



■ GENERAL ORTHOPAEDICS

The impact of COVID-19 on trauma and orthopaedic surgery in the United Kingdom

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The coronavirus 2019 (COVID-19) global pandemic has had a significant impact on trauma and orthopaedic (T&O) departments worldwide. To manage the peak of the epidemic, orthopaedic staff were redeployed to frontline medical care; these roles included managing minor injury units, forming a “proning” team, and assisting in the intensive care unit (ICU). In addition, outpatient clinics were restructured to facilitate virtual consultations, elective procedures were cancelled, and inpatient hospital admissions minimized to reduce nosocomial COVID-19 infections. Urgent operations for fractures, infection and tumours went ahead but required strict planning to ensure patient safety. Orthopaedic training has also been significantly impacted during this period. This article discusses the impact of COVID-19 on T&O in the UK and highlights key lessons learned that may help to proactively prepare for the next global pandemic.

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Introduction

On 11 March 2020, Coronavirus Disease 2019 (COVID-19) was declared a global pandemic by the World Health Organization (WHO), with over 100,000 cases reported in more than 200 countries and a case fatality rate of 5.2%.¹ The emergence of COVID-19 within the UK has had a major impact on the NHS, with over 42,000 COVID-related deaths over the coming three months. Trauma and orthopaedic (T&O) surgery was one of the most severely affected specialties as all non-emergency surgical cases were cancelled, outpatient consultations were reconfigured, inpatient admissions minimized, and staff redeployed to medical and intensive care specialties to help treat COVID-19 patients.² Guidelines were produced by the WHO, NHS, and British Orthopaedic Association (BOA) for the treatment of orthopaedic patients during the COVID-19 pandemic.³⁻⁵

In this review, we explore the impact of COVID-19 on T&O in the United Kingdom and assess how the current pandemic has influenced routine outpatient clinics, fracture clinics, elective and emergency orthopaedic surgery, staffing levels and redeployment, and orthopaedic training. The lessons learned may help T&O departments

within the NHS to better plan and proactively prepare resources for rapid changes in organisational structure and service provision to safely manage orthopaedic patients in any future pandemics.

Outpatient clinics

Fracture clinic. Fracture clinic is an integral part of the musculoskeletal trauma service. As an acute service offering specialist orthopaedic treatment for fractures and soft tissue injuries, BOA guidelines state that patients should be seen within 72 hours of presentation of their injury.⁶ Since COVID-19, the BOA has published new standards specifically on treating fractures during this period.^{3,4} They focus on minimizing patients returning to hospital for further assessment and imaging if this can be avoided by having orthopaedic assessment/consultation in a timely manner (directly in the emergency department (ED)). They also emphasize the importance of senior orthopaedic input for decisions on returning to the hospital and advise the use of removable splints and soft casts where possible. The routine use of imaging for demonstrating radiological union is not specifically advised and this helps to facilitate virtual follow-up (telephone or video appointment) as opposed to patients

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attending face-to-face appointments. The aim of this is to reduce hospital footfall and reduce exposure to the virus for both patients and clinical staff.

Greater emphasis is placed on treating fractures with proven high rates of union, such as clavicle, humerus and wrist fractures, nonoperatively.^{3,4} Closed reduction and full plaster casts can be applied and reduction confirmed with the use of a portable image intensifier. Full plaster casts can be subsequently bivalved in the emergency department to negate the need for patients to return to fracture clinic for completion of cast.

At our institution, we have successfully reduced face to face fracture clinic consultations by following this guidance. Key steps we have implemented include senior consultant reviews in the ED to provide definitive management for orthopaedic patients by the on call team (no need for fracture clinic intervention) and moving to a telephone-based follow-up system to identify any patients who need clinical input and those who can be discharged safely. For patients still requiring face to face clinics (postoperative, wound reviews, monitoring fractures for displacement), full precautions have been undertaken in the fracture clinic, including obligatory face coverings for all patients, temperature checks before entry into the clinic and no companions allowed. Clinical staff have also complied with the rules on wearing personal protective equipment (PPE). In any future pandemics, T&O patients must have early senior orthopaedic input early and definitive plans established within the emergency department to reduce hospital footfall for routine reviews or follow-up. This should be implemented with close communication and teamwork with the ED.

