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LETTER TO THE EDITOR

Wanted: automated objective proficiency assessment metrics for the FAST exam (and other POCUS studies)

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To the Editor:

We thank Zago et al. [1] for their work toward a much-needed objective proficiency assessment metric for the FAST exam, and other Point of Care Ultrasound (POCUS) studies.

It has been established that while performing a surgical procedure or POCUS study such as a FAST exam, experienced operators have more efficient motions, using less time, and movements to complete the task [1–6]. This efficiency is a critical component of what contributes to the "expertise" we appreciate on structured and unstructured visual assessment. Ultimately for assessments of POCUS studies, an expert observer is typically required to provide feedback on the exam and verify that the procedure has been completed adequately, as there is not a physical end point to a POCUS exam. The requirement of an expert observer constitutes a significant barrier to assessment.

An automated objective proficiency assessment metric for the quality of FAST exam has been studied by Bell et al. [5] which augments motion analysis, thereby reducing or eliminating the need for expert observation. In this study, points of interest (POIs) were virtually placed into a model along the critical anatomy for the FAST exam. When each POI was intersected by the ultrasound beam it was automatically verified as a point which, barring interference with beam transmission or reception, was visualized on the ultrasound screen. Significant differences were found between groups of differing experience levels for time, path length and POIs intersected by the ultrasound beam. Furthermore, POIs intersected by the ultrasound beam were found to be largely independent of efficiency metrics, indicating it measures a distinct facet of skill.

Additionally, when evaluating a POCUS exam, we advocate for the measurement of probe motion in addition to hand motion. By placing an article of measure onto the instrument, we allow for measurement of the action at the end of the instrument. This allows us to measure efficiency and effect compensating for difficult to quantify movements such as wrist motion, or changes in probe grip. Both of these movements can result in a dramatic difference in instrument action without a corresponding increase in hand movement number, working volume, or path length. In analysis of several studies of ultrasound guided interventions hand motion analysis was found to be a redundant metric, where the information gained was more appropriately displayed by other measures including by measuring the action end of the tool [7]. On scrutiny of other surgical procedures, the redundancy of hand motion analysis may also be found when tool motion analysis is simultaneously completed [8].

Objective proficiency assessment measures for procedural skills are a vital part of the progression and acceptance of competency-based assessment. With the creation of automated methods, the expert labour barrier to skill assessment is reduced. We sincerely thank Zago et al. for their work in pursuit of this goal.

Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

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