



AOA Critical Issues

The Characterization of Social Media in Orthopaedic Surgery

A Survey Study of 312 Residents and Applicants

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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.

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJSOA/A379>).

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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^{1,2}. 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 community²⁻⁵. 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^{1,5-8}. In 2020, 85% of all current orthopaedic surgery residency program Instagram accounts were created and the number of active orthopaedic podcasts more than doubled^{1,6}. Regardless of future COVID-19 pandemic consequences, the role of social media as a central player in orthopaedic information sharing is now well established⁷. 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 (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 coordinators 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 χ^2 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) (58.5%) 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

TABLE I Demographics and Characterization of Social Media Use Among Respondents*		
Demographics	Residents, n (%)	Medical Students, n (%)
Sex		
Male	102 (60.4)	108 (75.5)
Female	67 (39.6)	35 (24.5)
Age (yrs)		
<24	0 (0)	0 (0)
25-29	91 (53.8)	99 (69.2)
30-34	73 (43.2)	42 (28.7)
35-39	4 (2.4)	2 (1.4)
>40	1 (0.6)	0 (0.0)
Year in training		
MS4	—	142 (46.1)
PGY 1	53 (17.2)	—
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	45 (31.5)
30-60 min	0.007	45 (31.5)
1-2 h	<0.00001	34 (23.7)
>2 h	0.01	19 (13.3)
Days per week		
0-3	8 (5.0)	8 (5.9)
4-6	21 (13.0)	22 (16.2)
7	132 (82.0)	105 (77.2)
Orthopaedic podcast use		
Yes	118 (73.3)	96 (70.6)
No	43 (26.7)	47 (29.4)

*MS = medical student, and PGY = postgraduate year.

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 II Respondent Follow Characteristics		
Subspecialties Followed on Social Media	Residents, n (%)	Applicants, n (%)
Trauma	118 (73.8)	73 (54.5)
General	75 (46.9)	82 (61.2)
Arthroplasty	65 (40.6)	33 (24.6)
Sports	50 (31.3)	47 (35.1)
Hand	37 (23.1)	18 (13.4)
Foot/ankle	20 (12.5)	11 (8.2)
Spine	10 (6.3)	20 (14.9)
Pediatrics	12 (7.5)	17 (12.7)
Shoulder/elbow	11 (6.9)	15 (11.2)
Oncology	5 (3.1)	9 (6.7)
Orthopaedic professional organizations followed on social media		
AAOS	57 (35.8)	41 (31.3)
AOA	93 (58.5)	76 (58.0)
RJOS	23 (14.5)	42 (32.1)
OTA	31 (19.5)	31 (23.7)
ASSH	20 (12.6)	34 (26.0)
AOSSM	15 (9.4)	12 (9.2)
ORS	7 (4.4)	15 (11.5)
AOFAS	6 (3.8)	14 (10.7)
NASS	6 (3.8)	9 (6.9)
AANA	5 (3.1)	10 (7.6)
AAHS	4 (2.5)	10 (7.6)
POSNA	6 (3.8)	7 (5.3)
AAHKS	6 (3.8)	7 (5.3)
None	3 (1.9)	3 (2.3)
Orthopaedic journals followed on social media		
JBJS	85 (54.8)	68 (52.7)
JOA	20 (12.9)	25 (19.4)
AJSM	13 (8.4)	24 (18.6)
CORR	10 (6.5)	22 (17.1)
BJJ	11 (7.1)	20 (15.5)
JOT	1 (0.6)	0 (0.0)
JHS	1 (0.6)	0 (0.0)
None	67 (43.2)	52 (40.3)

AAHKS = American Association of Hip and Knee Surgeons; AAHS = American Association for Hand Surgery; AANA = Arthroscopy Association of North America; AAOS = American Academy of Orthopaedic Surgeons; AOA = American Orthopaedic Association; AOFAS = American Orthopaedic Foot and Ankle Society; AOSSM = American Orthopaedic Society for Sports Medicine; ASSH = American Society for Surgery of the Hand; NASS = North American Spine Society; ORS = Orthopaedic Research Society; POSNA = Pediatric Orthopaedic Society of North America; and RJOS = Ruth Jackson Orthopaedic Society.

