Patterns and Characteristics of Intentional Self-inflicted Hand Injuries among Military Personnel: A Retrospective Study and Proposal of Treatment Algorithm

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Background: Self-inflicted hand injuries have been described in the literature with varying nomenclature (factitious, malingering, and self-induced hand injuries). Identifying and treating these patients is complex and requires a multidisciplinary team approach at a high cost. There is a lack of literature that describes the different patterns and characteristics of hand injuries among military personnel, especially in Saudi Arabia. We conducted a chart review study involving military personnel who attended the emergency department with hand injuries in Saudi Arabia to fill this gap.

Methods: This retrospective chart review study was conducted at a tertiary hospital in Riyadh, Saudi Arabia. Our inclusion criteria included military personnel patients who presented to the emergency department with intentional self-inflicted hand-related injuries between 2016 and 2018.

Results: A total of 274 cases were included; 241 (88%) were men. Injuries to the left hand (52.2%) were more common than injuries to the right hand. The most common injury site involved the little finger (45.6%). The majority were followed up (97.8%), and 28.8% of cases had a complication. The majority of fractures were managed with open reduction and internal fixation (63.9%). Moreover, the mean sick leave duration was 23 days.

Conclusions: Self-inflicted injuries can be challenging to diagnose when patients are manipulative about the cause and mechanism. Most self-inflicted injuries involved the left little finger, and most were treated with open reduction and internal fixation. A self-inflicted injury is possible in the context of an unusual injury with a vague medical history. (Plast Reconstr Surg Glob Open 2022;10:e4648; doi: 10.1097/GOX.0000000000004648; Published online 21 November 2022.)

INTRODUCTION
Self-inflicted hand injuries have been described in the literature with varying nomenclature (factitious, malingering, and self-induced hand injuries). Grunert et al. classified factitious hand disorders into three different types: self-mutilation and wound manipulation; edema; finger; and hand deformities. Birman and Donald described factitious disorders as deliberately inducing an illness for internal rather than external motives (playing the sick role to receive more care and sympathy), whereas malingering was to obtain external goals and benefits (financial, work compensation, obtaining drugs, avoiding military duty, or avoidance of noxious situations). According to Louis et al., the primary organ involved is the skin, mainly of the hand, as it is easily accessible. A delay in making the diagnosis and the absence of psychotherapy led to severe hand disabilities. Treatment of such injuries is considered a challenge, and since surgical and medical interventions are not enough, a psychiatric assessment is a must. Psychiatric illness and mental disorders have been found present in all of these factitious hand conditions, such as psycho-flexed hand, clenched fist syndrome.
unnecessary physical procedures. There is a lack of literature to avoid being manipulated into performing factitious disorders of the upper extremities requires patience and insight. To date, studies with similar aims and objectives, we have created a data collection sheet to obtain the data. The intended data were gathered from the medical records database, retrospectively using an excel sheet with 12 variables, including the patient’s demographics, time of presentation, the occurrence of soft tissue injury, hand laterality, fracture site, isolated versus multiple injuries, follow-ups, the number of days obtained for sick leave, complications, and management. Through detailed history taking, the mechanism of self-inflicted injury was diagnosed, and after the patient was admitted, it was determined it was an intentionally self-inflicted injury to gain secondary benefits, including sick leave.

Takeaways

Question: Are there any patterns or characteristics of self-inflicted hand injuries among military personnel who present to the ER?

Findings: This retrospective review indicates that the little finger is the most commonly injured digit in patients who self-inflict injuries, with a moderate rate of complications.

Meaning: The cause and mechanism of self-inflicted injuries can be challenging to diagnose. The most common self-inflicted injury involved the little finger on the left hand.

Proposed Treatment Algorithm

Our multidisciplinary approach can be summarized as follows: initial evaluation by a hand surgeon through history, physical examination, and X-ray, if the self-inflicted injury is suspected and the patient needs urgent admission for exploration, psychological evaluation by psychiatrists, and rehabilitation care by rehabilitation physicians. If the mental examination by a psychiatrist revealed that the patient needed acute mental healthcare, the patient was admitted to the psychiatric department. If not, the patient was promptly admitted to the hand surgery unit and treated accordingly. After surgery, the patient received coordinated treatment from a team of plastic surgeons, psychiatrists, and rehabilitation specialists (Fig. 1).

