studies. No eligible observational or randomized clinical studies were published at the time of the literature search. Minimum scores of 14 (of 22) on the AHQR checklist were deemed sufficient for inclusion a priori. All 28 of the included studies exceeded the minimum scores required for final inclusion.

Characteristics of Included Studies

Study characteristics are summarized in Tables I and II. Publication years ranged from 2017 to 2022.

Statistical Analysis

Descriptive statistics, such as mean, SD, and ranges, are presented. Because of significant heterogeneity between studies, studies were manually grouped by similar outcome measures and social media platforms analyzed. Because of the low sample size, p values were not calculated.

Results

Of the 28 articles included studies, 11 focused on residency/fellowship programs[18-28], whereas the remaining 17 examined the utilization of social media by individual orthopaedic surgeons and surgical practices[29-45].

Part I. Residency/Fellowship Programs

All 11 studies examining the use of social media by residency and fellowship training programs explored at least one social media platform (Table I). Of these, Instagram was the most commonly investigated social media platform (11/11), followed by Twitter/X (10/11), and Facebook (9/11). Across these studies, Instagram was identified as the most common platform used by residency programs, with 42% to 88% reporting program-specific Instagram accounts, followed by Twitter/X (20%-52%) and Facebook (10%-38%) (Fig. 2). Social media was documented as a recruitment tool by residency programs (9/11 studies) and as a means to provide information to prospective residency applicants (8/11).

All 8 articles that examined social media use trends by training programs demonstrated an increase in use, as indicated by the rate of social media account creation (Fig. 3). From May 2019 to November 2020—over 9 months into the COVID-19 pandemic—the number of residency and fellowship Instagram accounts increased by 620%, whereas there was a 177% and 69% increase of Twitter/X and Facebook accounts, respectively[28]. LeDuc et al. (2021) revealed that the number of posts on Instagram by programs with existing accounts increased 96% (from 3.76 to 7.36 posts per month) after the onset of the COVID-19 pandemic[23].

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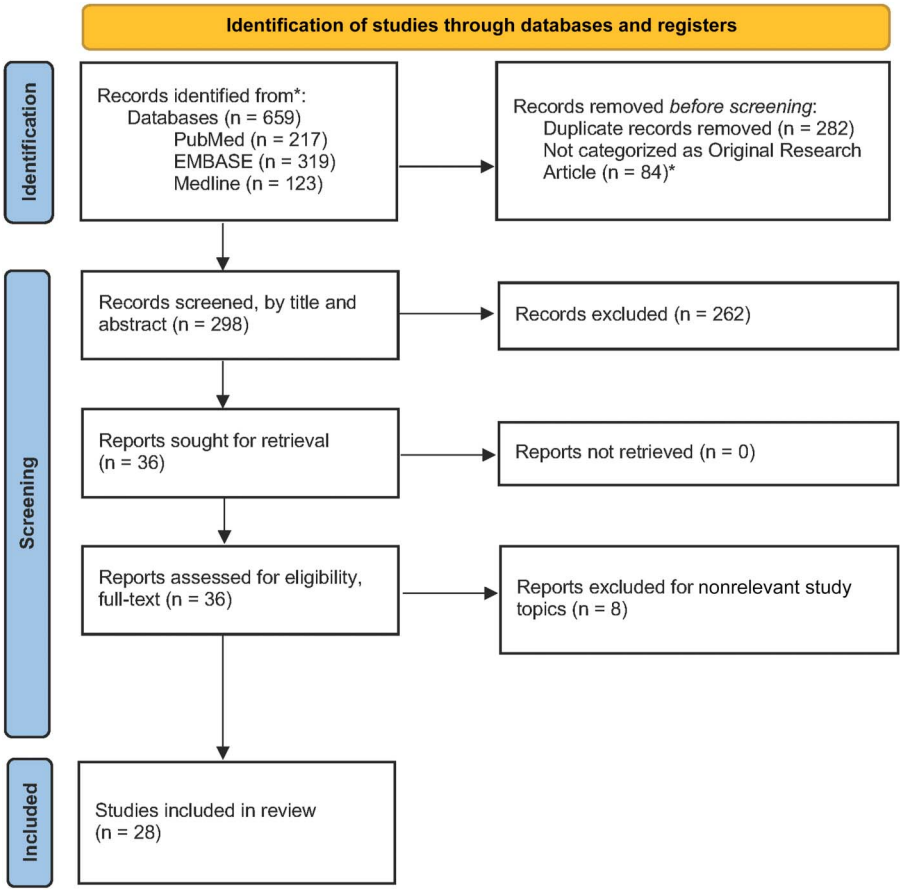

Fig. 1

Study selection PRISMA flow diagram. *Excluded article types include abstracts, conference proceedings, errata, editorials, and commentaries.[15] PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Part II. Individual Orthopaedic Surgeons

Seventeen studies analyzed trends in social media use among individual orthopaedic surgeons spanning a variety of subspecialty fields (Table II). Eight of the 17 studies assessed the percentage of surgeons who reported the use of any public social media page as a primary endpoint, whereas nearly all (15/16) studies reported the breakdown of social media usage by social media platform (Fig. 4). Social media use by individual orthopaedic surgeons ranged from 37% to 74%. Range of utilization by platform across studies was distributed in descending order as follows (mean; range): Twitter/X (1.7%-76%), Facebook (10%-73%), Instagram (0%-61%), LinkedIn (22%-61%), and YouTube (6.5%-56%).

