Utility of a Validated Rating Scale for Self-Assessment in Microsurgical Training

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OBJECTIVE: The purpose of this study is to determine the utility of self-assessment in microsurgical training using a previously validated rating scale.

DESIGN: A prospective study of surgical residents taking a hands-on 5-day microsurgical training course. Learners completed multiple self-assessments of their technical skills using the University of Western Ontario Microsurgical Acquisition/Assessment instrument. Simultaneously, preceptors assessed the learners using the same scale. Self-assessment and preceptor scores were compared using the Pearson correlation coefficient (PCC).

RESULTS: There was a significant agreement noted between the 32 preceptor assessments and 36 self-assessments that were completed. Correlation between scores for the knot-tying (PCC = 0.62) and anastomosis modules (PCC = 0.77) was good and excellent, respectively. Preceptor scores and self-scores improved over the duration of the course: for preceptors, knot-tying scores increased from 58% on day 1 to 78% on day 5 (p = 0.02) and anastomosis scores improved from 56% to 82% (p = 0.004); for self-scores, knot-tying scores increased from 44% to 81% (p = 0.001) and anastomosis scores from 49% to 84% (p = 0.001). Learners with greater experience (higher postgraduate year level) tended to have higher self as well as preceptor ratings, albeit not statistically significant.

CONCLUSION: Self-assessment using the University of Western Ontario Microsurgical Acquisition/Assessment instrument has good to excellent agreement with preceptor-assessment scores suggesting good interrater reliability. Self-assessment using such tools may, therefore, be used along with preceptor supervision and assessment to potentially improve self-directed learning during these courses. (J Surg Ed 2016;113:90-96. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: self-assessment, microsurgery, global rating scale, University of Western Ontario Microsurgical Acquisition/Assessment instrument

COMPETENCIES: Practice-Based Learning, Medical Knowledge, Patient Care

INTRODUCTION

Microsurgical skills are a key requirement for a number of surgical residency programs, including plastic surgery; ear, nose, and throat; gynecology; ophthalmology; orthopedic surgery; urology; and vascular surgery. These skills are difficult to teach as they require fine motor control, focus, and careful handling of blood vessels as small as 1 mm in diameter. Minor mistakes may lead to surgical failure with significant morbidity. These high stakes have driven microsurgical educators to use models and simulation before transferring these skills to actual patients. Microsurgical training courses are often instituted for junior residents who learn key technical skills on rat femoral vessels in a controlled laboratory setting. These courses are expensive and labor-intensive for surgeons who give up large amounts of time to teach and evaluate individual resident progress.

Formal skills assessment is an essential aspect of the education of novice microsurgeons. Such assessments identify areas of weakness and determine when residents are ready to “graduate” and use their skills in the real patient setting. A recent systematic review of microsurgical assessment tools identified 3 global rating scales and 1 motion analysis assessment device that were determined to be valid in assessing microsurgical skill. Although motion assessment devices are useful in the objective assessment of skill, they may also be prohibitively expensive for some centers, and therefore global rating scales have been more widely adopted. Of the validated assessment scales identified by Dumestre et al., the University of Western Ontario Microsurgical Acquisition/Assessment instrument...
MATERIALS AND METHODS

Ethics approval was obtained from the University of Calgary Conjoint Health Research Ethics Board (REB14-0900). Informed consent was obtained from all study participants.

A total of 8 surgical residents, ranging from postgraduate year (PGY) 1 to PGY 3 participated in the study. The course was run over 5 days for 8 h/d, with learners working in a laboratory setting on anesthetized rats. Equipment such as surgical microscopes, instruments, and sutures of similar quality to those found in the operating room was provided. On the first day an introductory session was given by a microsurgeon and the learners were given course materials including reference texts, demonstrative videos, and a technical manual. Learners received one-on-one direction and guidance from 1 of 5 preceptors. Most preceptors volunteered for one day of the course resulting in a different assessor for each resident on consecutive days of training.

The UWOMSA instrument comprises 2 modules, 1 for knot-tying, and 1 for anastomosis. The knot-tying module has 3 subscales including “quality of knot,” “efficiency,” and “handling.” The anastomosis module has 3 subscales including “preparation,” “suturing,” and “final product.” Each subscale consists of a 5-point Likert scale with anchor definitions for scores of 1, 3, and 5. These definitions help to increase the objectivity of the scores. For example, in the “quality of knot” subscale, a score of 1 has an anchor definition of “not square, loose, cut ends too long/short,” a score of 3 corresponds to “partially square, somewhat loose, cut ends OK length,” and a score of 5, “square knot, snug, cut ends proper length.”

RESULTS

A total of 8 surgical residents participated in the study, comprising 3 residents from PGY 1, 2 from PGY 2, and 3 from PGY 3. Of the 40 anticipated assessments, 32

![FIGURE 1](https://example.com/figure1.png)

**FIGURE 1.** (A) Averages of self- and preceptor-assessment scores for knot-tying module by day of training. (B) Averages of self- and preceptor-assessment scores for anastomosis module by day of training.
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