



Artificial Intelligence–assisted Coaching versus Faculty-led Coaching for Surgical Trainees: A non-inferiority randomized controlled Trial

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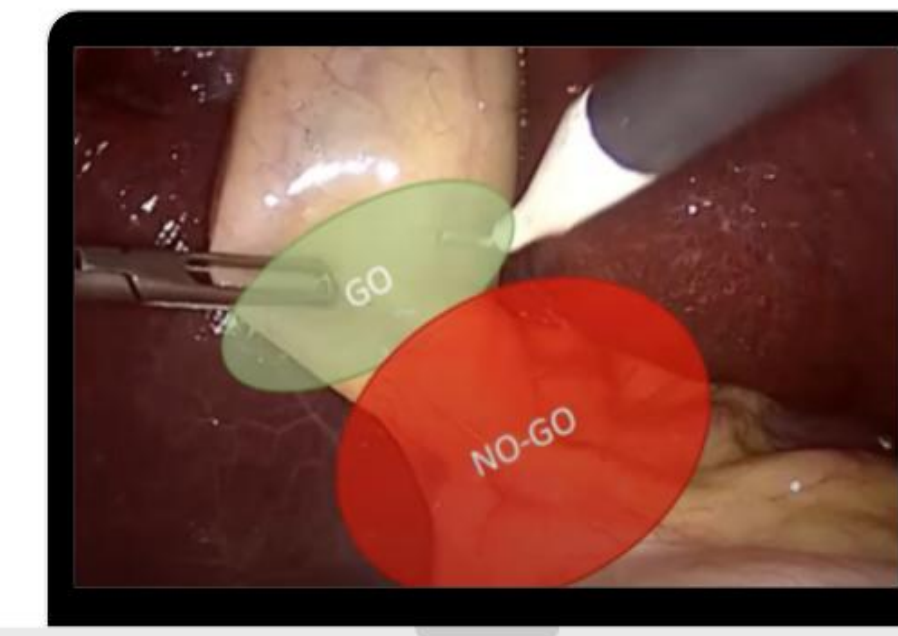
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BACKGROUND



- Accurate identification of critical anatomy during laparoscopic cholecystectomy is a core competency for trainees
- Conventional surgical feedback is often subjective and inconsistent, due to instructor variability and limited faculty availability

- ✓ Implementation of video-based coaching is beneficial but, remains limited by logistical and resource constraints
- ✓ A validated AI algorithm for laparoscopic cholecystectomy (**GoNoGoNet**) enables automated interpretation and assessment of surgical videos¹

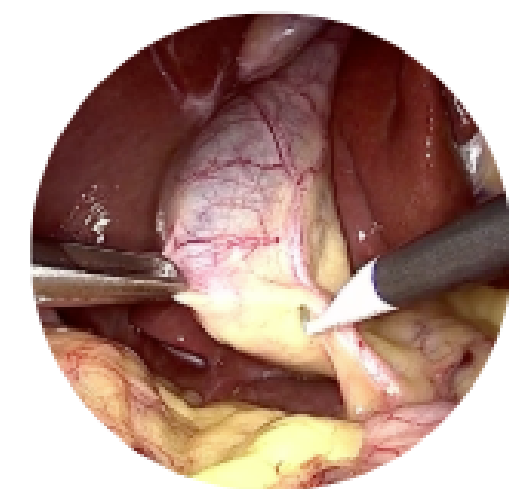


This study evaluates whether AI-assisted coaching is non-inferior to traditional faculty-led coaching in improving trainees' performance

METHODS

20 General Surgery Residents
(12 PGY1 , 8 PGY2)

Faculty coaching



AI-assisted coaching
(GoNoGoNet)



Post-coaching assessment
(Immediately and 1 month)



