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Original article

The impact of COVID-19 on hand surgery: A French retrospective comparative study in COVID-19 and non-COVID-19 hand trauma centers

Inès Regas^{a,b,c,*}, Marine Pichonnat^{a,b,c}, Isabelle Pluvy^{a,b,c}, Laurent Obert^{a,b,c},
Philippe Bellemère^d, Camilo Chaves^d, François Loisel^{a,b,c}

^a Service d'orthopédie, de traumatologie, de chirurgie plastique, reconstructrice et assistance main, CHU de Besançon, 3, boulevard Alexandre-Fleming, 25030 Besançon, France

^b Université de Bourgogne Franche-Comté, Sciences médicales et pharmaceutiques, 19, rue Ambroise-Paré, 25030 Besançon, France

^c Nanomédecine, imagerie, thérapeutique – EA 4662, université de Bourgogne Franche-Comté, sciences médicales et pharmaceutiques, 19, rue Ambroise-Paré, 25030 Besançon, France

^d Institut de la main Nantes Atlantique, boulevard Charles-Gautier, 44800 Saint-Herblain, France

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ABSTRACT

Introduction: In 2020, the pandemic divided France into two zones: COVID-19 and non-COVID-19. The main objective of our study was to compare the variability of surgical and emergency consultation activity amongst two hand trauma centers, between the pandemic period and outside the pandemic period. The secondary objective was to identify at-risk patients in order to develop preventative strategies in hand trauma.

Methods: This bi-centric retrospective study considered the epidemiology of admissions to trauma centers during the first French lockdown. The data were compared to the same period in 2019 (control group). Two thousand and fifty-five patients underwent consultations for hand or wrist trauma.

Results: The first French lockdown was associated with a 35% decrease in hand and wrist injuries in the COVID-19 zone versus 24% in the non-COVID-19 zone, compared to the same period in 2019 ($p < 0.0001$, 95% CI: 6.5–15.6). Comparing 2019 and 2020, the incidence of wounds significantly increased in the COVID-19 zone (58% vs. 78%, $p < 0.0001$) and significantly decreased in the non-COVID-19 zone (55% vs. 50%, $p < 0.0001$). Complex wounds (16% vs. 35%, $p < 0.0001$ and 15% vs. 17%, $p < 0.0001$) and open fractures (8% vs. 14%, $p = 0.019$ and 4.5% vs. 5.3%, $p < 0.0001$) significantly increased in both zones during the pandemic. The rate of male, non-manual workers injured in domestic accidents (76% vs. 36%, $p < 0.0001$) was significantly increased in all areas.

Conclusion: Hand and wrist trauma was less frequent but more severe during the pandemic compared to the same period in 2019. By encouraging the public to be aware of the risks and the means to avoid trauma, such as better information and compliance with safety instructions, we could minimize these risks. This data can be useful in planning preventative strategies for future lockdowns.

Level of evidence: III; case-control study.

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1. Introduction

The COVID-19 pandemic affected France from the start of 2020, particularly in the northeast of the country. Patients with risk

* Corresponding author at: Service d'orthopédie, de traumatologie, de chirurgie plastique, reconstructrice et assistance main, CHU de Besançon, 3, boulevard Alexandre-Fleming, 25030 Besançon, France.
E-mail address: ines.regas@gmail.com (I. Regas).

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factors such as obesity, immunosuppression, and advanced age presented with more severe forms of infection requiring hospitalization in intensive care units [1].

The French government took restrictive measures by imposing a lockdown from the 17th of March 2020 to the 11th of May 2020. The regions were divided into two zones: “red”, with COVID-19, or “green”, which were considered non-COVID-19, depending on the incidence of the virus and the capacity of resuscitation services [2]. Hospitals cancelled elective surgeries to free up beds and staff for new patients [3,4].

Table 1
Epidemiological data collected from the two hand trauma centers studied.

