2022 Cutner and BSSH Travelling Fellowship in the United States of America

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In August and September 2022 I spent three weeks in the United States of America (USA), where I visited Dr David Ring at Dell Medical School at the University of Texas at Austin, the faculty at the Kleinert Institute in Louisville Kentucky, and Dr Jason Strelzow at the University of Chicago Medical Center. I was funded as a recipient of the Royal College of Surgeons of Edinburgh (RCSEd) Cutner Travelling Fellow in Orthopaedic Surgery, and the British Society for Surgery of The Hand (BSSH) Education and Travelling Bursary. I received these awards in 2020, however my visit was delayed due to international travel restrictions resulting from the COVID-19 pandemic. I therefore undertook the visit in 2022, when I was an ST8 in Trauma and Orthopaedic Surgery, with a special interest in hand and wrist surgery. My visit had the specific goal of identifying strategies to optimise the use of patient-reported functional outcome measures (PROMs) in patients undergoing hand and wrist surgery in the United Kingdom (UK). I am currently working towards a Doctor of Medicine (MD) degree on this topic at the University of St Andrews. There were multiple opportunities to gain other educational experiences on an opportunistic basis, and these typically centred on service provision and design. What follows is a description of my experience and the key learning points of this visit.

Week 1: The University of Texas at Austin with Dr David Ring

My unit has historical links with Dr Ring, who has been to Edinburgh to lecture at the Edinburgh International Trauma Symposium[1]. We have also previously collaborated closely on research projects[2]. Dr Ring is an upper limb specialist Orthopaedic surgeon who also holds the position of Professor at the Dell Medical School. He has a research interest in PROMs, particularly the influence of psychosocial factors of PROMs in upper limb conditions. The primary research aim of this segment of the trip was to gain more insight into this phenomenon and to establish how these tools could be optimised for ongoing audit and research at the Fife Hand Clinic. These goals were achieved, however the secondary observations regarding organisation of clinical activity and the integration of psychological and surgical care were equally valuable.

Organisation of outpatient clinic

I had the opportunity to participate in conventional outpatient clinics at Dell Medical School as well as virtual clinics conducted via telemedicine. Both new patient and review appointments were encountered. The outpatient clinic setup follows a “hub” model with a centralised office for the attending (consultant) surgeon, resident surgeon (registrar), and Physicians’ Assistants (PA) who undertake clinical work in a role comparable to hand therapists or advanced nurse practitioners (ANP) in the UK, and can assess and treat common conditions. Patients are placed into their own rooms with a separate door to the waiting area and another on the other side for the treating team to enter. The patient remains in this room for the duration of this visit, thus avoiding prolonged waits in a crowded waiting room. Benefits of this approach are that the patient may become more relaxed in their own specific treatment room, which has obvious benefits from a

communication point of view or if treatment is to be administered (for example, injections). This same hub model was encountered in all units during my visit. I was told that in the development of this model, all clinical staff wore tracking devices which recorded their footfall and amount of time spent in each location, allowing calculation of the most efficient way to utilise resources. The majority of healthcare systems in the USA are insurance-based or privately funded, and part of the rationale behind this approach during development was to optimise the use of the clinic's most costly asset (the attending surgeon). Costs were also minimised by utilising a mini C-arm to undertake radiographs in the clinic, obviating the requirement for radiographers, and minimising the delay to the patients while waiting for radiographs.

Patient-reported outcome measures in the clinic

The most important observation was the use of routine PROMs in the outpatient clinic to optimise patient care. PROMs are collected on first presentation to the clinic on iPads. As well as upper limb-specific outcomes, patients completed the General Anxiety Disorder Assessment (GAD-7) and the Patient Health Questionnaire (PHQ-9). These tools gauge anxiety and psychological distress, and depending on the severity of the response, patients are asked about suicidal ideation. It is well documented that psychological distress can influence PROMs in patients with hand conditions[3]. It was, however, the application of this information that was most novel to me: patients scoring highly on these psychological questionnaires were offered counselling by a trained social worker there and then. The benefits of this approach are stark: not only do they represent a holistic approach to the patient, but they represent an opportunity for early intervention in patients with psychological distress. Application of such a process within the NHS may be difficult initially due to cost outlays for specific social work or nurse specialist sessions, but they would represent an innovative step forward in a high risk patient population, particularly when the current waiting times for social work input, and secondary economic impact of time off work due to psychological distress are considered.