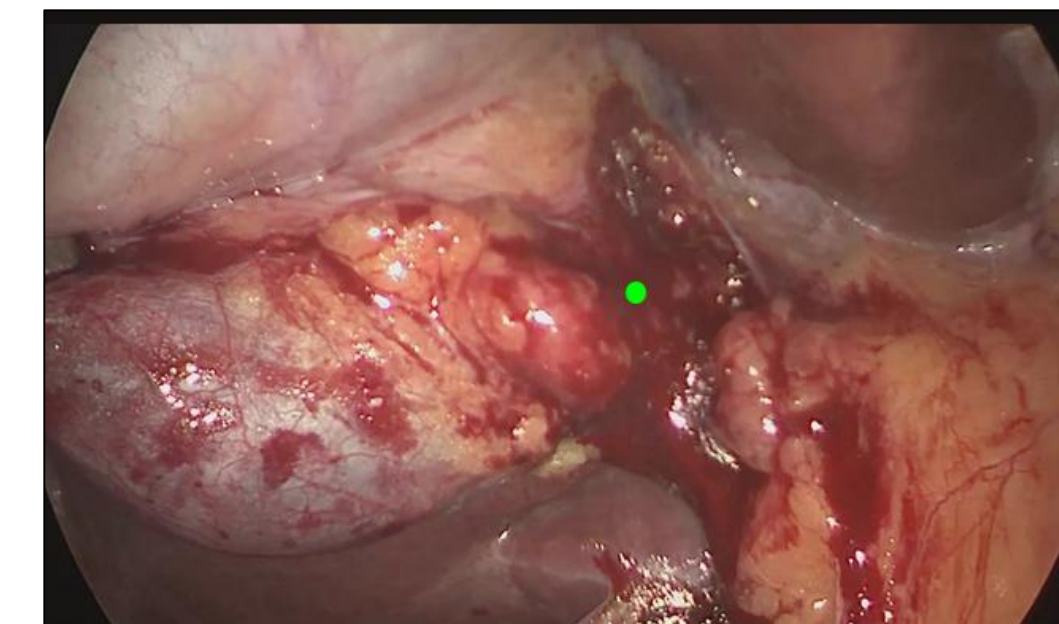
Baseline assessment



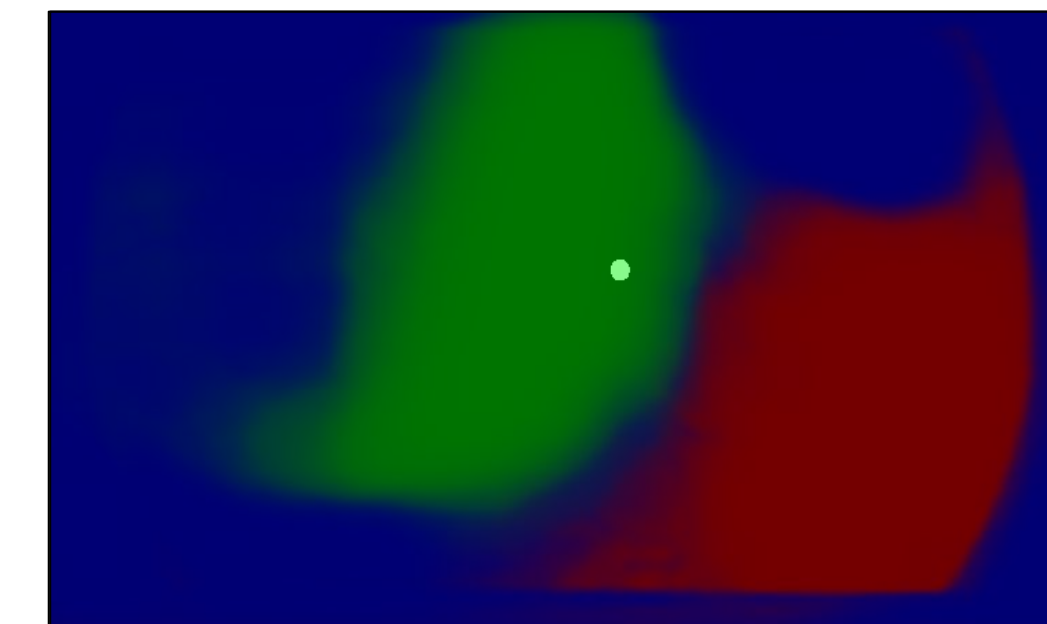
1:1
randomization

Assessment task: Participants were asked to annotate the regions on surgical frames **they would consider safe for dissection**

