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Original article

## An overview of the situation of hand surgery in Spain during the peak of COVID-19 pandemic



### *Aperçu de la situation de la chirurgie de la main en Espagne pendant le pic de la pandémie COVID-19*

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#### ABSTRACT

Since the first cases were detected in China in December 2019, the COVID-19 pandemic has spread rapidly, collapsing many healthcare systems, and forcing them to adapt. Hand surgery has been indirectly affected by this scenario. This article aims to provide an overview on how Spanish hand surgeons have modified their daily practice. Based on a survey conducted nationwide, we observed a decrease in the number of emergency cases and cancellation of elective cases, shift to a more conservative treatment approach, use of personal protective equipment, and decrease in the number of outpatient visits and tests. Without definitive evidence at this point, knowing how we have dealt with the situation so far will help us adopt the needed measures to ensure both the patient's and surgeon's safety and manage available resources in future pandemics.

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#### R É S U M É

Depuis que les premiers cas ont été détectés en Chine en décembre 2019, la pandémie de COVID-19 s'est rapidement propagée, mettant en difficulté de nombreux systèmes de santé et les forçant à s'adapter à la situation. La chirurgie de la main a été indirectement affectée par ce scénario. Cet article vise à fournir un aperçu de la façon dont les chirurgiens de la main espagnols ont modifié leur pratique quotidienne. Grâce à une enquête nationale, nous avons observé : une diminution du nombre de cas d'urgence et l'annulation de la chirurgie réglée, la considération d'une approche plus conservatrice, l'utilisation d'équipements de protection individuelle et la diminution du nombre visites et tests ambulatoires. Sans preuve définitive à ce stade, savoir comment nous avons géré la situation jusqu'à présent nous aidera à adopter les mesures nécessaires pour assurer la protection du patient et du chirurgien et gérer de manière appropriée les ressources disponibles dans les situations futures.

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## 1. Introduction

On December 31, 2019, the Wuhan Municipal Health Commission (Hubei province, China) reported a cluster of 27 pneumonia cases of unknown etiology but with common exposure, including seven severe cases [1]. The agent causing the

outbreak was identified as a new type of Coronaviridae, subsequently named SARS-CoV-2. This virus and its associated disease (the so called COVID-19) have triggered a dramatic and rapidly evolving health emergency around the world. On March 11, 2020, the WHO declared a global pandemic [2]. As of May 12, 2020, 4,178,750 cases have been registered worldwide. In Spain, a state of alarm was declared on March 14 [3], and when this article was submitted, it had the second-highest number of Coronavirus cases in the world: 228,030 had been diagnosed, and 26,920 deaths had been reported.

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SARS-CoV-2 is highly contagious [4]; it causes an illness that can affect the lungs and airways, potentially escalating to severe acute respiratory syndrome [5]. The ease of spread and severity of the disease translates into a high hospital and intensive care unit (ICU) admission rate. This situation has overloaded many healthcare systems that have been forced to increase the number of ICU beds and create specific units to isolate COVID-19 patients. To this end, different measures have been taken following guidelines derived from the experience in China and Italy [6–8] such as the cancellation of elective surgeries, the transformation of surgical wards into COVID-19 wards, the use of surgical areas as ICUs, the conversion of surgeons into supporting staff for COVID-19 units, or the closing of outpatient clinics. These measures and the new social situation derived from the population lockdown have collided with the usual activity of surgical departments, who have had to adapt to this situation.

Regarding hand surgery, each country has taken different approaches depending on their own pandemic situation and available resources [9,10]. To our knowledge, there are no published studies on how the peak of COVID-19 pandemic has affected hand surgery in Spain. We believe that with a global view of the situation, we will be able to improve the current and future care of patients with hand injuries.