Elective clinic. In line with NHS guidance, elective clinics have been undertaken remotely throughout the pandemic.³ Minimising the number of patients attending the hospital has been a priority. In this way, we have also managed to reduce the number of staff at the hospital and many clinics have taken place remotely from the office or from home. Any patients requiring urgent review have been brought to a fracture clinic where the standard precautions have been undertaken. Many patients receiving postoperative follow-up over three months or those undergoing six-month or annual surveillance appointments have found remote clinics to be convenient and adequate for their needs. In any future pandemics, we would strongly advise a low threshold for providing hospital staff with remote access and transitioning from face to face to telephone consultations to minimize nosocomial virus transmission to patients and healthcare professionals.

Emergency surgery. Urgent operations have continued throughout the pandemic. BOA Standards for Trauma and Orthopaedics (BOAST) provide guidelines which emphasize minimising patient length of stay while continuing to treat conditions which cannot be delayed.^{3,4} These include hip fractures, infections and cancer surgery. For

example, intracapsular hip fractures should be treated with hemiarthroplasty if performing a total hip arthroplasty will delay treatment and lead to a longer inpatient stay.⁷ Septic patients from joint infections should be managed emergently in theatre.⁸ Patients should be treated in such a way that allows them to weight-bear immediately postoperatively so that they can be discharged in a timely manner to reduce length of stay and exposure to COVID-19. Infections where the patient is clinically stable may be managed in an outpatient setting with suppression therapy. Upper limb injuries should be treated as day cases and patients should be discharged on the same day following their surgery.⁴ Wound closure should be undertaken where possible with dissolvable sutures and removable splints applied to minimize the number of patients coming back to the hospital for follow-up.

Emergency cases should proceed regardless of COVID-19 status so as not to delay treatment; however, patients are swabbed on admission to the hospital to rule out the virus.⁸ All patients must be treated as if they have COVID-19 and all theatre staff should take the necessary precautions with the correct PPE. Surgery involving high speed devices, as is the case in many orthopaedic procedures, should be treated as aerosol generating and must adhere to the most up-to-date public health guidance on the use of face masks and visors.^{8,9}

Services have been reconfigured to allow 'clean' and 'dirty' sites. Trauma surgery has been undertaken at 'dirty' sites, where a patient is admitted from ED and COVID-19 status cannot be determined. Urgent cancer surgery has been allocated to 'clean' sites, such as private institutions, so that immunocompromised patients are not exposed to potential infected cases. All patients undergoing surgery are requiring 'enhanced consent' where they are informed about risk of infection with COVID-19, in particular as their immunity is reduced in the immediate postoperative period. During a pandemic, neighbouring healthcare institutions should remain flexible in order to establish 'hot' and 'cold' centres for treating infected patients and noninfected patients. All patients should be managed as potentially infected with the virus and appropriately tested prior to any hospital admission.

Elective surgery. The majority of healthcare institutions worldwide cancelled routine elective surgery during the COVID-19 pandemic.⁸⁻¹⁰ Theatre recovery units and resuscitation departments in ED were transformed into critical care units (high dependency units and intensive care units), expanding the capacity to treat patients with COVID-19. Elective operating is gradually restarting. Following guidelines from the Royal College of Surgeons (RCS), resuming elective services is happening at a steady rate, ensuring that resources and interdependent services (theatres, staff including nurses and anaesthetists, PPE) are available to provide safe patient care.¹¹ Operation waiting lists are being vetted to identify the most urgent cases and suitable

patients (low risk, fewer comorbidities).⁸ Elective operating is taking place in 'clean' areas and hospitals and often being outsourced to private centres.

