



RCSI

ROYAL COLLEGE OF SURGEONS IN IRELAND

COLÁISTE RÍOGA NA MÁINLEÁ IN ÉIRINN

Ethicon Grant/Fellowship Report Form

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| Grant Holder Name | Jeffrey C. Y. Chan |
| Brief biography, including qualification and year of graduation (no more than 100 words) | Graduated from Trinity College, Dublin in 2002. Basic Surgical Training 2003-2005. Irish Surgical Residency Programme 2009-2011. Higher Surgical Training (Plastic Surgery) 2011-2017. |
| Title of Project/Fellowship | Microsurgical Reconstruction Fellowship |
| Year of Award: Commencement Date: Conclusion Date: | 2016 Nov 2016 Dec 2016 |

Summary (no more than 250 words)

The Gasthuisberg Campus of University Hospital Leuven (UZ Leuven) is the largest and most well known of the five campuses of UZ Leuven. It is an academic teaching hospital located in the Dutch-speaking region of Belgium and is associated with Katholieke Universiteit Leuven (KU Leuven). The Department of Plastic and Reconstructive Surgery in Leuven has a strong history of excellence and innovation in Reconstructive Microsurgery. This unit primarily focuses on reconstruction of major soft tissue and bone defects following oncologic resection. A variety of complex surgical defects are reconstructed with the majority of these being for head and neck, and breast cancer patients. Each week, 3-4 cases of microsurgical breast reconstructions and at least one case of head and neck cancer reconstruction were performed. Reconstruction of the chest wall, scalp and groin defects were also carried out during my visit there.

Of interest, this unit pioneered the technology for preoperative three-dimensional surgical planning of mandibular resection and reconstruction using preoperative CT scans and computer softwares (now commercialized by Materialise™). In addition, it has a well-established 3D printing technology for designing plastic molds that ensure precision of mandibular osteotomy during tumour resection. Matching customised 3D-printed molds are used for fibular flap harvest and fibular osteotomy for planning the reconstruction.

Grant Report (in the region of but no more than 500 words)

Objectives of Project/Fellowship:

1. To observe how does a unit that focuses on high volume of complex reconstruction cases operates efficiently
2. To improve my knowledge in the management of complex soft tissue and/or bone defects of the breast, head and neck region and limb reconstruction using a selection of free tissue transfers
3. To understand and observe the practical use of preoperative 3D surgical planning and use of 3D printing technology in guiding the reconstruction of bone defects (ProPlan™ and 3-matics™ by Materialise™)

Did you achieve these objectives?

Yes

In your opinion, what is the value of your award to:

(a) Yourself

This experience provided me with the exposure in volume and depth in the management of complex soft tissue and bone defects. The large volume of cases observed will enable me to build on my current repertoire of reconstructive options and absorb useful techniques that improve on surgical efficiency and decrease morbidities. It was personally very useful to watch how each consultant surgeon (Dr. Marc Vandevort, Dr. Gerd Fabre and Professor Nanhekhan) plan and execute their DIEP reconstruction, as every surgeon is slightly different, taking note of their “routine”, on-table decision making and tips and tricks that makes surgery easier and that reduces morbidity. Conversations with Professor Lloyd Nanhekhan and Professor Jan Vranckx about each head and neck reconstruction case were very reassuring for me personally; they have the same concerns, difficulties and case complexities, but were not easily discouraged. I was particularly impressed by the general “can do” culture in microsurgical reconstruction in the department. The availability of preoperative surgical planning for mandibular reconstruction- 3D surgical simulation and 3D printing technology helps to reduce uncertainties in the operating room and improve efficiency. I was grateful to be able to interact with Dr. Yi Sun who heads the 3D Surgical Planning Lab in UZ Leuven and get insights into his work.

(b) The institution in which you worked

We can often learn a great deal by visiting a different institution, culture and work ethics. I hope that the exposure I receive while in UZ Leuven, combined with the technical and knowledge already acquired during my Higher Surgical Training will allow me to think outside the box and prepare me for a career in treating patients in the Irish healthcare system. The technical experience gained will be shared with fellow trainees and consultants. The exposure to a very different health care structure will help us to critique our own healthcare system, with the aim to deliver an improved multidisciplinary service, planning of future

services in Ireland and strive for excellence in healthcare delivery.

(c) In the future for Irish patients

Initial experience from UZ Leuven showed that the 3D planning technology helped to save up to 120 minutes of operating time. With advanced planning, it helps the surgeon to inset the fibula bone flap in an optimal position. Different possibilities/ surgical plans can be simulated using ProPlan software to optimize osteocutaneous flap orientation, flap pedicle position and osteotomy sites. Additionally, the planning software can be used to design a surgical splint, and then printed out using a 3D printer. This is useful for cases involving bimaxillary/ orthognathic surgery.