



THE ROYAL
COLLEGE OF
SURGEONS
OF EDINBURGH

The Faculty of Surgical Trainers



FST/ASME Educational Research Grant Report 2017 - 18

Joshil Lodhia

RESEARCH GRANT RECIPIENT

Joshil Lodhia

DEPARTMENT

Cardiothoracic Surgery

PROJECT TITLE

Quantitative Analysis of Surgical Skills to Assess Improvement in Trainees' Performance Following Deliberate Practice

SUMMARY

Background:

Surgical training in previous decades was dependent on obtaining a high volume of operative cases. Due to the European Working Time Directive and the need to ensure highest standards, trainees are no longer able to obtain this volume. This study aims to assess the fine movements of surgery with the use of electro-magnetic sensors. This will allow both trainers and trainees to ensure the subtleties of surgery can be developed in a safe environment outside theatres before ensuring a high level of skill.

Methods:

Participants were asked to place 12 sutures around a punched-out hole in a banana while the sensor was placed onto the needle holder. The task was also timed. The sutures placed in the banana were assessed for cleanness of the bites and the accuracy of placement of these bites.

Conclusion:

There is indeed a difference between the experienced and the novice surgeon. Experienced surgeons used more rolling of the instruments. Experienced surgeons scored better in the cleanness of bites which can be explained by the increased use of rolling of the instruments. Furthermore, they placed the bites with greater accuracy. They performed the task in a shorter time though this is felt to be a by-product of having the basic techniques corrected.

FST/ASME Educational Research Grant Report 2017-18

RESEARCH GRANT REPORT

A) Clinical and Scientific Significance of Advances Made

This study has demonstrated the validity of the banana low fidelity simulation model. We have confirmed that experienced surgeons do indeed perform with greater accuracy (94% vs 80%, $p = 0.045$). Focused movements such as rolling the instruments and the needle through the tissue allows for cleaner placement of sutures with less damage to the tissue. While the data did show a difference, between experts and novices, in the amount of rotation, this was not significant (47.7 vs 18.1, $p = 0.074$). A culmination of these improved movements and accuracy allows for the task to be performed quicker by experts (2.04 min vs 4.07 min, $p = 0.17$).

If, however, the inexperienced surgeon attempts to simply perform the task quicker than the accuracy and smoothness drops further (66.7% vs 93%, $p = 0.33$).

This emphasises that focus on early training should be on accuracy and smoothness of movement.

B) Problems Encountered and Steps Taken to Overcome Them

Obtaining the equipment, especially the probes, from the supplier proved to be more challenging than expected. This did significantly delay the start of this project. Through perseverance we could ensure these probes arrived and subsequently the project could carry speed.

The data collected was vast. For each subject there were 175,000 data points collected. It therefore took a great deal of time to clean and analyse this data. This was simply overcome by time, effort and perseverance.

C) Collaborations Established

This study was carried out with the aid of equipment supplied by the University of Leeds. With collaboration from the Leeds School of Psychology and The Surgical Technologies Research Group which is part of the School of Mechanical Engineering we were able to obtain the equipment to move this research to obtain quantitative data.

D) Publications and Presentations

This study will be presented at the FST Meeting in October 2019.

It will also be used for my thesis for my Masters in Clinical Education with the University of Edinburgh. I enter the final year of this degree in September 2019.

E) Acknowledgments

I would like to thank The Faculty of Surgical Trainers (FST) and The Association for the Study of Medical Education (ASME) for the grant without which this research would not have been possible. I would like to acknowledge Mr. Papaspyros for having laid the foundations for this study with his previous grant research and Mr. O'Regan for his support and patience.



THE ROYAL
COLLEGE OF
SURGEONS
OF EDINBURGH

The Faculty of Surgical Trainers