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# Epidemiological, clinical, therapeutic, and evolutionary profile of hand and/or wrist wounds at the national reference university hospital center (Chu-Rn)

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**Abstract**
**Introduction**: Hand and wrist wounds are breaches of the skin barrier caused by a harmful agent. The aim is to describe the epidemiological, clinical, therapeutic, and evolutionary profile.
**Patients and Method**: This was a prospective descriptive study, conducted from January 2020 to June 2022, including all traumatic wounds (hand and/or wrist). The variables studied were epidemiological, clinical, therapeutic, and developmental.
**Results**: Out of 280 traumatic wounds received, we collected 44 hand and/or wrist wounds, representing 15.7%. The average age was 33.2 years [18-78 years] with a male predominance (sex ratio: 4.5). The etiological circumstances were dominated by assaults (45.5%) and traffic accidents (45.5%). Bladed weapons were used as injuring agents in 45.4% of cases. Motorcycle taxi drivers accounted for 56.8% of cases. The most frequent lesion location was the palm of the hand (59%) and the right side (52.3%). Tendon injuries were observed in 29 cases (65.9%), bone injuries in 25 cases (38.63%), nerve injuries in 8 cases (15.9%), and vascular injuries in 7 cases (13.63%). A sequela in the form of amputation was found in 8 patients, representing 18.18% of cases. The average time to return to work was 147 days; functional outcomes were rated as excellent in 22.8% (n=10) and good in 41% (n=18) of cases.
**Conclusion**: Hand and/or wrist injuries are common and serious, affecting the functional prognosis of the injured limb.

**Keywords:** Wounds, hand, wrist, N'Djamena / Chad

## Introduction

The hand is a complex, vulnerable organ, frequently exposed to trauma. Its richness in vital structures located just beneath the skin and its complex physiology make injuries to this organ potentially serious [1].

Hand injuries account for the majority of traumas in hospitals worldwide. Their frequency continues to increase, especially in developing countries [2]. They are sometimes overlooked, and the severity of the injuries underestimated by emergency services, particularly when associated with other life-threatening injuries [2, 3]. Hand wounds are often accompanied by tendon and adjacent muscular, nervous, and vascular injuries that require appropriate repair to avoid severe socio-professional consequences for the patient and society [3-5]. They represent a diagnostic and therapeutic challenge [2]. The quality of initial surgical management helps reduce sequelae and socio-professional consequences [3, 6]. The aim of this study was to describe the epidemiological, lesion-related, therapeutic, and developmental aspects of hand and wrist injuries in the Orthopedics-Traumatology department of the CHU-RN in N'Djamena.

## Patients and Methods

This was a descriptive cross-sectional study with prospective data collection focused on hand and wrist wounds in the Orthopedic-Traumatology surgery department over an 18-month period from January 2020 to June 2022. All patients presenting with a traumatic wound of the hand and/or wrist, aged at least 16 years old, who consented and received care in the orthopedic-traumatology department, were included. Chronic hand wounds, hand burn wounds, and patients who did not consent were excluded from the study. The variables studied were epidemiological (age, sex, socio-professional status, circumstances of injury), clinical (affected limb and observed lesions: type of wounds and topographic areas), therapeutic (surgical procedures performed, length of hospital stay), and patient outcomes. The Quick DASH Questionnaire [7] was used to evaluate the results. The collected data were recorded and analyzed using Excel and SPSS 20 software. Ethical and administrative considerations were taken into account.

## Results

During the 18-month study period, we collected 44 cases of hand and/or wrist wounds out of 634 recorded admissions, a frequency of 6.84%. There was a male predominance with 82% (n=36) of cases and a sex ratio of 4.5. The average age was 33.25 years, with extremes ranging from 18 to 78 years. Manual workers accounted for 56.8% (n=25) of cases, and 43.2% (n=19) of cases were unschooled. Tables I and II show the distribution of patients according to the circumstances of occurrence and the blunt object involved. The right hand was affected in 52.3% (n=23) of cases, and the dominant side was involved in 64% (n=28). The injuries were located in the palm of the hand in 59% (n=26) of cases, and tendon injuries were observed in 88.2% of cases (Table III, Figures 1 and 2). The average delay between the accident and patient care was 7 days, with a range of 1 to 20 days. Tables IV and V show, respectively, the injuries according to the anatomical zone and their repair.

