Original Article

Role of Hashtags in Educating and Promoting the Field of Hand Surgery on Social Media

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Purpose: This study identifies the hand surgery content being posted on Instagram, how hashtags are being used, and those posting to determine what is reaching the public.

Methods: Top hand surgery–related hashtags on Instagram from June 2020 to August 2020 were identified by searching "hand surgery" and sorting by relevance. Hashtags were quantified by number and qualitatively assessed. Posts without a clear relationship were excluded. Hashtags relevant to hand surgery were analyzed by educational merit, medical specialty, patient or nonpatient, and demographics.

Results: The top 25 hashtags contained 325,400 posts. The 3 hashtags with the highest number of posts were #carpaltunnel (64,700), #handsurgery (50,500), and #handtherapy (48,300). Most posts were educational (53.2%). Nonsurgical fields (66.5%) posted the most, followed by orthopedic (25.9%), and plastic hand surgeons (7.7%). Nonpatients (68.8%) posted more than patients. The top 3 languages of the posts were English (67.7%), Russian (9.4%), and Spanish (7.1%). However, when looking at the hashtags with more than half of the posts being made by hand surgeons, we observed that most (62.9%) of the posts were noneducational in content.

Conclusions: Instagram posts on hand surgery topics are largely posted by nonexperts and are educational in content. There is a major opportunity for hand surgeons to educate and market effectively using hand surgery–related hashtags. Given the number of hand surgeries performed annually, one would hope to see more representation by hand surgeons on social media. More active participation and provision of educational content by specialists is warranted.

Clinical relevance: There is an opportunity for hand surgeons to educate those searching upper extremity conditions and seeking out expertise in a domain where information is largely driven by nonsurgeons and the quality of information is not vetted. This study identifies the need for more hand surgeon involvement to expand knowledge and communication efforts within the specialty and with the public through the evolving world of social media.

Communication efforts have transcended to a global scale with the widespread use of social media. Applications like Instagram, Facebook, and Twitter allow users to distribute content for a variety of purposes, including marketing, education, and personal use.

Medical professionals can now capitalize on the trends in social media and adapt them as educational pieces or for self-promotion. Instagram is the top social media tool engaging 1.082 million monthly active users, with 80 million shared images a day.[1,2] Instagram posts are influential in promoting educational content and marketing for medical professionals.[3] This belief is shared by many physicians who participated in the study by Vardanian et al,[4] in addition to the shared opinion that incorporation of medical practice into social media is inevitable.

Patients play an increasing role in the dissemination of medical information online by discussing their procedures, the surgical team that treated them, and their overall experience. Patients also
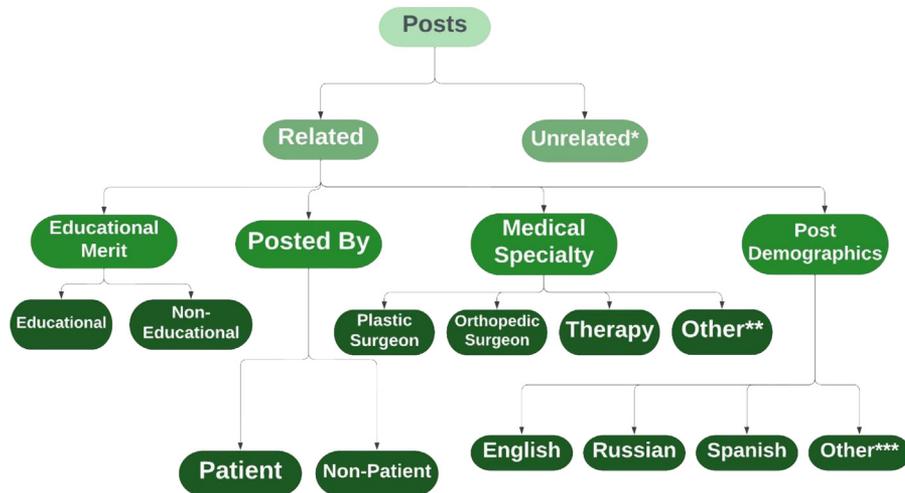
Figure 1. Method of analysis flow chart. * indicates posts that were unrelated and thus excluded from further analysis. ** indicates the "other" background in which posters did not come from a hand surgeon, professional therapist, physician, or other medical professional background (eg, anatomical artists, fitness gurus, athletes, sports coaches, social media influencers, advertising groups, and masseuses) *** indicates other languages such as Portuguese, Turkish, Italian, Arabic, Indonesian, German, Malaysian, French, and Dutch.

use social media to directly interact with surgeons to communicate their outcomes or interest in future procedures.[5] With the ability for users of Instagram to view the content created by medical professionals, the distribution of information is more streamlined than ever before.

