

# Laparoendoscopic single-site (LESS) surgery versus conventional laparoscopic surgery: comparison of surgical port performance in a surgical simulator with novices

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## **Abstract**

### **Background**

Although laparoendoscopic single-site (LESS) surgery is feasible, it poses many technical challenges not seen in conventional laparoscopy. Recent interest and widespread implementation of LESS stems from advancements in commercially available access port technology. Consequently, this study objectively compared the technical performance between conventional laparoscopic and LESS surgical ports in a modified Fundamentals of Laparoscopic Surgery (FLS) simulator.

### **Methods**

The 24 novice participants in this study performed the FLS peg transfer task using two conventional laparoscopic 12-mm working ports, the SILS port, the TriPort access system, and the GelPOINT system with two standard length 5-mm graspers. Each participant completed the task using conventional laparoscopy first for familiarization, followed by each of the three LESS surgical ports in random order. Task completion time, errors, and subjective questionnaire ratings were used to compare conventional laparoscopy and the single-port devices. Congruent with FLS scoring procedures, task completion time and errors were used to compute a standardized task score for each port.

### **Results**

The task score did not differ significantly between conventional laparoscopy and the single-port devices. Additionally, there were no task score differences between trials for either the SILS port or the GelPOINT system. There was a significant performance decrement starting with the TriPort versus starting with either the SILS port or the GelPOINT, which resulted in the lowest overall trial task score ( $p < 0.05$ ). Task completion difficulty and instrument maneuverability resulted in no significant differences between ports. Ease of use and overall rank were significant, with conventional laparoscopy rated as the easiest to use and the highest overall followed by the GelPOINT system.

## Conclusions

Overall, the TriPort may be more challenging for novices to use in learning the LESS procedure than either the SILS port or the GelPOINT system. The GelPOINT system may offer the most consistent platform for LESS performance and novice skill acquisition.