All patients undergoing elective surgery are being asked to self isolate for 14 days prior to their surgery and undertaking a COVID-19 swab 72 hours before the day of surgery to ensure they are COVID-19 negative.⁸ They are also being asked to self isolate for 14 days post-surgery while their risk of becoming infected remains high due to immunosuppression involved with undergoing surgery. Where appropriate, local and regional anaesthesia should be used in place of general anaesthetic to avoid generating aerosols during intubation and to enable same day discharge.⁸ The main lessons from this are that healthcare institutions must remain dynamic during a pandemic and facilitate prompt intraorganisational restructuring and rapid allocation of resources to increase critical care capacity. Recommencing elective work will need to be undertaken in a stepwise fashion with clear guidelines for testing, self-isolating, and social distancing pre- and post-surgery.

Redeployment of staff. Redeployment of staff has taken place throughout hospitals to ensure adequate and safe staffing levels for the busiest departments during the pandemic.¹ With elective services postponed and fewer presentations of trauma patients to the ED, T&O as a speciality has seen a massive reduction in its inpatient workload. As such, orthopaedic surgeons and junior team members have been redeployed to critical care units, EDs, and medical specialties.^{1,9} Some orthopaedic doctors have also covered minor injury units and have been redeployed as 'proning teams', assisting with the turning of COVID-19 patients on ventilators in ICU. Other orthopaedic doctors have worked as family liaison doctors, enabling inpatients to communicate with friends and family remotely, while hospital visitors were forbidden. Some departments have not yet recovered their full staffing levels and there is consideration of reconfiguring the structure of T&O staffing, in particular junior doctors, who may be deemed more useful in medical teams in the event that a 'second wave' of the pandemic were to occur. The main lessons learned from this are that T&O doctors must maintain their fundamental medical knowledge in case of redeployment during a future pandemic and maintain their clinical skills from the Advanced Trauma Life Support (ATLS) manual. The orthopaedic team may be able to provide a pivotal role in managing medical patients by efficiently undertaking procedures such as airway maintenance, chest drains, arterial lines, intrathecal access, and venous cutdown.

Staff sickness. Preparations for staff sickness and absence were made from the outset. Rotas were adjusted to allow for 'back-up teams'—building in substitutes in the case that an on-duty doctor would be off sick with COVID-19.¹² This also meant that there were fewer doctors in the

hospital, reducing risk of nosocomial transmission of COVID-19. Many precautions were undertaken, including setting up dedicated isolation wards and triage areas, training hospital staff in infection control procedures including 'donning' and 'doffing' PPE, and minimising exposure to high risk aerosol generating procedures.⁹ Wellbeing sessions and support were made available throughout the hospital to help staff deal with the stress and pressures of working during the pandemic.

Education and research. As a result of redeployment and cancelled operating lists, orthopaedic training has had to reinvent itself. It is clear that many training opportunities have been missed during this pandemic, in particular with trainees not meeting their operative numbers.^{9,13} Face-to-face teaching has been cancelled in line with social distancing rules. The Annual Review of Competency Progression (ARCP) process has provided guidance for trainees concerned about how their training will be affected and concessions have been made for those who may not meet their targets as a result of the COVID-19 pandemic.¹⁴ Trainees due to rotate sub-specialty or unit were unable to do so during the pandemic and may have missed out on valuable learning experiences.

Nonetheless, there have been many other and novel learning opportunities.¹³ Fracture clinics with reduced patient numbers have allowed more time for case based discussions between consultants and juniors. Similarly, trauma meetings with fewer patients to discuss and fewer attendees has allowed for small group teaching. Ad-hoc teaching has taken place during the day with on-call teams finding that this was enabled as a result of a lighter workload. Teaching programmes have shifted to using online meeting platforms to deliver their sessions.^{9,13} This has allowed a wider range of attendees as doctors can access the teaching even from home. In the same way, multidisciplinary team (MDT) discussions, journal clubs and Morbidity and Mortality (M&M) meetings have been able to continue online. Many courses have been postponed till next year. There has been a spike in research submissions to journals, not only because of increased opportunities with fast-tracking publications relating to COVID-19, but also because clinical staff have found they have more time to complete and submit research projects. The main lessons learned from this are that training with orthopaedic operating and outpatient clinics may reduce during a pandemic, but other opportunities for gaining knowledge will increase through web-based platforms and applications, medical and critical care teaching, and research projects.

