

# Social Media Posts About Distal Radius Fracture: A Cross-Sectional Analysis of Patient and Provider Perspectives

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## Abstract

**Background:** Social media offers a popular, unfiltered source of patient and provider perspectives on health care. This study investigated the characteristics of social media posts referencing distal radius fracture (DRF). **Methods:** Content was queried from Instagram from February 06, 2019, to December 08, 2021, using the hashtags “#distalradiusfracture” and “#wristfracture.” The 1500 most-liked posts were analyzed. Poster demographics including age, gender, region, laterality, and treatment type and post characteristics including post type, number, content, timing relative to treatment, tone, and satisfaction were examined. Variables were compared using  $\chi^2$  tests. Univariate, multivariate, and stepwise regression were performed. **Results:** The most popular post formats were single photo (44.5%), multiple photos (32.3%), and single video (13.9%). Patients (40.3%) were the most common poster followed by surgeons (33.4%). Men (48.7%) and women (51.3%) were evenly represented. Of the total posts, 87.7% depicted the post-treatment phase of care; 54.8% of posts depicted operative management, while 26.6% depicted non-operative management; and 73.7% of posts were positive in tone, 18.7% neutral, and 7.6% negative. Univariate analysis demonstrated that posters who were patients, friends/family of patients, female, and posts with >100 “likes” were more likely to share negative tones. Multivariate and stepwise regression were consistent with the above. **Conclusion:** Most posts regarding DRF originate from patients, are post-treatment, and are positive. Negative tone is associated with posts from patients, family/friends of patients, female posters, and posts with >100 likes. With this information, surgeons will be better prepared to address patient concerns, manage expectations, and actively participate in social media themselves.

**Keywords:** forearm, anatomy, psychosocial, research & health outcomes, epidemiology, biostatistics, trauma, diagnosis, distal radius, fracture/dislocation

## Introduction

Distal radius fracture (DRF) is a common orthopedic injury and accounts for one-sixth of all treated fractures in United States emergency departments annually.<sup>1</sup> These fractures typically occur in youth sustaining high-energy falls and osteoporotic seniors sustaining low-energy falls. Treatment typically consists of reduction followed by either non-operative management including splinting and casting or operative management via internal or external fixation.<sup>2</sup>

Recent research has demonstrated a clear connection between patient-reported satisfaction and improved post-interventional outcomes following treatment for DRF.<sup>3,4</sup> One study found a significant positive association between patient satisfaction and 30-day readmission rates and post-interventional complications.<sup>5</sup> These studies rely heavily on standardized patient reported outcomes (PROs), and while clinically useful, these measures can introduce several forms of bias including observational, recall, and confirmational

bias; suffer from low response rates; and may not fully convey the patient’s full experiences in health care.<sup>6–9</sup>

One increasingly popular and readily available source of unfiltered PROs is social media. Studies show that over 82% of Americans now use social media, which provides a free-flowing exchange of health care information and experiences between patients, surgeons, and other providers.<sup>10,11</sup> Previous studies have examined the use of social media in similar orthopedic surgery procedures including pilon fractures,<sup>12</sup> pediatric scoliosis,<sup>13</sup> anterior cruciate ligament (ACL)

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surgery,<sup>14</sup> spinal fusion,<sup>15</sup> and total joint arthroplasty.<sup>16</sup> However, no previous studies have examined patient and provider social media content related to DRF.

This observational/cross-sectional study analyzed the publicly accessible social media content related to DRF, specifically the content perspective, timing, tone, and patient satisfaction to better understand the landscape of social media relating to DRF experiences and identify drivers of positivity and negativity in patients' social media content.

## Materials and Methods

An online social media analytics program, Picodash (www.picodash.com), was used to identify publicly shared Instagram posts using the hashtags “#distalradiusfracture” and “#wristfracture” from February 6, 2019, to October 12, 2021. The 1500 most-liked posts were analyzed using similar methods described in other studies.<sup>16,17</sup> Posts including both hashtags were counted once. Unrelated posts and posts featuring ulnar or carpal fractures were excluded.

