The Reliability of Surgical Gestures for the Assessment of Performance in a Simulated Robotic Pancreatojejunostomy

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Background

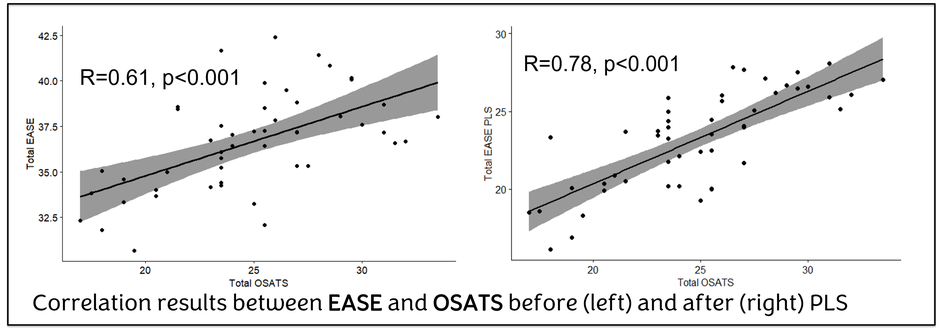
Global scales (OSATS, GEARS) and task specific metrics (TSM) assess surgical performance but lack gesture-level analysis.

The End-to-End Assessment of Suturing Expertise (EASE) scale was previously developed and validated for robotic urologic procedures

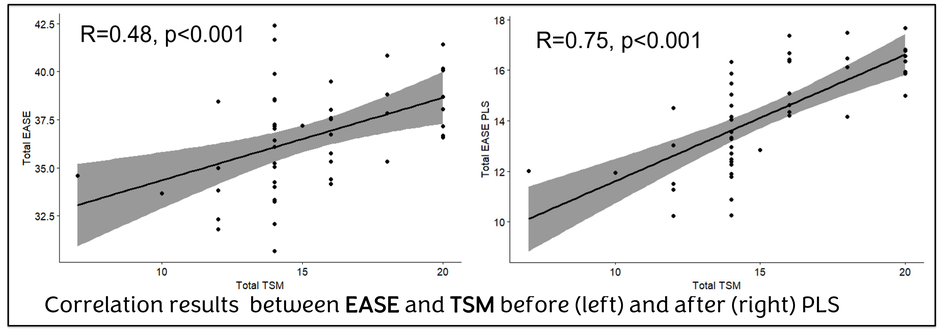
EASE evaluates 7 domains of suturing through 18 sub-skills such as driving smoothness, wrist rotation, and needle hold angle

Objective

The aim of this study is to evaluate the reliability of EASE scores for performance assessment of simulated robotic pancreatojejunostomy simulated on a bio-tissue model.



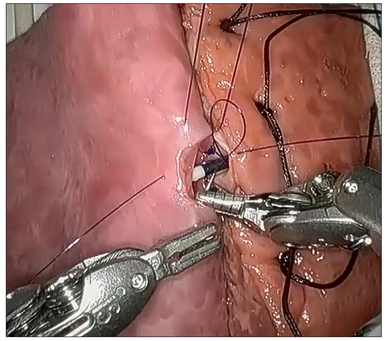
Correlation results between **EASE** and **OSATS** before (left) and after (right) PLS



Correlation results between **EASE** and **TSM** before (left) and after (right) PLS

Methods

The duct-to-mucosa (DTM) anastomosis step of 49 bio-tissue PJ videos was graded with Objective Structured Assessment of Technical Skills (OSATS), TSM, and EASE. Interrater reliability was established using intraclass correlation coefficient (ICC). The Spearman's rank correlation test was used to assess the reliability between the metrics. The correlation was optimized by computing relative weights using partial least squares (PLS) regression



Robotic simulated bio-tissue PJ

Results

- Interrater reliability was high for EASE (ICC = 0.9, p < 0.001), and for both OSATS and TSM (ICC = 0.96, p < 0.001).
- Prior to optimization, a moderate correlation was observed between EASE and OSATS and a low correlation was found between EASE and TSM (Figure)
- Key weighted factors after PLS for OSATS correlation were tissue approximation (3.24), knot tying (1.60), and suture awareness (1.35).
- Key weighted factors after PLS for TSM correlation were tissue approximation (1.96), suture awareness (1.21), and knot tying (0.82).
- After PLS regression, the weighted sum for EASE significantly improved the correlation for OSATS and TSM (Figure)

Conclusions

EASE is a reliable tool for assessing surgical performance and providing formative feedback to trainees in a simulated robotic PJ using surgical gestures

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