In 2019, hand surgery ranked among the top 5 most performed procedures in plastic and reconstructive surgery.[6] Compared with other surgical specialties, namely cosmetic surgery, hand surgery has a limited presence on social media. A previous study looked into the use of 21 plastic surgery–related hashtags on Instagram and found that 67.1% of the posts were self-promotional and not educational.[7] Furthermore, social media influencers falling under the categories of nonaccredited physicians and nonphysicians are dominating the landscape of plastic surgery–related content, and plastic surgeons eligible for membership in American Society for Aesthetic Plastic Surgery accounted for 17.8% of the top posts.[7]

This study identified the content being posted on Instagram with regard to hand surgery, how specific hashtags were being used to promote this content, and the posting entities to elucidate who was providing hand surgery educational and marketing content likely to reach the public via this social media platform. We hypothesized that most posts with hand surgery–related hashtags will not be educational in nature and hand surgeons will not make up a majority of content creators using these hashtags. The primary outcome of this study was to understand and quantify the representation of hand surgeons in hand surgery–related posts on Instagram and to quantify the demographics of content creators and what kind of content is being posted in hand surgery–related hashtags. Another outcome of this study was to quantify the difference in the content of the posts between hand surgeons and non–hand surgeons in hashtags where hand surgeons make up more than 50% of the top 100 posts.

Materials and Methods

This study identified the top hand surgery–related hashtags on Instagram by entering the query "hand surgery" into the search bar and sorting by relevant tags. Additionally, commonly performed procedures in hand surgery and commonly treated problems (eg,

carpal tunnel syndrome, trigger finger, wrist pain, and Dupuytren contracture) were used as additional hashtag queries in the search function of Instagram (Appendix 1, available on the Journal's website at www.jhsgo.org).[8–10] The time frame for data collection was from June 2020 to August 2020. A specific time-frame limit was placed on data collection from Instagram because of its dynamic landscape. At the time of data collection, we were not able to identify any reference set of hand surgery–related Instagram hashtags reported in previous research.

Hashtags relevant to hand surgery with post numbers greater than 1,000 were searched through the Instagram application on mobile devices (such as the iPhone and iPad). Hashtags that met the inclusion criteria were quantified by the number of posts and qualitatively assessed by 2 authors of this article and grouped by the type of content. At the time of data collection, we were not aware of any software applications that would qualitatively assess each individual Instagram post. Instagram sorts posts by either "top posts" (based on their algorithm) or by "recent posts" (based on chronological order). For each qualifying hashtag, the first 100 "top posts" were manually collected and individually analyzed for content through the Instagram application on a mobile device by 2 authors of this study (A.Z.D., D.M.) using the criteria discussed later in this article. Each post from these 100 top posts was saved using the "Save" feature on the Instagram application to save individual posts into a collection named after their respective hashtag and by taking a screenshot of the Instagram post on the device used to view the post, which was later reviewed by the 2 authors to ensure that redundant posts were not analyzed. Content that did not demonstrate a clear relationship to hand surgery was excluded from the analysis (eg, spam posts/unrelated advertisements, joke content, and content irrelevant to hand surgery).

Each post was analyzed for the number of likes for photos, number of views for videos, and the poster's follower count. The number of likes for videos is not accessible to the public; therefore, the number of views was quantified to measure engagement.

The posts were further independently reviewed by the 2 authors (A.Z.D., D.M.) to manually analyze the content of the post, and any conflicts in the analysis were resolved upon discussion. The posts were analyzed and classified, as shown in Figure 1.

Noneducational posts versus educational posts

Noneducational posts included posts related to the field of hand surgery that did not provide educational information, such as purely promotional/marketing posts, patient selfies, and medical professional selfies.

Educational posts included posts with educational merit to physicians, patients, or the average person. Some examples include surgical procedures, anatomic diagrams, posts on various pathologies or physiology, patient vignettes, case studies, educational research, and postsurgical exercises Posts made by patients that had visible scars, mentioned symptoms associated with their condition, or regarding the treatment of their condition were also considered educational.