METHODS



(Trainee annotation)



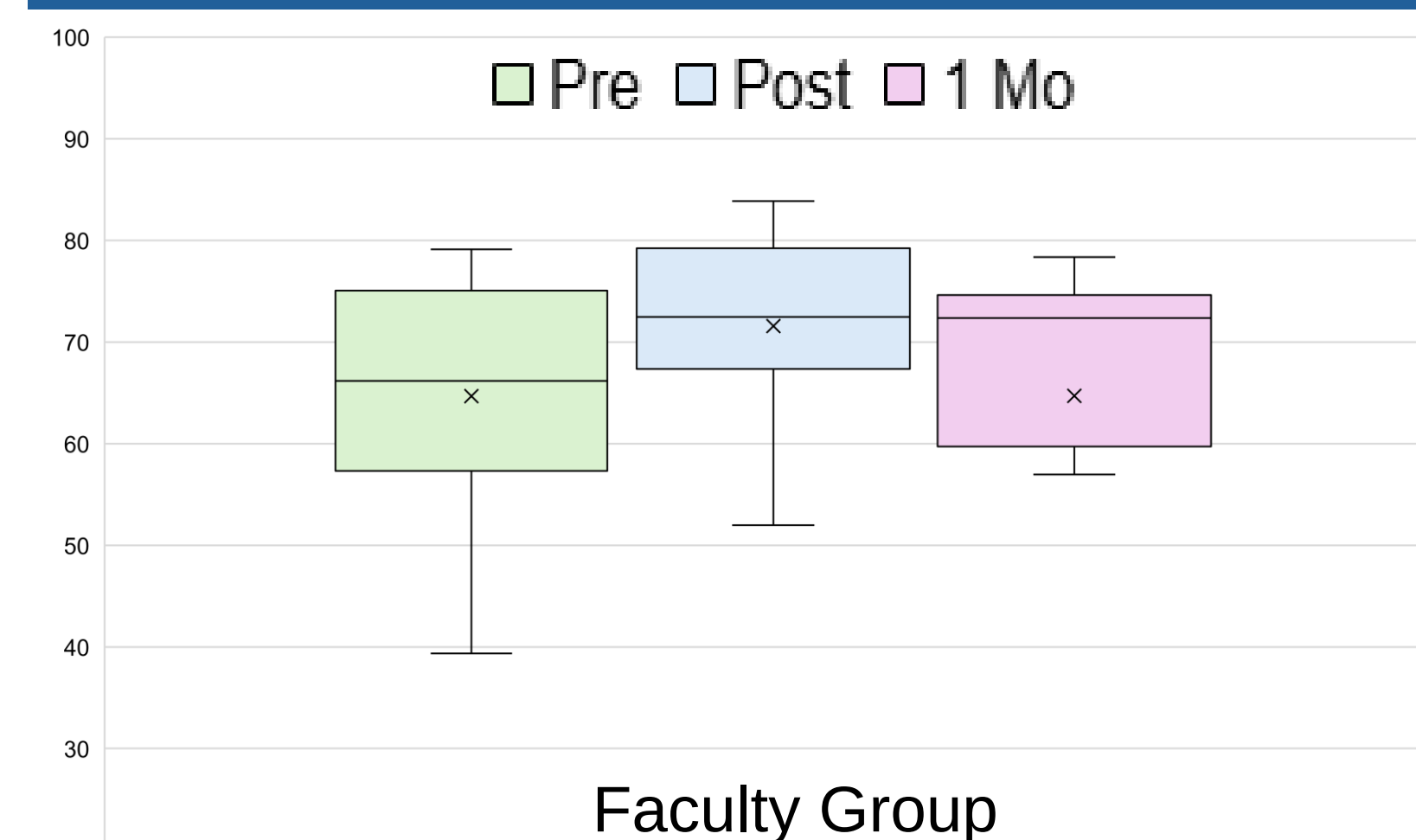
(Expert annotation)

