

## **Completion of project/Outcomes**

### **Project title: K- Wire fixation training using 3D printed hand model biomimetics**

**Aim:** The aim of this project was to provide further evidence of a novel standardized simulation training framework for hand fracture fixation with Kirschner wire (K-wire) techniques for junior residents in order to create a standardized hand-training framework that universally hones their skill and prepares them for their first encounter in a clinical setting.

**Methods:** A step-ladder approach training with six levels of difficulty on three-dimensional (3D) printed ex-vivo high fidelity hand biomimetics was employed on a cohort of 30 junior residents (n=30). Assessment of skills using a score system (global rating scale) was performed in the beginning and the end of the module by hand experts of our unit.

**Results:** The overall average score of the cohort pre- and post-assessment were 23.75/40 (59.4%) and 34.7/40 (86.8%) respectively. Significant ( $p < 0.01$ ) difference of improvement of skills was noted on all trainees. All trainees confirmed that the simulated models provided in this module were akin to the patient scenario and noted that it helped them improve their skills with regards to K-wire fixation techniques including improvement of their understanding of the 3D bone topography.

**Conclusion:** We demonstrate a standardized simulation training framework that employs 3D printed ex-vivo hand biomimetics proven to improve the skills of junior residents and which paves the way to more universal, standardized and validated training across hand-surgery.

**Note:** The above data will be submitted for an academic publication, please do not make the above data public.

**Note:** The project received very positive feedback from the trainees of the Plastic Surgery department at St.Thomas' hospital where the study took place.



**Figure 1:** Instructor and trainees during the teaching event.



**Figure 2:** Trainees performing K-Wire insertion on the 3D printed biomimetic hand model.