AOA Critical Issues

The Characterization of Social Media in Orthopaedic Surgery

A Survey Study of 312 Residents and Applicants

Andrew M. Schneider, MD, Jackson Tate, BA, Michael P. Murphy, MD, Kamran Hamid, MD, MPH, Terry R. Light, MD, FAOA, and Adam P. Schiff, MD, FAOA

Investigation performed at Loyola University Medical Center, Maywood, IL

Background: There is a paucity of information regarding the use of social media by both orthopaedic residents and applicants. Therefore, this investigation aimed to (1) characterize the use of social media by current orthopaedic surgery residents and applicants to an orthopaedic surgery residency and (2) evaluate the influence of social media on applicants to an orthopaedic surgery residency.

Methods: An anonymous, nationwide survey was conducted among current orthopaedic surgery residents and fourth-year medical students applying to the authors' orthopaedic surgery. Survey data included demographics, social media usage preferences, social media engagement, and the influence of social media on applicants' perception of and decision to apply to residency programs.

Results: Three hundred twelve surveys were completed, which included 170 resident surveys and 142 applicant surveys. Two hundred thirty-seven of the respondents (76%) use social media daily. Two hundred fourteen respondents (72%) have listened to orthopaedic surgery podcasts. Regarding educational social media posts, 81% of the residents and 57% of the applicants preferred case presentations with corresponding imaging; for noneducational posts, 89% of the applicants preferred content involving resident life outside the hospital. When asked how much an orthopaedic residency program's social media presence influenced application decision (on a scale of 0-10, 0 being no influence and 10 being the most influence), the mean response was 3.47 among all respondents.

Conclusions: Most survey respondents use social media daily, have listened to orthopaedic podcasts, find case presentations with corresponding imaging the most useful format for educational posts, and prefer to see residency programs post about resident life outside of the hospital. A residency program's social media presence did not significantly influence applicants' decision to apply to a specific program; however, there was a trend toward increasing influence with more recent applicants. Future research should further investigate social media's impact on the residency application process and the influence of social media on orthopaedic applicants and residents.
Introduction

The way orthopaedic surgery information is being transmitted is rapidly changing as online platforms now play a greater role for both trainees and surgeons. Social media, in particular Twitter and Instagram, are often used as avenues to remotely learn, teach, and engage with the national and international orthopaedic surgery community. The rapid dissemination of information that is possible with these platforms has made them powerful tools for education, networking, research sharing, and marketing.

The popularity of social media in the orthopaedic surgery community was sharply accelerated by the COVID-19 pandemic and the ensuing social distancing guidelines that limited in-person educational meetings. In 2020, 85% of all current orthopaedic surgery residency program Instagram accounts were created and the number of active orthopaedic podcasts more than doubled. Regardless of future COVID-19 pandemic consequences, the role of social media as a central player in orthopaedic information sharing is now well established. Understanding what content is being shared, who is sharing it, and how trainees and students are consuming that content can help guide orthopaedic surgeons and orthopaedic residency programs toward a more effective social media presence.

As social media continues to shape the dissemination and consumption of orthopaedic information, understanding its current use among trainees is important. Few studies have investigated the role of social media in orthopaedic surgery, and we are unaware of any previous study on the use of social media among current orthopaedic residents and applicants. Therefore, this study aimed to create a survey to (1) characterize the use of social media among current orthopaedic residents and applicants and (2) evaluate the influence of social media on applicants to orthopaedic surgery residency programs.

Materials and Methods

Study Design

After approval by the Institutional Review Board at the investigating institution, the Fellowship and Residency Electronic Interactive Database (FREIDA) was searched in the 2021 to 2022 academic year to obtain program director or program coordinator emails for accredited orthopaedic surgery residency programs in the United States. An anonymous, voluntary web-based survey was sent through email to 198 orthopaedic surgery residency coordinators whose emails were listed on the FREIDA site, requesting that the survey be distributed to each program’s current orthopaedic residents. In addition, the anonymous survey was also sent to all participants of the 2021 to 2022 application cycle who applied to the authors’ home program through the Electronic Residency Application Service. The twenty-question survey recorded participant demographics, social media usage, orthopaedic content consumption, and social media’s influence on the individual’s perception of different residency programs. Completion of the survey was incentivized by rewarding a random participant with a $100 Amazon gift card. Study data were collected through Microsoft Forms and were deidentified. The decoupled emails were used to select a gift card winner using a random number generator. To more accurately gauge the survey response rate, a 1-month follow-up email was sent to the 198 orthopaedic surgery residency coordinator asking them to reply with a simple “yes” if the survey had been forwarded to their residents.