Three studies looked at physician review websites (including, Google, Healthgrades, and Vitals) to examine the relationship between social media use and the number of surgeon ratings[33,37,41]. All 3 studies revealed a positive relationship between social media presence and the number of ratings and comments on these sites. Three studies found no relationship between social media presence on surgeon ratings[30,33,37], whereas one study reported significantly higher surgeon ratings among those with a social media presence[41].

Two studies found no difference in social media use by gender[25,45]. One study, of US hand surgeons, identified higher use of LinkedIn among male surgeons; the gender distribution was equal among other platforms[43]. Among shoulder and elbow surgeons, one study identified a higher use of Instagram by female surgeons compared with male surgeons, with no differences in use across other social media platforms[42].

Eight studies analyzed the association between social media use and practice settings. One study of members of the Cervical Spine Research Society[44] and one study of sports medicine surgeons[39] found no difference in social media use by practice type (academic vs. private) for any platform. Four studies identified differences in social media use between academic and private practice surgeons[34,40,42,46]. One study identified an overall higher use of social media among private practice surgeons[40], whereas another study identified higher use of ResearchGate by academic surgeons[42].

Four studies examined the ethics and professionalism of social media use among orthopaedic surgeons[29,31,32,38]. One study determined that 3.5% of social media content produced by orthopaedic surgeons was "unprofessional"[31]. Another study reported that 89.7% of orthopaedic surgeons surveyed had not read any guidelines for the professional use of social media[38]. When considering specific content, one study of Pediatric Orthopaedic Society of North America members identified considerable disagreement with the use of promotional posts on TikTok (65%) and Facebook (35%)[32]. Another study determined

TABLE I Data Regarding Social Media Use in Residency and Fellowship Programs

Authors (Year)	Study Design (Level of Evidence)	No. of Residency Programs Evaluated	Social Media Platforms Used and Assessed	Purpose for Social Media Use
J. X. Checketts et al. (2021)	Survey (level IV)	192	Twitter, Instagram, and Facebook	Gain information and recruitment tool
T. M. Yong et al. (2021)	Cross-sectional analysis (level IV)	164	Twitter, Instagram, and Facebook	N/a
K. Y. Wang et al. (2021)	Survey (level IV)	78	Twitter, Instagram, Facebook, and LinkedIn	Recruitment tool
J. T. Bram et al. (2021)	Cross-sectional analysis (level IV)	192	Twitter, Instagram, and Facebook	Distribute information and recruitment tool
C. K. Cantrell et al. (2022)	Cross-sectional analysis (level IV)	197	Twitter, Instagram, and Facebook	N/a
M. J. Abbas et al. (2021)	Comprehensive search strategy; cross-sectional analysis (level IV)	158	Twitter, Instagram, and Facebook	Distribute information and recruitment tool
R. LeDuc et al. (2021)	Cross-sectional analysis (level IV)	187	Twitter and Instagram	Distribute information and recruitment tool
B. M. Holderread et al. (2021)	Cross-sectional analysis (level IV)	202	Twitter, Instagram, and Facebook	Gain information and recruitment tool
A. Malyavko et al. (2021)	Cross-sectional analysis (level IV)	192	Twitter, Instagram, and Facebook	Gain information and recruitment tool
C. D. Wilson et al. (2022)	Cross-sectional analysis (level IV)	89	Twitter, Instagram, and Facebook	Distribute information and recruitment tool
D. L. Rodkey et al. (2021)	Cross-sectional analysis (level IV)	190	Instagram	Distribute information and recruitment tool

that certain social media content was associated with greater social media following, such as posts that elicit emotions, solicit viewer engagement, or use a combination of these approaches[29].

Discussion

Social media is engrained in modern life, and this is reflected across healthcare professions[47,48]. This systematic review demonstrates the rapid adoption of social media in the field of orthopaedic surgery because individuals and institutions seek to acquire and distribute information, recruit, and network. The COVID-19 pandemic accelerated this uptake. Within orthopaedic surgery, the role of social media depends on the user and their goal.

Part I. Residency/Fellowship Programs

Orthopaedic surgery residency applicants seem to value social media as a source of information. Wang et al. (2021) found that 67% of programs used social media for recruiting applicants in the 2020 to 2021 application cycle compared with 15% from the previous application cycle[26]. Moreover, more programs reported social media to be "extremely helpful" or "very helpful" for recruiting applicants in the 2020 to 2021 cycle (39% vs. 10%, $p < 0.001$)[26]. Checketts et al. (2021) surveyed 127 applicants from the 2020 to 2021 application cycle and found that 78% perceived that orthopaedic surgery residency programs should have social media accounts and 54% of applicants indicated that an orthopaedic surgery residency program's social media content increased their interest in the program[21]. In addition, 50% of surveyed applicants stated that they attended an open house, educational session, or information session hosted by a residency after learning about the opportunity through social media[21].