Patient versus nonpatient

Each post was then categorized into "posted by patient" or "posted by nonpatient" by inspecting the user's Instagram profile page/biography, captions, and post itself. If the content was posted by a medical professional, even if it included a picture of a patient, it was considered "posted by nonpatient." The "nonpatient" posts could later be parsed into medical professionals or nonmedical professionals, and we were then able to delineate medical specialty for the medical professionals.

Poster's background

Each post was further categorized into the surgical specialty or medical profession of the poster made available on their Instagram profile. The information about their specialty was cross-checked by a Google search to see whether they had a website or a health group website that could further confirm their credentials. The categories were hand surgeons, medical professionals, therapy, other, not specified, and post demographics.

Hand surgeons

This category comprised the training backgrounds of hand surgeons (eg, plastic surgery and orthopedic surgery).

Medical professionals

This category included physicians and nonphysicians from nonsurgical backgrounds, such as rheumatologists, x-ray technicians, radiologists, emergency medicine, sports medicine, internal medicine, and chiropractors.

Therapy

This category included hand therapists with occupational and physical therapy backgrounds.

Other

This category included those who did not come from a medical background and were not categorized as patients, such as anatomical artists, fitness enthusiasts, athletes, sports coaches, social media influencers, advertising groups, and masseuses.

Not specified

This category included posts by patients who did not credit the medical professional who worked with them. These "not specified" posts were excluded from calculations in relation to the medical specialty.

Post demographics

Posts were further analyzed by their language use. The "See Translation" feature of Instagram was used for posts in other languages to determine the content of the post and its relationship to hand surgery. Google Translate was then used for language detection.

Thus, each relevant post from the top 100 posts per hashtag analyzed was placed into 4 different categorical labels and sorted using an Excel spreadsheet. For example, 1 post can be deemed educational, posted by a plastic hand surgeon, posted by a nonpatient, and posted in English. The χ^2 test was used to compare the differences in these post categories or designations across each hashtag made by hand surgeons versus non−hand surgeons. This enabled analysis within each hashtag and across multiple hashtags to determine the purpose of the post, the details (such as medical professional, patient) of the person or institution posting, and the country of origin/native language of the post.

Results

The top 25 Hashtags contained 325,400 posts as on August 9, 2020. The top 25 hashtags had more than 1,000 posts (Table). Hashtags with less than 1,000 posts were excluded. The 3 most used hashtags that met the inclusion criteria were #carpaltunnel, #handsurgery, and #handtherapy. The 3 hashtags with the highest number of likes were #carpaltunnelsyndrome, #ganglion, and #wristmobility. The 3 hashtags in the top 25 with the lowest number of likes were #handburn, #triggerfinger, and #handsurgeon. The 3 hashtags with the highest number of followers were #carpaltunnelsyndrome, #wristpain, and #carpaltunnel. The 3 hashtags in the top 25 with the lowest number of poster followers were #handburn, #triggerfinger, and #handsurgery (Table). All queried hand surgery−related hashtags with their results of number of posts can be found in Appendix 1 (available on the *Journal's* website at www.jhsgo.org).

Of the posts, 53.2% (n = 923 of 1736) were educational and 46.8% (n = 813 of 1736) were noneducational (Table). Further, 66.% (n = 799 of 1202) of the posts were created by nonsurgeons, 25.9% (n = 311 of 1202) by orthopedic hand surgeons, and 7.7% (n = 92 of 1202) by plastic hand surgeons (Fig. 2). No posts were made by general surgeons. Nonpatients made 68.8% (n = 1195 of 1736) of the posts and patients made 31.2% (n = 541 of 1736) (Table). The posts were in English (67.7%, n = 1175 of 1736), Russian (9.4%, n = 163 of 1736), Spanish (7.1%, n = 123 of 1736), Portuguese (6.9%, n = 119 of 1736), Turkish (2.3%, n = 40 of 1736), Italian (1.4%, n = 24 of 1736), Arabic (1.2%, n = 21 of 1736), Indonesian (0.9%, n = 15 of 1736), German (0.6%, n = 10 of 1736), Malaysian (0.6%, n = 10 of 1736), French (0.3%, n = 5 of 1736), and Dutch (0.3%, n = 5 of 1736).

Posts with educational content received 85.6% of likes. Posts by hand surgeons received 7.3% of likes (2.3% by plastic surgeons and 5.0% by orthopedic surgeons), and posts by non−hand surgeons received 92.7% of likes (29.4% by other, 47.4% by therapists, and 15.8% by non−hand surgeon medical professionals). Posts by patients received 13.5% of likes (Table).