Telemedicine

I also observed the virtual conduction of telemedicine, both via zoom and via telephone. I initially had doubts regarding the accuracy of clinical examination, however this was not a significant impediment. (This is obviously provider-dependent, and may vary depending on experience and communication ability). The primary benefit of this approach is that you consult with a patient in a comfortable place for them, effectively on "neutral territory". Patients may therefore be more willing to engage with the surgeon during the consultation, or more receptive to information. Multiple patients had family members with them during their consultation. I was also told of a patient who undertook their consultation whilst walking around their house and smoking an electronic cigarette. This would be impossible in the hospital setting, but clearly represents an example of a patient being more at ease during their consultation.

In the UK, telemedicine appointments became commonplace during the COVID-19 pandemic. As we emerge from the pandemic, clinical activity is slowly reverting back to face-to-face consultations (the status quo). I think we should consider further the use of

telemedicine, for the reasons described above, and for the fact that it may be far more convenient for patients. This second point could reduce the risk of "DNAs" to the clinic, with a secondary environmental benefit.

Office based surgery

Dr Ring undertakes 90% of his surgeries as "office procedures" (in a clinic room), which I was able to observe. Cases would typically be routine hand procedures undertaken under local anaesthesia (e.g. trigger finger or carpal tunnel release). A typical half-day list would involve 8-12 such procedures. In order to deliver this level of efficiency, certain dogma have been challenged. Surgery is undertaken in the patients own clothes. Scrubs and gowns are not mandatory for the surgeon. There have been no knock-on effects on infection prevalence as a result. A single nurse is present to assist, and the surgeon is equally responsible for preparing the room between patients rather than relying on other staff. This reduces the overall number of personnel required for the list by two to three fold. For local anaesthetic procedures, patients do not require cardiac or postoperative monitoring. Furthermore, they are discharged directly from the "operating room" (clinic room) and can leave the hospital immediately, removing the need for postoperative observation.

We do not currently offer this service in my unit. The team at Dell Medical School have demonstrated that this approach is safe. The potential benefits of this within the NHS are a reduction in staff required for minor surgeries, and the freeing up of space within dedicated operating theatres which could reduce waiting lists.

Trauma surgery

In Scotland, 70% of hand surgery procedures are undertaken by general orthopaedic surgeons. This is an important consideration, as it is likely that hand procedures will be undertaken on the same list as general orthopaedic procedures. I took the opportunity to visit the general trauma operating room for a session to assess the efficiency of the approach to trauma in the USA. Seven cases (pilon fracture fixation, pelvic fracture fixation, proximal humerus fracture fixation, debridement of a gunshot wound, ankle fracture fixation, tibial nailing, femoral nailing) were done on a list which started with knife to skin at 0645 and finished at 1700. Aside from an early start, this efficiency arose partly due to extremely efficient turnover, with anaesthesiologists undertaking regional blockade or anaesthesia in a separate area while a physician assistant monitored the patient in the operating room. There was also a unique attitude towards the case list, where all members of the team were dedicated to the smooth running of the list: I witnessed a radiographer holding a limb while the scrub nurse prepared and draped while the surgeon scrubbed, for example. This attitude may stem from the fact that the theatre staff are allowed to go home when the operating list is complete, as opposed to the NHS where they are typically redeployed until the end of their shift.

I am acutely aware that the renumeration of both surgeons and theatre staff as a whole is vastly different in the USA compared with the UK. Trying to maximise motivation of a workforce that is already pushed to the limit with no further incentive is therefore unlikely to generate increased theatre efficiency, and I do not think that this sort of setup would be

achievable in the UK at present. I confirmed this viewpoint when I spoke to multiple international fellows at the Kleinert institute in Kentucky, who had trained in public healthcare systems.

