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# Adapting to the COVID-19 pandemic: A survey of UK and European hand surgery units

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**Summary** Hand surgery services had to rapidly adapt to the coronavirus disease 2019 (COVID-19) pandemic. The aim of the Reconstructive Surgery Trials Network #RSTNCOVID Hand Surgery survey was to document the changes made in the UK and Europe and consider which might persist.

A survey developed by the Reconstructive Surgery Trials Network, in association with the British Association of Hand Therapists, was distributed to hand surgery units across the UK and Europe after the first wave of COVID-19. It was completed by one consultant hand surgeon at each of the 44 units that responded.

Adult and paediatric trauma were maintained but elective services stopped. Consultations were increasingly virtual, and surgery was more likely to be under local anaesthetic and in a lower resource setting.

Many of the changes are viewed as being beneficial. However, it is important to establish that they are clinically and cost effective. These survey results will help prioritise and support future research initiatives.

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## Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak was declared a pandemic by the World Health Organisation on the 11th March 2020.<sup>1</sup> In the UK, the National Health Service prioritised caring for patients with the coronavirus disease 2019 (COVID-19) and delivering emergency care and cancer services. Hand surgery services were affected by the need to reduce patients' risk of exposure to the virus whilst accessing services and the redirection of resources to COVID-19 patients.

The British Association for Plastics, Reconstructive and Aesthetic Surgeons (BAPRAS), British Society for Surgery of the Hand (BSSH) and British Association of Hand Therapy (BAHT) published guidance on how to adapt hand surgery services during the pandemic.<sup>2-4</sup> Clinicians were encouraged to pause elective surgery and see urgent referrals only. For hand trauma, it was advised to minimise visits to healthcare settings by increasing non-operative management of injuries, delivering procedures in outpatient settings or as a day case where possible, increasing the use of remote consultations and sharing self-management strategies.

The Reconstructive Surgery Trials Network (RSTN), the UK network for plastic and hand surgery clinical trials established #RSTNCOVID to document the change in service provision and management of common conditions during the first wave of COVID-19. This effort was part of the Royal College of Surgeons of England's COVID-19 research portfolio.<sup>5</sup> #RSTNCOVID Hand was comprised of three projects; a

hand surgery unit survey completed by consultant surgeons, a hand therapy survey completed by hand therapists and a service evaluation, assessing changes to the management of common hand trauma conditions during the pandemic. In this publication, we present the results of the hand surgery unit survey.

The aim of the #RSTNCOVID Hand Surgeon survey was to describe how hand surgery services in the UK and Europe were modified during COVID-19 and identify changes that should be prioritised for further research.

## Materials and methods

The #RSTNCOVID Hand steering group developed the survey. It was piloted at two units and amended based on feedback. The survey investigated changes made to the delivery of hand surgery during the first wave of the COVID-19 pandemic [Supplementary file 1]. Respondents were asked to make the comparison to their previous practice. For the purposes of the survey, 'before COVID-19' was defined as prior to the 23rd March; the date of national lockdown in the UK. The 'COVID-19 period' was defined as the 23rd March to 1st June, as a significant number of UK lockdown restrictions were lifted on 1st June. Five-point Likert scales (e.g., always/very often/sometimes/rarely/never) were used.

The surveys were distributed via the RSTN and were completed between June and September 2020 by one consultant

per hand surgery unit. If more than one consultant in a unit completed the survey, the first complete response was used.

Study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at Kennedy Institute of Rheumatology, University of Oxford.<sup>6,7</sup> REDCap is a secure, web-based application designed to support data capture for research studies, providing (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources. Descriptive statistics were used to summarise survey data. For free text answers, themes and frequency of these themes were identified.

## Results

Completed surveys were received from 50 consultant hand surgeons, representing 44 hand surgery units. Six duplicate responses were discarded. Responses were distributed across the UK (England 34, Scotland 3, Wales 2), the Republic of Ireland (2) and Italy (1), Spain (1) and North Macedonia (1). Surveys were completed between 16th June and 21st September 2020, by plastic (61%) and orthopaedic (39%) consultant hand surgeons. Twenty-eight units provided a combined orthopaedic and plastic hand surgery service, seven were solely orthopaedic and nine were plastic surgery alone.

