Correlation between Progress in Box Trainers and Application in Animal Models for Laparoscopic Suturing

Thesis

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بسم الله الرحمن الرحيم

قَالُواْ سبحانك لاَ علْم لَنا إِلا ما
علمتنا إِنك أَنت الْعليم الْحكيم

صدق الله العظيم

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List of Abbreviations

2 D	: 2 dimension
3 D	: 3 dimension
AUA	: American Urological Association
BLUS	: Basic Laparoscopic Urologic Surgery
FLS	: Fundamental laparoscopic skills
fr	: French
LRNST	: Laparoscopic, Robotic, and new Surgical Technology
Mb	: Mega byte
MHz	: Megahertz
MIST-VR	: Minimally invasive surgical trainer-Virtual reality
NASA	: National Aeronautics and Space Administration
OR	: Operative room
PC	: Personal computer
PERC	: Perutaneous
RAM	: Random-access memory
SAGES	: Society of American and Endoscopic Surgeons
Sec.	: Second
UCI	: University of California, Irvine
US	: united States
USA	: United States of America
VR	: Virtual reality

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INTRODUCTION

At the time of this writing, interest in laparoscopic urology continues to rise at an unprecedented rate. This interest is currently evident in both urologic practice and training ***(Gill, 2006)***

Laparoscopic surgery owes much of its history to the development of endoscopic techniques in the beginning of the 19th century. Initial methods to examine body orifices were developed in 1805 by the German physician Phillip Bozzini who developed an awkward system of candles and mirrors to examine canine bladders ***(Kelley, 2008)***

Laparoscope had its modest beginning in 1901 when Kellings used Nitze cystoscope for the inspection of abdominal cavity of a dog and he called it coelioscopy. ***(Palanivelu, 2002)***

The adaptation of laparoscopy into the urologic armamentarium has been a slower process, the laparoscope was initially used to locate cryptorchid testicles and to plan a subsequent open procedure, Schuessler was the first to present laparoscopic approach to common urologic procedure, the pelvic lymphadenectomy ***(Nakada et al., 2010)***

But Urologic laparoscopy has dramatically progressed over the past 10 years. To date, however, the large experiences exist mainly at academic centers ***(Gill, 2006)***

This due to the wide range and availability of information, has led the patient population to demand laparoscopic knowledge and skills from the urologic community. Thus, residency programs are increasingly emphasizing laparoscopic training, and graduates should have enhanced familiarity with laparoscopic technique once delegated to specialty training ***(Gill, 2006)***

Laparoscopy challenges surgeons' skills on multiple grounds including: an inability to touch tissue, a lack of a 3-dimensional view, counterintuitive fulcrum lead, and the loss of finger dexterity ***(Gjertson et al., 2008)***

The laparoscopic approach also requires a longer operative time and creates greater stress and fatigue in surgeons. So, Laparoscopic surgery requires additional training compared with open surgery ***(Gallagher et al., 2002).***

Also Laparoscopic surgery requires skills that are different from those required for open surgery. Simulators were developed to train these skills in a pressure-free environment with or without supervision. Simulators can roughly be divided into box trainers (also video trainers) and virtual reality trainers ***(Mohammadi et al., 2010)***.

The interest in training facilities outside the operating room (OR) was further enhanced by issues like quality control, patient safety, and cost-effectiveness. Simulator training is shown to be effective in providing skills that are transferable to the OR and to decrease procedural complications. ***(Gjertson et al., 2008)***

Besides, the use of simulation in surgical training curricula is becoming more widely accepted as simulators are able to provide objective assessment and feedback. Objective assessment of performance is fundamental to provide formative feedback during training, allowing for continuous skill refinement ***(Aggarwal et al., 2004)***

Especially for laparoscopic suturing skills, it is important that the participants have tactile feeling of what they are doing during the procedure ***(Strom et al., 2006)***

This is because laparoscopic suturing has been considered as the "master technique" in endoscopic surgery. Suturing and knot tying in the closed confines of the peritoneum or retroperitoneum take mastery of laparoscopic dexterity to its maximum extent and clearly separates those with experience from the novice ***(Gill, 2006)***

Recently, Professional organizations have recognized the need to assess surgical performance objectively in order to standardize training programs, so the simulator has to provide metrics that are meaningful and informative to the trainee in order to be an effective training tool ***(Botden et al., 2009)***

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AIM OF THE WORK

To correlate the effect of receiving standardized training for laparoscopic suturing using box trainer with the progress in laparoscopic suturing in animal models.

REVIEW OF LITERATURE

I - LAPAROSCOPIC TRAINING

I) Importance and Advantages of Laparoscopic Training:

With advances in technology, laparoscopic surgery has replaced open surgery in many surgical operations. Advanced surgical operations are now being done laparoscopically, and more reconstructive procedures are being performed. The skill of laparoscopic suturing is very important for performance of these advanced laparoscopic procedures ***(Bansal et al., 2012)***

The main goal of training is to produce a surgeon who is highly competent and confident in performing laparoscopic procedures; and thereby mitigate the risks of complications. Because of the specific risks training via the apprentice-mentor teaching method may be suboptimal for teaching laparoscopic surgery ***(Stovall et al., 2006).***

Over the last 3 decades, many training devices have been developed in an attempt to remove the bulk of the training burden from the operating room. All of these platforms hope to minimize the morbidity and mortality associated with the learning curve of laparoscopic techniques