Posters uploading educational content had 88.0% of the total number of followers. Hand surgeons had 6.9% (2.8% by plastic surgeons, 4.1% by orthopedic surgeons) of the total number of followers, and non−hand surgeon posters had 93.1% (23.1% by other, 68.0% by therapists, 2.0% by non−hand surgeon medical professionals).

As content posters, hand surgeons had greater than 50% of posts in #handsurgery, #handsurgeon, #dupuytren, and #dupuytrencontracture (Fig. 3). We further investigated these hashtags and compared posts made by hand surgeons with those made by

Table
Results of Analyzing Hand Surgery–Related Posts for Hand Surgery–Related Hashtags, Number of Analyzed Posts, Number of Likes, Number of Followers, Medical Specialty Groups, Type of Post, Type of Poster, and Type of Language Used

Variable	Characteristics (Total No. of Posts Associated)	Posts Analyzed, n (%)	Total No.	
			Likes	Followers
Posts		1,736 (100)	2,914,395 Likes, n (%)	62,818,501 Followers, n (%)
Hashtags	#carpaltunnel (64,700)	63 (3.6)	280,936 (8.9)	7,861,679 (12.5)
	#handsurgery (50,500)	73 (4.2)	20,766 (0.7)	273,254 (0.4)
	#handtherapy (48,300)	93 (5.4)	34,761 (1.1)	676,261 (1.1)
	#triggerfinger (43,00)	20 (1.2)	10,018 (0.3)	188,676 (0.3)
	#wristpain (22,800)	61 (3.5)	293,146 (9.3)	9,282,767 (14.8)
	#carpaltunnelsyndrome (21,400)	79 (4.5)	505,447 (16.1)	9,329,671 (14.9)
	#handsurgeon (8,100)	77 (4.4)	19,244 (0.6)	276,334 (0.4)
	#ganglion (7,600)	43 (2.5)	320,722 (10.2)	622,177 (1.0)
	#handinjury (7,300)	71 (4.1)	104,492 (3.3)	3,843,232 (6.1)
	#carpaltunnelsurgery (6,600)	89 (5.1)	44,020 (1.4)	835,128 (1.3)
	#wristsurgery (6,200)	73 (4.2)	64,411 (2.0)	907,897 (1.4)
	#wristinjury (6,100)	62 (3.6)	94,421 (3.0)	5,126,871 (8.2)
	#wristmobility (5,100)	60 (3.5)	313,365 (10.0)	4,047,239 (6.4)
	#ganglioncyst (4,500)	59 (3.4)	307,722 (9.8)	2,341,757 (3.7)
	#dequervaintenosynovitis (3,000)	75 (4.3)	118,115 (3.8)	1,943,986 (3.1)
	#wristfracture (2,900)	86 (5.0)	72,265 (2.3)	1,678,822 (2.7)
	#dupuytren (2,700)	65 (3.7)	56,747 (1.8)	1,328,646 (2.1)
	#dequervain (2,400)	84 (4.8)	140,017 (4.5)	3,984,980 (6.3)
	#tendonrepair (2,300)	66 (3.8)	33,054 (1.1)	558,437 (0.9)
	#carpaltunnelrelease (2,200)	85 (4.9)	63,958 (2.0)	706,950 (1.1)
	#handburn (1,900)	22 (1.3)	893 (0.03)	33,777 (0.1)
	#dequervains (1,700)	73 (4.2)	136,780 (4.3)	2,613,124 (4.2)
	#dupuytrencontracture (1,500)	96 (5.5)	62,513 (2.0)	1,287,336 (2.0)
	#handtrauma (1,400)	74 (4.3)	24,209 (0.8)	2,260,525 (3.6)
	#handfracture (1,200)	88 (5.1)	23,432 (0.7)	808,975 (1.3)
Medical specialty groups	Hand surgeons[*]	403 (33.6)	199,275 (7.3)	3,925,068 (6.9)
	Non–hand surgeons[†]	799 (66.4)	2,530,017 (92.7)	52,897,183 (93.1)
Type of post	Educational	923 (53.2)	2,690,932 (85.6)	55,325,943 (88.0)
	Noneducational	813 (46.8)	453,906 (14.4)	7,492,558 (12.0)
Type of poster	Patient	541 (31.2)	424,807 (13.5)	6,112,284 (9.7)
	Nonpatient	1,195 (68.8)	2,720,031 (86.5)	56,706,217 (90.3)
Type of language used	English	1,175 (67.7)	2,276,097 (72.4)	50,811,575 (80.9)
	Non-English	561 (32.3)	868,741 (27.6)	12,006,926 (19.1)