Center-related data: number of admissions/day
Patient-related data: date of emergency room consultation, date of trauma, sex, age, smoking status, substance use, dominant hand, profession [manual workers with high functional demand, workers with intermediate functional demand (students, administrators, civil servants) and retired or unemployed]
Context of the trauma: workplace accident, domestic accident ^a , assault, self-injury, motor vehicle accident
Reason for coming to the emergency room Wound Burn Infection Amputation Fracture Trauma without fracture
Diagnosis Wound (single-lesion, multi-lesion) with localization (finger, hand, wrist, palmar face, dorsal face, D1 D2 D3 D4 D5, IFSSH zone classification, I II III IV V VI), presence of tendon injury, arterial or nerve microsurgery, loss of substance, amputation Closed or open fracture, wrist, carpal bone, metacarpus, phalanx Closed trauma without fracture Infection (abscess, arthritis, whitlow, phlegmon, others) Burn (cause, location, degree, extent in percentage)
Treatment: medical (functional, orthopedic), surgical, hospitalization

^a Domestic accident: unintentional trauma that does not occur on the road (traffic accident) or during working hours (workplace accident). They are divided between domestic accidents, accidents occurring outside (store, sidewalk, etc.), sports accidents and vacation or leisure accidents.

The practice of hand surgery was impacted with changes in professional practices [5]. The activity of some French hand trauma centers decreased by 64.9% [6] and by 20% abroad [7].

The main objective of this study was to compare the incidence of emergency pathologies at two hand trauma centers, one in the COVID-19 zone, and one in the non-COVID-19 zone, between the period of the first French COVID-19 pandemic lockdown, and outside of the pandemic, during the same period in 2019 (i.e. the control group).

The secondary objective was to identify at-risk patients in order to develop preventative strategies in hand trauma.

2. Patients and methods

This was a retrospective bi-centric comparative study with an epidemiological aim to investigate admissions to emergency trauma departments from two FESUM-accredited hand trauma centers during the first French lockdown from the 17th of March 2020 to the 11th of May 2020. The data were compared with the same period in 2019. This period was selected to minimize seasonal variability in the incidence of hand injuries.

2.1. Data collected

The data were collected anonymously in a protected Excel file, as per the STROBE and STROCCS recommendations (Table 1). Patients gave their consent for the use of their data in accordance with the Helsinki Convention.

2.2. Definition

We categorized the severity of the injury into two categories:

- simple single-injury trauma;
- complex or multi-injury trauma, where there was damage to at least two tissues or several fingers involved.

2.3. Patient inclusion and exclusion criteria

All patients included were over 15 years old, and presented to one of our hand trauma centers, with one or more post-traumatic injuries, or infections of the hand or wrist.

Excluded patients were minors, under 15 years of age (treated in another unit), or polytrauma patients with injuries associated to hand or wrist trauma, or patients with no hand or wrist trauma, and those not wishing to enter our management protocol.

2.4. Statistics

The data were analyzed using SPSS PASW Statistics 18 (SPSS, Inc., Chicago, Illinois). The significance threshold was set at 5%.

Qualitative variables were represented by rates (*n*) and proportions (percentages), while quantitative variables were represented by means and standard deviations.

A descriptive statistical analysis was conducted in two groups (2019 vs. 2020) or (COVID-19 vs. non-COVID-19). Potential differences between event rates and proportions were assessed by the Chi² test or Fisher's exact test for qualitative data, and by the Student's *t*-test for quantitative data.

3. Results

3.1. Characteristics of the population

During the lockdown, 2055 patients were seen for hand or wrist trauma in the two centers: 1737 in the non-COVID-19 zone and 318 in the COVID-19 zone (Tables 2 and 3).

The average age was 45 years in the COVID-19 zone and 43 years in the non-COVID-19 zone with no significant difference ($p = 0.212$, 95% CI: -0.767 to 3.4). The sex ratio was 2.03 in the COVID-19 zone and 1.78 in the non-COVID-19 zone.