## 2. Materials and methods

We prepared an online questionnaire (Google Forms; Alphabet Co., Mountain View, CA) <https://forms.gle/sxw1U4zTLH6XmmXY7> that was distributed online with the help of the Spanish Society of Hand Surgery (SECMA – more than 400 members) to orthopedic and plastic surgeons who are currently performing hand surgery in Spain. The questionnaire was disseminated among surgeons of all levels of expertise [11] and was completed between April 17 and April 28, 2020. It focused on the management of acute hand cases, obviating the elective cases as most of them were cancelled nationwide. Various topics were covered: level of activity during COVID-19 pandemic, activity prior to the pandemic, protective methods used during surgery, potential changes in surgical indication, hospital admission, transfers between centers, and changes in follow-up protocols. When asking about the use of COVID-19 tests, we did not make a difference between swab and blood tests.

At the end of the survey’s period, a total of 111 replies were analyzed, duplicate answers were manually screened and deleted, and

**Table 1**  
Characteristics of the respondents.

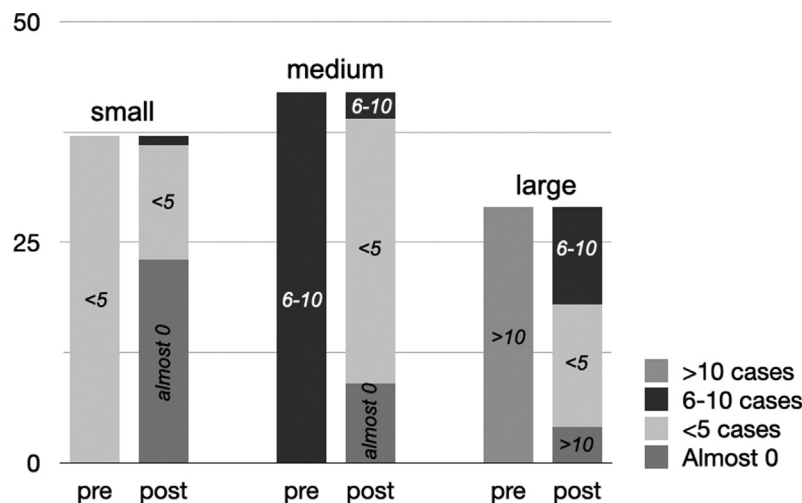
	Count	Percentage (%)
Surgery experience		
Resident	12	11
Less than 10 years	37	34
More than 10 years	59	55
Specialty		
Orthopedic surgeon	70	65
Plastic surgeon	38	35
Facility		
Public hospital	82	76
Private practice	18	17
Mutual	8	7
Number of daily urgent cases		
<5 (small)	37	34
6–10 (medium)	42	39
>11 (large)	29	27

statistical analysis was carried out. Categorical variables were expressed as percentages, while differences between groups were assessed using the Chi<sup>2</sup> test. Before and after comparisons were made using McNemar’s test. Statistical analyses were performed using R software (version 3.6.1., R Foundation for Statistical Computing, Vienna, Austria).

## 3. Results

After manually removing duplicates, a total of 108 surgeons from 64 centers from all over Spain had answered the questionnaire (Table 1). A reduction in the number of hand injuries seen in the emergency room was noted by most of the surveyed regardless of the number of emergencies they dealt with before the pandemic started (Fig. 1). No major variations were seen in the percentage of non-deferrable emergencies seen during the COVID-19 crisis relative to the prior situation (Fig. 2).

Ninety-four of those surveyed had reduced the number of admissions and the duration of hospital stay in their units. A decrease in the number of follow-up tests (45%) and follow-up visits (81%) was also found. Some changes in follow-up methods were also considered and 81% started using telemedicine for follow-up visits, while 14% of the surgeons increased their use of it. Among centers which often transfer patients or receive patients from other centers, 73% of those surveyed observed a reduction in



**Fig. 1.** Decrease in the number of urgent cases seen daily relative to a hospital’s previous case load. “Pre” shows the number of patients seen before the pandemic, and “Post” shows the number of patients seen after the pandemic started. Small (<5 cases/day), medium (6–10 cases/day) and large (>10 cases/day) units are shown ( $P < 0.001$ ).

