REPORT

EFORT Robotic Visiting Fellowship

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Report about my experience during the EFORT Robotic Visiting Fellowship

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Introduction:
It was a pleasure to be awarded the first EFORT robotic visiting fellowship, supported by Stryker. This robotic fellowship came highly recommended and was a perfect opportunity to augment my clinical arthroplasty skills with robotic assisted surgery.

The fellowship application opened in September 2019 and closed in January 2020. There is useful information to guide you through the process on the EFORT website (1). The processing of the application was prompt and I got notified of the outcome end of January. I was concerned whether the pandemic would affect my start date but fortunately, my chosen centre, University College London hospital (UCLH) (2) (Figure 1) was ahead of the curve and back to full operating capacity by July 2020.

I started this fellowship in August 2020 under the supervision of Professor Haddad (Figure 2), who is one of the pioneers of robotic surgery in the world. The fellowship is in a high-volume robotic surgery centre that has allowed me to gain excellent clinical experience coupled with academic involvement around robotic assisted arthroplasty surgery.

Clinical activities:
I chose to visit UCLH in London as it aligned with my career aspirations and the clinical exposure. It was an amazing experience; I have 250 surgical operations recorded on my surgical logbook (3) over the last 5 months. This just demonstrates how well, as a visiting fellow, I was supported and trained.

My clinical activities included but not restricted to the following:

1- Assessing new referrals and following up patients in the clinic. It was a great opportunity to council patients about robotic assisted surgery and to recruit them into the clinical trials.

2- I was welcomed to the team and I had the opportunity to organise operating lists and request the surgical instruments required for cases. For each list, the cases are planned and images templated prior to robotic surgery. Planning these cases is essential especially with the new version of robotic hip surgery (Version 4.0), in which standing and sitting hip x-rays are done to be incorporated into the robotic plan to add spinopelvic parameters. This allows surgeons to compare their conventional plan to the robotic surgical plan and execute the surgery with precision and confidence.

3- This fellowship permits surgeons to be involved in other surgical procedures such as conventional arthroplasty and sports surgery cases like ACL reconstructions and other arthroscopic procedures. My main concentration was on robotic surgery. The robotic arthroplasty procedures included: Unicompartmental knee replacement (UKR), Total knee replacement (TKR), Patellofemoral joint replacement (PFJR) and total hip replacement (THR).

4- I had the chance to drive the day-case arthroplasty services in this institution together with a large multidisciplinary team based on my Canadian experience and using the existed protocol for this service at the UCLH. We were successful in discharging robotic assisted THR, TKR and UKR same day. I think this will become increasingly common over time and I intend to utilise it in my future practice.

Scientific activities:
Despite the effect of the Covid-19 pandemic were most of the scientific activities across the globe cancelled, this fellowship allowed me to attend a robotic cadaveric course in Newcastle. During this course I had the chance to learn from experienced surgeons who use the robot routinely. It was an excellent forum to exchange ideas and discuss getting the best of the robotic assisted surgery.

The course
This was the Mako Certification Course 09 -10th September 2020 in Newcastle. Robotic surgery requires certification of the surgeons to be able to use this technology. For MAKO certification, there are many centres across the UK. In Newcastle, it is usually held at the Newcastle surgical training centre (NSTC) at the Freeman hospital (4).

Since the start of the pandemic, MAKO certification courses stopped worldwide and as many institutions started to resume the elective services, the need for surgeons' certification is necessary to start robotic assisted surgery. The first UK MAKO system certification course, post the first covid surge, was in Newcastle in September. This successful course was attended by 8 delegates surgeons and 3 faculty surgeons from the UK (Figure 3). The faculty consisted of Mr Sam Oussedik from UCLH, Mr Jonathan Conroy from Nuffield Health Leeds hospital and Mr Matthew Wilson from the Royal Devon and Exeter NHS trust.

These courses are sponsored by Stryker. Due to Covid-19, the government regulations and social distancing strategies were adopted and adhered to. Refreshments were provided in a COVID secure way.

This course allowed me to build on skills and I learnt new steps which I practiced on the cadavers. I learnt many tips and tricks especially things related to pin site wounds, balancing and checking the plans. I highly recommend this course to all surgeons who want to use the MAKO system in their practice.

Research activities
UCLH is world leading academic centre with high quality research trials on robotic surgery being conducted. Currently there are a number of ongoing prospective randomised controlled trials on robotic arthroplasty surgery in which I had the privilege of being involved. These trials include:

1- Computerised tomography-based planning with conventional total hip arthroplasty versus robotic-arm assisted total hip arthroplasty (5).

