

# SAFETY AND FEASIBILITY OF A LOW-COST LAPAROSCOPE IN A PORCINE MODEL.

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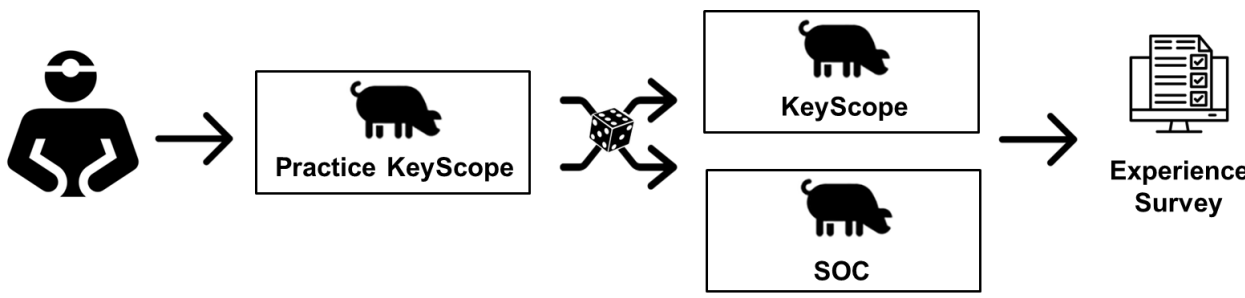
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## Introduction:

- KeyScope (KS) is a low-cost laparoscope that connects to a laptop, designed for Low- and Middle-Income Countries (LMICs)
- This study describes the safety and feasibility of the device in a porcine model

## Methods:

- Surgeons performed 3 laparoscopic tasks in 3 experimental conditions (Practice with KS, standard-of-care (SOC), KS):
  - Stapled bowel resection
  - Intracorporeal suturing
  - Cholecystectomy
- Vital signs, task completion time, and complications were compared using paired nonparametric tests.
- Surgeons completed surveys to assess feasibility and opportunities for technology improvement



## Results:

5 Surgeons completed 45 laparoscopic tasks in 15 pigs.

### Laparoscopic tasks

- There were no significant changes in vital signs between the KS and SOC
- There were no significant differences in time to perform stapled bowel resection or cholecystectomy (KS 3 min, SOC 3 min,  $p=0.185$ ; KS 6 min, SOC 8 min,  $p=0.887$ )
- Surgeons were significantly faster in performing the intracorporeal suturing with SOC scope than KS (KS 5 min, SOC 3 min,  $p = 0.012$ )
- All surgeons entered the gallbladder during cholecystectomy dissection, with more liver bed injuries using the SOC compared to KeyScope ( $n= 3$ , 60% vs  $n=2$ , 40%).

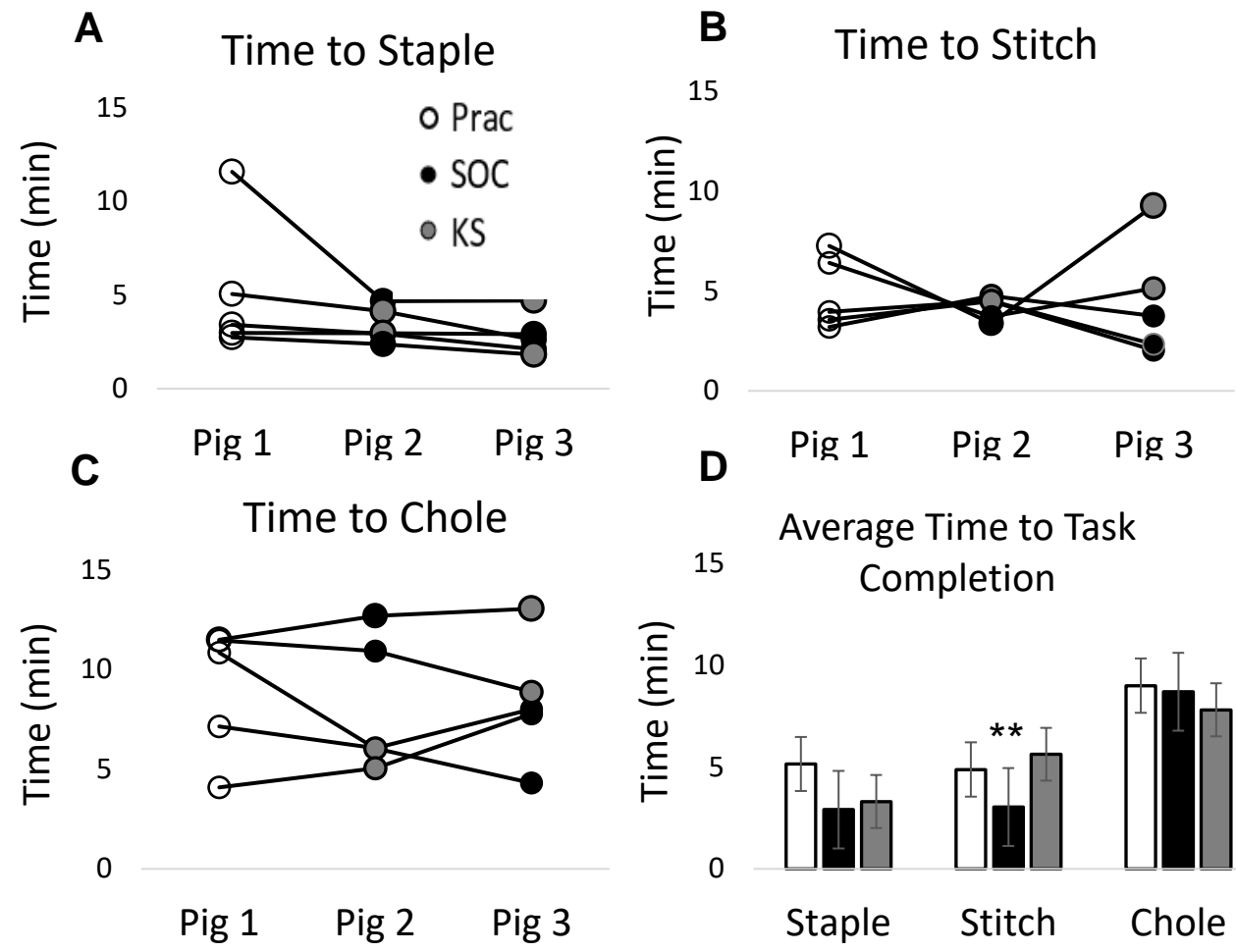
### Surgeon Experience and Evaluation Survey

