Maintaining surgical training during the Covid-19 pandemic; a novel use of surgical simulators.

The global covid-19 pandemic has had a wide-ranging impact on both our personal and professional lives. Extensive changes to our working patterns and the way we deliver a healthcare service had to be implemented to allow for an adequate response. Most centres adopted a consultant-lead trauma service, with elective orthopaedic services being cancelled. To limit the risk to medical personnel, only essential surgical staff had access to the operating theatres. As a result, already limited training opportunities further diminished, especially for our more junior trainees and colleagues.

Virtual reality surgical simulators are at the forefront of innovation in medical education. Their use has increased in popularity in recent years in an attempt to counteract the downward trend of decreased trainee surgical activity and to improve patient safety. These simulators are a validated platform that provide risk-free hands on surgical experience and improves the proficiency of trainees prior to undertaking these procedures on patients, hence are mutually beneficial. Typically, due to expense and limited resources, trainee access to surgical simulators are usually limited to private research facilities or courses and conferences.

The U.K wide lockdown and closure of the University of Bournemouth based, Orthopaedic Research Institute facility allowed for the transfer of the VirtaMed Arthros™, a passive haptic feedback surgical simulator, to our NHS facility.

The cohort of participants were junior surgical staff from a district general hospital. The majority of participants had very little arthroscopic exposure, if any, prior to the programme. During the lockdown period, daily teaching sessions were conducted by three fellowship-trained surgeons on the VirtaMed Arthros™ knee simulator. Participants were taught basic arthroscopic skills before undertaking training modules on diagnostic arthroscopy. At the end of every module, the simulator generates a session score based on parameters such as; time of the procedure, visualisation of key structures, percentage of iatrogenic chondral damage and camera depth length. This data was collected along with data from questionnaires regarding simulators as a teaching tool. In some cases structured interviews of participants were conducted.

Our cohort was composed of medical students (10%), junior surgical trainees (75%) and middle grade surgeons (15%). 90% of the cohort attended multiple sessions over several weeks, but averaged one session per week. The overall confidence and module scores improved amongst participants over the duration of the programme, with most participants attempting the therapeutic modules towards the end of the programme.

In conclusion, surgical simulators are a useful tool for surgical education and training. Their application can be wide ranging, from formal teaching of junior surgeons to self-directed learning and skill maintenance of more expert surgeons. A keystone of the entire process is the location and ease of access of the simulator. The availability of a surgeon trainer over a technician is also pivotal for the training of junior surgeons, as it provides valuable insight into the applicability of learnt skills in real life procedures.

Analysing the programme overall, we can conclude that the changes to the orthopaedic activity in our institution due to the covid-19 pandemic has allowed

for increased, more focused and consistent arthroscopic training of junior surgical staff, during a difficult period for trainees, bucking the national trend.