

LAPAROSCOPIC INSTRUMENT INSERTION MEMORY THROUGH TROCARS TOWARDS TARGET PATHOLOGY : A NEW METHODS OF TEACHING LAPAROSCOPY TO SURGICAL RESIDENTS

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INTRODUCTION

- Laparoscopy has revolutionized surgical practice by reducing postoperative morbidity and accelerating recovery.
- However, mastering laparoscopic skills remains a challenge for surgical residents due to the steep learning curve, the need for three-dimensional orientation on a two-dimensional screen, and the reliance on precise psychomotor control.
- Among the fundamental aspects of laparoscopy, safe and accurate instrument insertion through trocars toward the target pathology is critical to avoid tissue injury and ensure procedural efficiency.
- Traditional teaching methods rely on supervised practice during live surgeries or simulation models but often lack a structured framework to internalize the “memory” of instrument trajectory.

CONCLUSION

- We propose a novel teaching method—“Instrument Insertion Memory Through Trocars Towards Target Pathology”—designed to help residents develop spatial orientation, depth perception, and target precision.
- The objective is to create a reproducible and safe educational strategy that enhances psychomotor learning before independent operative performance.

METHODS

- This method emphasizes repeated practice of instrument introduction through trocars along predetermined vectors directed at the target anatomy.
- Residents are guided to visualize and memorize fixed geometric paths, reinforcing the concept of “trocar-to-target trajectory.”
- Training sessions employ dry labs, box trainers, and virtual simulators to replicate common surgical scenarios.
- Progressive feedback is provided on hand-eye coordination, angulation control, depth accuracy, and avoidance of collateral tissue contact.
- The approach integrates cognitive mapping, repetitive drills, and structured evaluation to create lasting motor memory.
- Additionally, real-time error analysis is documented to identify technical pitfalls and enhance learning retention.

RESULTS

- Preliminary implementation among postgraduate surgical trainees has shown improvement in several domains: reduction in instrument handling errors, shorter time to target acquisition, and improved confidence in performing basic laparoscopic tasks.
- Residents reported enhanced understanding of trocar positioning and target alignment, with fewer incidents of instrument “wandering” or tissue collision.
- Trainers observed measurable improvement in procedural economy of movement and overall safety margins

CONCLUSION

- The proposed method offers a structured, reproducible, and safe training paradigm for surgical residents.
- By combining visual memory, spatial orientation, and psychomotor repetition, this approach strengthens core laparoscopic competencies before application in live operating rooms.
- Wider adoption of this technique may significantly shorten the learning curve, improve patient safety, and standardize training outcomes across surgical programs.
- Future validation through randomized controlled studies will further define its impact on surgical education and operative performance.