

An analysis of the spectrum of hand fractures recorded in the emergency department of a tertiary hospital. A comparison of the incidence of hand fractures among Polish and Ukrainian patients before and after the outbreak of the war in Ukraine

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ABSTRACT

Introduction: Hand fractures are the most common fractures of the upper extremity. Following the outbreak of war in Ukraine, approx. 1.5 million Ukrainians fled to Poland. Many of these individuals quickly integrated into Polish society and found employment, often in manual labor. The objective of this study was to analyze the spectrum of hand fractures recorded in the emergency department of a tertiary hospital and compare the incidence of hand fractures among Polish and Ukrainian patients before (2020) and after (2022) the outbreak of the war in Ukraine.

Materials and methods: The study utilized records from the database of the Emergency Department SPSK 1 in Szczecin from 2020 and 2022, representing the year before and the year of Russia's invasion of Ukraine.

Results: A total of 344 hand fractures were recorded in 2020 and 437 in 2022. In both periods, the most common injuries were

finger and metacarpal fractures, accounting for 74% (2020) and 72% (2022) of all fractures. In 2020, 12 Ukrainians were registered, representing 3.5% of all patients that year, while in 2022, there were 44 Ukrainians, representing 10% of all patients (statistically significant, $p = 0.0004$). The number of work-related fractures was significantly higher among Ukrainians than among Poles, in both 2020 (6% vs. 58%) and 2022 (8% vs. 61%; statistically significant, $p = 0.0001$).

Conclusion: The higher incidence of hand injuries among Ukrainians may be due to less attention to work safety compared to Poles and the fact that they often work outside their trained professions, which increases the risk of injury.

Keywords: hand and wrist fractures; work-related injuries; foreign-born workers.

INTRODUCTION

Hand fractures are the most common fractures of the upper extremity, with a reported incidence of 3.7 per 1000 per year for men and 1.3 per 1000 per year for women [1, 2]. Over the past decade, there has been a noticeable trend toward a decrease in work-related injuries at the author's institution and nationally. This decrease can be attributed to improved work culture and the use of safer industrial machinery, particularly in woodworking and furniture factories, as well as in agriculture. Consequently, the number of severe hand injuries, including amputations, has gradually decreased.

Since 2014, the influx of Ukrainian citizens to Poland has increased due to economic factors and the initial stages of the Russian invasion, which resulted in the seizure of the Donbas region and Crimea. The most significant exodus occurred after the start of the full-scale Russian-Ukrainian war in February 2022. Many war refugees remained in Poland and found employment, primarily in industry and services. While this influx has had clear economic benefits for Poland, it has also led to an increase in hand injuries among Ukrainian workers. This increase in injuries is likely related to the lack of adaptation to new workplace conditions and generally lower attention

to work safety among this group. This trend has been observed in the emergency department and clinic of the hospital where the author of this paper works.

The aim of this study was to analyze the spectrum of hand fractures recorded in the emergency department of a tertiary hospital and to compare the incidence of hand fractures among Polish and Ukrainian patients before (2020) and after (2022) the outbreak of the war in Ukraine. The analysis was based on data obtained from the emergency department archives of the author's hospital.

MATERIALS AND METHODS

The study used records from the database of the Emergency Department SPSK 1 in Szczecin for the years 2020 and 2022. These years represent the period before Russia's invasion of Ukraine and the year when the invasion began, resulting in a significant influx of war refugees into Poland. The analysis focused on the number of fractures of individual hand and wrist bones, their distribution by gender and nationality (Polish vs. Ukrainian), and the incidence of work-related fractures.

Statistical analysis was conducted to compare the number of Ukrainian patients in 2020 and 2022 and to assess the difference in the number of work-related fractures within these groups. This analysis employed a two-sided Fisher exact test, with a p-value of less than 0.05 considered indicative of a statistically significant difference.

RESULTS

The results of the analysis are presented in Tables 1 and 2. In both analyzed periods, the most common injuries were finger fractures (excluding thumbs) and metacarpal fractures (excluding the first metacarpal). These 2 types accounted for 74% of all fractures in 2020 and 72% in 2022. There were more metacarpal fractures in 2020 (145 vs. 111) and more finger bone fractures in 2022 (163 vs. 152). The 3rd most common fracture was the first metacarpal fracture, which accounted for about 7% of all fractures. The hand and wrist bones fractures were significantly more common in men than in women: 82% vs. 18% in 2020 and 78% vs. 22% in 2022. There were also significantly more patients with hand bone fractures in 2022 than in 2020 (437 vs. 344), which can be explained by the lower number of patients in general at the end of 2020, due to the onset of the COVID-19 pandemic.

Figures 1 and 2 illustrate the distribution of finger and metacarpal fractures, respectively.

TABLE 1. Distribution of hand and wrist bone fractures in 2020

Name of the bone fractured	n	M/F	Ukrainian/ non-Ukrainian
Scaphoid	19	15/4	1/18
Other carpal bone	9	6/3	1/8
Ist metacarpal bone	24	20/4	2/22
Other metacarpal bone	145	128/17	3/142
Multiply metacarpal bones	9	8/1	0/9
Thumb bone	17	14/3	1/16
Other finger bone	111	83/28	4/107
Multiple finger bones	10	8/2	0/10
Total	344	282/62	12/332

TABLE 2. Distribution of hand and wrist bone fractures in 2022

Name of the bone fractured	n	M/F	Ukrainian/ non-Ukrainian
Scaphoid	24	16/8	2/22
Other carpal bone	16	10/6	2/14
Ist metacarpal bone	28	23/5	2/26
Other metacarpal bone	152	127/25	15/137
Multiply metacarpal bones	19	18/1	3/16
Thumb bone	23	17/6	3/20
Other finger bone	163	123/40	16/147
Multiple finger bones	12	6/6	1/11
Total	437	340/97	44/393