The BSSH issued guidance early in the pandemic.<sup>3</sup> Of the 39 UK units, 29 (74%) always followed the guidelines, 8 (21%) units followed them 'sometimes' and two (5%) units did not. Reasons for the latter included: development of local guidelines, consideration of patients on a case-by-case basis and continued provision of pre-pandemic services.

### Scope of service

During the pandemic, most hand services extended their scope of practice to take over minor injury care ( $n=16$ , 36%) or worked directly within the emergency department ( $n = 19$ , 43%). During this period, most respondents felt there had been no change in how closely orthopaedic and plastic surgeons worked together ( $n = 17$ , 61%).

Guidelines to reduce patient contact, followed by availability of resources, were felt to be the main factors impacting service provision (Supplementary Table 1). Staff sickness and redeployment affected units less commonly but were felt to have had an impact in 38 (87%) and 39 (89%) of units to some degree, respectively. The availability of personal protective equipment (PPE) was rarely felt to affect service provision, with 13 (30%) reporting a shortage at some point during the first wave (Supplementary Table 2).

### Elective hand services

All units usually provided adult elective hand surgery and most (38, 86%) provided a paediatric elective hand service.

During COVID-19, almost all stopped their elective hand services; only four adult (9%) and three paediatric (7%) services continued. None of the injection clinics or one-stop carpal tunnel clinics continued.

Elective referrals were mostly triaged by consultants both before and during the pandemic; the number of units reporting that they did not triage elective referrals at all halved during COVID-19 (Supplementary Table 3A). Clinic appointments switched from being mainly face-to-face to mainly by telephone or video (Supplementary Table 3B). Surgery was less likely to be performed in the main operating theatre, but there was not increased use of minor operation theatres or clinic settings, suggesting an overall reduction in the number of elective procedures performed (Supplementary Table 3C).

### Hand trauma services

All units had established adult hand trauma services and most also treated children (41, 93%). Only one unit stopped accepting adult trauma and three units (7%) stopped paediatric trauma. One further unit centralised its paediatric trauma service to the local children's hospital where the unit already provided a hand surgery service.

During COVID-19, there was an increase in triaging of referrals (Supplementary Table 4A). This was more likely to be performed by a registrar or consultant rather than a more junior team member (Supplementary Table 4B). Whilst most appointments remained face-to-face, there was increased use of telephone and video formats (Supplementary Table 4C). The most predominant format suggested under the 'other' options were email exchanges incorporating photos of injuries. There was a reduction in the use of the main operating theatre, but a large increase in the use of clinic rooms for operating (Table 1).

A majority of units (33, 75%) reported providing antibiotics for simple open hand wounds, at least until definitive treatment, which was reported to stay the same with the advent of COVID-19.

### Anaesthetic choice for hand trauma procedures

Before COVID-19, general or regional anaesthesia (RA) was the preferred choice for most of the procedures assessed (Table 2). During the first wave, there was a move towards using wide-awake local anaesthesia no tourniquet (WALANT) for many procedures. Extensor tendons were already largely performed under local anaesthetic (LA)/ WALANT, but there was an increase in the use of WALANT for flexor tendon surgery. There was also increased use of RA for phalangeal and metacarpal fixation.

### Imaging access in clinic

Permanent access to a mini C-arm increased from 11 units (25%) to 19 units (43%) with a further six having access on demand (increased from two units). Ten units (23%) had access to ultrasound in clinic, which did not change.

**Table 1** Setting for trauma surgery. *n* = number of units selecting response; frequency of responses ranked in order using greyscale colouring (darkest = highest frequency).