Findings would suggest that residency programs are expanding their use of social media as a recruitment tool and as an avenue to promote their program. Among residency programs, Instagram was consistently the most popular platform, used by 88% of programs[26]. This is followed by Twitter/X and Facebook[26]. The number of residency and fellowship programs with social media accounts before and after 2020 has increased substantially, with an average increase of 620%, 177%, and 69% for Instagram, Twitter/X, and Facebook, respectively[28]. The disproportionately larger increase in Instagram accounts compared with other platforms adds to the growing body of evidence, suggesting that Instagram is the primary social media platform among applicants and residency programs. According to applicants, Instagram provides the most benefit during the orthopaedic surgery residency application process[21].

The marked increase in social media use by orthopaedic training programs during 2020 coincides with the transition from audition externships to virtual away rotations at the onset of the COVID-19 pandemic. Although programs already realized the wide-reaching capabilities of social media, the

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TABLE II Data Regarding Social Media Use with Orthopaedic Surgeons Practices

Authors (Year)	Study Design (Level of Evidence)	No. of Surgeons Surveyed	Social Media Platforms Assessed	Study Population (Location)
D. Thorne et al. (2020)	Cross-sectional analysis (level IV)	1,039	Twitter, Instagram, Facebook, LinkedIn, ResearchGate, and YouTube	Orthopaedic surgeons (Australia)
M. J. Abbas et al. (2021)	Retrospective content analysis (level III)	25	Instagram	Orthopaedic surgeons (global)
D. N. Bernstein et al. (2021)	Observational study (level IV)	221	Twitter, Instagram, Facebook, LinkedIn, YouTube, and professional website	Spine surgeons (USA)
B. LaGrant et al. (2021)	Cross-sectional analysis (level IV)	505	Twitter, Facebook, Instagram, LinkedIn, and ResearchGate	Sports medicine physicians (USA)
D. Damodar et al. (2019)	Retrospective study (level III)	145	Twitter, Facebook, Instagram, and YouTube	Joint replacement surgeons (USA)
T. Call; R. Hillock (2017)	Cross-sectional analysis (level IV)	1,021	Twitter, Facebook, LinkedIn, YouTube, professional website, and professional blog	Orthopaedic surgeons (USA)
T. M. Duymus et al. (2017)	Survey (level IV)	321	Twitter, Facebook, and Instagram	Orthopaedic surgeons (Turkey)
T. Justinia et al. (2019)	Cross-sectional survey (level IV)	165	Twitter, Facebook, Instagram, Snapchat, LinkedIn, and YouTube	Orthopaedic surgeons (Saudi Arabia)
A. J. Hodakowski et al. (2022)	Cross-sectional analysis (level IV)	555	Twitter, Facebook, and Instagram	Hip arthroscopists
S. T. Lander et al. (2017)	Cross-sectional analysis (level IV)	987	Twitter, Facebook, LinkedIn, YouTube, ResearchGate, and PubMed	Pediatric orthopaedic surgeons
N. Reddy et al. (2021)	Cross-sectional analysis (level IV)	469	Twitter, Facebook, and Instagram	Hand surgeons
G. Garofolo-Gonzalez et al. (2021)	Cross-sectional analysis (level IV)	123	Twitter, Instagram, Facebook, LinkedIn, YouTube, professional website, and group website	Foot and ankle orthopaedic surgeons
J. R. McCormick et al. (2021)	Cross-sectional analysis (level IV)	646	Twitter, Facebook, and Instagram	Shoulder and elbow surgeons
A. S. Narain et al. (2021)	Cross-sectional analysis (level IV)	676	Twitter, Facebook, Instagram, LinkedIn, ResearchGate, and professional website	Shoulder and elbow surgeons
R. G. Samtani et al. (2021)	Cross-sectional observational (level IV)	325	Twitter, Facebook, Instagram, LinkedIn, YouTube, and professional website	Spine surgeons
B. J. Chiang et al. (2022)	Cross-sectional observational (level IV)	1,231	Twitter, Facebook, Instagram, LinkedIn, YouTube, TikTok, ResearchGate, and professional website	Pediatric orthopaedic surgeons
G. Garofolo et al. (2020)	Cross-sectional observational (level IV)	116	Twitter, Facebook, LinkedIn, YouTube, professional website, and group website	Hand surgeons