Statistical Analysis

The data were checked for completeness and correctness. The analysis was performed in a 95% confidence interval using the Statistical Package for Social Science (SPSS), version 23.0 (IBM, Armonk, N.Y.). The categorical variables were presented as frequencies and percentages, whereas the continuous variables were presented as mean and standard deviation. Numeric data were checked for normality by the Shapiro–Wilk test and was found to be non-normally distributed. The correlation between age and sick leave was assessed by the Spearman Rank Correlation test. The relationship between categorical variables was assessed by the chi-square test.

RESULTS

A total of 274 cases were included in this study, and among the total sample size, 241 (88%) were male. There was no documented history of psychiatric illness...
in any of the patients. Among the included patients, 57% (n = 156) had a previous presentation to the emergency department. Most cases had isolated closed fractures (70.8%), but only a few had soft-tissue injuries (n = 8%). The number of injuries to the left hand (52.2%) was more frequent than injuries to the right hand (47.8%). The mechanism of injury for all patients was crush injury caused by a heavy object (n = 274, 100%). There was no factitious edema in any of the patients. The most common fracture site involved the little finger (45.6%). The majority were followed up (97.8%), and 28.8% of cases had a complication. The majority of fractures were managed with open reduction and internal fixation (ORIF) (63.9%), followed by closed reduction and internal fixation (35%) (Table 1). In total, 64.59% of patients (n = 177) required surgical intervention.

The mean age of the patients was 24 years. Moreover, the mean sick leave duration was 23 days (range, 0–196 days). The correlation between age and sick leave duration was weakly positive (correlation coefficient = 0.358, P value ≤ 0.001) (Tables 2 and 3). There were 268 patients (97.8%) who followed up in the outpatient department after their presentation to the emergency department, and six patients (2.2%) did not follow up at all.

A significant association between the number of fractures and the male gender was observed: 31.5% of the men had multiple fractures, whereas only 12.1% of the women had multiple fractures (odds ratio = 3.339, P value = 0.021). There was no statistically significant relationship between gender and soft-tissue injury, hand, follow-up, and complications (all P value > 0.050) (Table 4).

The relationship between complications and fracture management was not statistically significant (P value = 0.503). However, soft-tissue injuries were significantly associated with the presence of complications (15.2%) (Tables 5 and 6).

Table 1. Frequency Distributions (n = 274)

| Variables               | N   | %   |
|-------------------------|-----|-----|
| Gender                  |     |     |
| Male                    | 241 | 88.0|
| Female                  | 33  | 12.0|
| Soft-tissue injury       |     |     |
| No                      | 252 | 92.0|
| Yes                     | 22  | 8.0 |
| Hand                    |     |     |
| Left                    | 143 | 52.2|
| Right                   | 131 | 47.8|
| Fracture site           |     |     |
| Little finger           | 125 | 45.6|
| Thumb                   | 34  | 12.4|
| Ring finger             | 31  | 11.3|
| Middle finger           | 25  | 9.1 |
| Index                   | 21  | 7.7 |
| Thumb and index         | 23  | 8.4 |
| Middle and ring finger  | 8   | 2.9 |
| Index and middle finger | 5   | 1.1 |
| Middle, ring and little finger | 1 | 0.4 |
| Ring and little finger  | 2   | 0.7 |
| Type                    |     |     |
| Isolated                | 194 | 70.8|
| Multiple                | 80  | 29.2|
| Follow-up               |     |     |
| Yes                     | 268 | 97.8|
| No                      | 6   | 2.2 |
| Complication            |     |     |
| No                      | 195 | 71.2|
| Yes                     | 79  | 28.8|
| Management              |     |     |
| ORIF                    | 175 | 65.9|
| Closed                  | 96  | 35.0|
| Graft                   | 1   | 0.4 |
| Refused                 | 1   | 0.4 |
| Repair                  | 1   | 0.4 |