Three of the 2055 patients tested positive for COVID-19 (two in the COVID-19 zone and one in the non-COVID-19 zone), they were asymptomatic.

3.2. Attendance rates

During the first lockdown, 78% of patients were seen on the day of the trauma, in the COVID-19 zone, versus 36% in the non-COVID-19 zone (Fig. 1 and Table 3).

The incidence of workplace injury consultations was significantly higher in the COVID-19 zone compared to the non-COVID-19 zone.

3.3. Incidence of pathologies during the first lockdown 2020

The incidence of consultations for single or multiple wounds, amputations, burns, or open or closed fractures was significantly higher in the COVID-19 zone compared to the non-COVID-19 zone (Table 2 and Fig. 1).

Infections and blunt trauma were significantly less common in the COVID-19 zone versus the non-COVID-19 zone.

Injuries from work accidents were proportionally higher and conventional hospitalizations were significantly higher in the COVID-19 zone than in the non-COVID-19 zone.

3.4. Incidence variability between 2019 and 2020 in each center

Between 2019 and 2020, the consultation rate decreased by 35% in the COVID-19 zone versus 24% in the non-COVID-19 zone ($p < 0.0001$, 95% CI: 6.5 – 15.6) (Table 3).

In one year, consultations for wounds increased significantly and those for burns decreased in the COVID-19 zone, and the reverse in the non-COVID-19 zone. Complex

Table 2
 Overall demographics, injury characteristics and treatment of patients treated during the first national lockdown, due to the COVID-19 pandemic.

	COVID-19 zone		Non-COVID-19 zone		p
	n	%	n	%	
Sex					
Male	213	67	1105	64	0.325
Female	105	33	632	36	
Age (years)					
15–30	95	30	481	28	0.407
31–45	83	26	541	31	0.125
46–60	62	20	402	23	0.124
61–75	52	16	222	13	0.150
> 75	26	8	91	5	0.036
Occupational demand					
Strong	148	47	625	36	0.048
Intermediate	73	23	678	39	
Low	97	30	434	25	
Reason for consultation					
Open trauma	249	78	923	53	0.061
Wounds	247	78	877	50	
Simple	137	43	569	37	<0.0001
Complex	110	35	308	17	<0.0001
Tendinous	55	17	201	12	<0.0001
Microsurgical	38	12	107	6	<0.0001
Amputations	8	3	41	2	0.01
Burns	2	1	5	<0.005	<0.0001
Fractures	105	33	263	15	0.056
Closed	62	19	170	10	<0.0001
Open	43	14	93	5	<0.0001
Infections	16	5	378	22	<0.0001
Closed trauma	6	2	173	10	<0.0001
Context					
Workplace accident	47	15	195	11	<0.0001
Domestic accident	262	82	1514	87	0.131
Self-injury	4	1	5	<0.5	0.001
Assault	5	2	18	1	0.573
MVA	0	0	5	<0.5	0.317
Treatment					
Medical	116	36	378	22	0.084
Surgical	202	64	1359	78	
Hospitalization					
Conventional	47	15	169	9.7	<0.0001
Outpatient	271	85	1568	90.3	
	318	100	1737	100	

MVA: motor vehicle accident.

wounds, open fractures, and the rate of consultations for domestic accidents were significantly more frequent in both zones.

The incidence of consultations for domestic accident was significantly higher in 2020 than in 2019, across both zones. Consultations

for assault were significantly higher in the non-COVID zone between 2019 and 2020.

The proportion of surgical treatment was significantly higher in 2020 than in 2019 in the COVID-19 zone, with no significant difference in the non-COVID-19 zone.

