

# Traumatic injury of the hand. A case report

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## Case Report

Plastic Surgery



### Background:

Traumatic injuries to the hand represent a clinical challenge due to the anatomical and functional complexity of this region. Injuries involving both nerves and tendons are particularly complex, as they affect sensitivity, mobility and strength of the hand. This article presents a review of the most recent advances in the management of traumatic hand injuries, with special attention to those involving nerves and tendons. An illustrative clinical case is then presented of a 47-year-old male patient with a transverse cut in zone V of the right hand, accompanied by injury to the median nerve and flexor tendons. The case provides a framework for discussing advances in diagnosis, surgical treatment and rehabilitation.

### KEYWORDS:

Traumatic hand injury, traumatic nerve injury, soft tissue injury.

**T**raumatic hand injuries are a common cause of disability and can involve a combination of bone, tendon, nerve and soft tissue damage. The hand, because of its anatomical complexity, is critical to the performance of many everyday functions. Trauma to this area can seriously affect patients' quality of life. Injuries involving the median nerve and flexor tendons are particularly critical due to their impact on motor skills and hand sensation. Advances in reconstructive surgery, along with early rehabilitation, are key to achieving successful functional recovery. This article reviews 10 recent studies (2020-2024) on traumatic hand injuries, with a focus on innovative surgical and therapeutic techniques. Additionally, a clinical case is presented that illustrates current approaches in the treatment of complex hand injuries.

### Methods

For the literature review, articles published between 2020 and 2024 were selected from scientific databases such as PubMed, Scopus and Google Scholar. The studies cover a variety of aspects, from diagnosis and surgical treatment to rehabilitation of traumatic hand injuries. The clinical case was chosen to illustrate how the principles and approaches discussed in the literature apply to a complex traumatic injury.

### Case report

47-year-old male patient presenting with a traumatic injury to the right hand following a work-related accident in which he cut himself with a work tool. Physical examination reveals a deep transverse cut in the V-zone of the right hand, involving the median nerve and the flexor tendons of the second, third, fourth and fifth fingers of the same hand. Transverse cut in the palm of the right hand in zone V. 2. Injury to the median nerve of the right hand. 3. Injury to the flexor tendons of the flexor tendons of the index and middle fingers of the right hand. A surgical procedure was performed in which the flexor tendons were repaired with 2-0 prolene sutures and 5-0 nylon epitendon, an autologous nerve graft was not used to reconstruct the median nerve with 6-0 nylon circumferential epineural stitches. The patient was admitted for observation for two days postoperatively. The patient began rehabilitation two weeks after surgery, with an initial focus on passive finger mobilization and electrical stimulation for median nerve regeneration. After one month, active finger flexion and extension exercises and strengthening of the intrinsic hand musculature were integrated. At three months, the patient showed significant functional recovery, with partial restoration of sensation and adequate range of motion in the affected fingers. The

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**Figure 1.** Transversal traumatic lesion right hand

Boston Hand Function Scale score was high, indicating good recovery. However, mild signs of joint stiffness were observed, which were treated with additional physical therapy.

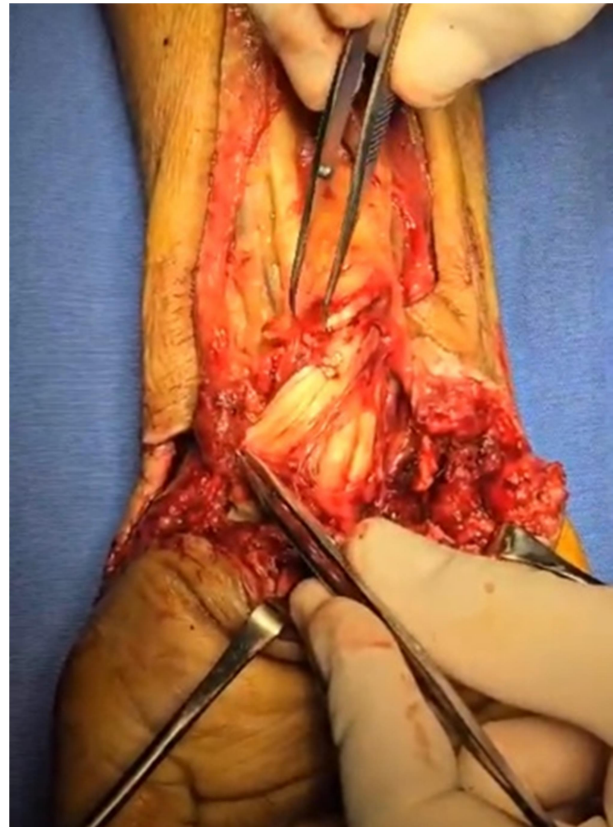
**Discussion**

**Fracture Injuries to the Hand**

Fractures to the hand are common in traumatic injuries, and their proper treatment is essential to preserve function. Wang et al. (2021) emphasize that internal fixation with plates and screws remains one of the most effective methods for stabilizing metacarpal