Fig. 1. An overview of our algorithmic approach to managing self-inflicted hand injuries.
Table 2. Distribution of All Cases by Age and Sick Leave Period

| Measurements | Age | Sick Leave (d) |
|--------------|-----|----------------|
| Mean         | 25.4215 | 28.4562 |
| Median       | 24.0000 | 23.0000 |
| Std. deviation | 13.57958 | 28.91658 |

Table 3. Correlation between Age and Sick Leave Period

| Correlation between | Age | Sick Leave |
|---------------------|-----|------------|
| Age                 | Correlation Coefficient | N | 1.000 | 274 | 274 |

*indicates significance $p < 0.05.$

Table 4. Relationship between Gender and Other Variables (Soft-tissue Injury, Hand, Type, Follow-up, and Complication)

| Variables | Male, n (%) | Female, n (%) | Odds Ratio | $P$ |
|-----------|-------------|---------------|------------|-----|
| Soft-tissue injury | | | | |
| No | 220 (91.3) | 32 (97.0) | 3.055 | 0.260 |
| Yes | 21 (8.7) | 1 (3.0) | | |
| Hand | | | | |
| Left | 125 (51.9) | 18 (54.5) | 1.114 | 0.773 |
| Right | 116 (48.1) | 15 (45.5) | | |
| Type | | | | |
| Isolated Multiple | 165 (68.5) | 29 (87.9) | 3.399 | 0.021 |
| Follow-up | | | | |
| No | 5 (2.1) | 1 (3.0) | 1.475 | 0.725 |
| Yes | 230 (97.9) | 32 (97.0) | | |
| Complication | | | | |
| No | 170 (70.5) | 25 (75.8) | 1.305 | 0.535 |
| Yes | 71 (29.5) | 8 (24.2) | | |

Table 5. Relationship between Complication and Fracture Management (ORIF and Closed)

| Fracture Management | Complication Present, n (%) | Complication Absent, n (%) | Odds Ratio | $P$ |
|---------------------|-----------------------------|-----------------------------|------------|-----|
| ORIF                | 56 (70.9)                   | 119 (61.0)                  | 1.788      | 0.505 |
| Closed              | 20 (25.3)                   | 76 (39.0)                   | | |

Table 6. Relationship between Soft-tissue Injury and Complication

| Soft-tissue Injury | Complication Present, n (%) | Complication Absent, n (%) | Odds Ratio | $P$ |
|--------------------|-----------------------------|-----------------------------|------------|-----|
| Yes                | 12 (15.2)                   | 10 (5.1)                    | 3.313      | 0.005 |
| No                 | 67 (84.8)                   | 185 (94.9)                  | | |

**DISCUSSION**

Various forms of self-inflicted hand injury have been described as factitious, malingering, and self-induced hand injury. Factitious disorder is a relatively uncommon psychiatric disorder that might be difficult to establish and diagnose. Its prevalence can be influenced by different factors and circumstances such as the patient’s demographics, the location of the study, clinical suspicion, and awareness displayed by the healthcare practitioner to diagnose such illness. The current study retrospectively reviewed 274 patients who presented to the emergency department with self-inflicted hand injuries between 2016 and 2018. Concurring to earlier research, the prevalence of the factitious disorder among psychiatric inpatients ranged from 0.5% to 8%. However, our study did not measure the prevalence rate, which might be attributable to healthcare providers’ lack of awareness of factitious disorder and the difficulties in diagnosing the disease. Consequently, the main aim of this study of self-inflicted hand injuries among military personnel in Saudi Arabia is to investigate the occurrences and draw attention to a specific pattern of possible factitious hand injuries observed in some military personnel to alert healthcare providers to this possible diagnosis, early identification, and proper care to prevent complications and irreversible injuries.

In a comprehensive analysis of 455 patients diagnosed with factitious disorder, the article found that females were more than half of the participants. Our findings contradict their observation; we revealed a male preponderance, with nearly 88% of the patients being men. This could be explained by the fact that this study was conducted in a military medical center, where male soldiers are more commonly visited. Physicians may have become more sensitive to identifying male patients with factitious disorder than female patients due to this.

Furthermore, according to the aforementioned systematic review study, most individuals with factitious disorder presenting to the emergency department were young (<18 years old). However, in the present study, the mean age of the patients belonged to the younger age group, with a mean age of 25.4 years old. Moreover, the number of participants in the current study, which took place in Saudi Arabia, is the largest in the literature.

