

## Research Article

# A Virtual Takeover: The Impact of Covid-19 Pandemic on Teaching Methodology in Postgraduate Education and Training

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## Abstract

**Background:** Increased clinical commitments, establishment of emergency rotas and redeployment to areas of clinical need have dramatically changed the shape of training during the COVID-19 pandemic. Postgraduate examinations, deanery led teaching and CPD Courses have all been postponed with a detrimental effect on surgical training.

**Methods and materials:** The focus of our survey was to assess the usefulness and ease of accessibility of online deanery, department teaching and specialist association/industry webinars. We aimed to assess whether this modality of teaching can be used for delivery of core curriculum and postgraduate (FRCS Orth) examination preparation topics.

Pan-London Orthopaedic trainees (ST3-ST8) were surveyed in April-May 2020 using a simple 10-point questionnaire to evaluate the impact of the COVID-19 pandemic on teaching and training-based competencies. A minimum response rate was set at 100 participants. All responses were collated and analysed.

**Results:** Satisfaction rates and potential integration into deanery teaching was reviewed. Individual experiences and learning opportunities during the COVID-19 pandemic were recorded, particularly focusing on web-based delivery of teaching as a replacement to conventional teaching.

Hundred percent of respondents had been affected during the COVID-19 pandemic, 58% of whom had teaching delivered online. 25% of trainees were able to access recorded teaching sessions online if they missed a teaching session due to sickness or clinical duties. Majority of trainees found web-based teaching beneficial, however, most would not be in favour of web-based teaching replacing conventional teaching methods.

**Conclusion:** Mandatory teaching of trainees has been greatly affected by the COVID-19 pandemic. Current trends to online teaching benefits trainees in delivering didactic curriculum teaching, post-graduate viva practice and interactive critical case-based discussions. It is a simple, cost effective educational tool which eliminates travel expenses. Such teaching is an adjunct to conventional teaching and cannot replace clinical, practical sessions and educational workshops.

**Keywords:** Musculo-skeletal system; Postgraduate; Medicine; e-learning/computers; Study skills

## Key Notes

### Main messages

- The COVID-19 pandemic has had a significant impact on postgraduate education and training.
- Many postgraduate exams were postponed or moved onto a virtual setting with changes to normal exam structure.

- COVID-19 has changed postgraduate education, with a greater shift towards virtual and distance learning in lieu of conventional teaching methods.

### Current questions

- What are the thoughts of current trainees whose postgraduate training has been affected by the COVID-19 pandemic?
- Is virtual based teaching an effective replacement for conventional teaching?
- Has COVID shaped the structure of postgraduate education?

### What is already known on the subject?

- COVID-19 has caused disruption to postgraduate training with a delay in progression for trainees in certain specialties.
- The minimum teaching requirements for trainees in the UK has been relaxed in order to meet appraisal deadlines.
- There has been a huge limitation on conventional face-to-face teaching methods.

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## Background

In December 2019 a novel coronavirus causing a global pandemic that has ravaged the United Kingdom, causing multiple national lockdowns with 3,945,684 cases and caused over 112,465 deaths in the United Kingdom [1]. This has had a monumental impact on the National Health Service (NHS), the re-organisation and long term changes dramatically changed the shape of training [2]. Alongside this, thousands of clinical trials, courses and medical conferences have similarly been cancelled or postponed, creating barriers in research and knowledge dissemination [3]. The national trainee survey, of over half of all trainees and 22% of trainers, found that 74% of trainees/trainers agreed that there has been a disruption to training by the pandemic [2].

The most common format to complete Trauma and Orthopaedic (T&O) training is via national selection process, one has to complete a two-year core surgical training post and subsequently 6 years of registrar training, they need to pass exams, attend courses and be assessed regularly on surgical/non-surgical competencies [4]. In April 2020, the British Orthopaedic Association released guidelines for management of urgent patients during the pandemic; it highlighted the need for social distancing, staffing and remote access to trauma meetings [5]. Orthopaedic practice and training has been particularly affected; interviews in 2020 for registrar posts were cancelled, social distancing has forced clinics, examinations, trauma meetings, teaching to be cancelled or become virtual. Cancelled elective operations and reduction in emergency department presentations led to less operating and exam cancellations led to less trainees able to progress, that created a reduced number of progressions that creates a backlog down the line of training that effects recruitment [6,7]. A recent study by Bodansky et al. [8] has shown a 43% disruption to training within orthopaedics, with some trusts recommending that consultants complete procedures to reduce operating time.

