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The effect of COVID-19 on surgical training

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Abstract
The COVID-19 pandemic has had a huge impact on society, healthcare in general and also on training in surgery. Cancellation of elective procedures, redeployment and establishment of green sites have combined with other factors to create significant gaps in training experience in operative and all other areas of surgery. There are nearly a million cases which have been lost to training since March 2020 and recovery means that tens of thousands of extra training cases have to be performed every month to recover that experience. There are pressures to address huge waiting list backlogs which may squeeze out time for training unless training is considered at the heart of any recovery plan. #NoTrainingTodayNoSurgeonsTomorrow. New, no blame, COVID ARCP outcomes have helped recognize the impact of the pandemic on progression and significant trainee and trainer organizations are united in raising the profile of the training crisis and offering a suite of suggestions on how to speed recovery. Disruption caused by the pandemic has allowed existing simulation and conferencing platforms to finally be widely accepted and the importance of the wider surgical team in supporting surgical training to be realized. New, outcomes-based curricula, with better feedback at their centre, will speed recovery of training trajectories. We should embrace the opportunity for change to help short and medium term recovery and improve the delivery of surgical training into the future.

Keywords COVID-19; curriculum; delivery of health care; feedback; pandemics; training support; waiting lists

Introduction
There has not been such an upheaval in society since the last world war than what we have experienced since early 2020. All parts of daily life have been affected and the National Health Service (NHS) has been at the centre of the response to the pandemic since its earliest days. The NHS began restructuring and reprioritizing services in February 2020. With the NHS only just managing the increased admissions of patients with COVID-19, beds were full of seriously ill people. Elective surgical procedures were cancelled from 17 March 2020 in order to free inpatient and critical care capacity. Staff were required to care for these patients and had to change roles at short notice, were redeployed to unfamiliar areas, performing tasks not normally in their current skillset. Operating theatres were repurposed to provide additional ventilatory capacity. There was an inevitable, significant impact on delivery of healthcare to patients who did not have COVID, especially in elective craft specialities seen in the UK and around the globe. Once the first wave of the pandemic had passed some elective services were able to restart. Initiatives were introduced to cope with elective surgery in the context of ongoing COVID admissions. The establishment of ‘green’ pathways designed for those at minimal COVID risk meant that throughput was slower than normal, and only the most urgent cases, such as patients with cancer, were operated upon. Extra precautions also called for consultant operating and off-site surgery at elective “green” hospitals, often in the independent sector.

Effect on surgical training
The combination of these factors had a huge and potentially long-lasting impact on operative training in all surgical specialities with a loss of 900,000 elective training cases recorded in surgical logbooks from the start of the pandemic to May 2021. Elective activity still remains significantly below pre-COVID levels, exacerbating the situation further. To recover in a year, 75,000 training cases above the normal, pre-COVID level must be performed (Figure 1). It seems unlikely that this will be feasible, even without further COVID waves.

The significant reduction in training cases recorded in logbooks has been seen in all specialties and regions of the UK, with none spared. Elective cases have been 53% (95% CI 50–56) and emergency cases 85% (84–87) of their pre-COVID rates overall, with the worst affected being elective trauma and orthopaedics at 42% (38–48) of 2019 levels. Other specialities whose scope of practice has either a high proportion of benign disease or heavy dependency on intensive care for immediate postoperative care are close behind. Vascular surgery, with its high volume of emergency or urgent operative case load has been least affected, although it is running at 71% (64–78) of pre-COVID levels.

Operative training is the most obvious area to be affected by the pandemic. However, it is only one of the key areas of practice required of a consultant surgeon. Emergency admissions were below normal levels for some time during lockdowns. Clinics were cancelled in the first wave and have since relied heavily on telephone consultation. Exposure to experience in the care of surgical inpatients and managing ward rounds has been reduced by a combination of there being little or no elective activity for long periods, or redeployment of trainees to non-surgical areas. These non-operative capabilities in practice are much less easy to quantify than logbook numbers, but it has to be remembered that there may have been even greater loss of training opportunity in one of more of these areas also.