Conclusion

The COVID-19 pandemic has had an unprecedented impact on T&O within the UK, with changes in outpatient clinics, fracture clinics, inpatient hospital admissions, elective and emergency operative procedures, staff

redeployment and reallocation of resources. The main lessons learned for the next pandemic are that orthopaedic departments need to remain flexible to infra-structural reorganisation to increase critical care capacity, maintain a low threshold for remote staff computer access to reduce hospital staff exposure, facilitate outpatient management via telephone consultations to reduce hospital footfall, and redirect training via web-based platforms while operative experience cannot be gained.

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References

- Sarpong NO, Forrester LA, Levine WN.** What's Important: Redeployment of the Orthopaedic Surgeon During the COVID-19 Pandemic: Perspectives from the trenches. *J Bone Joint Surg Am.* 2020;102-A(12):1019–1021.
- Graichen H.** The role of an orthopaedic surgeon in the time of Covid-19 Pandemic—a German perspective. *J Orthop.* 2020;19:A1–A3.
- No authors listed.** Clinical guide for the management of trauma and orthopaedic patients during the coronavirus pandemic. NHS. 2020. <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0274-Specialty-guide-Orthopaedic-trauma-v2-14-April.pdf> (date last accessed 9 July 2020).
- No authors listed.** Management of patients with urgent orthopaedic conditions and trauma during the coronavirus pandemic. British Orthopaedic Association. <https://www.boa.ac.uk/uploads/assets/ee39d8a8-9457-4533-9774e973c835246d/4e3170c2-d85f-4162-a32500f54b1e3b1f/COVID-19-BOASTs-Combined-FINAL.pdf> (date last accessed 9 July 2020).
- No authors listed.** Clinical management of severe acute respiratory infection when novel coronavirus (2019-nCoV) infection is suspected. interim guidance. World Health Organization. 2020. <https://apps.who.int/iris/bitstream/handle/10665/330893/WHO-nCoV-Clinical-2020.3-eng.pdf?sequence=1&isAllowed=y> (date last accessed 9 July 2020).
- No authors listed.** Fracture Clinic Services. British Orthopaedic Association. 2013. https://www.boa.ac.uk/uploads/assets/7ded8f00-987e-42d5-a389e739b1e03b47/ec9d4564-4fa7-4d08-ae4efc3cede7d53/fracture_clinic_services.pdf (date last accessed 9 July 2020).
- No authors listed.** Clinical guide for the perioperative care of people with fragility fractures during the coronavirus pandemic. NHS England. 2020. https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0086_Specialty-guide-_Fragility-Fractures-and-Coronavirus-v1-26-March.pdf (date last accessed 9 July 2020).
- Mouton C, Hirschmann MT, Ollivier M, Seil R, Menetrey J.** COVID-19 - ESSKA guidelines and recommendations for resuming elective surgery. *J. Exp. Orthop.* 2020;7(1):28.
- Ambrosio L, Vadal G, Russo F, Papalia R, Denaro V.** The role of the orthopaedic surgeon in the COVID-19 era: cautions and perspectives. *J Exp Orthop [Internet].* 2020;7(1):35.
- de Caro F, Hirschmann TM, Verdonk P.** Returning to orthopaedic business as usual after COVID-19: strategies and options. *Knee Surgery, Sport Traumatol Arthrosc.* 2020;28(6):1699–1704.
- No authors listed.** Recovery of surgical services during and after COVID-19. Royal College of Surgeons. 2020. <https://www.rcseng.ac.uk/coronavirus/recovery-of-surgical-services/> (date last accessed 9 July 2020).
- Mauffrey C, Trompeter A.** Lead the way or leave the way: leading a Department of Orthopedics through the COVID-19 pandemic. *Eur J Orthop Surg Traumatol.* 2020;30(4):555–557.
- Kogan M, Klein SE, Hannon CP, Nolte MT.** Orthopaedic Education During the COVID-19 Pandemic. *J Am Acad Orthop Surg.* 2020;28(11):e456–e464.
- listed Naughters.** Annual Review Competency Progression - England. Health Education England. <https://specialtytraining.hee.nhs.uk/ARCP> (date last accessed 9 July 2020).

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