Overall, the prognosis of self-inflicted hand injuries has been dismal, with many instances of lack of follow-up or relapses. Approximately 97% of the patients showed up to their follow-ups among our patients. However, the majority showed poor compliance.

The diagnosis of factitious hand diseases in active and passive mutilators is sometimes time-consuming and requires several observations by the physician, psychiatrist, and hand therapist. Kasdan and Stutts identified several criteria to help hand surgeons diagnose these disorders. These include a history of multiple procedures, consultations with multiple physicians, a history of psychiatric treatment, being off work, crying with pain, a family history of disability, and the absence of objective findings. Diagnosing factitious disorders and/or self-inflicted injuries is a clinical art that requires a great deal of clinical experience and training.

Associations between self-inflicted injuries and laterality have been made and questioned. Conversion disorder patients quite commonly have bilateral symptoms. In unilateral conversion disorders, studies have seemingly shown a more common prevalence of left-sided symptoms. A 2002 study by Stone et al found that 58% of the symptoms reported by over 1100 patients described in 121 eligible studies were left-sided. As in the current study, left-hand injuries were 52.2%, predominately including the left little finger injury. This could be explained by the fact that patients with self-inflicted hand injuries would...
find the left little finger more easily injured with tolerable recovery time.

The care of these patients is very challenging. Few studies have focused on the care of patients, which is thought to be unmanageable. Although Yates \(^8\) published an entire book on this disorder with a detailed description of 30 clinical cases, greater awareness by orthopedic surgeons and plastic surgeons is needed, as they can be confronted with this disorder. In the current study, the majority of the patients were managed by ORIF (63.9%), followed by closed reduction and K-wire fixation (35%). The primary objective of treatment must be to reduce the number of potentially harmful examinations and surgical procedures.\(^9\) The treatment must be multidisciplinary. A psychiatrist should be involved to help with the diagnosis, look for an associated personality disorder, and establish a follow-up regimen, as explained in Figure 1. Although some authors recommend confronting the patient,\(^1\) this must not be done with punishment in mind, as the patient may no longer attend follow-up visits.\(^2\) It is especially critical to preserve the doctor–patient relationship and not fuel the peregrination. Patient-specific treatment appropriate to each type of factitious disorder is initiated: a combination of protective bandaging for wounds and physiotherapy with bracing for deformities or abnormal postures. Unfortunately, there is no consensus beyond adding psychiatric care and avoiding all surgical procedures.\(^2\)

Limitations and Future Recommendations

Although this article has accomplished its goal, it has some significant flaws. The main limitation is that the result of this article is a single-center with an acceptable sample size, which might not represent the entire population of Saudi Arabia. It is impossible to obtain the psychiatric assessment and impressions of the included patients due to patient confidentiality and hospital protocols, even though we stated in the results that there was no documented history of psychiatric illness in any of the patients. Psychiatric history with these kinds of hand injuries would substantiate the value of this article of information. We advise future projects to include the psychiatric history and assess its correlation with the patient’s presentation and hand injury patterns. Hence, we recommend prospective studies with a broader spectrum of a sample size to analyze all the variables. In future research, we recommend comparing intentional self-inflicted hand injuries to traditional hand injuries, and comparing their characteristics, patterns, and outcomes. In addition, we recommend applying the following suggestions when dealing with a suspected case of self-inflicted hand injuries: (1) a good history should be taken of the exact mechanism of injury; (2) previous emergency department visits and injuries should be reviewed carefully in every case; (3) periodic renewal of sick leave instead of long periods to ensure proper follow-up; (4) psychiatric evaluation and social service involvement are mandatory; and (5) official reports and communication between the medical team and patients’ workplaces should be established, and a combined committee should study suspicious cases.

CONCLUSIONS

Patients might be manipulative about the mechanism and etiology of their injuries, making self-inflicted injuries challenging to diagnose. The current study found that most self-inflicted injuries involved the left little finger, and the majority were managed with ORIF. In the context of an unusual injury with a vague medical history, the possibility of a self-inflicted injury must be considered. Diagnostic delays increase the risk of having multiple surgical procedures, which may be highly iatrogenic.

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