The **Pixel Concordance Method**² was used to compare participant-annotated regions with expert annotations by calculating pixel-level overlap on each frame to generate an accuracy score (–100 to +100)

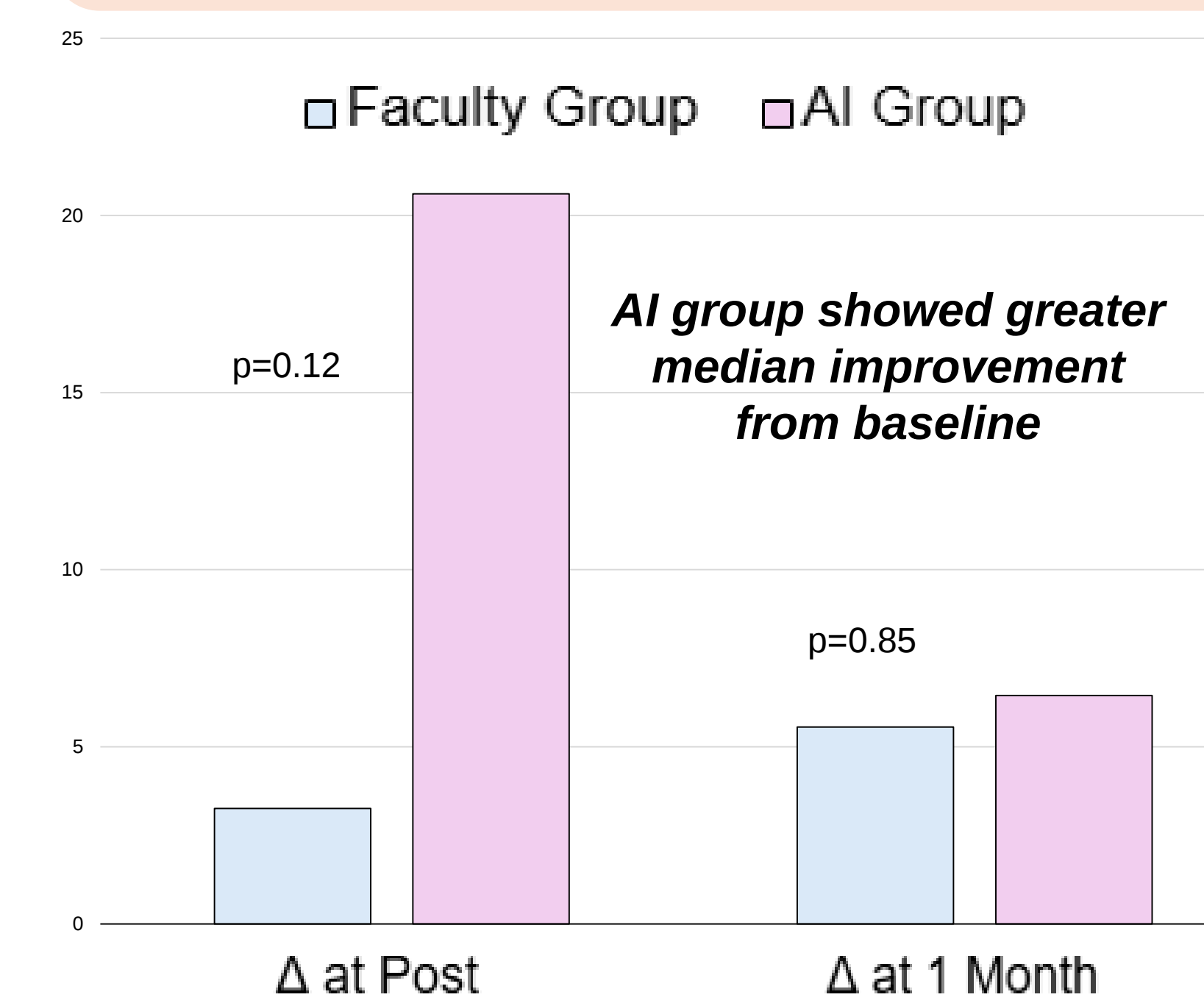
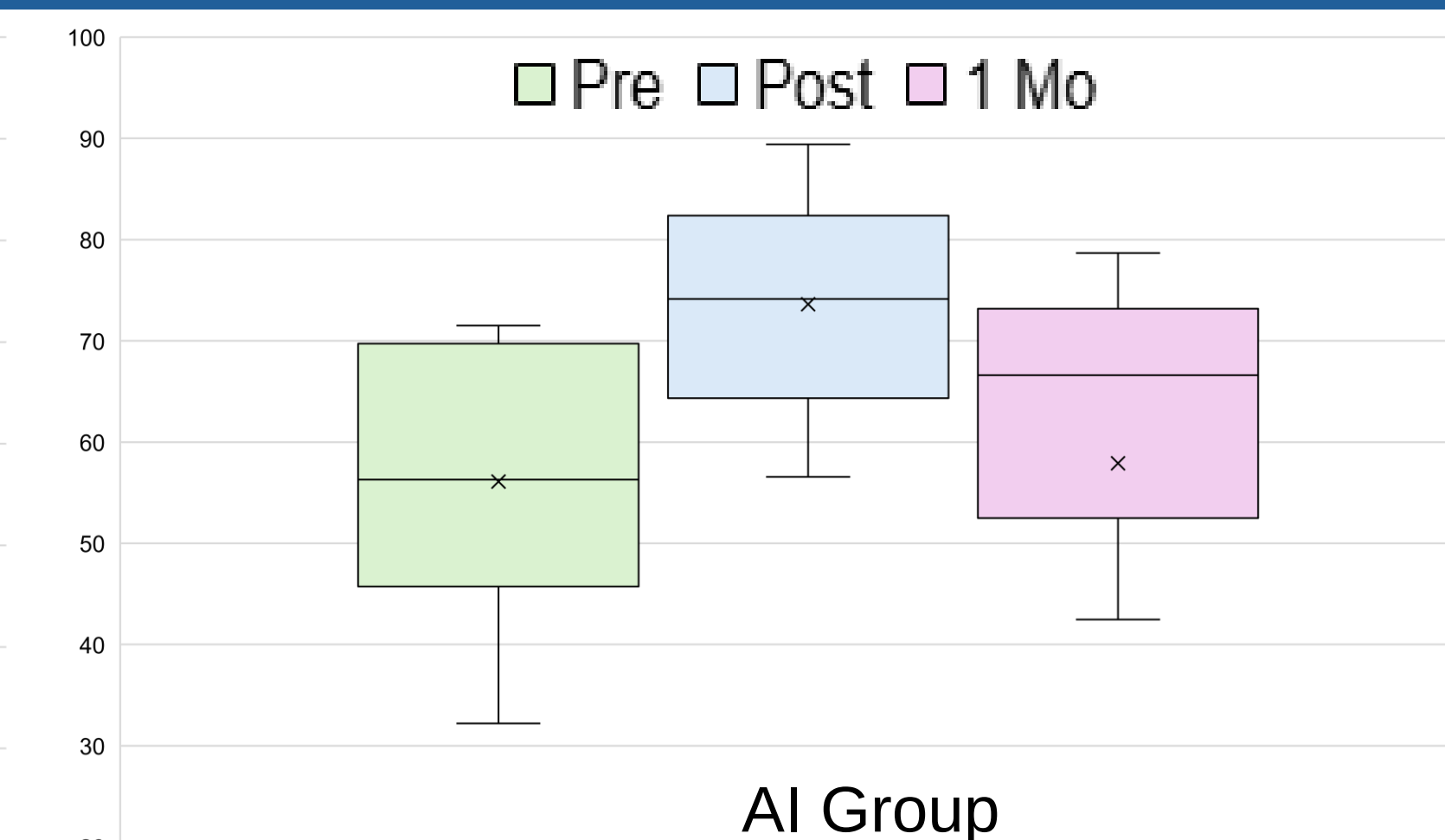


