

Clinical observership- Osaka, Japan September 2023

Project Engine based in Osaka University, Japan.

I had the honour and privilege to visit the esteemed Project Engine lab at Osaka University in Japan, at the invite of Professor Nakajima.

As a Trainee Surgeon in the NHS in the UK, I know very well how essential medical devices are for day to day working life of healthcare staff. The innovation and development of devices have been integral to the advancement of medicine and surgery throughout millenia. From the design and development of surgical instruments specific to procedures noted in the famous *Al Tasreef*, written by the famous Arab Surgeon, Al Zahrawi- known in the West as Albucasis who was born in 936 AD. To the modern-day use of robotics in surgery and operative equipment.

Surgical innovation is an exciting field that is ever growing with new technology being developed as well as refinements to current devices.

Innovations in surgery are not only integral, but also essential to improve upon the delivery of care, reduce complications, provide the best and most optimised treatments we are able to offer our patients. Allowing for precise and finer movements to minimise risk of injury, in addition to allowing for better usage ergonomically for surgeons and physicians alike, as we continue to move towards less invasive procedures.

Furthermore, with the COP28 ambition of net zero emissions by 2050, ensuring that surgical innovation and devices are environmentally friendly is another aspect of consideration in the development and pursuit of surgical enhancement.

My visit to the Project Engine lab was an incredibly rewarding educational experience that allowed me to gain invaluable insight into the healthcare system in Japan. Whilst there are many similarities in the practice of surgery and the surgical techniques employed. Japan is well ahead in the use of surgical devices. In particular, I saw a number of upper gastrointestinal operative cases that are still being performed mostly laparoscopically in the UK, are now firmly surgically established with the robot in Japan.

I was also given the opportunity to visit Keio Hospital in Tokyo to observe the gastroenterology team perform endoscopic submucosal dissection (ESD). This is a procedure that is used less frequently in the UK (the endoscopic screening programme in Japan is much more comprehensive), therefore it was my first time observing it.

It is incredibly awe inspiring, and very rewarding as a surgeon to be aware of how such innovations can significantly impact on a patient's life. Being able to detect and treat early-stage disease especially cancer, is life altering. Avoiding, the distress of advanced disease and the consequences it can have on quality of life for both patients and their families, as well as their livelihood.

Attending the Project Engine lab design meetings over the course of 2 weeks, I was able to observe staged development from conceptualisation of ideas, research and development, design prototyping, design modification, preliminary testing and retesting as well as the lab day involving animals. I observed the cohesion and collaboration between industry partners, clinical research fellows and surgeons to ensure that the devices are not only innovative but are functionally appropriate for the clinical indication as well as user friendly. It is a fantastic way of ensuring that a device is produced with optimal expertise and perspective.

One of the highlights of my visit to Project Engine, was to attend the surgical devices lab day in Kobe. I was amazed by the range of devices as well as the organisation of the day. Carefully and

meticulously planned and carried out to ensure that each of the teams attending, were able to have ample time and resources available to test a wide range of equipment.

I was so impressed by the detail of each device. Each team had clearly protocolled their ambitions for the testing day. I saw devices at various points of their prototyping and development stages.

There were devices focused on improvement of patient comfort and endoscopist ergonomics with an inflatable cushion that could provide varied supine and seated positions for patients. As well as a vest to allow more freedom of movement with the endoscope. Devices that would allow better operative technique intraabdominally, such as an all-in-one device for combined cautery, suction and irrigation as well as surgical clip application for resection of bowel.

Also noted were how surgical simulations were also carried out to allow various members of public service personal, including the coast guard, prehospital care teams of ambulance crew, doctors, and nurses to carry out moulage and trauma scenarios.

The lab day at Kobe is very different to training in the UK where simulation is often carried out on tissue and models, and not on live animals. Therefore, as a visitor I observed how beneficial and respectful, as well as ethically appropriate the lab day in Kobe was.

One of the key aspects that I also took away with me is that whilst the use of medical devices has enhanced to provide improved and precise operative management of pathology. It has not taken over the human interaction and bedside manner that is essential to the role of a Doctor.

It may be that as we see the development of using AI in the future that requires less human involvement in the detection and treatment of disease. However, to be part of a world of continual surgical innovation that works alongside the caring, compassionate and knowledge seeking role of a doctor, is a great privilege.

The observership was a fantastic opportunity to network and establish professional relationships. The field of Medicine has no borders, and as medical professionals we can collaborate to share knowledge and information enabling global enhancement in the delivery of Surgery. This will improve the care we provide our patients as well as strengthen the bond of the Surgical community.

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I would also like to thank the Endoscopy team at Keio University in Tokyo, led by Professor Kato.

Most especially, I'd like to thank Professor Nakajima for his kind invite and the opportunity to learn about the Japanese healthcare system and pursue my interest in surgical innovation and medical devices.



Photo 1: Outside the Project Engine office at Osaka University.



Photo 2: Project Engine lab day in Kobe.



Photo 3: Keio University with Professor Kato and the gastroenterology team.



Photo 4: With Professor Nakajima and Professor Miyazaki at Habikino hospital.