A list of current orthopaedic surgery residency programs was created through the FREIDA website, and a manual search of 2 popular social media platforms, Instagram and Twitter, was performed to identify and analyze social media accounts associated with orthopaedic surgery residency programs. All data recorded from this manual search, including the number of posts and number of followers, occurred on November 5, 2021.

Statistics

Data entry and analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 26.0). Statistical significance was set at p value <0.05. A nonparametric Kruskal-Wallis 1-way analysis of variance was used to assess a relationship between sex and time spent on social media per day (p = 0.271). Given the lack of significance, sex was not treated as a confounding variable in subsequent analyses. Questions in which rankings were used (increasing social media time, importance of social media presence, or number of programs/attendings followed), a χ² test for statistical significance was first performed. Post hoc analysis involved pairwise comparisons of each respondent’s ranked order with the Wilcoxon signed-rank test with Bonferroni correction.

Results

Demographics

Twenty-two residency programs responded to the 1-month follow-up email confirming that the survey was forwarded to their residents, creating a resident survey population of 493. The survey response rate for the resident group was 34%. The survey response rate for the applicant group was 16%.

Among resident respondents, 102 (60.4%) were male, 91 (53.8%) were of 25 to 29 years, 73 (43.2%) were of 30 to 34 years, 4 (2.4%) were of 35 to 39 years, and 1 (0.6%) was older than 40 years (Table I). Most residents (63.5%) spent 30 to 60 minutes per day and 7 days per week (82.0%) on social media. One hundred eighteen resident respondents (73.3%) have listened to orthopaedic surgery podcasts. Among orthopaedic surgery subspecialty accounts followed on social media, trauma was the most popular, with 73.5% of respondents following (Table II). The American Academy of Orthopaedic Surgeons (AAOS) (38.5%) and the Journal of Bone and Joint Surgery (JBJS) (54.8%) were the most followed orthopaedic professional organization and orthopaedic journal, respectively.

Among applicant respondents, 108 (75.5%) were male, 99 (69.2%) were of 25 to 29 years, 42 (28.7%) were of 30 to 34 years, and 2 (1.4%) were of 35 to 39 years (Table I). Almost 34% of applicants spend more than 2 hours a day on social media.
social media, and most (77.8%) use it 7 days per week. Ninety-six medical student respondents (71.1%) have listened to orthopaedic surgery podcasts. Among orthopaedic surgery subspecialty accounts on social media, general orthopaedic surgery podcasts were the most popular (61.2%) followed by trauma (54.5%) (Table II). The AAOS (58.0%) and the Journal of Bone and Joint Surgery (52.7%) were the most followed orthopaedic professional organization and orthopaedic journal, respectively.

**Social Media Preferences and Engagement**

When asked to identify the most useful format for education-related orthopaedic surgery posts, 81% of resident respondents and 57% of medical student respondents chose case presen-

| TABLE I Demographics and Characterization of Social Media Use Among Respondents* |
|---------------------------------|---------------------------------|
| **Demographics**                | **Residents, n (%)**            |
| **Medical**                     | **Students, n (%)**             |
| Sex                             |                                 |
| Male                            | 102 (60.4)                      |
| Female                          | 67 (39.6)                       |
| Age (yrs)                       |                                 |
| <24                             | 0 (0)                           |
| 25-29                           | 91 (53.8)                       |
| 30-34                           | 73 (43.2)                       |
| 35-39                           | 4 (2.4)                         |
| >40                             | 1 (0.6)                         |
| Year in training                |                                 |
| MS4                             | 53 (17.2)                       |
| PGY 1                           | 81 (12.2)                       |
| PGY 2                           | 33 (10.7)                       |
| PGY 3                           | 26 (8.4)                        |
| PGY 4                           | 25 (8.1)                        |
| PGY 5                           | 29 (9.4)                        |
| Time spent on social media      |                                 |
| Time per day                    |                                 |
| 0-30 min                        | 0.01                            |
| 30-60 min                       | 0.007                           |
| 1-2 h                           | 0.000001                        |
| >2 h                            | 0.01                            |
| Days per week                   |                                 |
| 0-3                             | 8 (5.0)                         |
| 4-6                             | 21 (13.0)                       |
| 7                               | 132 (82.0)                      |
| Orthopaedic podcast use         |                                 |
| Yes                             | 118 (73.3)                      |
| No                              | 43 (26.7)                       |