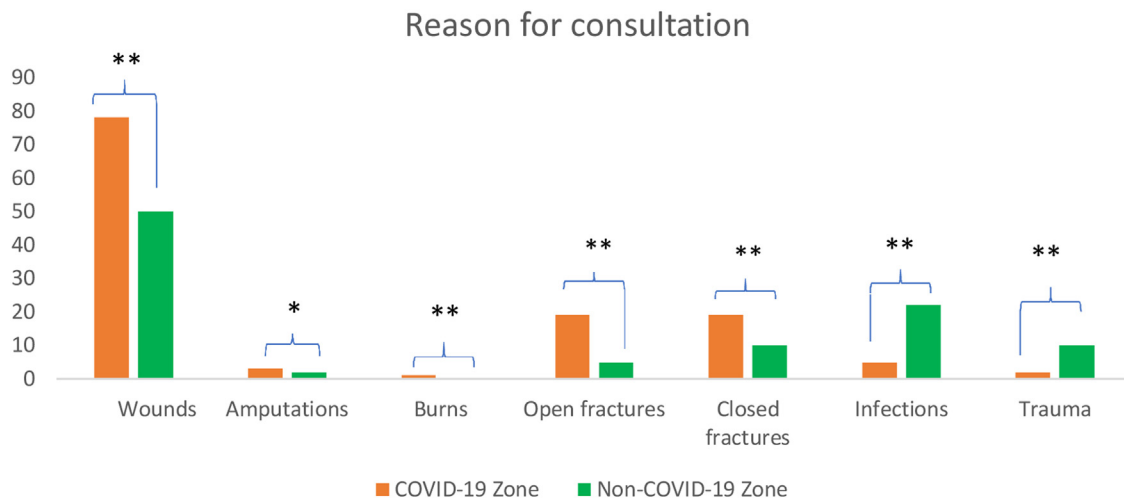


Fig. 1. Overall demographics, injury characteristics and treatment of patients during the first French lockdown of 2020. (*) $p < 0.01$, (**) $p < 0.0001$.

Table 3
Epidemiology of hand injuries during the first French lockdown of 2020 compared to the same period in 2019.

	COVID-19 zone						Non-COVID-19 zone						
	2019		2020		Δ%	p	2019		2020		Δ%	p	
	n	%	n	%			n	%	n	%			
Sex													
Male	338	69	213	67	-2	0.551	1464	64	1105	64	0	0.824	
Female	152	31	105	33	+2		823	36	632	36	0		
Age (years)													
15-30	163	33	95	30	-3	0.332	524	23	481	28	+5	0.001	
31-45	140	29	83	26	-3	0.432	796	35	541	31	-4	0.014	
46-60	95	19	62	20	0	0.981	615	27	402	23	-4	0.007	
61-75	55	11	52	16	+5	0.037	295	13	222	13	0	0.917	
> 75	37	8	26	8	0	0.752	57	2	91	5	+3	<0.0001	
Reason for consultation													
Open trauma	309	67	249	78	+11	<0.0001	1342	59	923	53	-6	<0.0001	
Wound	283	58	247	78	+20	<0.0001	1267	55	877	50	-5	<0.0001	
Simple	203	41	137	43	+2	0.642	929	40	569	37	-3	<0.0001	
Complex	80	16	110	35	+19	<0.0001	338	15	308	17	+2	<0.0001	
Tendinous	64	13	55	17	+4	0.097	202	9	201	12	+3	<0.0001	
Microsurgical	21	4	38	12	+8	<0.0001	136	6	107	6	+0	0.275	
Amputations	19	4	8	2.5	-1.5	0.293	75	3	41	2	-1	0.084	
Burns	11	2	2	0.6	-1.4	0.0074	0	0	5	<0.005	+0.005	0.01	
Fractures	167	34	105	33	-1	0.755	259	11.5	263	15	+3.5	<0.0001	
Closed	126	26	62	19	-7	0.041	156	9	170	10	+1	0.056	
Open	41	8	43	14	+6	0.019	103	4.5	93	5	+0.5	<0.0001	
Infections	39	8	16	5	-3	0.106	631	28	378	22	-6	<0.0001	
Closed trauma	5	1	6	1.9	+0.9	0.299	55	2.5	173	10	+7.5	<0.0001	
Context													
Work accident	113	23	47	15	-8	0.004	709	31	195	11.2	-19.8	<0.0001	
Domestic accident	369	75	262	82	+7	<0.0001	1562	68.3	1514	87.1	+18.8	<0.0001	
Self-injury	4	1	4	1	0	0.536	2	0.1	5	0.3	+0.2	0.131	
Assault	4	1	5	2	+1	0.317	5	0.2	18	1.1	+0.9	0.001	
MVA	0	0	0	0	0	0	9	0.4	5	0.3	-0.1	0.573	
Treatment													
Medical	224	46	116	36	-10	0.009	468	21	378	22	+1	0.317	
Surgical	266	54	202	64	+10		1819	79	1359	78	-1		
Hospitalization													
Conventional	63	13	47	15	+2	0.436	185	8.1	169	9.7	+1.6	0.679	
Outpatient	427	87	271	85	-2		2102	91.9	1568	90.3	-1.6		
	490	100	318	100	-35		100	1737	100	-24			