Three authors reviewed posts in a standardized fashion for the following factors: format (photo, video, multiple photos, or multiple videos), perspective of poster (patient, surgeon, friend/family, physical therapist, support group, other health care professional, hospital, industry), gender (male, female, other), age (0-65, 65+), region (domestic, international), phase of care, pre-treatment, peri-treatment (<1 week before), peri-treatment (<1 week after), post-treatment (>1 week <3 months), post-treatment (>3 months), post-treatment non-specified, and non-treatment, laterality (right, left, bilateral), type of treatment (operative, non-operative), number of images/videos per post, and image content (incision/dressing, imaging/study, daily activity, symptom, recovery, work, sport, physical/occupational therapy, or scene, clinic scene, surgical technique, medication, article/poster/advertisement, other).

Tone (positive, neutral, or negative) was determined in all posts based on explicit statements or images including text, caricatures, and emojis. Satisfaction (satisfied, neutral, or dissatisfied) was determined only in post-interventional posts based on explicit statements or images of satisfaction and positivity, positive caricatures or emojis, or implied satisfaction with outcomes, such as a post of a patient returning to daily activity postoperatively. In contrast, dissatisfaction and/or negative tone were identified by posters demonstrating dissatisfaction through negative words or images. Ambiguous posts were discussed with senior authors, who provided tie-breaking votes.

## Statistical Methods

Recorded variables are reported as both a frequency and proportion and are compared using the  $\chi^2$  test or Fisher's exact

**Table 1.** Post Content Characteristics.

Post Characteristic	N (%) <sup>a</sup>
Hashtag used	
#WristFracture	769 (51.3)
#DistalRadiusFracture	731 (48.7)
Number of likes	
≤ 100 Likes	1114 (74.3)
> 100 Likes	386 (25.7)
Type of post	
Single photo	667 (44.5)
Multiple photos	484 (32.3)
Video	208 (13.9)
Multiple videos	35 (2.3)
Photos + videos	93 (6.2)
Number of images/videos	
1	874 (58.3)
2	164 (10.9)
3	128 (8.5)
4	108 (7.2)
≥ 5	226 (15.1)
Post primary content	
Imaging/Study	560 (37.3)
Recovery	190 (12.7)
Daily activity	156 (10.4)
Physical/Occupational therapy	139 (9.3)

<sup>a</sup>Posts may not total 1500 as some posts were uncategorizable according to specified characteristic.

test as appropriate. Univariable and multivariable stepwise logistic regressions were performed to identify predictive factors of social media post tone. Results are reported with odds ratios (OR), where OR > 1 indicates a specific independent variable increases the likelihood of negative tone (vs. positive/neutral) in a post, and 95% confidence intervals (CI) were calculated. A *P* value less than .05 was considered statistically significant. All calculations were carried out in MATLAB (MathWorks, Natick, Massachusetts).

## Results

### Post Demographics

There were 4368 public posts identified, and the 1500 most-liked posts were analyzed. Of all these posts, 769 were identified using #wristfracture, and 731 posts using #distalradiusfracture. Of the total posts, 74.3% had less than 100 “likes.” The most popular post formats were single photo, multiple photos, and single video. Most posts were of a single image or video, and the next most common post type included ≥ 5 images/videos. Post content mostly focused on imaging/studies, followed by recovery, daily activity, and physical/occupational therapy (Table 1).