2- A prospective double-blinded randomised control trial comparing robotic arm-assisted functionally aligned total knee arthroplasty versus robotic arm-assisted mechanically aligned total knee arthroplasty (6).

3- Robotic-arm assisted medial unicondylar knee arthroplasty versus jig-based unicompartmental knee arthroplasty with navigation control (7).

I have written two book chapters on robotic surgery that are in press. These chapters discuss the surgical steps, the clinical aspects, cost effectiveness and patient's reported outcomes with robotic surgery. I have also written on variety of subjects not related only to robotic surgery but on all aspects of arthroplasty services especially on day-case surgery services.

Social aspects:
This fellowship has introduced me to an excellent team of junior and senior fellows that were very welcoming. We shared our clinical experiences and supported each other during the fellowship.

I was lucky to have three other senior fellows onboard including Sandeep Singh (Figure 4) who is a fully trained surgeon from India, he was a great asset to the team. Ahmed Magan (Figure 5) from the Cambridge training program and Ricci Plastow (Figure 6) from the Manchester training program, both are post CCT trained surgeons from the UK who are both excellent surgeons and very competent individuals. It was great to learn from their experiences as they all did respectable fellowships, and this will be a lifelong collaboration.

We have great junior research fellows within the team who are excellent and very committed group of growing surgeons. This allowed me to teach and supervise them in doing multiple research projects. In addition, I taught them principles and surgical skills especially in robotic surgery.

Due to the Covid pandemic, there were restrictions on our social activities, but we were able to have some social events whilst maintaining government rules and adhering to social distancing policy.

Technical skills learnt:
I have learnt a variety of technical skills related to many aspects of arthroplasty surgery as well as sports surgery. However, I focused mainly on the technical skills pertaining to robotic surgery.

I used the old version of Mako to perform UKR which has only the haptic hand-held burr arm, which is still very useful, however the new version is easier and quicker using a combination of a saw and a burr (Figure 7 a,b,&c)

I was lucky to use the old version of MAKO THR and the new version (Version 4.0) which has many more points of interest especially taking into account the spinopelvic relationship (8). Another technical tip I learnt related to the robotic THR was the use of suture to wrap around the acetabular checkpoint. This to avoid losing the checkpoint which needs to be removed at the end.

The balancing of both TKR and UKR is amazing using the robot as it gives finer details which would otherwise go undetected using the conventional method. Regarding TKR, I learnt how to achieve a balanced knee using different principles of functional and neutral-mechanical alignments. These are just two different concepts in achieving a balanced TKR. The

introduction of functional alignment concept has led to less soft tissue releases, less inflammatory response and facilitates discharge (9,10).

Theoretical Knowledge:
The main theoretical knowledge that I gained, which I plan to build on, is the concept on balancing the knee during TKR using the functional alignment and how this is different from other types of alignments (11).

Another important concept is predicting the normal alignment of the knee prior to the development of osteoarthritis using a variety of measurements like the arithmetic Hip-Knee-Ankle (aHKA) angle and the Mechanical Hip-Knee-Ankle (mHKA) angle which can be used to plan knee arthroplasty especially using navigation or robotic surgery in order to replicate the original alignment (12).

I developed my theoretical knowledge and evidence-based approach to day-case arthroplasty surgery service through appraising the published evidence and writing several narrative reviews on day case lower limb arthroplasty surgery.

I believe that all the theoretical and the practical skills I gained will be transferable to my future career, especially as I will continue to have access to robots, which means I will be able to incorporate it into my standard practice.

Reflective statement:
I believe this fellowship has equipped me with the knowledge and experience which, I will use in my career especially relating to robotic surgery. The use of robotic surgery is growing and it will become the norm in the future. There is no doubt that this will improve the outcome for both patients and surgeons and provide wealth of clinically relevant information to the various joint registries. I am proud to be the first surgeon to do this fellowship in Europe and I believe that this will positively influence my future career plans.

Future Plans:
I am honoured to be able to secure my substantive consultant job within the North Central London region at the Whittington Health in partnership with UCLH. I will have regular access to MAKO robots at the new Elective Orthopaedic Centre (EOC) where I am going to perform my arthroplasty procedures. I aim to make robotic surgery as part of my routine practice. I will be keen to be part of this fellowship mentorship in the future and will be happy to teach on future MAKO certification courses.