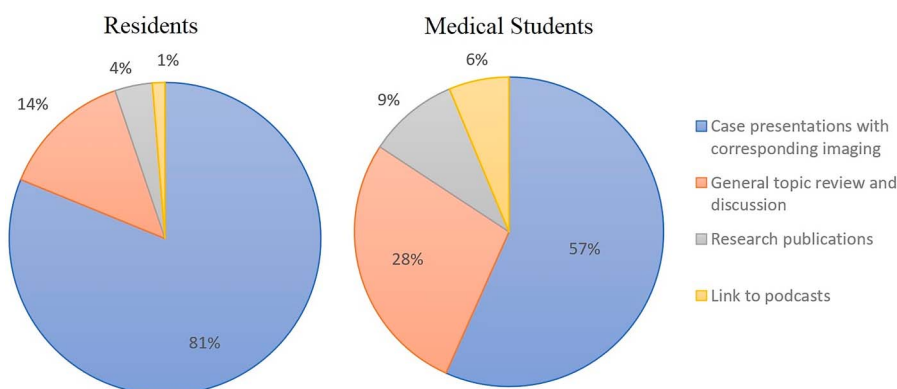


Fig. 1 Most useful orthopaedic education posts for medical students and residents. Seventy-percent of all respondents chose case presentations with corresponding imaging as the most useful format for education-related orthopaedic surgery posts.

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

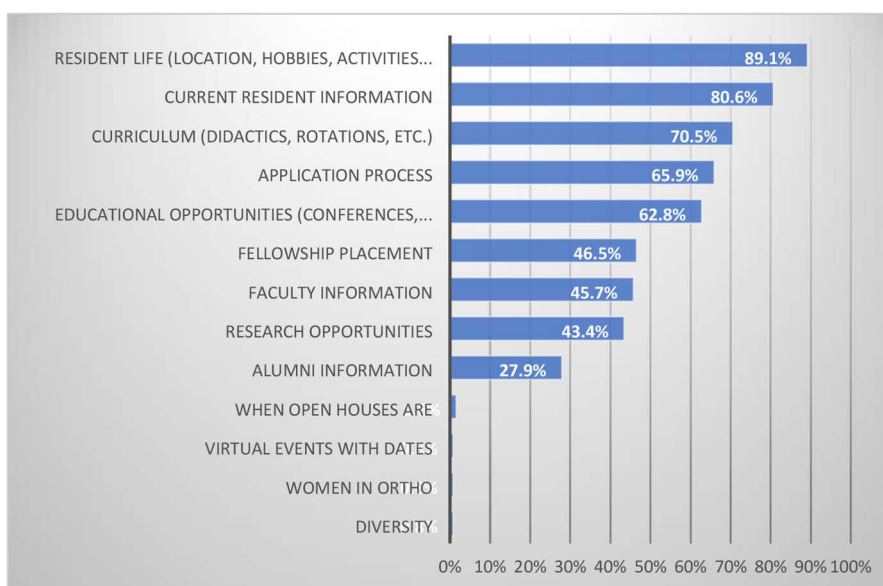


Fig. 2 Applicant preferences for orthopaedic residency program posts. Most applicants preferred residency program posts related to resident life (location, hobbies, activities outside the hospital, etc.) (89.1%).