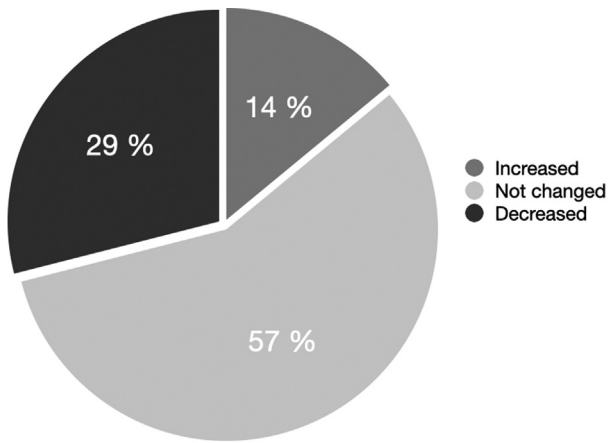


Fig. 2. Changes in the percentage of urgent surgeries that can be deferred.

these transfers. When a patient was COVID-19 positive, a more conservative approach (i.e., managing fractures non-operatively that in normal times would be operated on) was adopted by 48% of surgeons.

No major differences were detected when comparing this conservative approach between more experienced (>10 years of experience) and less experienced surgeons (<10 years), as older surgeons adopted a more conservative approach in 53% of cases, and younger surgeons in 37% ( $P=0.124$ ). This trend towards conservative management was also observed in the percentage of closed fractures that were managed non-operatively after the COVID-19 pandemic started (Fig. 3). In spite of this more conservative approach, replantation criteria did not change for 75% of the surgeons, although a more restrictive approach was seen in 24% of them. Other changes were noted in surgical indications: 24% of surgeons performed fewer flaps for soft tissue coverage, and 64% reduced the use of implanted devices for non-elective cases.

An increase in the use of regional or local anesthesia instead of general anesthesia was noted by 67% of the surgeons. And minor procedures were performed outside the operating room by 46% to free up the OR.

Whenever surgery could be delayed at least a few hours, 82% of the surveyed would ask for a COVID-19 test for the patient. When

the surgery could be delayed a few days, this test was ordered 24 hours before surgery by 60% and 48 hours by 32% of the surgeons. Protective measures taken in the operation room included widespread use of personal protective equipment (PPE) for both positive and suspected cases of COVID-19 (Fig. 4).

#### 4. Discussion

We are all facing a new disease and a new healthcare scenario worldwide. In this situation, there is global consensus that any treatment other than urgent or emergent care should be avoided in order to reduce the rate of new case development, minimize resource exhaustion, and conserve disposable medical supplies [7,12]. At first glance, the current pandemic does not directly affect hand surgeons; however, surgical safety has fallen under the spotlight and surgeons play a role in the continuation of emergency surgical care as well as the protection of medical staff and patients [9,13].

As shown in this survey, Spanish hand surgeons have adapted to the situation by protecting themselves in the operating room, being more conservative in their indications and protecting patients from exposure by reducing the number of visits, as shown in other articles [9,10,14].

Protecting healthcare workers should be a priority when facing any pandemic. Up to 20.4% of COVID-19 cases in Spain have been detected in healthcare workers [15]. It is known that COVID-19 has a long incubation period (5–7 days) [4,16,17], resulting in many asymptomatic carriers [18]. For this reason, appropriate measures should also be taken in asymptomatic patients. Most of the surgeons who responded to the questionnaire stated that surgical patients underwent presurgery screening to determine their risk of COVID-19 infection whenever the procedure could be postponed [19,20]. Contrary to other surgeries, hand surgery can often be delayed at least a few hours in order to get the test done before proceeding with surgery.