With a continued need for training and education, novel use of online video-conferencing apps has been an effective platform in delivering teaching to many trainees at any one time [9]. British Orthopaedic Association have utilized such platforms to deliver virtual training courses and webinars, these have been of particular use for the registrar surgeons taking the Fellowship of Royal College of Surgeons (FRCS) Examination [10]. The advent of online training and covering of the FRCS syllabus *via* this platform has been welcomed by the orthopaedic training community with a sense of support during this pandemic where service provision has been the priority [11]. Webinars have taken various guises ranging from deanery led curriculum teaching, departmental teaching, various subspecialty associations, mentoring groups and industry webinars being held on a weekly basis. The focus of our survey was to assess the usefulness and ease of accessibility of the online webinars that have been implemented in a rapid response to provide educational content across the orthopaedic community.

## Methods and Materials

Our aim was to assess whether online teaching can be used effectively to teach T&O during and after the Covid-19 pandemic. Individual experiences and learning opportunities during the COVID-19 pandemic were recorded, particularly focusing on web-based delivery of teaching as a replacement to conventional teaching. To evaluate the impact of the COVID-19 pandemic on teaching and training-based competencies.

Pan-London Orthopaedic doctors were surveyed, *via* an email notification of a Survey Monkey link, in April-May 2020. The questionnaire first had simple closed questions about online teaching, form of remote access, ascertaining whether online teaching was received, the cost effectiveness and whether the recordings were useful. Then with questions on a scale of 0 to 100 they graded the ease of access, overall experience of online teaching, experience of face-to-face and how much they agree with a statement of "would you like online teaching to replace conventional teaching." We received a total of 85 responses from a total of 100 email invitations across the region, a response rate of 85%. Simple descriptive statistical analysis was used to calculate the mean and standard deviation. A two-tier T test was used to calculate a P value to assess the significance of the difference for the experience question when comparing the overall experience of face-to-face teaching.

## Results

Results were reviewed and analysed, of all questionnaires sent out across the London regions, we received 85 responses from trainee Specialist Registrars. Our survey demonstrated that the coronavirus pandemic had impacted 96.5% of respondent's clinical teaching and examination preparation, with teaching being completely cancelled in 29.4% of cases.

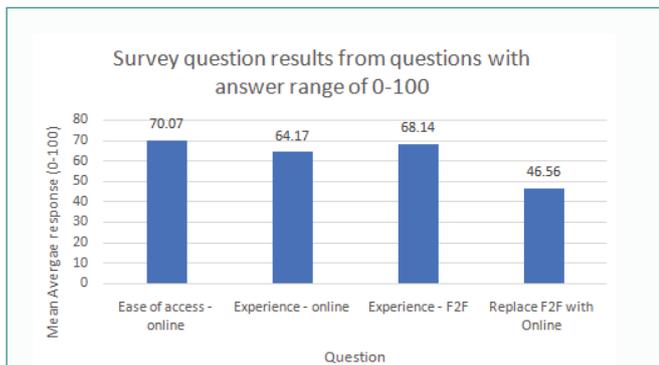
An average response of 70.07, as seen in Figure 1, was found on a scale of 0 to 100 for participants who rated ease of access of online teaching, the standard deviation was large at 31.11. When asked about the overall experience, on average participants scored face-to-face question at 68.14, which was slightly better than the average for online which was 64.17, the difference between these two was not significant ( $p=5.149$ ). An average response of 46.56 was found on a scale of 0-100 for participants who agreed with a statement for; online teaching to replace face to face teaching, the standard deviation was large at 32.96.

The survey showed 42.5% of trainees accessed materials in their own homes via online learning. The most commonly used device for online learning was a computer at home with 80% (68/85) of participants, the second most common used device was mobile phones at 45.9% (39/85). Within the study we found 19 out of 85 participants used 3 or more devices to access online learning. We found that 70.6% (60/85) of our participants could receive web-based teaching, with 78.9% (67/85) of participants agreeing that online teaching is a cost-effective form of teaching and (as seen in Figure 2). A 47.05% of participants found recordings of online sessions useful.

