

Effect of a Short Preclinical Laparoscopy Course for Interns in Surgery: A Randomized Controlled Trial

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OBJECTIVES: Surgical interns are often not well prepared and have high anxiety about the execution of basic technical skills. This study investigates whether a short preclinical course focusing on laparoscopic camera-navigating skills is useful in the preparation for internship.

DESIGN: Through randomization, an experimental group who attended a short laparoscopic training session and a control group were created. Students' interest for this training and their confidence for laparoscopic exposure during surgical internship were inquired. During internship, camera-navigating skills were assessed by the operating surgeons (using a validated global rating scale) as well as by the students themselves (using a 10-points Likert scale).

SETTING: All research was performed in the Center for Surgical Technologies, Leuven, Belgium.

PARTICIPANTS: A total of 205 fifth-year medical students at the University of Leuven, Belgium.

RESULTS: Of the control group students, 80% were interested in attending the training session. There was no difference in confidence between experimental and control group. According to the surgeons and students, there was a significant improvement in clinical performance from the first (scores on global rating and Likert scales $\pm 50\%$) to the last procedure (scores $\pm 70\%$) for both groups. However, there was no difference in performance between groups.

CONCLUSIONS: Students are very interested in attending a preclinical laparoscopic training session. However, trained students did not display higher confidence or better clinical

performance during internship. Even without previous training, students are fast to acquire the necessary skills during surgical internship. (J Surg 71:187-192. © 2014 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: preclinical, laparoscopy, internship, camera navigation, confidence, training

COMPETENCY: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement

INTRODUCTION

Changing environments in surgical departments, such as time limitations or legal pressure, have created the need for acquisition of technical skills outside the operating room (OR).¹ Although much attention is focused on teaching surgical skills during residency now, few efforts are made to prepare medical students for the technical skills necessary to be an intern.² Surgical interns often have high anxiety about the execution of basic technical skills.^{2,3} It has been proven that elaborate structured technical skills curricula held before internship significantly improved their overall confidence in performing these skills.^{2,4-6}

As laparoscopy and other minimally invasive techniques have gained a very important role in almost every surgical discipline, interns would have to attend and sometimes participate in these procedures, mostly to navigate the camera. When they perform poorly in the use of the laparoscopic camera with failure to achieve the optimal view (errors in horizontal axis, centering, or zooming), the performance of the surgeon may be hampered.⁷

During internship, medical students are supposed to practice basic technical skills and apply the theoretical

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knowledge gathered through the years. During operations, interns can refresh their anatomical knowledge and learn about the different surgical procedures and techniques. However, it is known that human beings have a limited attentional capacity. When these attentional resources are only used to acquire technical skills and spatial judgment (e.g. during camera navigation), there is little left to learn anything about anatomy or operative decision making.⁸

Therefore, it seems useful to include a preclinical training session in laparoscopy and camera navigation to ensure an optimal learning environment for the intern. There is evidence that preclinical training courses are useful in improving camera-navigating skills in a laboratory setting,^{7,9,10} but this study investigates whether it can also improve performance in real clinical practice. The second outcome parameter focused on the effect of the laparoscopic training session (focused on camera navigation) on the confidence of students for this specific technical skill.

MATERIALS AND METHODS

This study was performed on students who were in the fifth year of medical training at the University of Leuven, Belgium. Medical students in Belgium start internship after 5 years of theoretical courses. For an entire year, they attend clinical activities in hospitals, among which 4 months of surgery is included. Thus at the time of the study, students had no clinical experience and all were in the prospect of attending 4 months of internship in the OR.

All students in the fifth year of medical training were randomly divided into 2 groups (taking into consideration the different time schedules of students): an experimental group ($n = 104$) who had the possibility to attend a short laparoscopic training session during their fifth year of medicine and a control group ($n = 101$) who did not receive this training. At the beginning of the sixth year, a short questionnaire concerning this preclinical training and confidence for laparoscopic exposure during surgical internship was given to all students. Finally, during their surgical internship (sixth year of medicine), camera-navigating skills were assessed by the supervising surgeons as well as by the students themselves. Informed consent was obtained from all participants.

Training lasted 3 hours and started with a theoretical introduction about the video installation and instruments used in laparoscopy. Students were instructed to connect endoscope, camera, light source, and monitor in a correct way. After that, students attended the hands-on part of the training. The exercises were performed on a Laparoscopic Skills Testing and Training model (Fig. 1)¹¹ in a Szabo trainer box (Karl Storz, Tutlingen, Germany) with a conventional laparoscopic tower (Karl Storz, Tutlingen, Germany). The first exercise focused on the use of the 30° angled laparoscope. The Laparoscopic Skills Testing and Training

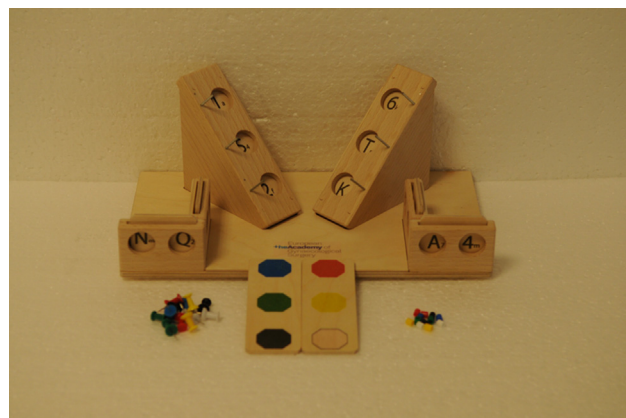


FIGURE 1. The LASTT model.¹¹

model was mounted with 14 targets at the different modules in such a way that they could only be identified by moving the scope in all directions (rotation, lateral, and zoom-in/zoom-out movements). A second exercise focused on the interaction between the camera navigator and the surgeon. One student navigated the 0° laparoscope while the other student grasped an object, transferred it from the dominant hand, and introduced it into its target. The last exercise focused on hand-eye coordination. The student grasped an object with a Kelly forceps and positioned it onto its target while manipulating the camera with the nondominant hand. Construct validity for all exercises was shown by Molinas et al.¹¹ After the video demonstration of the different exercises, students performed them independently (2 students per box trainer). Training was supervised with continuous expert feedback by a research fellow. A cystoscopy task in a cadaver porcine bladder (retrieval of an object from the bladder) was added to provide a real life application.

The questionnaire that was administered in the beginning of the sixth year of medicine gathered information concerning gender, dexterity, and experience with laparoscopic simulators and video games. It also included a complex visual-spatial test, the Schlauch figures test, requiring mental visualization and manipulation of objects in 3 dimensions.¹² Control group students were asked whether (before randomization) they had been interested in attending the training session (yes/no). The experimental group was asked how useful they thought the training had been on a Likert scale (1 = not useful at all and 6 = extremely useful) and whether they would recommend it to their successors (yes/no). Furthermore, all students had to indicate on a 6-point Likert scale how prepared they felt for laparoscopic exposure during surgical internship (1 = totally not prepared and 6 = very well prepared) and how nervous were they for their role as camera navigator during laparoscopic procedures (1 = not nervous at all and 6 = very nervous).

Assessment during surgical internship (4 months in the sixth year of medicine) was performed by the operating

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