*MS = medical student, and PGY = postgraduate year.
tations with corresponding imaging (Fig. 1). When medical student respondents were asked to identify their preference for orthopaedic residency program posts, respondents preferred content about resident life (location, hobbies, activities outside the hospital, etc.) (89.1%), current resident information (80.6%), additional information on the application process for that institution (65.9%), educational opportunities (conferences, laboratories, etc.) (62.8%), fellowship placement (46.5%), and faculty information (45.7%) (Fig. 2). The number of orthopaedic residency programs followed on social media was greatest among more junior respondents (Fig. 3). Most applicants (MS4s) are following more than 20 programs (42.2%) while most postgraduate year (PGY) 5s are following only 1 to 5 programs (65.4%). A similar trend of more junior respondents following more accounts was seen with those following specific orthopaedic attendings: Most PGY 1 residents followed 11 or more specific orthopaedic attendings while most PGY 5s followed only 1 to 5 attendings (Fig. 4). Interestingly, when it came to following attendings, applicants did not follow this trend.

Social Media Influence
When asked to rate the quality of content on orthopaedic social media accounts (on a scale from 0 to 10, with 0 being the worst quality and 10 being the best quality), medical students gave higher (better) scores than residents. The overall mean response was 6.17 (Fig. 5). This was not statistically related to sex ($p = 0.172$), although it was statistically related to age ($p < 0.01$) and postgraduate year ($p < 0.0001$). The mean rating of quality of content by year was 6.86 for applicants, 5.80 for residents.

**Fig. 1**
Most useful orthopaedic education posts for medical students and residents. Seventy-percent of all respondents chose case presentations with corresponding imaging as the most useful format for education-related orthopaedic surgery posts.

**Fig. 2**
Applicant preferences for orthopaedic residency program posts. Most applicants preferred residency program posts related to resident life (location, hobbies, activities outside the hospital, etc.) (89.1%).
PGY 1 residents, 8.84 for PGY 2, 5.13 for PGY 3, 5.46 for PGY 4, and 5.35 for PGY 5. When asked how much an orthopaedic residency program’s social media presence influenced respondent decision to apply there (on a scale of 0-10, 0 being no influence and 10 being the most influence), the mean response was 3.47. Here, sex was statistically related to the importance of social media (p < 0.01), with female respondents placing more importance (mean: 4.21) on social media than male respondents (mean: 3.09). There was a general trend toward increasing influence with those earlier in training (more junior postgraduate year), which was statistically significant (p < 0.0001). Specifically, the mean influence by year was 4.32 for applicants, 4.73 for PGY 1 residents, 3.39 for PGY 2, 1.24 for PGY 3, 1.30 for PGY 4, and 0.81 for PGY 5 (Fig. 6).

Fourteen percent of respondents have had their opinion of an orthopaedic residency program being negatively influenced by their social media page, and 76.6% have had their opinion of a positive influence. Eight percent have observed posts related to orthopaedic surgery that might be considered inappropriate or a violation of patient privacy.

**Discussion**

Social media use in the orthopaedic surgery community has been steadily growing in recent years, with a recent surge after the emergence of the COVID-19 pandemic. While studies have published data reflecting the rising popularity of social media in orthopaedic surgery, to the best of our knowledge, no previous work has evaluated social media usage among current orthopaedic surgery residents and orthopaedic surgery residency applicants. This study demonstrated that daily use of social media, for up to an hour per day, is common. Current residents and applicants are engaged in podcasts and find case presentations with corresponding imaging the most useful educational post type. Applicants prefer resident-centered content from residency program social media accounts, and 14% of respondents were negatively influenced by an orthopaedic residency social media account. Understanding these results can aid orthopaedic educators and residency programs in optimizing orthopaedic social media content.