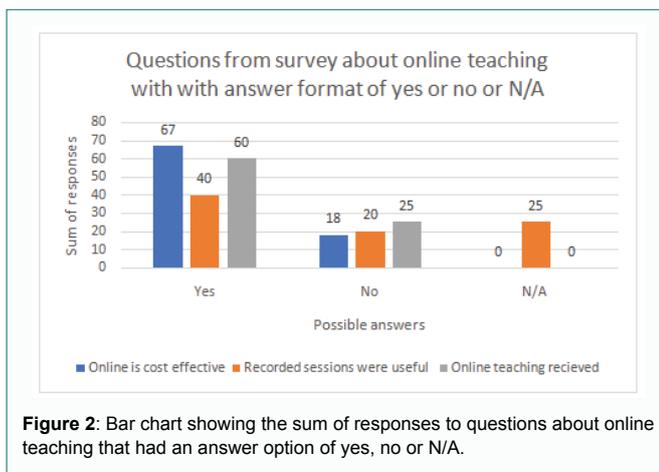
## Discussion

Figure 1 and 2 both show positive feedback for online teaching, studies similar to ours have shown comparable results, with Figueroa et al. [12] finding 72% of participants wanted to attend online teaching after the pandemic and overall positive feedback for online modalities. Garcia et al. [13] described common challenges for surgical e learning, with those for the trainee including poor communication and need for self-motivation, for education providers the challenges can include course accreditation and development of surgical simulators.

As noted by Potts, the impact of deficient surgical experience during this pandemic is likely to be greatest on senior trainees in their final or penultimate years of training [14]. Our study was based only on Specialist Registrar grade surgeons with overall feedback being positive, Essilfie et al. [15] also had similar feedback within the equivalent grade but senior staff was not so positive. Our study did not have a majority in favour of replacing face-to-face with online



**Figure 1:** Bar chart showing the mean average response to questions that had an answer range of 0 - 100.



**Figure 2:** Bar chart showing the sum of responses to questions about online teaching that had an answer option of yes, no or N/A.

teaching and this is echoed with other surveys, T&O may be ready to welcome online learning but no hint that conventional face to face teaching is being replaced.

With a reduction in orthopaedic cases, the use of virtual reality technology during pandemics could allow orthopaedic trainees to enhance their surgical techniques. Logishetty et al. [16] conducted a randomized controlled trial on orthopaedic trainees using online learning, in the form of virtual reality, with improved surgical performance. Virtual reality is something that we did not set out to specifically survey in our online learning questionnaire, but future studies may need to specifically assess its integration into online teaching and surgical performance.

Trainees mostly agreed on the cost effectiveness of online learning, see Figure 2, it has found online teaching to be beneficial with regards to time, money and travel. It eliminates the need to rush from an over-running clinic or theatre list for example to travel to a designated venue for compulsory deanery teaching, where such factors regularly come into play and affect the outcome at trainee annual review.

The utilization of technology to fulfill educational needs during COVID-19 is paramount. We have seen the novel advent of teaching methods with excellent and reliable technology to allow for such provision to large numbers of attendees. Teaching programmes for orthopaedic trainees can be moved online utilising various resources, including videoconferencing platforms [17]. These platforms have almost been pioneering in the way we can shape the future of deanery teaching, not only in orthopaedics but across all medical

specialties, foundation and core teaching but also at an undergraduate level., which is particularly important in the current climate with increased levels of staff illness. The availability of recorded sessions allows trainees to access materials remotely, with the possibility to be viewed at a later time and allows for flexibility in trainees schedule to access teaching or not miss out on important learning topics, this is important given 80% of participants using a computer for online learning at home. It will account for missing teaching sessions due to clinical delays, annual leave and on call commitments, and as already alluded to sickness.

## Conclusion

Mandatory teaching of trainees has been greatly affected by the COVID-19 pandemic. Current trends to online teaching benefits trainees in delivering a diverse curriculum. Online teaching is a simpler, cost effective educational tool which eliminates travel expenses. Online teaching has grown rapidly due to the pandemic, but more likely as an adjunct to conventional teaching and cannot replace face-to-face teaching, yet. It is vital that leaders in medical education continue to take an adaptive approach to ensure that surgical trainees are educated and mentored appropriately to meet training requirements both during and after this global pandemic.

## Contributorship Statement

JB and YB were responsible for planning the study and survey questionnaires. YB conducted the survey and collated and analysed the data. GD contributed to the data analysis. YB and GD equally contributed to writing the article. JB and GD also contributed to formatting the article. YB submitted the article. None of the authors have declared any competing interests. No funding was required for this study.

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