Our systems are generally well-designed to deal with the occasional high-risk case, but general measures should be adopted during a pandemic [19]. Operating rooms are high risk areas for SARS-CoV-2 transmission that require specific protective measures. Emergency surgery and surgery that cannot be delayed should only proceed with adequate staffing and personal protective equipment (PPE) [7], as used by most hand surgeons. Any

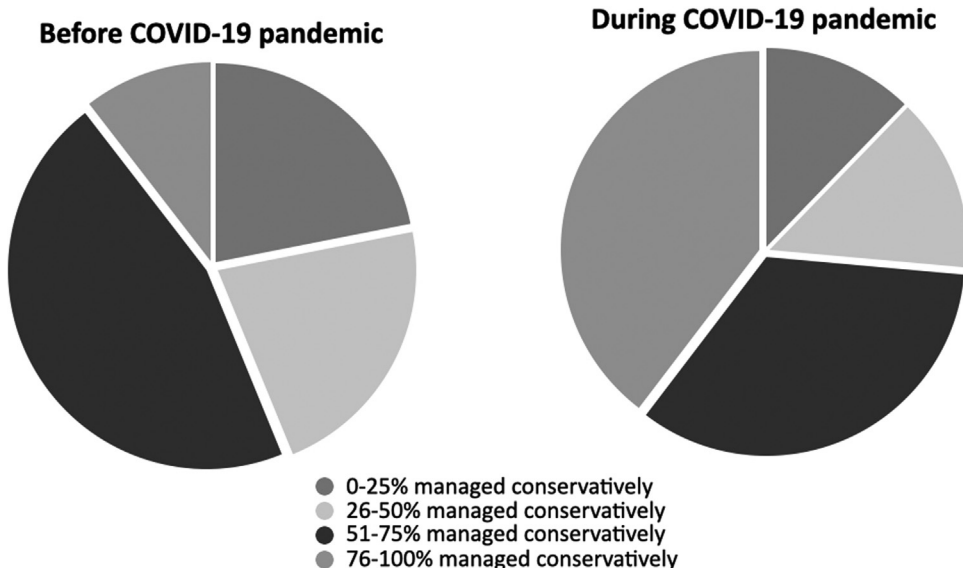
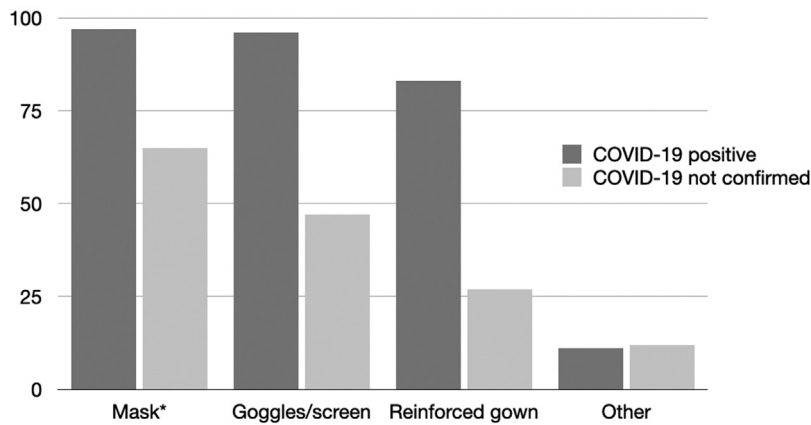


Fig. 3. Percentage of closed fractures managed conservatively before and after the COVID-19 outbreak.



**Fig. 4.** Use of protective personal equipment in the operation room depending on whether or not the patient is confirmed positive for COVID-19 \*Mask = FFP2 or FFP3 respirators.

procedure involving aerosol generation has a high risk of dispersion of viral particles, and this includes airway manipulation for general anesthesia. More widespread use of local or regional anesthesia was documented, which helps avoid airway instrumentation and the patient coughing during intubation and extubation, thus reducing the risk of infecting staff via the associated aerosol generation [20]. This would also theoretically reduce postoperative pulmonary complications in COVID-19 patients [21]. We have seen an increase in minor surgical procedures, such as wound debridement and closure, done as outpatient procedures in the emergency department to decrease the use of operation rooms. This means decreasing the number of transfers inside the hospital and decreasing the risk of contagion for both patients and workers. Orthopedic procedures using saws, drills and electrocautery are also aerosol generating; although not proven, their use for implant placement should be reduced and power settings should be as low as possible [8,22].