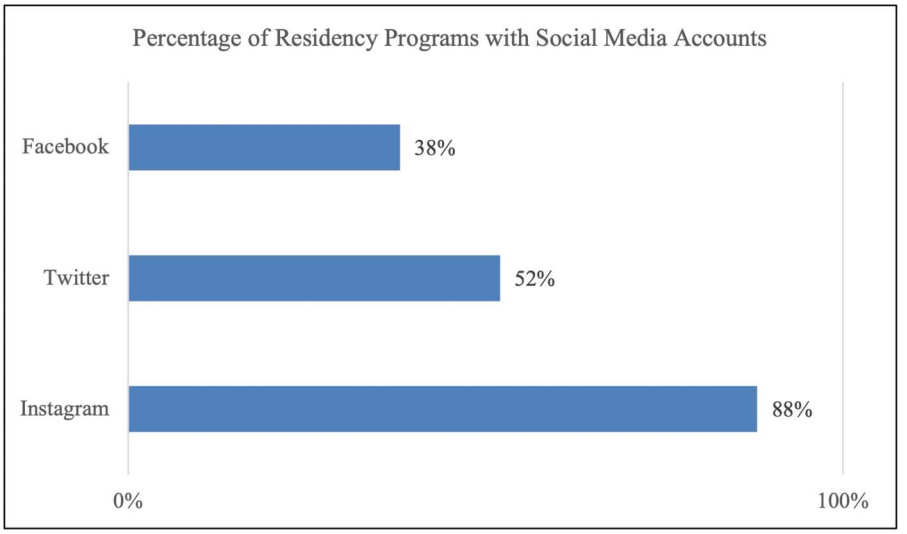

Fig. 2

Orthopaedic residency social media presence by platform across included articles (N = 11).

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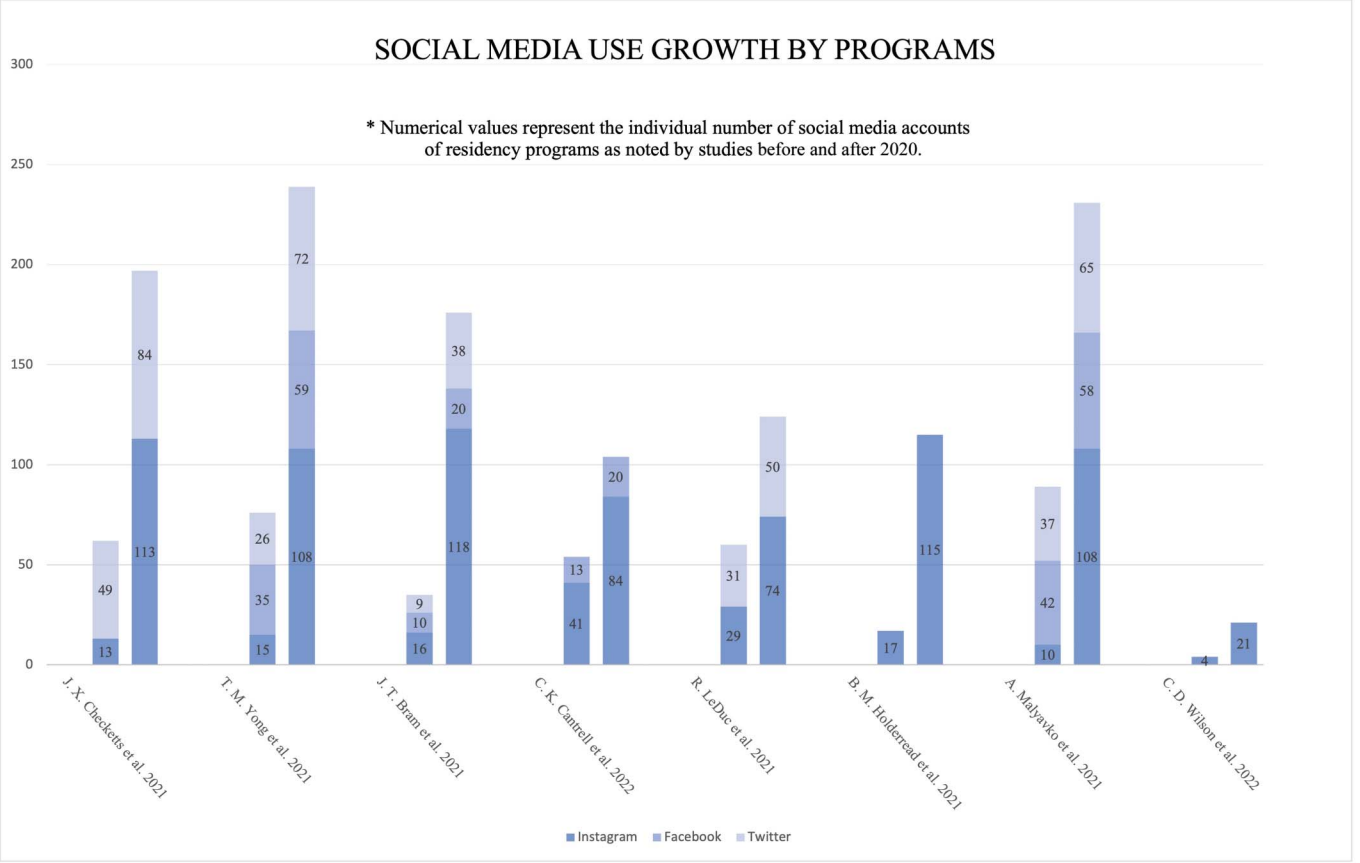

Fig. 3

Growth in orthopaedic surgery residency program social media presence with the COVID-19 pandemic. Numerical values represent the individual number of programs with a noted social media account before and after March 2020 (the initial wave of the COVID-19 pandemic). For each article, the bar on the left represents prepandemic, and the bar on the right represents after the start of the COVID-19 pandemic.

pandemic seems to have hastened the integration of social media into the residency application process. These findings are in line with literature from other surgical specialties[14]. In otorhinolaryngology (ENT), 61% of programs had at least 1 social media account as of June 2020[49]. Similar to the rapid growth seen across orthopaedic surgery residency programs, 67% of Instagram accounts among ENT residency programs were created after March 2020—the beginning of the COVID-19 pandemic in the United States[50].