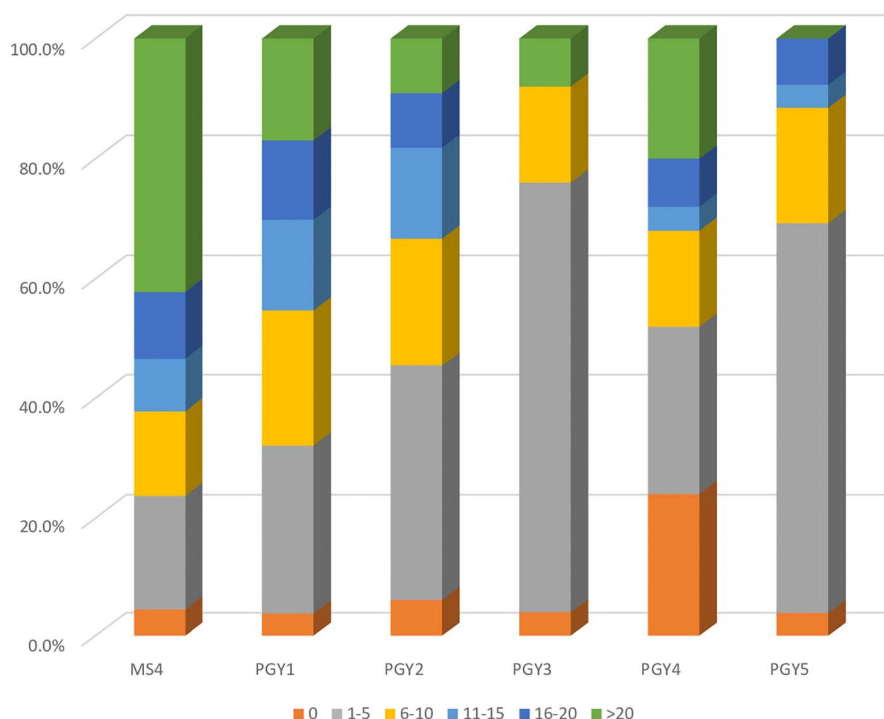


Fig. 3
Number of residency programs followed. The number of orthopaedic residency programs followed on social media was greatest among more junior respondents.

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^{6,7}. 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 respondents⁹. 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

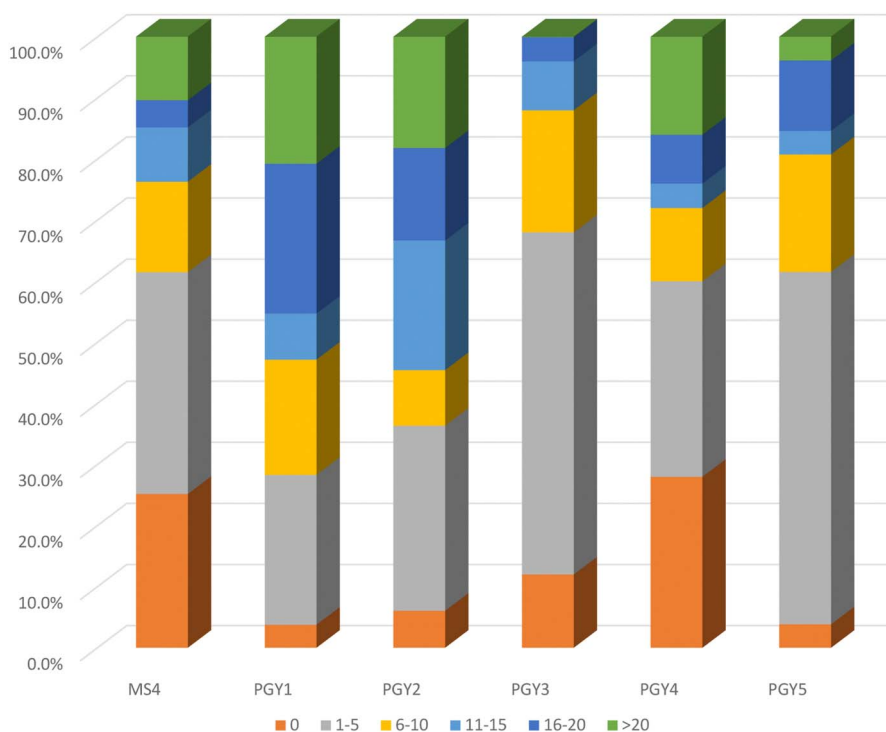


Fig. 4
The number of orthopaedic attendings followed stratified by year in training.

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. Pre-pandemic 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.

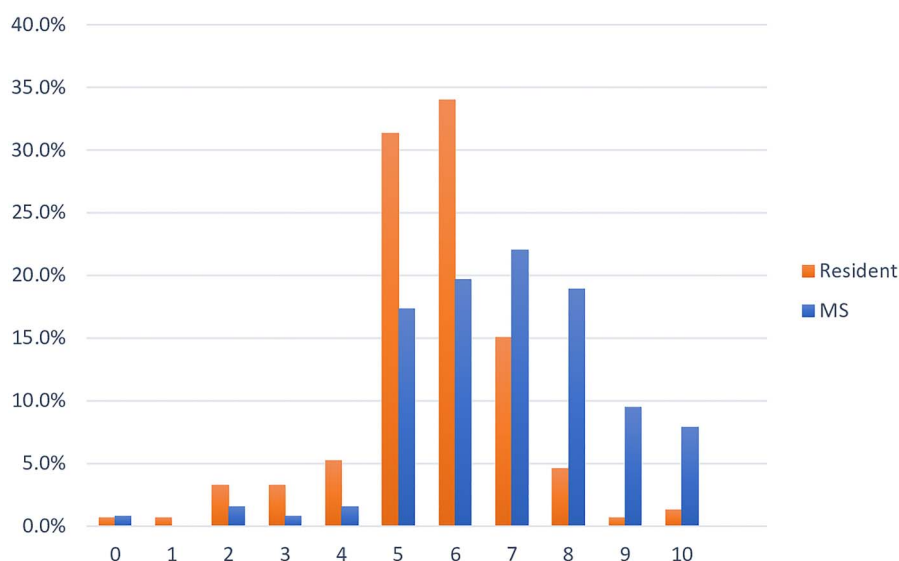


Fig. 5
Respondent ratings of orthopaedic social media quality stratified by residents and medical students. The mean rating was 6.17 among all respondents.