Recent studies have attempted to characterize social media trends and preferences among trainees in other specialties. In a 2018 to 2019 survey study of plastic surgery residency applicants, Irwin et al. reported daily use of social media in just over half of their respondents. In addition, 72% of their respondents found a residency program’s social media page to have a positive effect, and the most preferable social media posts included information regarding educational opportunities, resident life, resident and faculty accomplishments, and research. This study supports the positive influence of social media posts, with 81% of applicants and 77% of all survey respondents reporting posts having a positive effect. However, compared with the aforementioned study, a larger proportion of respondents in our study (>80%) reported daily social media use, and the most preferable posts included resident life (hobbies, activities, etc.) and current resident information (Fig. 2). These results are echoed in the study by Malyavko...
et al., who assessed the utility of social media for recruitment by orthopaedic surgery residency programs⁶. They demonstrated that most residency program Instagram accounts showcased the daily work of residents, a resident biography, or resident life outside of the hospital. The increased importance of resident life among survey respondents in the study by Malyavko et al. and this study can be explained by the increasing reliance on virtual platforms, such as social media, to assess the culture of a residency program in the COVID 19 pandemic era. Prepandemic studies found components of program culture such as perceived happiness, quality of life, and camaraderie of residents to be the key features considered by prospective orthopaedic surgery applicants. These elements were traditionally evaluated during away rotations and in-person interviews¹⁰.
Jella et al. reported a 1,240% growth in active orthopaedic podcasts between January 2016 and October 2020, with 62 active podcasts as of October 2020. The findings of this study reflect this recent rapid growth of podcasts, with 72.1% of the respondents reporting having listened to an orthopaedic podcast, suggesting its promise as a viable orthopaedic information medium.

Survey respondents found case presentations with corresponding imaging desirable, with 81% of the residents and 57% of the applicants reporting it to be the most useful type of educational social media post. With its easy photograph-sharing capabilities, Instagram naturally facilitates case-based learning in visually and radiographically rich disciplines such as orthopaedic surgery. The Department of Radiology at the University of Arkansas for Medical Sciences and Arkansas Children’s Hospital online teaching curriculum, consisting of more than 650 teaching cases posted on Instagram, has over 60,000 followers.

Although previous studies have found that applicants use social media for residency program information, the results of this study demonstrated that a residency program’s social media presence only marginally influenced an applicant’s decision to apply to that program (Fig. 6). However, mean ratings seen in our survey trended toward increased importance among more junior residents (more recent orthopaedic surgery residency applicants). The COVID-19 pandemic changed the application process for medical students applying to residency and could explain this result. With the cancellation of in-person “away” rotations, applicants and residency programs alike were forced to rely on a virtual presence for social engagement and residency interviews.

The acceleration of social media use in the orthopaedic world has resulted in educational and informational benefits for residents and prospective applicants, although not all the results of our study were encouraging. Twenty percent of all respondents reported either seeing or being unsure whether they had seen an orthopaedic surgery post that could be considered inappropriate or a violation of patient privacy. There are currently no universal guidelines for social media use in the orthopaedic surgery community, and uncertain ethical and legal standards remain. A 2017 study by Call et al. reviewed online content posted by 1,021 orthopaedic surgeons across social media platforms, identifying some form of unprofessional content from 3.5% of surgeons. Although most posts are well-intentioned, it is imperative that the greater orthopaedic community stay vigilant to prevent posting material that can be construed as offensive or as violating the sanctity of the physician-patient relationship. In addition, 14% of respondents were negatively influenced by an orthopaedic residency social media account. Eliciting the reasons for this would significantly improve our understanding of the influence of social media in orthopaedics but is outside the scope of this study. Further exploration of this finding in future studies is encouraged.

In a 2021 review of social media in orthopaedic resident education and training, Cole et al. outlined the different types of social media platforms within orthopaedics, which included social networks (Facebook, Twitter, and Instagram), blogs (OrthoGate, Medscape Orthopedics, and Orthopedics Today).
Characterization of Social Media in Orthopaedic Surgery

Conclusion

This study characterized the use of social media among current orthopaedic surgery residents and applicants and evaluated the impact of social media on applicants to orthopaedic surgery residency. Most survey respondents use social media daily, have listened to orthopaedic podcasts, find case presentations with corresponding imaging most useful format for educational posts, and prefer to see residency programs post about current residents. When residency programs post on social media, the impact is overwhelmingly positive. A residency program’s social media presence did not significantly influence the surveyed applicants’ decision to apply to a program; however, there was a trend toward increasing influence with more recent applicants. The orthopaedic community on social media must remain vigilant to protect patient privacy. Future studies should further investigate social media's impact on the residency application process and the influence of social media on orthopaedic applicants and residents. 