Initiatives to support surgical training and trainees
Early recognition of the huge impact of the pandemic on training in medicine led the statutory education bodies (Health Education England Wessex and a Consultant in Critical Care and Anaesthesia in Portsmouth, UK) to offer a suite of suggestions on how to speed recovery. Disruption caused by the pandemic has allowed existing simulation and conferencing platforms to finally be widely accepted and the importance of the wider surgical team in supporting surgical training to be realized. New, outcomes-based curricula, with better feedback at their centre, will speed recovery of training trajectories. We should embrace the opportunity for change to help short and medium term recovery and improve the delivery of surgical training into the future.
England and their Home Nation equivalents) to recognize that goals for the 2020 training year would not be met by many, through no fault of their own. New outcomes for the Annual Review of Competence Progression (ARCP) were developed, accounting for the effect of the pandemic on progression through training. Outcome 10.1 was awarded when some areas of the curriculum had not been achieved due to COVID, but that extension of training was not required, and Outcome 10.2 awarded at critical progression points of curricula when extension of training would be required to meet the curricular requirements. The summation of the lack of training opportunities since March 2020 is reflected in the proportion of Outcomes 10 awarded. At the time of writing (July 2021) the spread of ARCP outcomes in each surgical specialty and core surgical training is shown in Figure 2. The trend in Outcomes 10 is shown in Figure 3. The number of Outcomes 10 is, unsurprisingly, highest in trauma and orthopaedics, the specialty most affected by the pandemic. Although there has been relatively little extension of training through Outcome 10.2, the high proportion of Outcomes 10.1 are of concern. Gaps in training need to be addressed before a trainee reaches a critical progression point and needs training to be extended through outcome 10.2.

The requirement for new consultants is greater than ever and there are several factors creating a perfect storm:

- with nearly 18 months of surgical backlog to be addressed, over 5.5 million patients on waiting lists
- planned or early consultant retirement not slowing

The effects of Brexit on workforce recruitment remain to be seen.

There is a high training demand which, if not addressed by any national COVID recovery plan, will have the potential to cause a significant workforce shortage impacting on the provision of surgical care for years to come.

To highlight the plight of training in surgery the Twitter hashtag #NoTrainingTodayNoSurgeonsTomorrow was launched. Its purpose is to provide a space on line to disseminate the latest news and figures on how surgical training was fairing as the pandemic progressed. It is also intended to allow trainers and trainees to share suggestions, solutions and good practice for making the most of resources available to mitigate the effect of the pandemic training environment.

Following on from this campaign a document offering suggestions on how to maximize training was developed by a collaboration of the Joint Committee on Surgical Training (JCST), the Association of Surgeons in Training (ASiT), the British Orthopaedic Trainee Association (BOTA) and the Confederation of Postgraduate Schools of Surgery (CoPSS). This document stresses that the gap in training is everyone’s problem, be they trainee, trainer, statutory education body, employer or the NHS itself, and everyone needs to be part of the solution. Suggested solutions were practical and aimed at different groups involved in training. Each case is a training case and ‘there is no operation a trainee cannot do at least part of’ was at the core of the document, along with a reminder that training in all areas, not

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**Impact of COVID-19 pandemic on training cases recorded in E-logbook and the activity levels above pre-pandemic levels needed to make up the lost cases in 12 and 24 months**

N.B. Pre-pandemic activity levels have yet to be reached and all lines to the right of June 2021 are projections.

**Increase in training activity above normal required for impact of COVID to be recovered over 12 or 24 months**

With thanks to Dr Brett Doleman

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just technical skills needed attention. Ideas for what each of the different stakeholders could do, from those on the shop floor to Surgical Royal Colleges were developed.

The 'Maximizing Training' document was well received, although it is impossible to quantify its impact, and many challenges to training delivery remain, not least the solution of the problem itself: waiting lists. While the obvious way to regain the correct training trajectory would be for all cases supposed to be done last year be done with the involvement of trainees this year, pressures to catch up on waiting lists may, in turn, squeeze time for training (or at least give that perception, there being little evidence that training impacts throughput if properly supervised). In addition, the Getting it Right First Time advice on booking theatre lists does not take training into account, and remuneration from the COVID recovery fund rewards those where throughput is in excess of 100% of 2019 levels.