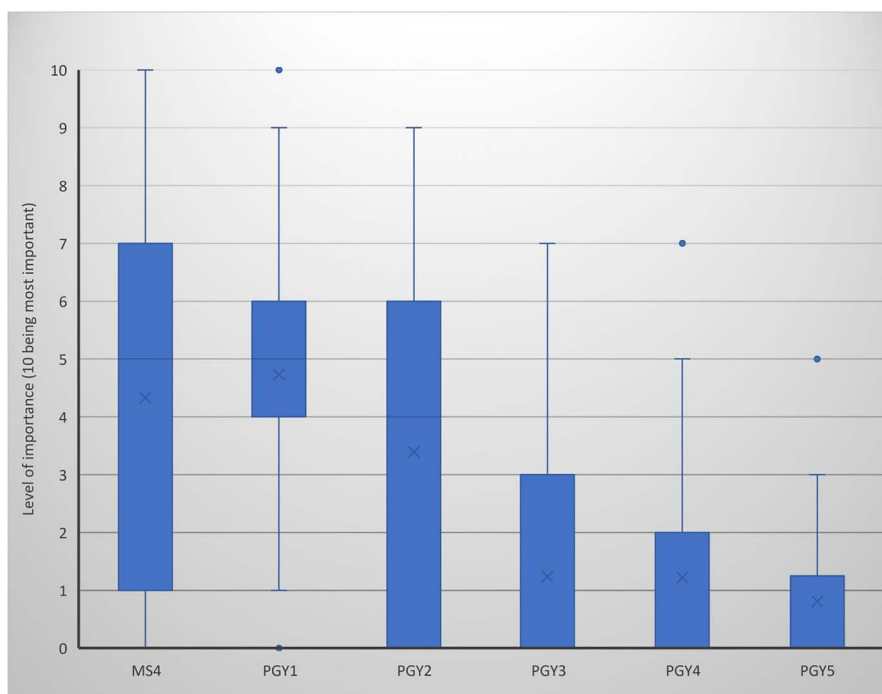


Fig. 6
The impact of residency program social media presence on a resident's decision to apply to a program was significantly greater for residents earlier in training ($p < 0.0001$).

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^{11,12}.

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^{2,10,13,14} (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^{13,15}.

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 remain⁶. 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^{12,16}. 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 This

Week), forums (OrthoGate), professional networks (LinkedIn, Sermo, and OrthoGate), academic networks (ResearchGate and Academia), and video-sharing platforms (YouTube, Vu-Medi, JoMI surgical videos, and AAOS Orthopaedic Video Theater), podcasts (The Orthobullets Podcast, Nailed It Ortho, JBJS Podcast, and OrthoJoe), and E-learning (OTA Online curriculum and AOFAS resident curriculum)¹⁷. As these different social media outlets continue to expand, our results can help tailor their growth to the preferences of target audiences such as orthopaedic residents and applicants. Future studies should focus on the use and content preferences of residents across the various platforms.

There are several limitations to this study. Recall bias is an inherent issue for any survey study, and this study is no different. The estimated survey response rate was 34% for the resident group, although the exact rate is impossible to determine because we were unable to email residents directly and depended on emailing program coordinators whose email addresses were readily available online. One could imagine that residents may be less likely to respond to the survey if they do not use social media or if they have a bias for or against the investigating institution. Selection bias was also present in this study. Although resident solicitation for the survey was mediated by program coordinators, the population of the applicant group was created from individuals who applied to our program. However, in the past year, a total of 1,192 people applied to orthopaedic surgery residency programs; the 883 applicants who received our survey would have represented 74.1% of the total number of orthopaedic surgery applicants from past year¹⁸. Despite these limitations, our results can offer guidance to orthopaedic leaders, educators, and residency programs as the use of social media for communication and education in orthopaedic surgery matures.

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. ■

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