Most surgeons use FFP2/3 masks as well as protective goggles/screens and reinforced gowns when operating whether the patient is confirmed positive for COVID-19 or not. Risk stratification of patients is important to avoid over-depletion of PPE supplies [23] by using them mainly when the patient is a confirmed or suspected case of COVID-19. The use of essential PPE can be challenging to hand surgeons because it can physically interfere with the magnification loupes or the microscope's bifocal eye piece [10,24]. When the patient is COVID-19 positive, the risks and benefits of proceeding versus postponing surgery should be weighed [19]; this has apparently led to a more conservative management of these patients in Spain. We should keep in mind that this conservative approach might imply an acceptance of potential suboptimal clinical outcomes to decrease the risk of COVID-19 infection [12].

The safest place for patients during the COVID-19 pandemic is not in the hospital; measures aimed at decreasing the length of hospital stay as well as the number of follow-up visits have been taken by Spanish hand surgeons [25]. There has been a reduction in the number of visits to the outpatient clinic for follow-up and a reduction in the number of follow-up tests such as X-rays, to decrease the patient's exposure to densely packed waiting rooms.

Although non-urgent outpatient clinic visits have been postponed until the situation improves, we still must ensure that we maintain the quality of care expected by our patients. This can be done using novel technologies [13], including the adoption of telemedicine for follow-up visits. However, these novel technologies are not standardized, and their long-term efficacy are not proven. A mid- and long-term study to analyze follow-up

strategies and functional outcomes of these patients would be useful so we can adapt our healthcare systems to high demand situations like this pandemic.

Spain has imposed a lockdown on its citizens that resulted in a decrease in the number of patients going to the emergency departments for hand trauma, both due to a decrease in manufacturing activity and a fear of going to the hospital for minor injuries. This marked decrease in the number of patients in some hospitals that decreased their number of daily hand emergency cases to a point where there were zero hand emergency cases on some days. This situation is not uniform, as emergency cases have not decreased in other countries [10].

This study is based on the personal opinion of surgeons who replied to the questionnaire and numbers such as reduction in cases or number of cases treated non-operatively have not been calculated. One of the main drawbacks of this study is that it lacks accurate data and does not necessarily reflect the official protocols adopted in each center. It reflects the situation during the peak of the pandemic in Spain (officially 3rd of April), capturing a moment in time where most of the attention was focused on treating COVID-19 patients. How the disease will behave in the mid- and long-term is still unclear, and surgical policies will have to change as the pandemic disease burden evolves. To our knowledge, this is the first study to capture hand surgery practice in Spain during the pandemic and all regions of the country were included. Our aim with this study was to show the changes made by hand surgeons so far.

As of the date of submission of this article, there were no set protocols for how surgical departments should adapt to an unusual situation like this pandemic. The studies needed to obtain such evidence would require lengthy follow-up and a vast number of patients and professionals. Although reliable information on the potential risk of contagion during surgery is not available, this does not mean that it is safe to proceed with usual practices. A multicenter study with accurate data from the different units across the country as well as a mid- and long-term follow-up of these patients would provide us with better information on how we have dealt with the disease and if we should change anything before facing a similar situation again in the future. This will help us define the measures needed to ensure both the patient's and surgeon's safety and manage available resources in future pandemics.

#### Human and animal rights

The authors declare that the work described has not involved experimentation on humans or animals.

### Informed consent and patient details

The authors declare that the work described does not involve patients or volunteers.

### Disclosure of interest

The authors declare that they have no competing interest.

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