Conclusion:
This is the first EFORT Robotic visiting fellowship in Europe which was very successful. The host institution (UCLH) is an outstanding environment to make this success due to the high volume of surgery, excellent supervisor and the facilities available within this institution. With the start of the new EOC, this institution will be even more suitable to host any future visiting fellowships due to the availability of three new MAKO robots and the level of training. I highly recommend this fellowship for all my colleagues in the UK and worldwide.

References:

1. EFORT Robotic Visiting Fellowship [Internet]. [cited 2020 Dec 21]. Available from: https://www.efort.org/fellowships/introduction/efort-robotics-fellowship/
2. University College London Hospitals [Internet]. [cited 2020 Dec 29]. Available from: https://www.uclh.nhs.uk/
3. ELOGBOOK [Internet]. [cited 2020 Dec 29]. Available from: https://www.elogbook.org/
4. Newcastle Surgical Training Centre [Internet]. [cited 2020 Dec 29]. Available from: https://nstcsurg.org/
5. Kayani B, Konan S, Tahmassebi J, Ayuob A, Haddad FS. Computerised tomography-based planning with conventional total hip arthroplasty versus robotic-arm assisted total hip arthroplasty: Study protocol for a prospective randomised controlled trial. Trials. 2020;21(1):1–10.
6. Kayani B, Konan S, Tahmassebi J, Oussedik S, Moriarty PD, Haddad FS. A prospective double-blinded randomised control trial comparing robotic arm-assisted functionally aligned total knee arthroplasty versus robotic arm-assisted mechanically aligned total knee arthroplasty. Trials. 2020;21(1):1–10.
7. Kayani B, Konan S, Tahmassebi J, Ayuob A, Moriarty PD, Haddad FS. Robotic-arm assisted medial unicondylar knee arthroplasty versus jig-based unicompartmental knee arthroplasty with navigation control: Study protocol for a prospective randomised controlled trial. Trials. 2020;21(1):1–11.
8. Mako Total Hip 4.0 [Internet]. [cited 2020 Dec 29]. Available from: https://www.stryker.com/ph/en/about/news/2020/stryker-releases-mako--total-hip-4-0-software-upgrade.html
9. Kayani B, Konan S, Pietrzak JRT, Haddad FS. Iatrogenic Bone and Soft Tissue Trauma in Robotic-Arm Assisted Total Knee Arthroplasty Compared With Conventional Jig-Based Total Knee Arthroplasty: A Prospective Cohort Study and Validation of a New Classification System. Journal of Arthroplasty [Internet]. 2018;33(8):2496–501. Available from: https://doi.org/10.1016/j.arth.2018.03.042
10. Kayani B, Konan S, Pietrzak JRT, Tahmassebi J, Haddad FS. Robotic-arm assisted total knee arthroplasty is associated with improved early functional recovery and reduced time to hospital discharge compared with conventional jig-based total knee arthroplasty. Bone and Joint Journal. 2018;100B(7):930–7.
11. Oussedik S, Abdel MP, Victor J, Pagnano MW, Haddad FS. Alignment in total knee arthroplasty. Bone and Joint Journal. 2020;102 B(3):276–9.
12. MacDessi SJ, Griffiths-Jones W, Harris IA, Bellemans J, Chen DB. The arithmetic HKA (aHKA) predicts the constitutional alignment of the arthritic knee compared to the normal contralateral knee. Bone & Joint Open. 2020;1(7):339–45.

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Figure 1: A photo of the University College London Hospital, Euston Road, London, UK

Figure 2: Photo with Professor Haddad (second from the right) with Ahmed (First on the right), Ricci (first on the left) and I (Second on the left).

Figure 3: Newcastle cadaveric certification course with surgeons from Manchester, Mr Oussedik (Second from left) and I (Second from Right).

Figure 4: Mr Sandeep Singh (Left) and I (Right) having fish and chips on Friday at the UCLH restaurant.

Figure 5: Mr Ahmed Magan (Right) and I (Left) having a dinner in London.

Figure 6: Mr Ricci Plastow and I having coffee before Wednesday clinic adhering to the hospital Covid guidelines.

Figure 7 (a,b&c)
The new version of UKR MAKO (a) with hand-held haptic saw (b) and a haptic hand-held burr (c)

(a) MAKO ready for action covered with sterile drapes

(b) A MAKO Haptic hand-held saw for UKR

(c) A MAKO hand-held haptic burr for UKR