Andrew M. Schneider, MD
Jackson Tate, BA
Michael P. Murphy, MD
Kamran Hamid, MD, MPH
Terry R. Light, MD, FAOA
Adam P. Schiff, MD, FAOA

1Department of Orthopaedic Surgery and Rehabilitation, Loyola University Medical Center, Maywood, Illinois
2Loyola University Chicago Stritch School of Medicine, Maywood, Illinois

E-mail address for A.M. Schneider: Aschneider924@gmail.com

References

1. Jelia TK, Cwalina TB, Acuna AJ, Samuel LT, Kamath AF. Good morning, orthopods: the growth and future implications of podcasts in orthopaedic surgery. J Bone Joint Surg Am. 2021;103(9):840-7.
2. Steele TN, Galaira-Pazet L, Aguilo-Seara G, David LT. Social media impact in the match: a survey of current trends in the United States. Arch Plast Surg. 2021;48(1):107-13.
3. Plancher KD, Shamungam JP, Pettersson SC. The changing face of orthopaedic education: searching for the new reality after COVID-19. Arthrosc Sports Med Rehabil. 2020;2(4):e295-8.
4. Santani RG, Webb A, Burleson J, Beven 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. Global Spine J. 2021;2021:21925682211035716.
5. McCormick JR, Patel MS, Hodakowski AJ, Rea PM, Naik KP, Cohn MR, Mehta N, Damodor 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.
6. Malayvao A, Kim Y, Harmon TG, Quan T, Gu A, Bernstein SA, Tabaei SA, Thakkar S. Utility of social media for recruitment of orthopaedic surgery residency programs. JBJS Open Access. 2021;6(3):e21.00076.
7. Friedman LGM, Menendez ME. What's important: how social media can foster connectedness: voices from the #OrthoTwitter community. J Bone Joint Surg Am. 2021;103(12):1152-4.
8. Yong TM, Pappas MA, Ray GS, McManus TG, Cog MP. Analyzing the proliferation of social media use among orthopaedic surgery residency programs. JBJS Open Access. 2021;6(3):e21.00017.
9. Irwin TJ, Eberlin KR. Reply: the impact of social media on plastic surgery residency applicants. Ann Plast Surg. 2021;86(3):335-339. 10.1097/SAP.0000000000002996.
10. Huntington WP, Haines N, Patt JC. What factors influence applicants’ rankings of orthopaedic surgery residency programs in the national resident matching program? Clin Orthop Relat Res. 2014;472(9):2859-66.
11. Wadhva V, Raichandani S, Villanilam GK, Van Tassel D, Jorgensen S, Wang K. Establishing an online educational teaching file on Instagram for an academic radiology department: proof-of-concept. Acad Radiol. 2021;28(5):711-7.
12. Cole WW, Perez-Chaumont A, Miskimim C, Mulcahey MK. Social media and its use in orthopaedic surgery residency education and training. JBJS Rev. 2021;9(11):10.2106/JBJS.RVW.21.00083.
13. Rohde SC, White EM, Yoo PS. Residency program use of social media in the COVID-19 era: an applicant’s perspective. J Surg Educ. 2021;78(4):1066-8.
14. Chen VW, Hoang D, Garner D. Who websites provide what applicants need? Plastic surgery residency program websites versus applicant self-reported needs. Plast Reconstr Surg Glob Open. 2018;6(10):e1900.
15. Feddelia A, Sotropoulos MG, Hannahan JG, Janga D, Dedeilias P, Sideris M. Medical and surgical education challenges and innovations in the COVID-19 era: a systematic review. In Vivo. 2020;34(3 suppl):1603-11.
16. 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.
17. Cole WW, Perez-Chaumont A, Miskimim C, Mulcahey MK. Social media and its use in orthopaedic surgery residency education and training. JBJS Rev. 2021;9(11):10.2106/JBJS.RVW.21.00083.
18. Gordon AM, Malik AT, Schanschmidt TJ, Goyal KS. Cost analysis of medical students applying to orthopaedic surgery residency: implications for the 2020 to 2021 application cycle during COVID-19. JBJS Open Access. 2021;5(1):e20.00158.