Setting for surgery (n, %)		Always	Very often	Sometimes	Rarely	Never
<b>Main operating theatre (standard ventilation)</b>	Before	9 (20)	19 (43)	10 (23)	2 (5)	4 (9)
	During	6 (14)	13 (30)	12 (27)	8 (18)	5 (11)
<b>Main operating theatre (laminar flow)</b>	Before	9 (20)	19 (43)	7 (16)	4 (9)	5 (11)
	During	4 (9)	11 (25)	10 (23)	10 (23)	9 (20)
<b>Minor operating theatre</b>	Before	5 (11)	8 (18)	9 (20)	9 (20)	13 (30)
	During	5 (11)	10 (23)	11 (25)	5 (11)	13 (30)
<b>Clinic room</b>	Before	2 (5)	2 (5)	7 (16)	11 (25)	22 (50)
	During	4 (9)	12 (27)	8 (18)	4 (9)	16 (36)

\*Percentages may not total 100 due to rounding.

**Table 2** Anaesthetic type for hand trauma procedures. % of units selecting anaesthetic type as their preferred method for each procedure. (WALANT, wide-awake local anaesthesia no tourniquet; GA, general anaesthetic; MCPJ, metacarpophalangeal; UCL, ulnar collateral ligament; ORIF, open reduction internal fixation)

Anaesthetic type (% of units performing procedure)		Local anaesthetic	WALANT	GA	Regional
<b>Nailbed repair</b>	Before	91	9	0	0
	During	83	12	2	2
<b>Digital nerve</b>	Before	52	17	21	10
	During	54	31	8	8
<b>Thumb MCPJ UCL</b>	Before	7	5	44	44
	During	13	33	8	46
<b>Extensor zone I-V</b>	Before	55	18	18	9
	During	59	32	7	2
<b>Extensor zone VI-VII</b>	Before	11	11	48	30
	During	22	37	12	29
<b>Flexor zone I</b>	Before	3	15	53	30
	During	8	47	13	32
<b>Flexor zone II</b>	Before	0	10	58	33
	During	5	49	13	33
<b>Flexor zone III-V</b>	Before	0	3	60	38
	During	0	41	21	38
<b>Flexor washout</b>	Before	0	2	68	30
	During	0	22	36	42
<b>Terminalisation</b>	Before	81	9	7	2
	During	69	17	8	6
<b>Phalangeal fracture k-wire</b>	Before	30	5	41	25
	During	30	19	14	37
<b>Phalangeal fracture ORIF</b>	Before	14	5	49	33
	During	14	19	24	43
<b>Metacarpal fracture k-wire</b>	Before	2	5	57	36
	During	2	24	29	45
<b>Metacarpal ORIF</b>	Before	2	2	55	41
	During	2	21	35	41
<b>Scaphoid screw</b>	Before	0	4	63	33
	During	0	13	47	40

\*Percentages may not total 100 due to rounding.

## Wound closure, follow-up and patient information

Most units used non-absorbable sutures for both elective ( $n = 23$ , 55%) and trauma ( $n = 29$ , 66%) hand surgery before the pandemic. This preference changed to absorbable sutures for both elective ( $n = 18$ , 82%) and trauma ( $n = 36$ , 84%) hand surgery during the first COVID-19 wave. Antimicrobial sutures were not the predominant choice of suture type in any of the units before or during COVID-19.

Wound reviews ( $n = 42$ , 95%) and suture removal ( $n = 37$ , 84%) were usually performed in hospital. However, there was a move towards units encouraging patients to remove their own sutures (increase from three units (7%) to 15 units (34%) and performing their own wound reviews (increase from three units [7%] to 29 [66%]). No units used virtual wound reviews, either via video or email before COVID-19, but this was used in 22 (50%) of units during the pandemic. There was no change in the reported use of community settings, e.g., general practice for either suture removal ( $n = 21$ , 48%) or wound reviews ( $n = 23$ , 52%) due to COVID-19.

