Live Surgical Assessment of Laparoscopic Competence: A Comparative Study of Simulation versus Traditional Training Modalities.

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AIMS & OBJECTIVES

The aim of this study is to evaluate and compare the laparoscopic surgical competence of resident surgeons trained through two different modalities:

- simulation-based training (Group A)
- traditional operative training (Group B)

Using the Global Operative Assessment of Laparoscopic Skills (GOALS) score, the study assesses the **technical proficiency, accuracy and efficiency** of participants during a live laparoscopic cholecystectomy.

➤The findings are intended to inform future surgical training frameworks and support evidence-based enhancements in residency education.
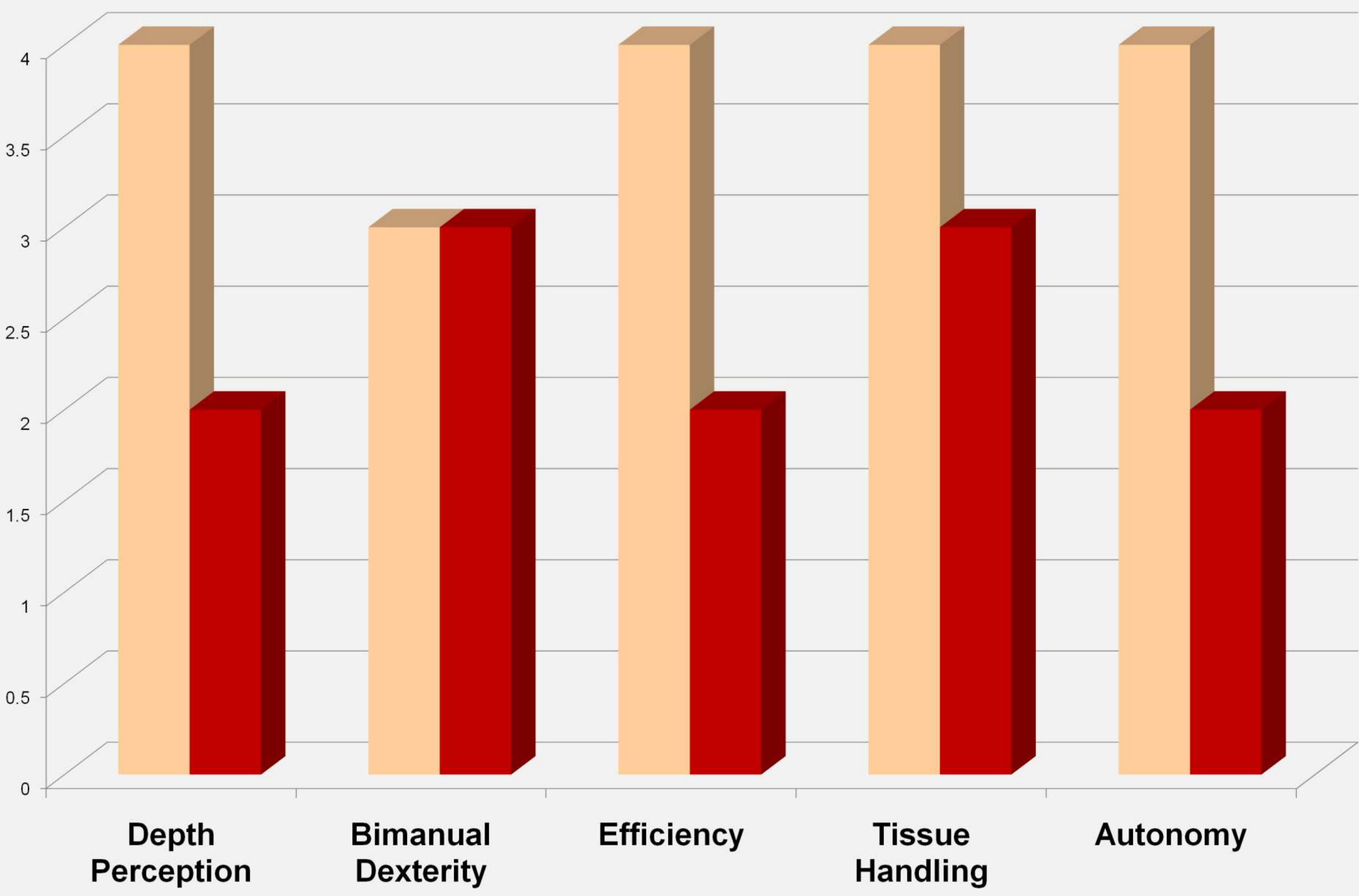
METHODS

➤Prospective cohort study.

➤This duration of this study was March, 2025 to September, 2025.

➤Non probability consecutive sampling.

➤All eligible final year general surgery residents at Khyber Teaching Hospital were invited (total eligible N = 28). For the comparative two-group analysis this yields n = 14 per group

➤Members from each groups were asked to perform a laparoscopic cholecystectomy (after appropriate approvals from Hospital ethical committee and consent from patients) and their skills were observed by two senior surgeons and scored based on the **"Global Operative Assessment of Laparoscopic Skills (GOALS score)"**

Global Operative Assessment of Laparoscopic Skills (GOALS score)

Depth perception	1.Constantly overshoots target, wide swings, slow to correct 3. Some overshooting or missing of target, but quick to correct 5. Accurately directs instruments in the correct plane to target
Bimanual Dexterity	1. Uses only one hand, ignores non dominant hand, poor coordination between hands 3. Uses both hands, but does not optimize interaction between hands 5. Expertly uses both hands in a complimentary manner to provide optimal exposure
Efficiency	1. Uncertain, inefficient efforts; many tentative movements; constantly changing focus or persisting without progress 3.Slow, but planned movements are reasonably organized 5. Confident, efficient and safe conduct, maintains focus on task until it is better performed by way of an alternative approach
Tissue handling	1. Rough movements, tears tissue, injures adjacent structures, poor grasper control, grasper frequently slip 3. Handles tissues reasonably well, minor trauma to adjacent tissue (i.e. occasional unnecessary bleeding or slipping of the grasper) 5. Handles tissues well, applies appropriate traction, negligible injury to adjacent structures
Autonomy	1. Unable to complete entire task, even with verbal guidance 3. Able to complete task safely with moderate guidance 5. Able to complete task independently without prompting

RESULTS

CONCLUSION

✓Simulation-based laparoscopic training significantly enhances surgical competence.

✓Residents trained through simulation demonstrated superior laparoscopic skills across most domains particularly depth perception, efficiency, tissue handling, and autonomy.

KEY TAKEAWAYS

➤Simulation based surgical training is the absolute need of the time.

➤ Simulation-based education promotes **patient safety** by refining technical skills before real operative exposure.

➤Access to simulation facilities bridges the gap between **training hospitals and global surgical standards.**

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