**Table 2.** Poster Demographics.

Poster Demographic	N (%)
<b>Perspective of poster</b>	
Patient	605 (40.3)
Surgeon	501 (33.4)
Family/Friend	62 (4.1)
Physical therapist	137 (9.1)
Support group	70 (4.7)
Other health care professionals	45 (3)
Hospital	38 (2.5)
Industry	42 (2.8)
<b>Sex of poster<sup>a</sup></b>	
Male	627 (48.7)
Female	661 (51.3)
<b>Age of poster<sup>a</sup></b>	
0-65	1284 (86.9)
65+	16 (1.2)
<b>Region of poster<sup>a</sup></b>	
Domestic (US)	513 (41.7)
International (Non-US)	717 (58.3)
<b>Phase of care<sup>a</sup></b>	
Pre-intervention	95 (6.5)
Peri-intervention (<1 week before)	48 (3.3)
Peri-intervention (<1 week after)	343 (23.6)
Post-intervention	932 (64.1)
Non-intervention	35 (2.4)
<b>Type of intervention<sup>a</sup></b>	
Operative	821 (67.4)
Non-operative	398 (32.6)
<b>Laterality of fracture<sup>a</sup></b>	
Left	593 (46.9)
Right	628 (49.6)
Bilateral	45 (3.6)

<sup>a</sup>Posts may not total 1500 as some posts were uncategorizable according to specified characteristic.

### Poster Demographics

Patients were the most frequent posters followed by surgeons. Men and women were equally represented. Posters 0 to 65 years old accounted for the vast majority of posts. Most posters were from outside of the United States. Posts primarily depicted the post-interventional phase of care. Operative treatment posts outnumbered non-operative treatment posts 2:1. Right- and left-handed DRF were similarly represented with 4% of posts bilateral (Table 2). Patients primarily referenced recovery, return to daily activities, and sport. Hand surgeons mostly referenced imaging/studies and the operating room. Non-surgeon health care providers primarily shared about hand therapy. (Table 3).

### Tone and Satisfaction

Overall, most posts were positive or neutral in tone, while 7.6% were negative. In addition, the majority of posts

showed satisfaction with post-interventional outcomes, with 10.3% indicating dissatisfaction (Table 4). Comparison of user demographics and tone showed that most posts were positive or neutral based off the number of likes ( $P = .016$ ), perspective of the poster ( $P < .001$ ), sex of poster ( $P = .020$ ), and phase of care ( $P = .007$ ) (Table 5).

### Variable Analysis

Univariable analysis revealed patient-perspective posts were more likely to be negative (OR = 4.51,  $P < .001$ ). Patient's family/friends (OR = 3.99,  $P = .007$ ) and female posters (OR = 3.13,  $P < .001$ ) were also more likely to share negative tones. In addition, posts with >100 likes (OR = 1.63,  $P = .017$ ) or single-photo posts (OR = 1.79,  $P = .01$ ) were more likely to be negative. Post-interventional posts were less likely to be associated with a negative tone (OR = 0.62,  $P = .03$ ). Multivariable and stepwise regression analyses showed an independent association between patient-perspective posts (OR = 7.24,  $P < .001$ ) and patient's family/friend perspective posts (OR = 4.95,  $P = .002$ ), as well as posts with >100 likes (OR = 2.32,  $P < .001$ ) and post-interventional posts (OR = 0.34,  $P < .001$ ). No statistical significance was identified between treatment cohorts, age, or region (Table 6).

### Discussion

While DRF treatment is generally successful, one recent systematic review found a 15% overall post-interventional complication rate for DRF repair, citing complications of nerve dysfunction, tendon injury, and up to 5% of patients requiring reoperation.<sup>18</sup> Chung et al noted that up to 23% of DRF patients experienced malunion.<sup>19</sup> Several studies have identified contributing factors to post-interventional complications including low socioeconomic status,<sup>20</sup> pre-existing medical comorbidities, delayed timing and evaluation after injury, working status, and severity of fracture.<sup>21</sup> In one study, Fang et al found that patient pre-interventional expectations independently predicted outcomes at 6 and 12 months after DRF.<sup>22</sup> In a similar study, Constand et al found patient-centered care and patient comprehension improved post-intervention outcomes in DRF treatment.<sup>3</sup> These findings indicate that post-interventional complications and patient satisfaction are directly influenced by a variety of factors, including patient pre-intervention expectations and comprehension. Social media provides an unfiltered insight into patient perspectives, expectations, comprehension, and experiences in health care, and its analysis provides additional predictors of patient experiences both pre- and post-intervention.