Trust produced paper leaflets were the predominant source of patient information provided for hand trauma patients across the units both before and during COVID-19 ( $n = 34$ , 77%) (Supplementary Table 5). The use of trust produced information sent via email, information via text message and app-based information doubled. Even so, apps were still used infrequently ( $n = 6$ , 14%).

## IT access

IT access for staff improved in several areas during the pandemic. Around half of the units had remote access to the hospital desktop before COVID-19 ( $n = 23$ , 52%), increasing to over three-quarters ( $n = 34$ , 77%). Video consultation and conferencing were rarely used in units before COVID-19 (in four (9%) and five (11%) units, respectively), increasing to three-quarters of units using video consultation software ( $n = 33$ , 75%) and almost all units using video conferencing software ( $n = 42$ , 95%) during the pandemic. There was a little change in access to image exchange software ( $n = 14$ , 32% vs  $n = 15$ , 34%).

## Education and training

Around half of units ( $n = 23$ , 52%) maintained their full educational programme. A minority ( $n = 7$ , 16%) discontinued completely. Almost all respondents ( $n = 39$ , 89%) utilised webinar-based training or eLearning. Particularly, useful webinars highlighted included Pulvertaft Hand Centre ( $n = 23$  responses), BSSH ( $n = 17$ ), BAPRAS ( $n = 10$ ) and Plastic Surgery Trainees Association (PLASTA) ( $n = 7$ ) webinars.

## Strengths and weaknesses of change during COVID-19

Respondents completed free text boxes to report positive and negative changes and what they felt would be the biggest change post COVID-19.

Remote consultations ( $n = 20$  responses), increased use of LA, WALANT and RA ( $n = 18$ ), and a more streamlined service for patients with decreased waiting times in clinic and for theatre ( $n = 11$ ) were the best changes. The increase in the use of minor operating procedure rooms ( $n = 7$ ), increased consultant input and decision-making for trauma ( $n = 7$ ), and improved teamwork with other specialties and the hand therapists ( $n = 5$ ) were also highlighted. The major themes identified regarding what changes had not worked included reduced access to theatre ( $n = 10$  responses), difficulties with assessing and managing some patients via remote clinics ( $n = 6$ ), inefficiency in theatre turnover ( $n = 4$ ) and the lack of elective capacity for dealing with the backlog of cases ( $n = 4$ ).

The biggest change following the pandemic was felt likely to be the use of remote consultations ( $n = 18$ ), the remote or reduced follow-up of trauma patients ( $n = 6$ ) and increased use of LA, WALANT and RA ( $n = 8$ ). Streamlining of services to reduce patient visits and waiting times and reduced theatre capacity ( $n = 5$ ) were both felt to also be likely enduring changes.

## Discussion

This study shows that in a short space of time there was a rapid reorganisation of hand surgery services. As services start to return to the 'next' normal, they will need to consider what, if any, changes will be kept and what further adaptations are needed to meet new challenges, such as increased elective waiting lists.<sup>8</sup> With less than 10% of surveyed units providing an elective service during the initial wave of the pandemic, the backlog of chronic hand conditions and untreated traumatic injuries is likely to represent a substantial burden to health services.

There was a rapid change to remote delivery of care. This was delivered throughout the patient journey from initial triaging of referrals, assessment of the injury and subsequent hand therapy and follow-up. NHS England provided initial guidance on the management of remote consultations and working early in the pandemic.<sup>9</sup> Whilst there was support for this change in the comments, it will not be suitable for all circumstances. Challenges include IT literacy, access for patients and misdiagnoses. Virtual management of fracture clinics and remote consultations in hand surgery were established in the UK pre-pandemic, but there is limited previous literature.<sup>10-12</sup> It is likely that better electronic patient information is needed to support this change and research into the effect of remote consultations on patient care and satisfaction.