Part II. Individual Orthopaedic Surgeons

In assessing social media use among individual orthopaedic surgeons, a wide variety of social media platforms surveyed did not fit within the conventional perception of social media. In particular, professional websites and ResearchGate profiles are not as commonly considered social media outlets compared with more dominant platforms such as Instagram, Facebook, and Twitter/X. As such, these authors assumed the definition of social media as any platform in which users can create and share content or participate in social networking. The more expansive definition allowed additional analysis into the use of these less common platforms that are vital to individual orthopaedic surgeon practice and professional promotion. Several studies found that a professional website was the most common platform, with use as high as 98% among surveyed orthopaedic surgeons[30].

A wide variety of social media practices existed among orthopaedic surgeons across the published studies. Although the studies were relatively consistent in their findings regarding the percentage of surgeons reporting use of any social media platform, the breakdowns by platforms vary. The largest discrepancy was in the use of Twitter/X, with values ranging from 1.7% to 76% of orthopaedic surgeons[35,38]. The former statistic stems from a study of US hand surgeons[35], whereas the latter statistic came from a study of all orthopaedic subspecialists in Saudi Arabia[38]. Similarly, most studies examined particular subspecialty groups, such as hand surgeons[35,43], foot and ankle surgeons[36], or shoulder and elbow surgeons[42]. More research is warranted to understand the impact of regional and cultural beliefs, as well as subspecialty, on social media use and platform preference.

The importance of social media presence differs between academic and private practice-based orthopaedic surgeons in certain settings. Private practice pediatric orthopaedic surgeons

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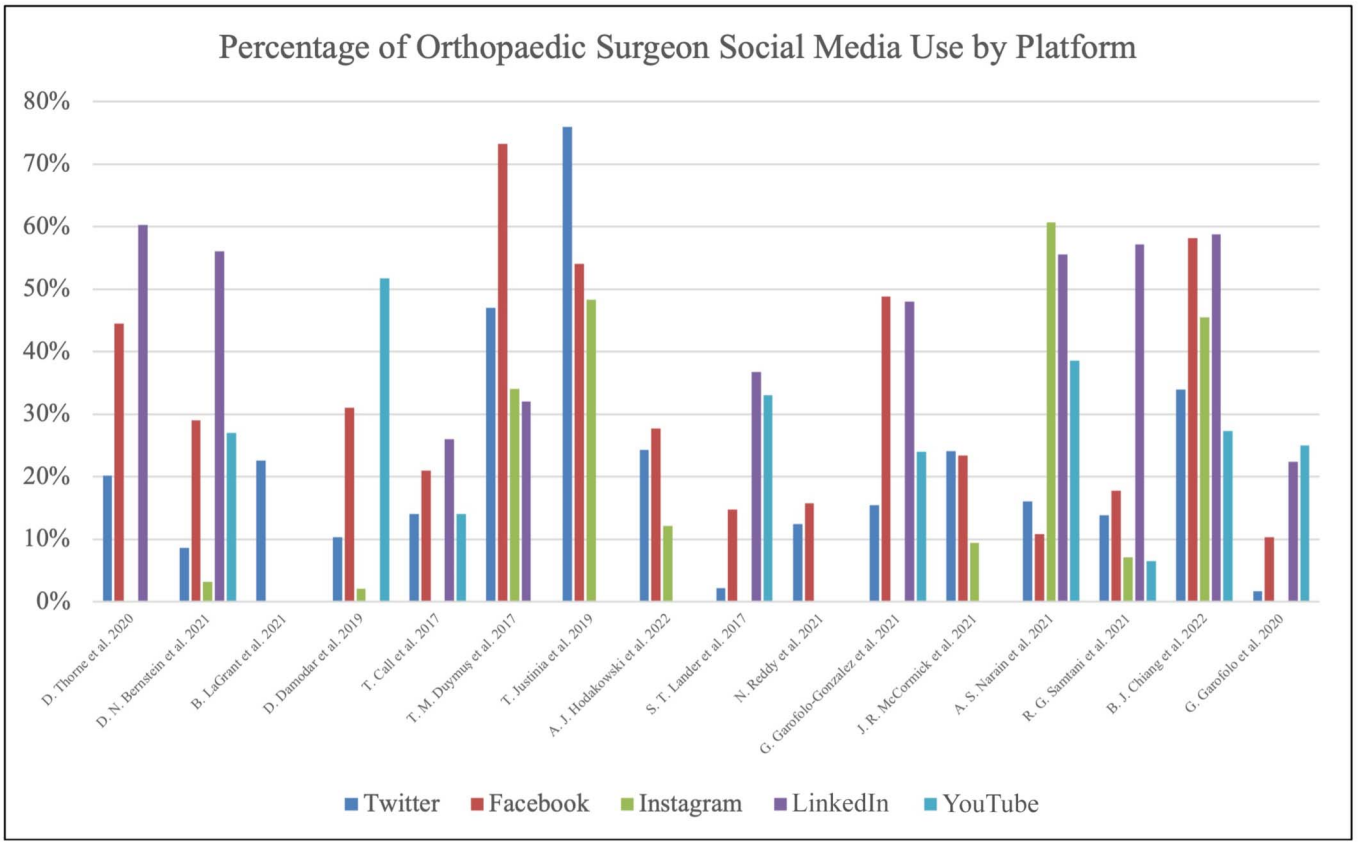