MVA: motor vehicle accident.

3.5. Manual and non-manual workers

In 2020, between the two zones, a significant difference in the consultation rate could be objectified between manual workers with a strong functional demand, those with an intermediate functional demand (students, administrators, civil servants), and those with a low functional demand (retired and unemployed) (Table 2).

Manual workers injured in workplace accidents accounted for 35.3% in the COVID-19 zone compared to 26.7% of patients in the non-COVID-19 zone.

Between 2019 and 2020, the rate of non-manual workers injured increased significantly across both zones (58% vs. 64%, $p=0.046$), and particularly in domestic accidents (61% vs. 70%, $p=0.002$). The number of non-manual male workers injured in daily accidents was greater across both zones (76% vs. 36%, $p<0.0001$), with no significant difference between the two zones (56% vs. 61%, $p=0.058$).

3.6. Incidence of infections

There was no significant difference in sex, age or time to consultation for infection between the 2 zones (Table 3 and Fig. 2).

The incidence of consultations for whitlow was significantly higher in the non-COVID zone (74% vs. 13%, $p<0.0001$). The incidence of consultations for abscesses was significantly higher in the COVID-19 zone (33% vs. 6%, $p<0.0001$).

Compared to 2019, the incidence of consultations for infections decreased in the COVID-19 zone and increased in the non-COVID-19 zone.

Surgically treated infections were significantly more frequent in the non-COVID-19 zone compared to the COVID-19 zone (94% vs. 67%, $p<0.0001$).

4. Discussion

4.1. Incidence of pathologies

The primary objective of this study was to compare the variability in the incidence of emergency pathologies at 2 hand trauma centers between the period of the first COVID-19 pandemic lockdown with a period outside the pandemic. The consultation rate decreased by 35% in the COVID-19 zone compared to 24% in the non-COVID-19 zone between 2019 and 2020. This decrease was observed in France [6] and abroad [7,8].

4.2. Wounds

A comparison of 2019 and 2020 demonstrated that the incidence of wounds increased significantly in the COVID-19 zone and decreased significantly in the non-COVID-19 zone. However, the severity of wounds and fractures increased significantly in both zones. Conversely, there was a decrease in the overall volume of trauma, of around 20%, and a considerable increase in the number

