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DESIGN OF A MULTI-PURPOSE TRAINING BOX FOR LAPAROSCOPIC SURGERY

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Objective:
Laparoscopic surgery is a more complex procedure compared to traditional surgery, especially with the recent development of single-incision laparoscopic surgery (SILS) techniques. A solution to acquire these skills effectively is pre-operation training in the laboratory. This study aims to design a multi-purpose training box that could be used for laparoscopic surgery and SILS training.

Materials and Methods:
The multi-purpose training box was designed based on human ergonomics. In order to evaluate its usability, twenty novice surgeons were recruited to accept laparoscopic skills training. They accepted two hours training a day for 2 weeks and completed seven surgical tasks including cutting, transferring, suturing etc. Finally, their performances were scored and evaluated by experienced laparoscopic surgeons.

Results:
The training box profile simulates inflated abdominal cavity which can provide trainees more intuitive operating experiences. Multiple incision sites were arranged which are suitable for either traditional laparoscopic surgery or single-incision surgery. A drawer system was designed to place and change different training tasks. And twenty participants' learning curves reveal that their skills are increased after training.

Conclusion：

This multi-purpose training box is useful not only for traditional laparoscopic surgery but also single-incision laparoscopic surgery. The training results show that designed training box can provide trainees more intuitive experiences and an easy way to master complex surgical skills. This training box may also provide a useful platform to evaluate a team training performance and evaluate new minimally invasive devices such as multi-degree-of-freedom instruments and single ports.