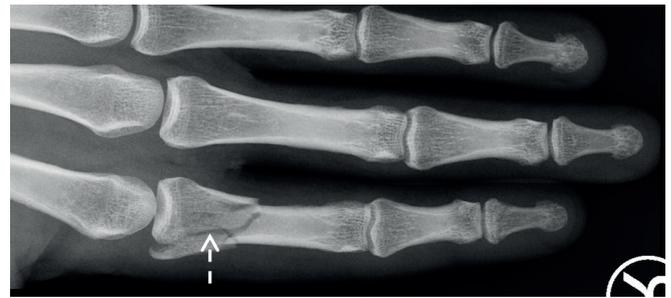


FIGURE 1. Multifragmentary fracture of the proximal phalanx of the little finger



FIGURE 2. Spiral fracture of the shaft of the fifth metacarpal

With regard to the nationality of patients with hand fractures, 12 Ukrainians were registered in 2020, representing 3.5% of all patients that year, whereas 44 Ukrainians were registered in 2022, representing 10% of all patients (statistically significant difference, Fisher test, $p = 0.0004$). This significant increase in the number of Ukrainian patients with hand fractures in 2022 is a direct effect of their increased emigration to Poland.

Regarding work-related fractures among Ukrainians, in 2020, 7 out of 12 (58%) were work-related, while in 2022, 27 out of 44 (61%) were work-related (year-by-year difference statistically insignificant; Fisher test, $p = 0.32$) – Table 3. Among Polish patients, 21 out of 332 (6%) had work-related fractures in 2020, and 33 out of 393 (8%) in 2022 ($p = 0.65$). However, the number of work-related fractures was statistically significantly higher among Ukrainians compared to Poles, in both 2020 (6% vs. 58%) and 2022 (8% vs. 61%), with this difference being statistically significant (Fisher test, $p = 0.0001$).

TABLE 3. Number of work-related fractures in the analyzed periods among Polish and Ukrainian patients

Nationality of patients	Work-related fractures	
	2020	2022
Polish	n: 21/332, %: 6	n: 33/393, %: 8
Ukrainian	n: 7/12, %: 58	n: 27/44, %: 61

DISCUSSION

The hand is the most frequently injured part of the body, particularly in young people due to their greater activity in work, sports, and recreation compared to older individuals. The number of patients with such injuries is steadily increasing, as seen in emergency departments and outpatient clinics. This study also observed an increase in the number of hand fractures between the 2 analyzed periods. The results are consistent with the existing literature on the epidemiology of fractures.

Dominguez-Prado et al. reported epidemiological data from a tertiary hospital in Vigo, Spain, serving a population of 470,000. Over 3 years, 1,267 patients (422 per year) were diagnosed with 1,341 hand fractures, representing 30% of all upper limb fractures during that period. The most frequent injury was a metacarpal fracture (other than the first metacarpal), with the 5th metacarpal being the most common (40% of all hand fractures). The next most common injury was a phalangeal fracture of the fingers (35% of all hand fractures), with the proximal phalanx fracture being the most common. The global incidence rate was 99 fractures per 100,000 per year, with no seasonal variation. The vast majority of these fractures (90%) were treated conservatively [3].

Weum et al. reported epidemiological data from a university hospital in Tromsø, Norway. Over 1 year (2010), 593 patients with 691 fractures were identified, including 411 phalangeal (59%), 200 metacarpal (29%), and 80 carpal fractures (12%). The 5th metacarpal fracture was the most commonly diagnosed fracture, with 99 patients (18%). The highest incidence of fractures in men was in the age group of 10–24 years, while in women, it was in the age group of 50–70 years. There were no seasonal variations, although a marked decrease in fractures was seen in December [4]. The data from this study are broadly consistent with the results of the present study.

There is limited information in the literature on work-related injuries among immigrants, with some data coming from the United States and Poland. Frost et al. analyzed work-related injuries among Hispanics and other foreign-born workers at an urban trauma center in the United States over an 8-year period. Foreign-born workers were more likely to be victims of occupational fatalities, and their number of injuries increased steadily. Hispanics were more likely to be injured by machinery and hand tools. Workers reported hazardous working conditions, lack of workers' compensation, short time in their current job, and not working in their usual (learned) occupation [5].

Zhang et al. compared rates of non-fatal work-related injuries among foreign-born and US-born adult workers in the

United States. Interestingly, foreign-born workers had a statistically significantly lower overall rate of work-related injury compared to US-born workers (50/10,000 vs. 89/10,000, $p < 0.01$). Both groups faced significant injury risks, especially in industries such as construction, agriculture, forestry, fishing, and manufacturing [6].

In a study from Poland, Cianciara et al. analyzed the causes of hospitalization of injured immigrants in Poland over 3 years (2008–2010), using data from the General Hospital Morbidity Study. They found that the number of foreigners hospitalized due to injuries ranged from 4,600 to 21,200, with injuries accounting for 8–12% of all foreigners' hospital stays. The majority of patients were male, but the proportion of females gradually increased to 37% in 2010. The average age of the patients was 35 years. The structure of traumas differed from the general population, with a prevalence of minor injuries to the wrist, hand, ankle, and foot [7].

In conclusion, the outbreak of the war in Ukraine has led to an influx of approx. 1.5 million refugees. Many of these individuals found employment in Poland, with men often performing manual labor in various sectors of the economy. This has resulted in an increase in work-related hand injuries, as shown in the results of this study. The higher incidence of hand injuries among Ukrainians may be due to less attention to occupational safety compared to Poles and the fact that they often work outside their trained professions, increasing the risk of injury.

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