Fig. 4

Distribution of social media platforms used by individual orthopaedic surgeons. The 5 most common platforms reported are portrayed (N = 17).

were twice as active on social media than their hospital-based counterparts[40]. Social media use could be more critical for patient recruitment and visibility for the private practice surgeon. Conversely, academic-based hip arthroscopy surgeons were more likely to use Twitter/X than their private practice-based colleagues, possibly as a means to promote their research[37]. Future studies are needed to delineate the difference in social media utilization between academic and private practice-based surgeons.

Future Directions for Social Media Use in Orthopaedic Surgery

It is likely that the variety of social media platforms will continue to diversify, with platforms such as TikTok already becoming popularized among healthcare professionals. Further study into the psychological aspect of social media utilization within healthcare is necessary. The authors are not clinical psychiatrists or psychologists and thus are unable to expound on the designs of various social media platforms and how they can be optimized for specific purposes. Instagram is a platform built on visual stimulation, whereas Twitter/X is designed based on the dissimilation of written thought. In a continuously competitive market, additional studies would be of benefit to determine which platforms are best suited to a particular task within healthcare.

Despite the broad utilization of social media throughout society, there are concerns regarding its use among physicians. Ethical and professional conduct concerns permeate throughout institutional leadership and medical licensure governing bodies. In a study evaluating the social media accounts of orthopaedic surgeons within the American Academy of Orthopaedic Surgeons directory, unprofessional content was documented in 2.8% of surgeons sampled[31]. Concern regarding professional infractions also exist within the clinician ranks. Approximately 37.9% of surveyed foot and ankle surgeons reported apprehension pertaining to social media use secondary to professional conduct concerns[51]. Social media posts containing misinformation and/or content deemed unprofessional can quickly damage the reputation of an orthopaedic surgeon or institution. A need for clearer guidelines for surgeons regarding appropriate use of professional social media accounts[31]. There is an opportunity for subspecialty organizations to develop guidelines for their members to create a shared understanding of appropriate usage. Care must be taken to ensure that the rapid adoption of social media across the field of orthopaedic surgery is an overall positive change that serves to increase accessibility to orthopaedic care and training.

Limitations

This systematic review has several limitations. Primarily, all articles analyzed in this study were Level III evidence or lower. However, a strength was the breadth of the literature search, having queried 3 large literary search engines for all articles meeting the inclusion criteria. This strategy ensured a high

confidence that all relevant articles evaluating the use of social media within the field of orthopaedic surgery were captured, and that no higher-level studies were omitted from the review. This review demonstrates a need for higher-level studies to investigate the evolving presence of social media in orthopaedic surgery training and practice. Second, our results are those of the data reported at the moment of each specific articles publication. Unfortunately, this does not allow for the evaluation of real-time assessment of evolving social media trends or the adoption of newer platforms. This does represent a limitation and an opportunity for future survey and follow-up studies analyzing alterations in trends over time. Society's increasing reliance on technology is likely to prompt new and innovative uses of social media.

Conclusion

Social media has become instrumental to orthopaedic surgery training and practice as a means of information acquisition and dissemination, recruitment, and networking. Because of physical distancing restrictions, the COVID-19 pandemic further catalyzed the adoption of social media by orthopaedic institutions and surgeons alike. Instagram, Twitter/X, and Facebook are the premier platforms that patients, residency applicants, and institutions frequent, but additional platforms are proving valuable to research promotion and information distribution. With the continued growth of social media use anticipated, it will be critical for institutions and individuals to create and abide by guidelines outlining respectful and professional integration of social media into practice.

Appendix

eA Supporting material provided by the authors is posted with the online version of this article as a data supplement at jbjs.org (http://links.lww.com/JBJSOA/A594). This content was not copyedited or verified by *JBJS*. ■