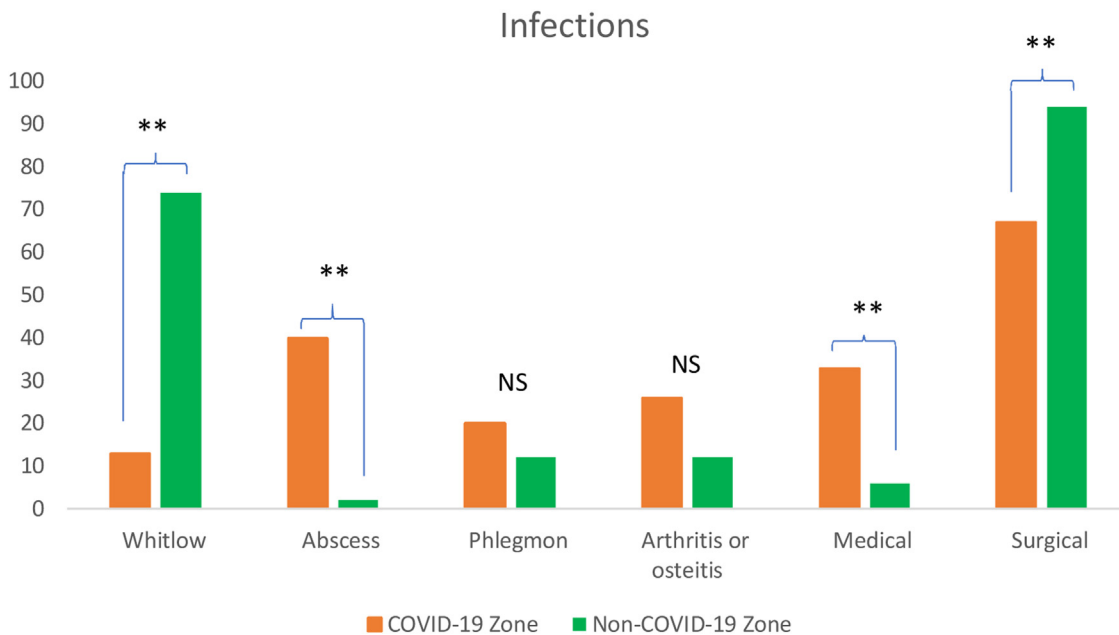


Fig. 2. Epidemiology of hand and wrist infections during the first French lockdown of 2020. (**) $p < 0.0001$, NS: non-significant.

and proportion of penetrating trauma injuries were observed abroad (17.5% vs. 23.7%, $p < 0.001$) [9].

4.3. Infections

Soft tissue infections were less frequent but more serious with a decrease in the rate of whitlow and an increase in the rate of abscesses in the COVID-19 zone compared to the non-COVID-19 zone, without an increase in time to consultation. Compared to 2019, soft tissue infections were less common in the COVID-19 zone and more common in the non-COVID-19 zone. Conversely, some authors have demonstrated an increase in the incidence of infections in the COVID-19 zone (8.7% vs. 5.1%, $p = 0.0299$) [6].

The variability in the incidence of infection can be explained by improved hand hygiene and decreased onychophagia, due to fear of COVID-19 contamination. It could also be secondary to lockdown, with a clear increase in manual domestic accidents or activities like DIY, gardening, or fishing [6].

4.4. Context

In one year, the incidence of consultations decreased significantly in the context of work accidents, and increased significantly in the context of domestic accidents in the two zones. This variability is specific to lockdowns, with a drastic decrease in the rate of road, work, leisure and sports accidents, as well as a marked increase in domestic accidents.

4.5. Surgical treatment

In our study, the proportion of surgical indications was significantly higher in 2020 than in 2019 (+8%, $p = 0.021$) in the COVID-19 zone, with no significant difference in the non-COVID-19 zone. This increase in indications for surgical management in the COVID-19 zone was observed in France [6] and abroad [10]. Patients appeared to have consultations for more serious reasons, than during the period outside the pandemic.

4.6. Time to consultation

Our study did not identify any significant change in the time to consultation. The delay in time until consultation could have been due to a fear of COVID-19 transmission in the hospital setting [10].