Future research planning

I joined Dr Ring and his research team for a morning conference where we talked over their ongoing projects and ideas for future research. I described the setup for PROMs measurements and sought formal advice on whether this could be optimised. We agreed that moving from paper to electronic data capture would be beneficial to the patients and the unit, and I was advised on how to set this up. I also asked about setting up longitudinal studies to evaluate the natural history of rarer conditions that may or may not require surgery (for example Kienböck's disease). Dr Ring advised that a registry based system (like we currently have in place[4]) was the most appropriate way to collect these outcomes. He also advised that we should consider the impact of psychological distress in order to determine predictors of outcome, describing which PROMs I should use to capture this. This would represent an improvement on our current setup where we simply ask patients to report whether or not they have a history of depression, and our historical setup where we utilised the short form 12 score[5].

Week 2: The Kleinert Institute in Louisville, Kentucky

The second week of my fellowship was spent at the Kleinert Institute. This is based primarily in Louisville, Kentucky, although there are other surgery centres in the vicinity including in neighbouring Indiana, which I also visited. The Kleinert network is a private service which is affiliated with the University of Louisville. It is world famous for its pioneering work in microsurgery, which culminated in the unit performing the world's second successful hand transplant. It operates as the hub of a hub and spoke model of hand trauma care, dealing with state-wide emergencies including replantation. There are no residents (registrar equivalent), and the work that would typically be undertaken by registrars is done by a team of fellows (domestic and international). Given the previous cutting-edge techniques developed in this unit, the primary aim of this portion of the trip was to learn from the faculty about what degree of governance is required when introducing or designing a new technique, and how PROMs can be used as an adjunct in this situation.

I was surprised to learn that the Kleinert Institute does not run a registry like we do in Fife, and does not routinely collect PROMs. The fellows are therefore instrumental in the completion of research projects. The fact that this setup exists is probably due to the employment of post-CCT equivalent fellows who will usually have demonstrated a degree of research capability or developed these skills in training. Clinical research projects at this centre typically fall into two categories: retrospective case series for reports of new techniques or modifications, and prospective studies. I was told of the considerable levels of approval that had to be sought prior to commencing the hand transplant programme.

The faculty were able to shed light on my primary aim. We agreed that governance is essential and there is a duty to audit your own practise. I was told that the considerations would vary depending on what technique was being considered. Minor modification of a

previously well described procedure was unlikely to require any specific paperwork, or change to follow-up protocols. In contrast, the design of an entirely new technique or treatment often requires significant amounts of funding. In order to obtain this there are multiple levels of institutional review and ethics that must be counselled. These programmes are typically followed much more closely postoperatively. Most surgeons will not develop new techniques, however with the evolution of new technology it is likely that a surgeon will introduce a new technique to their unit at some point in their career. The same principles of governance can be applied to self-audit in this scenario. The prospective registry, whether or local or national, offers an attractive solution to this.

I had volunteered to deliver a presentation in each unit I visited on this fellowship, and I delivered this on the final day of my attachment. I presented an overview of hand surgery in the South of Scotland, including current studies that we are undertaking at the Fife hand Clinic. I was interested to learn when researching this talk that historical links existed between Scotland and Louisville. Two of the surgeons involved in founding what would become the centre I visited actually trained as registrars in Canniesburn before moving to Kentucky in the 1970s (Graham Lister and Robert Acland). I was pleased to be able to continue this historic link in a small way. Having presented the history, I described the setup at the Fife Hand Clinic. We have virtualised many of our patient pathways, resulting in more efficient use of clinic time, with high degrees of patient satisfaction. This is audited using PROMs. We recently expanded this to deal with suspected scaphoid fractures[2]. This presentation was met with enthusiasm by the faculty, who expressed a desire to establish a similar setup in their unit. I have volunteered to review their workload and determine if this would be possible, and I hope that this will continue the historic link I have previously described.