**Table 1:** Distribution of patients according to the circumstances of occurrence

| Circumstances | N | % |
|---|---|---|
| Assault | 20 | 45,5 |
| Road Traffic Accident | 20 | 45,5 |
| Work Accident | 2 | 4,5 |
| Domestic Accident | 2 | 4,5 |
| Total | 44 | 100 |

**Table 2:** Distribution of patients according to blunt objects

| Blunt Objects | N | % |
|---|---|---|
| Bladed Weapon | 20 | 45,5 |
| Motorcycle | 19 | 43,2 |
| Saw | 2 | 4,5 |
| Firearm | 2 | 4,5 |
| Nail | 1 | 2,3 |
| Total | 44 | 100 |

**Table 3:** Distribution of patients by involvement of major structures of the hand

| Damage of Major Structures | N | % |
|---|---|---|
| Tendon damage | 39 | 39 |
| Bone damage | 25 | 25 |
| Vascular damage | 14 | 14 |
| Nerve damage | 13 | 13 |

**Table 4:** Distribution of damages by anatomical area

| Flexors | | | Extensors | | |
|---|---|---|---|---|---|
| Area | N | % | Area | N | % |
| I | 3 | 6,8 | I | 3 | 6,8 |
| II | 13 | 27,3 | II | 1 | 2,3 |
| III | 2 | 4,5 | Iii | 1 | 2,3 |
| IV | 1 | 2,3 | IV | 2 | 4,5 |
| V | 5 | 11,4 | V | 1 | 2,3 |
| T2 | 1 | 2,3 | VI | 3 | 6,8 |
| T3 | 1 | 2,3 | VII | 3 | 6,8 |

**Table 5:** Distribution of patients by damage repair

| Distribution of damages | N | % |
|---|---|---|
| Tendon sutures | 39 | 88,6 |
| Osteosyntheses | 25 | 56,8 |
| Vascular sutures | 14 | 31,8 |
| Nerve damage | 13 | 29,6 |
| Stump regularization | 8 | 18,2 |

**Fig 1a:** Sutured wound with minimal tissue damage on the back of the hand

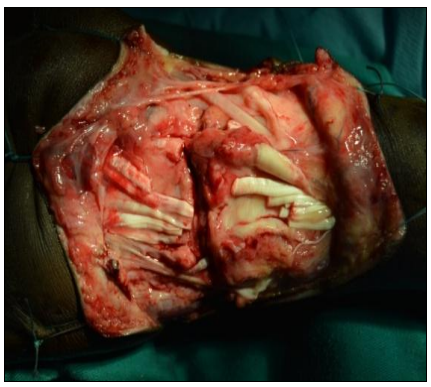

**Fig 1b:** Exploration with significant tendon damage

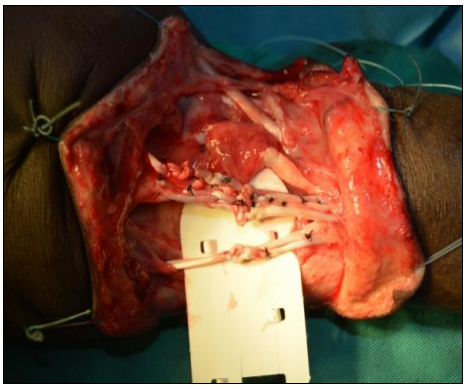

**Fig 1c:** Tendon repair

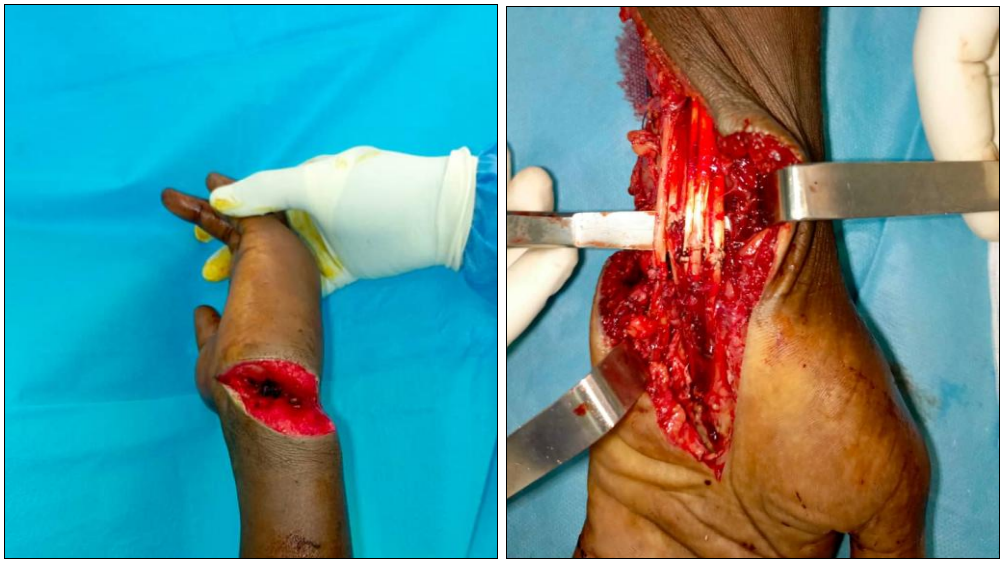

**Fig 2:** Complex wrist injury: severing of the ulnar carpal flexor, superficial and deep common flexors of the fingers, severing of the ulnar artery, ulnar nerve, and median nerve. The average length of hospitalization is 14.6 days, with extremes ranging from 2 to 30 days. At an average follow-up of 12 months, 40 patients were evaluated, with an excellent functional outcome (figure 3) in 22.8% (n=10) and a good outcome in 41% (n=18)