4.7. Limits

Our study had selection biases with a higher rate of manual workers in the COVID-19 zone studied. Firmly anchored in the COVID-19 zone studied, agriculture accounts for 4% of the regional value, compared to 1.7% in metropolitan France [11]. The COVID-19 zone studied had more manual workers (34.2% vs. 33.8%) with more farmers (2.6% vs. 2.4%) and tradesmen (6.7% vs. 6.2%), but fewer workers (24.9% vs. 25.2%) than the non-COVID-19 zone studied [11].

Another limitation may be the fact that the non-COVID-19 center was a private hand trauma center, compared to the COVID-19 hospital studied, which was multidisciplinary. This may explain the consultation rate of our two centers.

4.8. Patient profile

This epidemiological study emphasizes a change in the profile of injured patients, with a significant increase in non-manual workers injured in domestic accidents between 2019 and 2020 regardless of the zone (61% vs. 70% $p = 0.002$). This higher rate of hand trauma among non-manual workers during DIY activities at home was found in France with high percentages of men, and of wounds treated surgically, during domestic accidents [6,12]. In France and abroad, the general population was occupied with cooking projects [10], gardening, DIY [6] or other manual work at home.

4.9. Preventative measures to be implemented

Lockdown during the pandemic reduces the number of hand and wrist injuries. Some countries have not yet experienced a lockdown, which would lessen the burden on trauma services.

We can draw from this study the importance of the use of personal protective measures as well as the safety of electrical and thermal tools when carrying out professional or domestic

manual work. A focus on the prevention of hand and wrist injuries could be beneficial in terms of public health. NHS Digital data demonstrated 25,000 hospital admissions for DIY and gardening accidents between 2014 and 2017 [13]. In 2020, there were more than 4800 additional admissions secondary to power tool injuries, compared to 2019. The associated consultations are responsible for significant costs due to work absences, medical costs and loss of productivity [14].

By encouraging the public to be aware of the risks, and means to avoid them, information on protective and preventive measures, such as wearing gloves, following safety instructions when using power tools and the use of safety or door latches, can minimize these risks [15]. Information on the need to maintain equipment, protect oneself with appropriate clothing, and learn what actions are considered hazardous, requires further improvement for manual activities [16]. National preventative campaigns, such as that organized by FESUM, could strengthen information dissemination and prevention of hand injuries [17,18].

Although the time to consultation before infection appears unchanged in our study, we also stress the importance of getting to the emergency room as quickly as possible, even during a pandemic. This is to ensure that hand injuries are dealt with promptly, as they can be complicated by infection, or even require upper limb amputation if specialist treatment is delayed for too long.

The lockdown measures put in place could have negative psychological and social repercussions, highlighting the need for prevention of mental health issues, surveillance and access to care measures [19–21].

The referral of patients to hand trauma centers ensures better management with improved rates of resumption of work activities [22]. During pandemics, including COVID-19, every effort is made to accommodate patients in the safest sanitary conditions.

Disclosure of interest

Laurent Obert has conflicts of interest with FX solutions, Zimmer, Medartis, Evolutis and Wright-Medical. Philippe Bellemère has conflicts of interest with Wright-Medical Tornier and Stryker. The other authors declare that they have no competing interest.

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None.

Author contribution

MP and IR are co-first authors; they contributed equally to this work.

IR collected the data, wrote the manuscript, corrected and supervised it.

MP collected the data and wrote the manuscript.

PB and LO provided important feedback and motivated the work.

FL, CC and IP helped with conceptualization and correction of the manuscript.