Week 3: University of Chicago, Illinois

The final week was spent in Chicago with Dr Jason Strelzow, Assistant Professor at the University of Chicago Medical Centre. I also spent time with Dr Jennifer Moriatis Wolf, President-Elect of the American Society for Surgery of the Hand (ASSH). This level I trauma centre serves a population of approximately 1.2 million. Due to its geographical location, it serves a very “underserved” area of the city, which has one of the highest murder and gun crime rates in the entire USA. As an illustration, their centre treats over 2000 gun shot wounds per year, of which around 10% affect the upper limb[6]. I first worked with Dr Strelzow when he was an overseas fellow for a year in 2017 at the Royal Infirmary of Edinburgh. He currently works as an attending on both the hand and trauma on-call rotas. The specific aims of this portion of the trip were to determine how best to deal with an itinerant population in a research setting. This is relevant because we have found that deprived patients are less likely to respond to PROMs questionnaires in both research and clinical settings[7]. At the University of Chicago, patients attending clinic complete PROM questionnaires at every appointment, and these are then sent to an electronic medical record portal. Again, there is no prospective registry, and patients are contacted either prospectively or retrospectively depending if PROMs-based research is being undertaken. Patients are also offered the opportunity to complete PROMs forms remotely. Utilising these two approaches leads to a PROMs completion rate of 30-40%. Patients also have the

ability to log in remotely and view their own medical records portal. This is known as an "open notes" policy and is common throughout the USA.

We identified specific barriers to the completion of routine PROMs, which we classified as patient-related, surgeon-related, and hospital-related. The most important patient-related barrier is health literacy, and this is particularly relevant in the most vulnerable or deprived patient groups. These is a correlation between health literacy and the likelihood of completing PROMs questionnaires. In addition, patients in the USA are less used to PROMs questionnaires forming part of their routine healthcare, and communication from the hospital staff is insufficient to explain to these patients why this is necessary. As a result, the education of healthcare providers on the benefits of PROMs in clinical practice is necessary. A proportion of surgeons collect but do not utilise PROMs as part of clinical care. I have previously only considered PROMs as research tools, but I can see that if they were used to guide clinical care or provide reassurance, then patients may be more inclined to complete them. Finally, hospital infrastructure can act as a significant barrier to completion: if there is no easy way for patients to complete PROMs questionnaires in clinic, then relying on them to complete this is their free time further reduces the likelihood of completion.

During this attachment I also spent time in the operating room and observed the surgical treatment of multiple patients with high-energy hand and upper extremity trauma, including closed and ballistic mechanisms of injury. This was a secondary benefit of this attachment as I have never encountered this caseload in my training.

Did the Americans learn anything from me?

In the spirit of sharing information, I think that the Americans also learned from how things are run both in the NHS and particularly at the Fife Hand Clinic. Our method of virtual follow-up, particularly the virtual management of suspected scaphoid fractures was very different to their setups. In all centres we discussed whether such an approach was possible in the American healthcare system. The majority of surgeons I spoke to did not feel that this was achievable at present, primarily due to the attitude of patients towards their healthcare system. Patients in the USA pay for healthcare, either directly or via insurance (with an excess paid for by the patient). This results in the concept of the "global surgical period", a 90-day aftercare period following an intervention that is included in the price. During this period, healthcare providers feel obliged to provide the "best" care, because reputation matters and is important for generating new business. Surgeons are also careful to provide "adequate follow-up to avoid litigation". Both of these concepts mean that patients feel they are entitled to a degree of in person follow-up. On the other hand, the majority of patients I met in Texas were desperate to return to work at the earliest possible stage, and I am convinced that these patients would be happy with virtual follow-up that could be done from the office or construction site.

The assumption among surgeons and patients is that in-person follow-up is the gold-standard, and that virtualisation leads to inferior care. In Edinburgh and Texas, I have seen that this is not the case, although it may be some time before this approach becomes culturally acceptable in the USA. Encouraged by the contacts I met during this trip, I am

planning to travel to the ASSH meeting in 2023, where I hope to present a symposium on virtual care. I look forward to seeing how this concept develops in this healthcare system.

Reference list

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