**Fig 3:** Complex wrist wound: severing of the ulnar carpal flexor, superficial and deep common flexors of the fingers, severing of the ulnar artery, ulnar nerve, and median nerve: 10-month outcome. Good functional recovery

## Discussion

Wounds of the hands and/or wrist remain one of the most common reasons for visits to emergency departments across various healthcare facilities. In France, the number of hand injuries is estimated at 1,400,000 per year, of which 620,000 are severe and complex, potentially leaving sequelae and disability [8]. In our case, hand and/or wrist wounds represent 6.8% of admissions to the orthopedic and trauma surgery department. This frequency is much lower than in other series: Tidjani *et al.* [9] and Bah *et al.* [2]. The seemingly minor appearance of these injuries, combined with patients' lack of awareness of their severity as well as that of the emergency department staff, may account for this low rate in the series.

Numerous studies have reported a predominance of the male sex [1, 6, 10, 11, 12]. In our study, we observed a male predominance with 82% of cases and a young population with an average age of 33.2 years. Male sex and young age represent the most active social group in society, which is exposed to hazards such as road accidents and assaults. Our study shows that manual workers (carpenters, shoemakers, welders, farmers, cultivators, and moto-taxi drivers) constitute the most affected occupational class, accounting for 56.8% of cases. This result is in line with some data in the literature [1, 2, 13]. The average admission delay resulting from our study is 14.2 hours; it is similar to that reported by Akambi *et al* [14], which revealed an average delay of 14 hours. However, Mouton *et al.* [1] and Ahmed *et al.* [15] observed an average admission delay of 6 hours and 8 hours, respectively, which is significantly lower than ours. The neglect of hand wounds due to their benign appearance could explain the delayed admission in our context. This study shows that assaults and public road accidents (45.4%) are the main circumstances of occurrence. Its result illustrates the severity of a situation dominated by the operation of two-wheeled vehicles, sometimes under the influence of alcohol, with no respect for traffic rules, and growing insecurity with the very easy use of knives. For Bah *et al.* [2], the primary circumstance was work accidents in 42.44%, followed by domestic accidents in 24.96%. Ahmed *et al.* [15] reported that 55.81% of cases were caused by domestic accidents. In our case, we observe a predominance of the right hand being affected in 52.3% of cases, and the dominant side is affected in 64% of cases. The same observation was made by Akambi [14].

In this series, the palm of the hand is affected in 59% of cases, with a predominance of tendon injuries in 88.2% of cases. The palm of the hand serves as the stabilizing area in case of a fall and for protection in case of assault. These figures correspond to the literature regarding the frequency of predominant involvement of the palmar side of the hand [1, 16-18]. However, it is higher than those reported by Frazier *et al.* [19], Ibrahima *et al.* [11], and Bah *et al.* [2], who report bone injuries in 11.4%, 39.4%, and 45.75% of cases, respectively.

Many authors recommend the systematic surgical exploration of any wound on the palmar or dorsal side of the hand [1, 20]; thus, for all our patients, the treatment was primarily surgical. For simple wounds, debridement was performed, and repair of the flexor tendons was done using the KESSLER technique with 4/0 prolene (the extensor tendons were sutured in a similar manner, followed by immobilization of the hand in a plaster splint in flexion in cases of flexor injuries, or in extension in cases of extensor tendon injuries), according to expert hand surgery recommendations [1, 21, 22]. We performed pinning of phalangeal fractures using 8/10th Kirschner wires, and stump regularization was carried out for finger amputations. Rehabilitation was systematically provided for all patients.

At an average follow-up of 12 months, 90% of our patients were evaluated with an overall satisfactory outcome of 68%.

## Conclusion

Hand and/or wrist injuries are common and serious, jeopardizing the functional prognosis of the affected limb. The predominance of injuries caused by traffic accidents and assaults with bladed weapons in our context should draw the attention of authorities and the public to this scourge. The complexity of these injuries requires prompt surgical management by qualified personnel to minimize functional sequelae.

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