Our study identified several novel findings regarding trends in social media use among DRF-related content. First, patients were responsible for the greatest proportion of posts (40.3%), followed by physicians (33.4%) and

**Table 3.** Analysis of Post Content by User Group.

User	Recovery	Return to activity	Imaging/studies	Hand therapy
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Patients	229 (24)	167 (17)	113 (11.9)	46 (4.8)
Hand surgeons	36 (2.5)	23 (1.6)	940 (66.7)	20 (1.4)
Non-surgeon health Care providers	11(3.9)	5 (1.7)	13 (4.6)	215 (76.3)

**Table 4.** DRF Social Media Tone and Satisfaction.

Poster tone and satisfaction	<i>n</i> (%)
Tone of post <sup>a</sup>	
Positive	1105 (73.6)
Neutral	280 (18.6)
Negative	114 (7.6)
Satisfaction with outcome <sup>a</sup>	
Satisfied	647 (74.4)
Neutral	133 (15.3)
Dissatisfied	90 (10.3)

Note. DRF = distal radius fracture.

<sup>a</sup>Posts may not total 1500 as some posts were uncategorizable according to specified characteristic.

hand therapists (9.1%). Although surgeons accounted for just 33% of social media posts, this proportion is much higher than those reported in similar studies: 11.8%, 13.5%, 8.5%.<sup>12,16,23</sup> Similarly, these groups varied drastically in what they shared. Patients focused on recovery and return to activities and work, while surgeons focused on imaging/studies, and hand therapists focused their content toward hand therapy. These results support recently published studies on social media use among health care providers, primarily social media being used as a medium for professional networking, education, organizational promotion, and patient care.<sup>24</sup>

Second, the vast majority of social media posts are positive or neutral in nature. Overall, positive tone was identified in 73.6% of posts, with 18.6% identified as neutral, and 7.6% as negative. Negative tone was associated with identifiable characteristics including perspective of poster, gender, number of “likes,” and phase of care.

Third, the majority of posts (87.7%) depicted the post-interventional phase of care. Satisfaction in the post-intervention phase was identified in 74.4% of posts, indicating the majority of people were content with their clinical outcomes. Of the 10.3% of users indicating dissatisfaction with their outcomes, patients and patients’ friends/family were more likely to share dissatisfaction.

Fourth, the majority of posts (67.4%) depicted operative DRF management, contrary to recent epidemiologic studies showing an estimated 77.5% non-operative management rate for DRF.<sup>25</sup>

Finally, a large number of commercially focused, organization-promoting, non-operative posts were identified. This study frequently featured non-surgeon health care providers including physical therapists, chiropractors, and others using social media as a form of promotional marketing, consistent with trends previously identified in the literature.<sup>24</sup>

In comparison with other studies analyzing social media use relating to orthopedic procedures, our study found similar percentages of negative toned posts (7.6%) when compared to studies examining total joint arthroplasty (7%),<sup>17</sup> ACL surgery (12%),<sup>14</sup> scoliosis (11%),<sup>13</sup> pilon fracture (12%),<sup>12</sup> and anterior cervical discectomy and fusion (ACDF) (11.8%).<sup>23</sup> Like the aforementioned orthopedic procedures, post-interventional and single-photograph posts were the most common post type. In one comparable study, Swiatek et al investigated patients undergoing ACDF using the hashtag #ACDFsurgery. They found among ACDF posts that the majority of posts originated from patients (85%) and were positive in tone (79.2%).<sup>26</sup> These results coincide with our results. Our study also found similar rates of positive/neutral tones (92.4% vs 88% and 85%) and post-interventional representation (87.7% vs 67% and 73%) compared to studies examining pilon fractures and ACL repair.<sup>12,14</sup>