- Surgeons report that if in an LMIC they would prefer to use the KS over an open procedure
- Surgeon willingness to use the KS surpassed their routine laparoscopic practice for multiple procedures
- Surgeons preferred the KS for its ergonomics and degree of fogging, but preferred SOC for light intensity, distance vision, and amount of focus

## Conclusions:

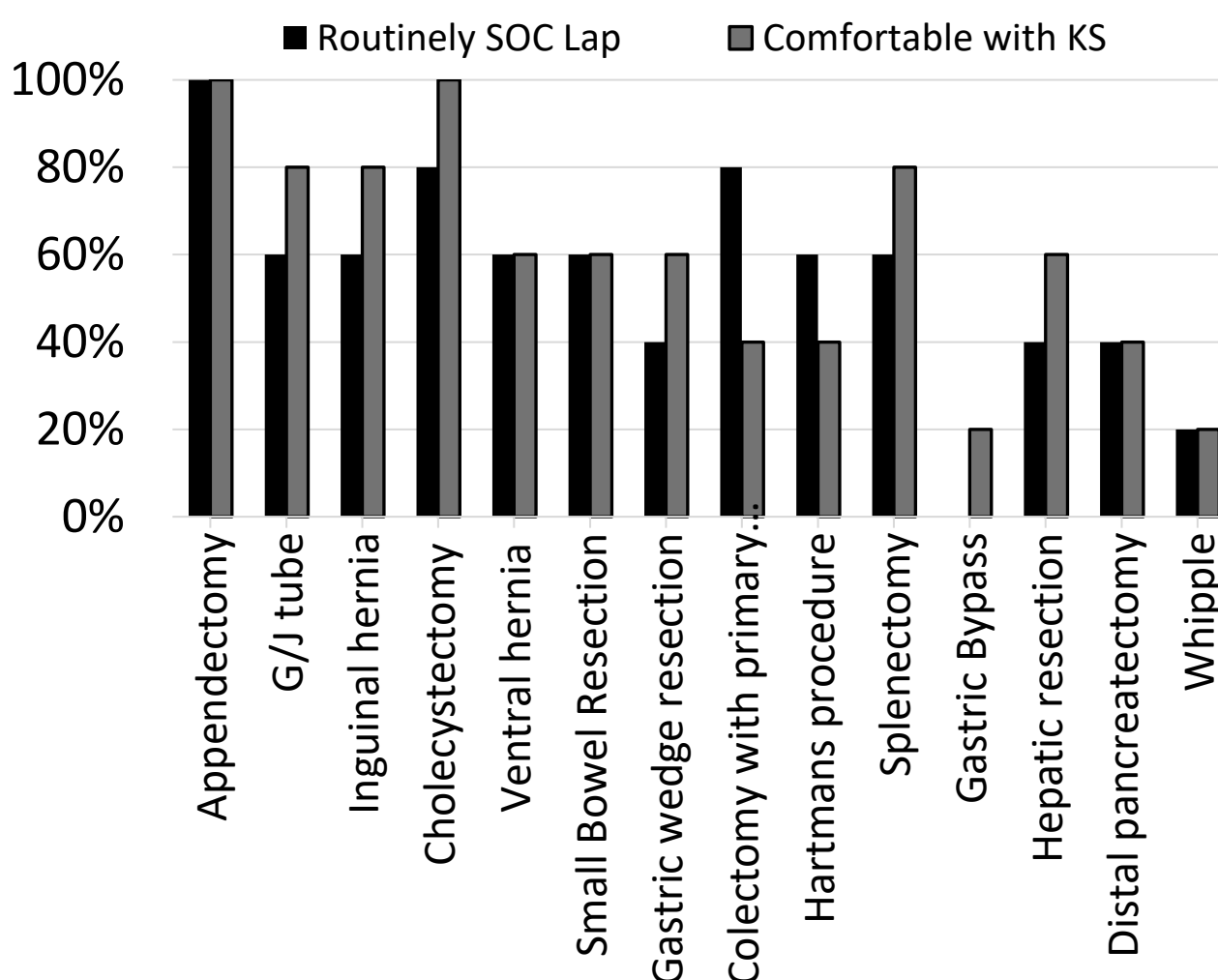
- KeyScope performed similarly to the SOC with fewer complications, demonstrating its safety.
- Surgeons preferred the KeyScope for its ergonomics and lack of fogging, but preferred SOC for light intensity and amount of focus.