References

- [1] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497–506.
- [2] Décret n° 2020-293 du 23 mars 2020 prescrivant les mesures générales nécessaires pour faire face à l'épidémie de COVID-19 dans le cadre de l'état d'urgence sanitaire – APHP DAJDP n.d.
- [3] Sarac NJ, Sarac BA, Schoenbrunner AR, Janis JE, Harrison RK, Phieffer LS, et al. A review of state guidelines for elective orthopaedic procedures during the COVID-19 outbreak. *J Bone Jt Surg* 2020;102:942–5.
- [4] DePhillipo NN, Larson CM, O'Neill OR, LaPrade RF. Guidelines for ambulatory surgery centers for the care of surgically necessary/time-sensitive orthopaedic cases during the COVID-19 pandemic. *J Bone Jt Surg* 2020;102:933–6.
- [5] Ducournau F, Arianni M, Awwad S, Baur E-M, Beaulieu J-Y, Bouloudhine M, et al. COVID-19: initial experience of an international group of hand surgeons. *Hand Surg Rehabil* 2020;39:159–66.
- [6] Pichard R, Kopel L, Lejeune Q, Masmoudi R, Masmajeun EH. Impact of the Coronavirus Disease 2019 lockdown on hand and upper limb emergencies: experience of a referred university trauma hand centre in Paris, France. *Int Orthop* 2020;44:1497–501.
- [7] Hwee J, Chiew J, Sechachalam S. The impact of coronavirus disease 2019 (COVID-19) on the practice of hand surgery in Singapore. *J Hand Surg* 2020;45:536–41.
- [8] Facchin F, Messana F, Sonda R, Faccio D, Tiengo C, Bassetto F. COVID-19: initial experience of hand surgeons in Northern Italy. *Hand Surg Rehabil* 2020;39:332–3.
- [9] Qasim Z, Sjöholm LO, Volgraf J, Sailes S, Nance ML, Perks DH, et al. Trauma center activity and surge response during the early phase of the COVID-19 pandemic – the Philadelphia story. *J Trauma Acute Care Surg* 2020;89:821–8.
- [10] Rinkoff S, Jemec B. Variation in volumes and characteristics of hand trauma patients seen during the early COVID-19 lockdown in a central London Plastic Surgery Unit. *BJs Br J Surg* 2020;107:e571–2.
- [11] *Comparateur de territoire – Insee* 2017 n.d.
- [12] Régas I, Bellemère P, Lamon B, Bouju Y, Lecoq F-A, Chaves C. Hand injuries treated at a hand emergency center during the COVID-19 lockdown. *Hand Surg Rehabil* 2020;39:459–61.
- [13] NHS England. NHS urges public to take care over the weekend, but get help if they need it n.d.
- [14] de Putter CE, Selles RW, Polinder S, Panneman MJM, Hovius SER, van Beeck EF. Economic impact of hand and wrist injuries: health-care costs and productivity costs in a population-based study. *J Bone Joint Surg Am* 2012;94:e56.
- [15] Mc Nab. Focusing on hand injury prevention would ensure vital benefits for the public and the NHS 2019.
- [16] Loisel F, Bonin S, Jeunet L, Pauchot J, Tropet Y, Obert L. Woodworking injuries: a comparative study of work-related and hobby-related accidents. *Chir Main* 2014;33:325–9.
- [17] Bellemère P, Guimberteau JC. Experience of a national campaign for hand trauma prevention in France. *Handchir Mikrochir Plast Chir* 2013;45:335–8.
- [18] Bellemère P. A national campaign for the prevention of hand accidents. *Chir Main* 2003;22:233–9.
- [19] Wang Y, Zeng L, Yao S, Zhu F, Liu C, Di Laura A, et al. Recommendations of protective measures for orthopedic surgeons during COVID-19 pandemic. *Knee Surg Sports Traumatol Arthrosc* 2020;28:1–9.
- [20] Gunnell D, Appleby L, Arensman E, Hawton K, John A, Kapur N, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry* 2020;7:468–71.
- [21] Wathelet M, Duhem S, Vaiva G, Baubet T, Habran E, Veerapa E, et al. Factors associated with mental health disorders among university students in France confined during the COVID-19 pandemic. *JAMA Netw Open* 2020;3:e2025591.
- [22] Dubert T. Epidemiology and socio-economic aspects of hand injuries. *Rev Prat* 2013;63:1229–32.