[*] Plastic surgeons and orthopedic surgeons.
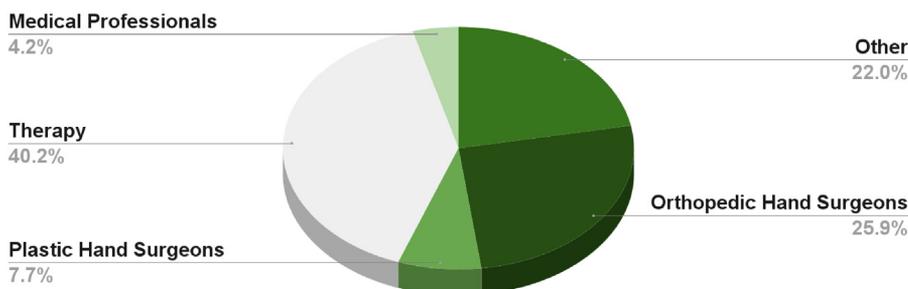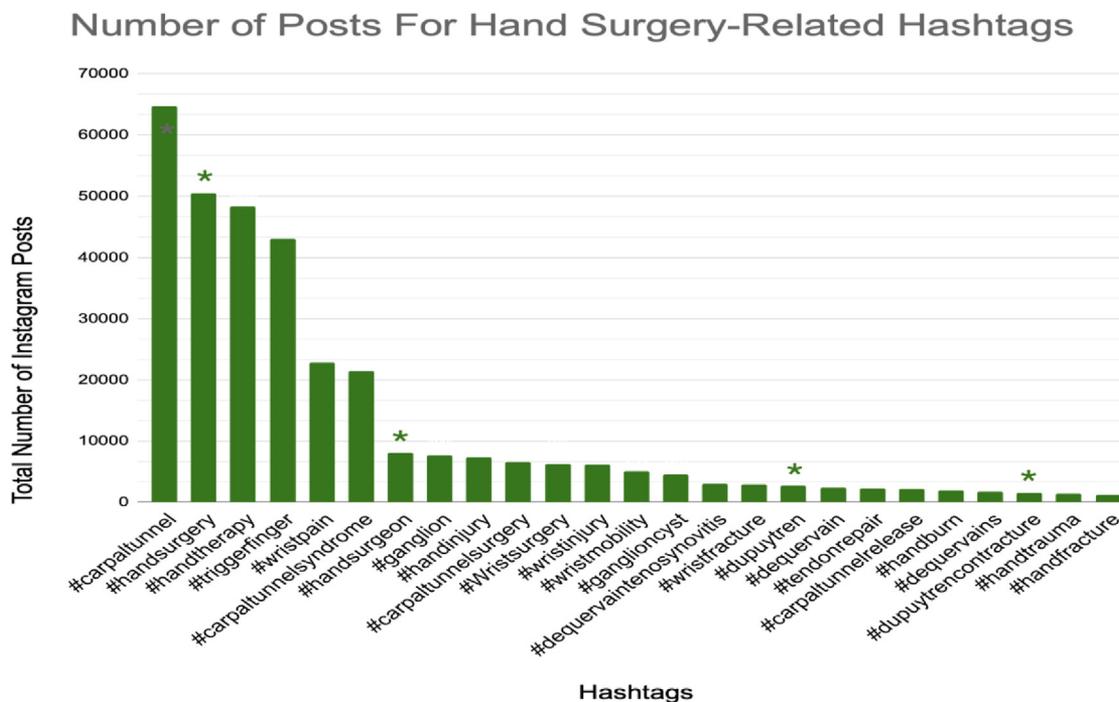[†] Therapists, medical professionals, nonmedical persons/other.