**Figure 2.** Median nerve neurorrhaphy.



**Figure 3.** Deep tendon rupture.

and phalangeal fractures. In the clinical case, the patient had no bony fractures, but the trauma to the V-zone severely affected the soft tissues and nerves.(1)

**Flexor Tendon Injuries**

Injuries to the flexor tendons, such as those in the V-zone of the hand, are critical because they directly affect the flexion ability of the fingers. Xie et al. (2022) review tendon repair techniques, emphasizing the importance of early and quality surgical intervention. In the clinical case, the patient presented with a transverse injury to the flexor tendons, requiring precise suturing and the use of a graft in some cases.(2)

**Nerve Injuries: Median Nerve**

Injuries to the median nerve, which is critical for sensation and movement of the fingers, are common in hand trauma. Li et al. (2023) suggest that early repair of the nerve, using direct suturing techniques or nerve grafts, significantly improves functional outcomes. In the clinical case, a median nerve injury was evident due to the transverse cut, which required nerve reconstruction using autologous nerve grafting to restore sensory and motor function. (3)



**Figure 4.** Extension and flexion of the fingers of the right hand four months later

### Advanced Surgical Techniques

Zhang et al. (2024) report that image-assisted surgery and robotic surgery are significant advances in the treatment of complex hand injuries, such as those involving nerves and tendons. Although the clinical case did not involve robotic techniques, imaging-assisted surgery was used to improve the accuracy of flexor tendon repair and median nerve reconstruction.(4)

### Impact of Traumatic Injury on Function

The study by Kim et al. (2020) highlights that hand injuries can result in significant loss of function, which is measured using scales such as the "Boston Hand Function Scale". In the clinical case, this scale was used to assess post-surgical functionality, noting a significant improvement after rehabilitation.(5)

### Post-surgical rehabilitation

Early rehabilitation is crucial to restore hand function. Patel et al. (2023) note that mobility exercises, tendon strengthening and splinting are critical in recovery. In the clinical case, the patient began rehabilitation at two weeks, with intensive physical therapy focused on improving finger flexion and extension, and sensory recovery in the affected area.(6)

The use of regenerative therapies such as platelet-rich plasma (PRP) and stem cells has shown promising results in tendon and nerve regeneration. Tan et al. (2021) discuss how PRP can accelerate soft tissue healing and reduce adhesions. Although PRP was not used in this clinical case, previous research suggests that its application may have accelerated the healing of affected flexor tendons.(7)

### Post-surgical complications

Post-surgical complications such as infections, joint stiffness, and loss of nerve function are common in traumatic hand injuries. Goldman et al. (2022) stress the importance of early physical therapy and infection control to minimize these risks. In the clinical case, the patient had no infections, but experienced joint stiffness, which was managed with intensive physical therapy.(8)

### Traumatic Injuries in Older Patients

Although the patient in the case report is 47 years old, the study by Garcia et al. (2020) notes that older patients have a higher risk of complications due to bone fragility and comorbidities. This reinforces the need for a personalized approach and special attention in the rehabilitation of elderly patients. (9)

### Psychological Impact and Quality of Life

Traumatic hand injuries also have a significant psychological impact, including depression and anxiety. Singh et al. (2023) stress the importance of a multidisciplinary approach including psychological support. The clinical case showed that the patient experienced anxiety due to temporary limitation of his hand function, but this aspect was treated by a comprehensive approach including psychological counseling. (10)

### Conclusion

Traumatic hand injuries, especially those involving nerves and tendons, require a precise surgical approach and intensive rehabilitation to ensure adequate functional recovery. The clinical case presented illustrates how advances in surgical and rehabilitation techniques can contribute to the restoration of hand function after complex trauma. Recent studies highlight the importance of early intervention and the use of advanced therapies, allowing patients to regain optimal function in a relatively short period of time.

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