

Compartment Syndrome Training Assessment and Education Tool

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Background/Purpose: Assessing technical and motor skills is becoming an increasingly important component of orthopaedic resident education. Assessment methods, however, are underreported. In general surgery, residents' surgical and technical skills are evaluated using the Objective Structured Assessment of Technical Skills (OSATS) and Global Rating Scale (GRS). To our knowledge, no such assessment tool has been validated in assessment of orthopaedic resident surgical training. The purpose of this study was to utilize multiple methods of assessing orthopaedic surgical competency (knowledge test, OSATS, GRS, and task-specific surgical approach pass/fail assessment) and determine the reliability of these assessment tools applied to the lower limb compartment syndrome release. We hypothesized that these methods of evaluation would be a reliable means of evaluating orthopaedic residents' surgical skills for this specific procedure.

Methods: 20 residents spanning 5 years of surgical training (5 postgraduate year (PGY)-1, 5 PGY-2, 3 PGY-3, 3 PGY-4, and 4 PGY-5) were tested for their knowledge base and technical skill pertaining to compartment syndrome release. First residents took an electronic knowledge test and were then evaluated independently by three board-certified orthopaedic surgeons. Evaluation tools included OSATS with a detailed checklist score, GRS, and final task-specific pass/fail assessment. Time to completion was recorded. Each resident demonstrated intracompartmental pressure monitoring on an electronic lower extremity model, with a separate OSATS checklist and GRS. We hypothesized that these methods of assessment would provide an objective method of evaluating surgical skill and procedural competency applied specifically to compartment syndrome fasciotomies.

Results: Checklist scores varied significantly based on PGY in training on both the anterior-lateral ("lateral") ($F = 4.29$, $P = 0.005$) and superficial-deep ("medial") ($F = 5.35$, $P = 0.001$) fasciotomies, but no significant difference was seen by PGY in compartment measurements on the electronic lower leg model. Subjective pass/fail also varied by PGY for the lateral ($\chi^2 = 20.21$, $P = 0.01$) and medial ($\chi^2 = 15.82$, $P = 0.003$) approaches. PGY significantly influenced GRS score ($F = 9.6$, $P < 0.001$). Junior trainees (PGY-1 to PGY-3) scored significantly lower than senior residents (PGY-4 and PGY-5) on the lateral ($P = 0.048$) and medial ($P = 0.018$) approach checklists as well as GRS score ($P = 0.001$). No significant differences in time required, knowledge test scores, or number of adverse events were observed between training years. Inter-rater reliability (IRR) for the lateral approach was 0.64, with 79% pass/fail agreement. IRR for the medial approach was 0.62 with 79% pass/fail agreement. GRS inter-rater reliability was 0.86.

Conclusion: Residency programs across the nation have long been tasked with training the next generation of orthopaedic surgeons. However, with the heightened focus on competencies and necessary milestones implemented by the Accreditation Council for Graduate Medical Education, despite increasing restrictions on duty hours, the orthopaedic surgery

community needs to develop standard assessment methods to ensure our residents achieve these goals, and do so in a stepwise and comparable manner throughout their training. Currently, only a few generalized methods of orthopaedic surgery resident evaluation exist. The need for more specific evaluation of resident technical and motor skills exists, and if done on a task specific basis can provide information on the technical level at which residents are, and identify areas in which they need improvement. This project allowed us the opportunity to investigate skill assessment tools which can be implemented at training programs across the nation.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.