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References

1. Farsi D. Social media and health care, part I: literature review of social media use by health care providers. J Med Internet Res. 2021;23(4):e23205.
2. Gallo T. Twitter Is Trending in Academic Medicine. Association of American Medical Colleges; 2017. Available at: https://www.aamc.org/news-insights/twitter-trending-academic-medicine. Accessed September 14, 2022.
3. Hameed I, Oakley CT, Ahmed A, Naeem N, Robinson NB, Hameed NUF, Gaudino M. Analysis of physician use of social media. JAMA Netw Open. 2021;4(7):e2118213.
4. Merchant RM. Evaluating the potential role of social media in preventive health care. JAMA. 2020;323(5):411-2.
5. Ellenbogen MI, Ellenbogen PM, Rim N, Brotman DJ. Characterizing the relationship between hospital Google star ratings, hospital consumer assessment of healthcare providers and systems (HCAHPS) scores, and quality. J Patient Exp. 2022;9:23743735221092604.
6. Richter JP, Kazley AS. Social media: how hospital facebook activity may influence patient satisfaction. Health Mark Q. 2020;37(1):1-9.
7. Liu QB, Liu X, Guo X. The effects of participating in a physician-driven online health community in managing chronic disease: evidence from two natural experiments. MIS Q. 2020;44(1):391-419.
8. HealthCare Recruiters International. The Digital Patient: Journey into Hospital Selection. HealthCare Recruiters International; 2015. Available at: https://hcrnetwork.com/the-digital-patient-journey-into-hospital-selection/. Accessed September 14, 2022.
9. Fuller CC, Deckey DG, Brinkman JC, Tummala SV, Lu PG, Mishra N, Bingham JS. General surgery residency applicants' perspective on social media as a recruiting tool. J Surg Educ. 2022;79(6):1334-41.
10. Walk CT, Gerardo R, Parikh PP. Increasing social media presence for graduate medical education programs. Am Surg. 2023;89(5):2108-10.
11. Budd J, Miller BS, Manning EM, Lampos V, Zhuang M, Edelstein M, Rees G, Emery VC, Stevens MM, Keegan N, Short MJ, Pillay D, Manley E, Cox IJ, Heymann D, Johnson AM, McKendry RA. Digital technologies in the public-health response to COVID-19. Nat Med. 2020;26(8):1183-92.
12. Statistica. Additional daily time spent on social media platforms by users in the United States due to coronavirus pandemic as of March 2020. Statistica. 2022. Available at: https://www.statista.com/statistics/1116148/more-time-spent-social-media-platforms-users-usa-coronavirus/. Accessed September 14, 2022.
13. Jha A, Lin L, Savoia E. The use of social media by state health departments in the US: analyzing health communication through facebook. J Community Health. 2016;41(1):174-9.
14. Bludevich BM, Fryer M, Scott EM, Buettner H, Davids JS, LaFemina J. Patterns of general surgery residency social media use in the age of COVID-19. J Surg Educ. 2021;78(6):e218-e225.
15. Vaishya R, Scarlat MM, Iyengar KP. Will technology drive orthopaedic surgery in the future? Int Orthop. 2022;46(7):1443-5.
16. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Syst Rev. 20212021;10(1):89.
17. Agency for Healthcare Research and Quality. Research Findings and Reports. Agency for Healthcare Research and Quality; 2022. Available at: https://www.ahrq.gov/research/findings/index.html. Accessed September 14, 2022.
18. Abbas MJ, Jildeh TR, Khalil LS, Buckley P, Mumuni SP, Washington KJ, Okoroha KR. Social media use continues to increase among orthopaedic residency programs in the United States. Arthrosc Sports Med Rehabil. 2021;3(6):e1761-e1767.
19. Bram JT, Jia L, Huffman W, Ahn J. Orthopaedic surgery residency program social media presence during the COVID-19 pandemic. JB JS Open Access. 2021;6(4):e21.00073.
20. Cantrell CK, Gulati RK, Curtis DZ, Plantz MA, Gerlach E, Smith H, Butler BA, Buchler LT. Orthopaedic surgery residency program websites: a five-year update and the rise of social media. Cureus. 2022;14(2):e22680.
21. Checketts JX, Hunt T, Checketts BR, Scott JT, Johnson M, Boose M, Schwartz M, Chalkin B. Analysis of social media perceptions among orthopaedic surgery residency applicants and social media use by residency programs during the 2020 to 2021 cycle. JB JS Open Access. 2021;6(4):e21.00083.
22. Holderread BM, Liu J, Wininger AE, Harris JD, Liberman SR. The effect of the COVID-19 pandemic on orthopaedic residency program social media utilization. JB JS Open Access. 2021;6(4):e21.00104.

23. LeDuc R, Lyons MM, Riopelle D, Wu K, Schiff A. Social media utilization trends in orthopaedic surgery residency programs during the COVID-19 pandemic. Iowa Orthop J. 2021;41(1):13-7.

24. Malyavko A, Kim Y, Harmon TG, Quan T, Gu A, Bernstein SA, Tabaie SA, Thakkar S. Utility of social media for recruitment by orthopaedic surgery residency programs. JB JS Open Access. 2021;6(3):e21.00076.

25. Rodkey DL, Nelson SY, Lundy AE, Helgeson MD. Exponential growth of social media utilization among orthopaedic surgery residency programs: a cross-sectional study. Curr Orthop Pract. 2021;32(5):500-4.

26. Wang KY, Babu J, Zhang B, Jami M, Musharbash F, LaPorte D. Effect of the COVID-19 pandemic on the orthopaedic surgery residency application process: what can we learn? J Am Acad Orthop Surg Glob Res Rev. 2021;5(10):e21.00204.

27. Wilson CD, Scherry HA, Syed MA, Hammonds KAP. Social media use by hand surgery fellowship programs. J Am Acad Orthop Surg. 2022;30(15):728-34.

28. Yong TM, Pappas MA, Ray GS, McManus TG, Coe MP. Analyzing the proliferation of social media use among orthopaedic surgery residency programs. JB JS Open Access. 2021;6(3):e21.00017.