This data supports that KeyScope is a feasible tool to increase laparoscopy in LMICs.

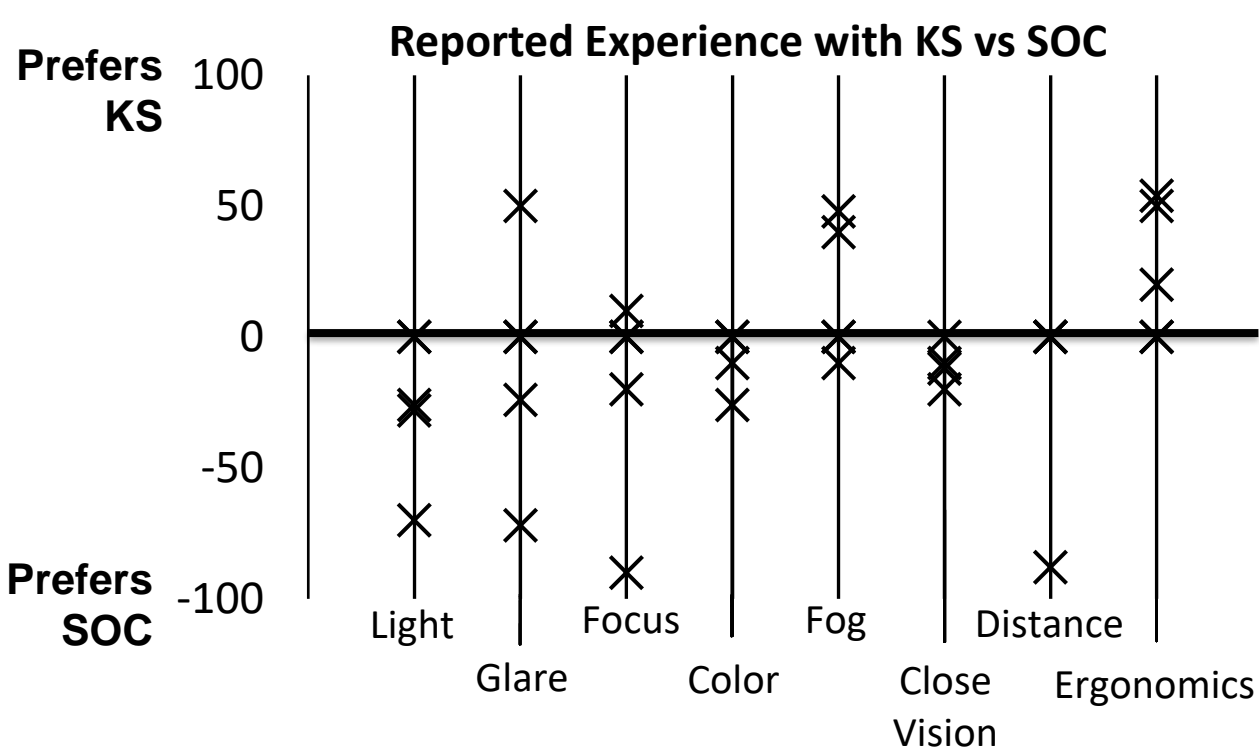


**Figure 1 Time to perform laparoscopic tasks with the Standard of Care (SOC) and KeyScope (KS).** Individual times to perform (A) stapled bowel resection, (B) intracorporeal knot tying, and (C) laparoscopic cholecystectomy. (D) Average time to complete these tasks for each surgeon. \*\*Time to perform intracorporeal knot tying was significantly faster with the SOC

## Self-Reported Laparoscopic Use and KeyScope Willingness



**Figure 2 Surgeon self-reported laparoscopic practice compared to their willingness to use the KeyScope for those same procedures.**



**Figure 3 Reported Experience with SOC vs KS.** Each participant's preference for KeyScope (KS) vs Standard of Care Laparoscope (SOC) based on ratings of performance characteristics.