There was a move towards performing surgery under WALANT before the pandemic for both elective and trauma hand surgery.<sup>13,14</sup> This appears to have accelerated and was adopted for a broad range of procedures, particularly tendon injuries. There is currently a systematic review ongoing to assess outcomes of flexor tendon injuries when repaired under WALANT compared to regional or general anaesthesia.<sup>15</sup> WALANT was particularly well suited for the pandemic as it allowed procedures to move out of the main operating theatres and avoid the need for an anaesthetic team, who were largely redeployed to intensive care. Concerns were raised around patient choice for

anaesthetic, the additional time taken to inject patients with LA and the quality of the bloodless field. The preferred anaesthesia type for phalangeal and metacarpal fracture fixation moved from general anaesthesia to regional. These would be the next procedures to be increasingly performed under WALANT and have been reported in the literature.<sup>16,17</sup>

There was a reduction in the use of main operating theatres and increased use of minor operating theatres and clinic rooms. The available evidence suggests that outpatient operating is safe and does not increase the risk of infection,<sup>18</sup> but it remains uncertain owing to a lack of high-quality research. Recommendations have been produced on the minimum facilities required to carry out minor surgical procedures; a naturally ventilated room with easily cleaned surfaces and scrub-up facilities is sufficient.<sup>19</sup> Further studies are important to establish the infection rate following procedures in outpatient settings.

Changes were often more economically and environmentally sustainable. Delivery of care can be in low-cost settings and potentially delivered closer to patients' homes. Fewer trips to hospital by both healthcare workers and patients reduce the carbon footprint of services.<sup>20</sup> The use of WALANT and an outpatient setting consumes significantly fewer resources than a general anaesthesia in the main operating theatre as well as reduces the carbon emissions from the use of anaesthetic gases.<sup>21-23</sup> There was a move from the use of paper leaflets towards electronic patient information or trust produced leaflets sent via email. Sustainability in surgery is a current focus for the Royal College of Surgeons of England.<sup>24</sup>

Many of the changes challenged and accelerated the move away from established dogma. Whilst the safety of LA with adrenaline is well established in hand surgery across the world, it has not necessarily been widely adopted. The British National Formulary still states that it should be avoided in digits and anecdotally, medical schools continue to teach this.<sup>25,26</sup> A recent Cochrane review concluded that further research was needed.<sup>27</sup>

Absorbable sutures in hand trauma are safe and reduce the need for follow-up.<sup>28,29</sup> Selected patients can safely perform their own follow-up. Skin cancer patients are already taking increasing responsibility for their own healthcare and show a preference for patient-led surveillance and fewer scheduled clinic visits.<sup>30</sup> NHS England is supporting providers to roll out patient-initiated follow-up moving forward.<sup>31</sup>

At least three-quarters of the units reported providing antibiotics for simple open hand wounds, at least until definitive treatment. The routine use of antibiotics has not been shown to reduce the infection rate in simple hand wounds requiring surgery,<sup>32,33</sup> and BSSH does not recommend their use in these injuries.<sup>34</sup> Antibiotic stewardship must be addressed by units and individuals to reduce the risk of antimicrobial resistance.

Two previous surveys have examined the impact of COVID-19 on hand surgery worldwide.<sup>35,36</sup> An initial survey early in the pandemic, carried out in March 2020, showed that the majority of surgeons had already modified their practice; many had stopped elective operations, were performing surgeries in a smaller operating theatre than normal and managing more cases conservatively.<sup>35</sup> Our survey sug-

gests that these changes were reflected in the UK and Europe and continued throughout the first wave. A survey by the Kleinert Society of members, with responses predominantly from the USA, covered a similar time period in the first COVID-19 wave to our survey. It showed similarly reduced clinic and elective surgery volumes.<sup>36</sup> However, contrary to our findings, telemedicine was not widely used and felt to have multiple drawbacks.

The limitations of this study include those associated with surveys, specifically reporting and selection bias. The service evaluation performed at the same time should corroborate the findings. There was also a predominance of responses from the UK.

Through necessity rapid changes were made to service delivery. Understandably, there was little patient involvement or rigorous evaluation of the changes. Now is the time to formally engage patients and the public in service redesign and assess the clinical effectiveness of new approaches to delivering care.

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