29. Abbas MJ, Khalil LS, Haikal A, Dash ME, Dongmo G, Okoroha KR. Eliciting emotion and action increases social media engagement: an analysis of influential orthopaedic surgeons. Arthrosc Sports Med Rehabil. 2021;3(5):e1301-e1308.

30. Bernstein DN, Melone G, Jubril A, Zhang J, Mesfin A. Evaluating social media use among active American members of the cervical spine research society. Clin Spine Surg. 2021;34(6):E337-41.

31. Call T, Hillock R. Professionalism, social media, and the Orthopaedic Surgeon: what do you have on the Internet? Technol Health Care. 2017;25(3):531-9.

32. Chiang BJ, Lo KD, Jorgensen AA, Tabaie SA. The evolving role of social media in pediatric orthopaedics. J Pediatr Orthop. 2022;42(4):233-8.

33. Damodar D, Donnally CJ, McCormick JR, Li DJ, Ingrasci GV, Roche MW, Vakharia RM, Law TY, Hernandez VH. How wait-times, social media, and surgeon demographics influence online reviews on leading review websites for joint replacement surgeons. J Clin Orthop Trauma. 2019;10(4):761-7.

34. Duymuş TM, Karadeniz H, Şükür E, Atiç R, Zehir S, Azboy İ. Social media and Internet usage of orthopaedic surgeons. J Clin Orthop Trauma. 2017;8(1):25-30.

35. Garofolo G, Akinleye SD, Golan EJ, Choueka J. Utilization and impact of social media in hand surgeon practices. Hand (N Y). 2020;15(1):75-80.

36. Garofolo-Gonzalez G, Iturriaga CR, Pasternack JB, Bitterman A, Guyton GP. Social media use among foot and ankle orthopedic surgeons. Foot Ankle Orthop. 2021;6(1):2473011420981926.

37. Hodakowski AJ, McCormick JR, Patel MS, Pang C, Yi D, Rea PM, Perry AK, Nho SJ, Chahla J. Social media in hip arthroscopy is an underused resource that enhances physician online reputation. Arthrosc Sports Med Rehabil. 2022;4(2):e349-57.

38. Justinia T, Alyami A, Al-Qahtani S, Bashanfar M, El-Khatib M, Yahya A, Zagzoog F. Social media and the orthopaedic surgeon: a mixed methods study. Acta Inform Med. 2019;27(1):23-8.

39. LaGrant B, Navarro SM, Becker J, Shaikh H, Sulapas I, Shybut TB. Fellowship training is a significant predictor of sports medicine physician social media presence. Arthrosc Sports Med Rehabil. 2021;3(1):e199-e204.

40. Lander ST, Sanders JO, Cook PC, O'Malley NT. Social media in pediatric orthopaedics. J Pediatr Orthop. 2017;37(7):e436-e439.

41. McCormick JR, Patel MS, Hodakowski AJ, Rea PM, Naik KP, Cohn MR, Mehta N, Damodar D, Abboud JA, Garrigues GE. Social media use by shoulder and elbow surgeons increases the number of ratings on physician review websites. J Shoulder Elbow Surg. 2021;30(12):e713-23.

42. Narain AS, Dhayalan A, Weinberg M, Latario LD, Shuman ME, Bango J, Holmes S, Patel JK, Chan W, Aaron DL. Social media utilization among shoulder and elbow surgeons. J Am Acad Orthop Surg. 2021;29(3):123-30.

43. Reddy N, Evans T, Jefferson R, Roebke AJ, Jain SA. Social media use among academic hand surgeons. J Hand Surg Glob Online. 2021;3(5):249-53.

44. Samtani RG, Webb A, Burleson J, Berven S, Theologis A, Abotsi E, Burch S, Deviren V, Haddas R. Spine surgeons social dilemma: benefits and risks of social media for spine surgery practice in the 21st century. Glob Spine J. 2023;13(6):1441-9.

45. Thorne D, Burton C, Tulloch S. Australian orthopaedic surgeons and social media: the future of education and communication? Australas Med J. 2020;13(7):239-46.

46. Earp BE, Kuo K, Shoji MK, Mora AN, Benavent KA, Blazar PE. Evaluating the online presence of orthopaedic surgeons. J Am Acad Orthop Surg. 2020;28(2):e86-91.

47. Chen J, Wang Y. Social media use for health purposes: systematic review. J Med Internet Res. 2021;23(5):e17917.

48. Patrick M, Venkatesh RD, Stukus DR. Social media and its impact on health care. Ann Allergy Asthma Immunol. 2022;128(2):139-45.

49. Ahmadmehrabi S, Xie DX, Ward BK, Bryson PC, Byrne P. OHNS residency program and applicant social media presence during the COVID-19 pandemic. Ann Otol Rhinol Laryngol. 2021;130(8):961-5.

50. Goshtasbi K, Tsutsumi K, Berger MH, Kuan EC, Tjoa T, Haidar YM. Otolaryngology residency programs' rising social media presence during the COVID-19 pandemic. Laryngoscope. 2021;131(5):E1457-9.

51. Salimy MS, Narain AS, Curtin PB, Bellinger EC, Patel AR. Perceptions of social media utilization among orthopaedic foot and ankle surgeons. J Foot Ankle Res. 2023;16(1):58.

FIGURES / TABLES