Figure 2. Percentage of posts by medical specialty.

non–hand surgeons for their educational content. In these hashtags, 311 posts met our analysis criteria, which also excluded posts deemed unrelated to the field of hand surgery as per our methods section above. Hand surgeons posted a total of 245 posts, and non–hand surgeons posted a total of 66 posts. Of the 311 posts, 140 were educational in nature and 171 were noneducational in nature. Of the 245 posts made by hand surgeons, a minority of the posts were educational in nature (91 [37.1%] posts) and most posts were noneducational in nature (154 [62.9%] posts). Of the 66 posts made

by non–hand surgeons, most posts were educational in nature (49 posts [74.2%]) and a minority of posts were noneducational in nature (17 [25.8%] posts). There was a large difference between the proportions of educational and noneducational posts by hand surgeons compared with non–hand surgeons. Relatively, hand surgeons posted more educational posts in sheer volume than non–hand surgeons (91 [65.0%] posts vs 49 [35.0%] posts) among the 140 educational posts. For noneducational posts, there were large differences in the number of posts made by hand surgeons

Figure 3. Hashtags with increased representation of hand surgeons.

and non−hand surgeons (154 [90.1%] posts vs 17 [9.9%] posts). The 4 hashtags that dominated the posts of hand surgeons (#handsurgery, #handsurgeon, #dupuytren, and #dupuytrencontracture) were also evaluated by surgical specialty (orthopedic vs plastic) in a similar manner, and 82.9% of the posts were made by orthopedic surgeons and 17.1% by plastic surgeons. Additionally, 73.4% of posts by plastic surgeons were noneducational and 26.2% were educational. Orthopedic surgeons followed a similar trend (60.6% noneducational and 39.4% educational).

Discussion

This study found that hand surgery has limited representation on Instagram. The hashtags #handsurgeon and #handsurgery were in the bottom 3 of average number of likes and followers, which seemed counterintuitive given #handsurgery has the second highest number of posts (50,500 posts). When assessing for likes and followers, posts by hand surgeons were receiving less engagement than those by non−hand surgeons. Therefore, there is potential for growth in the field of hand surgery on Instagram. More participation by hand surgeons and their practices would provide more opportunities for patient interaction. Social media interaction between patients and providers leads to increased interest in seeking procedures.[5] Furthermore, studies have found that online presence can dramatically increase a patient's perception about the expertise of the provider in their field.[5,11]

Most of the hand surgery−related posts are made by individuals without formal hand surgery training. Even when looking at the hashtags with a higher presence of hand surgeons, there were more noneducational posts made by hand surgeons than by non−hand surgeons. When accounting for all examined hashtags, most posts were educational. This suggests that hand surgery−related content with educational merit is being posted to a greater extent by

non−hand surgeons. Interestingly, educational posts showed higher engagement in the number of likes, and the posters of educational content tended to have more followers.

This emphasizes that there is both a discrepancy and an opportunity for hand surgeons to produce more educational hand surgery content on Instagram. Physicians can use social media as an educational platform for patients and peers so that evidence-based information is disseminated to the public in a digestible manner. This view is shared by many professionals in the field.[3−5,7] However, data from this study demonstrate that we are perhaps lacking in hand surgeon participation in high enough numbers to make the ideal impact and optimize the use of this particular social media platform. Increased participation by hand surgeons on social media for the provision of educational content could result in an increased proportion of educational posts and reverse the current representation of the specialty.

Limitations

Instagram was the only social media platform analyzed for this study. There are other social media platforms such as Twitter and TikTok that may have different representation of hand surgery content online. At the time of the study, Instagram had more than 400 million users with approximately 80 million images shared daily, making it one of the top social media applications.[2] Now, other social media platforms such as TikTok are gaining traction in the medical community; however, the content is limited to short video clips. The Instagram still offers content such as photo posts, video posts, hybrid of photo and video posts, and even short video clips (reels).

Another limitation at the time of the study was that there was no tool known to us that could automatically sort and categorize posts according to our methods. Therefore, 2 authors, A.Z.D. and D.M., manually performed data collection from June 2020 to August

2020. This also limited the authors to choosing 1 social media platform, as manual data collection was a major time constraint in the study. If a tool were to exist that could perform what was done in this study, it would be an amazing opportunity to analyze more data points and possibly look at other social media platforms for hand surgery–related content.

Categorization of posts is a possible limitation of this study, as some content was not clear cut on whether it was educational or marketing. For example, the caption of a post could provide educational information on how a procedure was performed or the indications for a procedure, but the picture in the post could be an image of the facility with contact information of the surgeon. To combat this uncertainty, posts like these were discussed between the authors, A.Z.D. and D.M., over a video call or in person. Upon discussion, both authors would come to an agreement on how to classify the post using the criteria outlined in the methods section of this article.

Acknowledgments

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