In the rush to address waiting lists, training is at risk of being forgotten, saving up today’s problem for tomorrow as the training gap continues to widen. Training should be available wherever NHS patients are treated. As some elective services move to ‘green’ sites to protect against further waves of COVID and annual winter pressures, it is essential that trainees have access to these sites, often hosted in independent sector providers. The Byzantine arrangements around commissioning and contracts between NHS and independent sector providers has made access for trainees challenging for most of the pandemic, and numbers of training opportunities delivered in the independent sector remain low. This is an issue that needs to find a long-term solution soon.

However, disruption to systems provides opportunity. The restriction on travel and meeting in groups has allowed long available technology, particularly group video conferencing via a variety of platforms, to finally realize its potential in facilitating teaching and learning. The pandemic has been the era of the webinar, allowing interactive access to national and international experts at relatively low or no cost, democratizing knowledge acquisition and negating geographical, temporal and financial barriers to learning from the best in a particular field. It frees travel time, is cheaper and is far more environmentally friendly than traditional face-to-face teaching, although some of the ‘networking’ enjoyment may be the trade off. Several specialties have embraced the opportunity and have developed national teaching programmes mapped to curricula so that there is no longer regional variation in what is delivered and content is relevant to the required learning outcomes. Resources can be stored on line and so viewed later if on call, on nights or on leave. Platforms are interactive and the relative anonymity may facilitate asking of questions. There remains a lot to be done; moving from ‘death by PowerPoint’ to ‘virtual death by Power-Point’ is hardly an advance, but quality is improving rapidly. Also, it has long been possible to deliver at least basic skills teaching via video conference platform, and newer technologies are becoming popular as they bring the operating theatre to your laptop in interactive ways.
COVID has made it clearer than ever that the clinical workforce in the NHS is stretched. While service commitment provides many learning opportunities, a balance has to be struck to allow time for training. As there is always a service to be provided the only way to release surgical trainees for learning and training is to have some of the service provided by members of the extended surgical team. Taking the best aspects of the Improving Surgical Training pilot, Health Education England (HEE) has embarked on a project at eight sites to explore the impact of developing other professionals to provide further roles on the ward and in theatre to free up trainees to access learning opportunities. Demonstrating success in this project will hopefully spur roll out, enhancing both training and service.

It is not only trainees who need protected time to train. While it is the duty of all doctors to teach, train, supervise and mentor others, pressures mentioned above and lack of dedicated allocation in job plans for training means that too little priority is given to training and supervision of training. It is hoped that the new funding arrangements between HEE and trusts will lead to more of the monies allocated to training reaching the front line and buying time in job plans to train the trainers and provide high quality supervision.

The pandemic has affected each trainee differently. Training requirements for each trainee need to be identified and a bespoke plan made to address gaps in training left by COVID. To this end Training Programme Directors or Educational Supervisors have met with trainees and made individualized training plans. These now need to be executed to restore the correct trajectory for training. For those trainees who wish to step off the training pathway to allow more time to address COVID training gaps and recover from understandable feelings of burnout, both category 3 less than full time training and Out of Programme Pause (OOPP) are available to surgical trainees. However, care must be taken to ensure that OOPPs encompass the training gap for a particular trainee and not just use them to plug service requirement, tempting for the employing trust who will be paying the salary for the duration of the OOPP.

August 2021 saw the implementation of new curricula for all surgical specialties. Their introduction is timely: outcomes-based curricula will allow trainees to progress at their own rate to CCT and allow COVID disruption to be caught up if training is active and focused on gaps. A key component of the new surgical curricula is the multiple consultant report (MCR) which, together with trainee self-assessment using the same tool, will readily identify the most important learning needs for each trainee, and incorporate these into the learning agreement. The MCR will allow better handover between placements and review of goals at the midpoint of placement, giving more agile and responsive objectives for training in each placement. This improved feedback and reflection, comparing a trainee’s current capability with the end point of training and mandating identification of areas most important for development in the next 3–6 months of placements will allow quicker recovery from the impact of COVID and faster, safe progression to certification.

Conclusion

COVID-19 has had a huge and immediate negative impact on surgical training. However, it has allowed everyone involved in training to examine what they do, find areas for improvement, not only in trainees, but also in trainers and training structures and has allowed increasing integration of supportive technology into training. We should embrace the opportunity for change to
help short and medium term recovery and improve the delivery of surgical training into the future.

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