Limitations of this study are as follows: (1) Only publicly shared posts were accessible to analyze due to privacy settings, introducing sampling bias.<sup>27</sup> (2) Recent social media polarization has pushed posters toward dichotomous perspectives. Poster’s overshare positive and negative experiences at the expense of more neutral posts.<sup>28</sup> (3) Preferentially sampling the 1500 most-liked social media posts may introduce bias as one recent study indicated negative posts receive twice as much engagement as positive posts.<sup>29</sup> This may contribute to oversampling of negative posts. However, the study design is meant to replicate the patient experience of browsing social media for information regarding DRF. Social media algorithms are more likely to bring posts with more likes to a patient’s attention, justifying the analysis of most-liked posts. In addition, this study’s sample size of 1500 posts is large enough to overcome such bias that may exist. (4) Singer et al identified increased prevalence of wrist fractures among males from 15- to 49-year age group and females older than 40 years.<sup>30</sup> Considering that only 40% of

**Table 5.** Comparison of User Demographics and Tone of Post.

Demographic variable	Positive/neutral post, n (%)	Negative post, n (%)	P value
Number of Likes			
≤ 100 Likes	1037 (93.3)	74 (6.7)	.016
> 100 Likes	343 (89.6)	40 (10.4)	
Perspective of poster			
Patient	520 (86.1)	84 (13.9)	<.001
Surgeon	484 (97.4)	13 (2.6)	
Family/Friend	56 (90.3)	6 (9.7)	
Physical therapist	134 (97.8)	3 (2.2)	
Support group	69 (98.6)	1 (1.4)	
Other health care professionals	42 (93.3)	3 (6.7)	
Hospital	38 (100)	0 (0)	
Industry	37 (90.2)	4 (9.8)	
Sex of poster			
Male	598 (95.8)	26 (4.2)	<.001
Female	580 (88)	79 (12)	
Phase of care			
Pre-intervention	81 (85.3)	14 (14.7)	.007
Peri-intervention (< 1 week before)	44 (91.7)	4 (8.3)	
Peri-intervention (< 1 week after)	306 (90)	34 (10)	
Post-intervention	870 (93.5)	60 (6.5)	
Non-intervention	35 (100)	0 (0)	

**Table 6.** Univariate and Multivariable Sub-analysis.

Variable	Univariate OR (95% CI)	P value	Multivariable OR (95% CI)	P value	Stepwise regression OR (95% CI)	P value
Poster specific						
Female	3.13 (1.98-4.95)	<.001	—	—	—	—
Patient	4.51 (2.81-7.21)	<.001	7.24 (3.41-15.39)	<.001	—	—
Family/friend	3.99 (1.45-10.92)	.007	—	—	4.95 (1.79-13.74)	.002
Post specific						
> 100 likes	1.63 (1.09-2.45)	.017	2.32 (1.48-3.63)	<.001	2.11 (1.38-3.22)	<.001
Post-intervention	0.62 (0.4-0.96)	.03	0.34 (0.21-0.57)	<.001	—	—
Single photo	1.79 (1.15-2.80)	.01	—	—	—	—

Note. OR = odds ratio; CI = confidence interval.

the US population over the age of 65 years uses social media compared to 80% of those younger than 50 years, our data oversample the younger population at the expense of the elderly.<sup>31</sup> (5) Women are more active social media users than men, likely leading to oversampling of female posters at the expense of male posters.<sup>32</sup> (6) Judgements of tone and satisfaction are inherently subjective. To combat this, reviewers were rigorously instructed to use the tripartite categorizing system to standardize judgments.

In conclusion, these new insights into patient and health care provider experience in DRF provide a novel approach to address patient concerns, manage expectations, and improve upon health care delivery. There is a vast amount of publicly available social media content regarding DRF,

most of which is shared by patients. The post-interventional phase of care and operative forms of treatment are most represented, and most posts are positive or neutral in tone. With this information, physicians will be better prepared to address patient concerns, work to improve pre-interventional expectations and comprehension, anticipate patient clinical outcomes, and actively participate in the social media space themselves.

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## Ethical Approval

This study was approved by our institutional review board.

## Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

## Statement of Informed Consent

Informed consent was not required for this study design. All data used were publicly available.

## Declaration of Conflicting Interests

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