AI group completed a post-study survey to evaluate usability, satisfaction, and educational value of AI tool

RESULTS

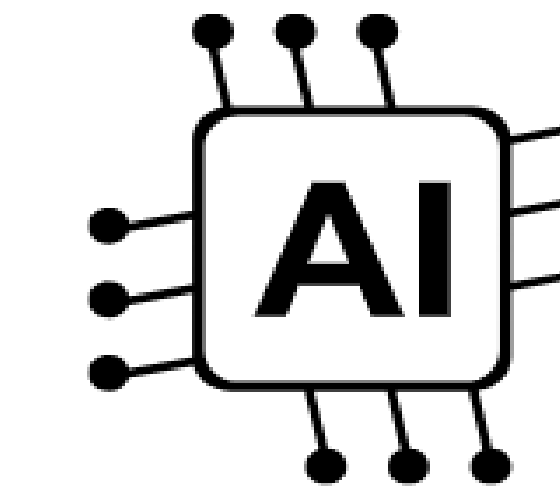


Post-intervention scores were comparable between groups
[Faculty: 72.5 (69.8–77.3) vs. AI: 74.1 (67.1–81.2)], with similar findings at one month
[Faculty: 72.4 (61.2–73.9) vs. AI: 66.6 (56.6–73.1)]



AI coaching met non-inferiority criteria at both time points
(Post: 95% CI [–4.50, 29.28]; 1 month: 95% CI [–11.22, 14.85])

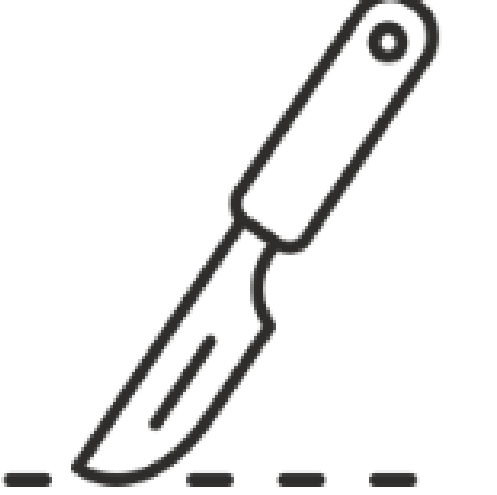
RESULTS



82% : AI tool is easy and intuitive to use



90%: Should be integrated in post-operative teaching



100% : Valuable adjunct to surgical training



“Very useful for PGY1 to watch this at the beginning to understand anatomy, dissection planes, and safety lines”

“Addition of narration would help review why certain structures are avoided in the red zone.”

“It would be helpful to perform our own surgery, then review it with AI to see how far off we were.”

CONCLUSION

- ✓ AI-assisted coaching is a feasible and scalable modality, providing standardized feedback to support trainee skill acquisition
- ✓ While not a substitute for expert faculty mentorship, it serves as a valuable adjunct to traditional surgical training

References :

- Laplante, S. et al. (2023). Validation of an artificial intelligence platform for the guidance of safe laparoscopic cholecystectomy. *Surgical endoscopy*, 37(3), 2260-2268.
- Madani, A., et al. (2017). Measuring intra-operative decision-making during laparoscopic cholecystectomy: validity evidence for a novel interactive Web-based assessment tool. *Surgical endoscopy*, 31(3), 1203-1212.



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