Microsurgical Skill Acquisition Learning Curves Are Normally Distributed: Implications for Postgraduate Career Selection and Surgical Training Curriculum Design

Savitha Ramachandran, MBBS, MSc, MMED, Centre for Cutaneous Research, Barts and the London School of Medicine and Dentistry, London, United Kingdom
Ali Ghanem, MD, PHD, Centre for cutaneous research, Bart's and the London School of Medicine and Dentistry, London, United Kingdom; Simon Myers, PHD, FRCS(plast), Centre for Cutaneous Research, Barts and the London School of Medicine and Dentistry, London, United Kingdom

Abstract Text:

Introduction:

In order for surgical educators to develop a competency-based curriculum in microsurgery several poorly defined aspects of microsurgery training and practice and practice need first to be addressed:

1. Training Duration

2. Number of training sessions

3. Establishment of training outcome measures

4. Establishment of safe clinical thresholds

Answers to these pertinent questions lie in the understanding of microsurgical skill acquisition, and the construction of standardized learning curves specific to the stage of training. The paucity of literature in these crucial aspects of curriculum development has inspired this study.

Methodology:

A Literature search investigating the learning curves of high-risk professions (Pilots training) and surgical training has been performed. At the London Deanery Microsurgical Anastomosis Simulation Hub (MASH) a group of surgical trainees at various levels of their surgical training are being studied. A standard simulated microsurgical procedure is performed at the end of a training session, recorded and blindly analyzed using standardized and modified global rating scales (GRS) . The same group is then followed through with serial exercises to investigate a learning curve. Microsurgical skill acquisition is assessed with standarised global rating scales (GRS) and compared to that of an expert group of microsurgeons.

Results:

A total of 43 participants (18 females, 25 males) were analyzed. Using GRS scores and time to complete microsurgical task as outcome measures, our study demonstrated significant increase in mean GRS scores and a decrease in time to complete procedure for all the cohorts except the expert cohort over a standarised 5-session training course. Average GRSs at the end of each session were analysed and found to be of normal distribution.

Conclusion:

Learning curves of normal distribution exist in skill acquisition of microsurgery for undergraduate and postgraduate doctors. Standardising These curves when validated will enable us to identify the percentile in which a trainee is in and modify training for each individual in the form of practice and feedback which in turn will serve as career guidance for individuals who are unable to reach safe clinical thresholds. These learning curves and percentiles, serve as training goals and hence a source of ranking for trainees. This study further highlights the possibility of establishing safe clinical thresholds which could better inform curriculum design in microsurgery.