



Original article

Validation of a Model of Intensive Training in Digestive Laparoscopic Surgery[☆]



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A B S T R A C T

Introduction: Our objective was to assess a laparoscopic training model for general surgery residents.

Methods: Twelve general surgery residents carried out a training programme, consisting of a theoretical session (one hour) and a hands-on session on simulator (7 h) and on animal model (13 h). For the first and last repetitions of simulator tasks and the Nissen fundoplication technique, time and scores from the global rating scale *objective structured assessment of technical skills* (OSATS) were registered. Before and after the course, participants performed 4 tasks on the virtual reality simulator LAPMentorTM: (1) hand-eye coordination, (2) hand-hand coordination, (3) transference of objects and (4) cholecystectomy task, registering time and movement metrics. Moreover, the residents completed a questionnaire related to the training components on a 5-point rating scale.

Results: The last repetition of the tasks and the Nissen fundoplication technique were performed faster and with a higher OSATS score. After the course, the participants performed all LAPMentorTM tasks faster, increasing the speed of movements in all tasks. Number of movements decreased in tasks 2, 3 and 4; as well as path length in tasks 2 and 4. Training components were positively rated by residents, being the suture task the aspect best rated (4.90 ± 0.32).

Conclusions: This training model in digestive laparoscopic surgery has demonstrated to be valid for the improvement of basic and advanced skills of general surgery residents. Intracorporeal suturing and the animal model were the best rated training elements.

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Validación de un modelo de formación intensivo en cirugía digestiva laparoscópica

RESUMEN

Palabras clave:

Formación
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Introducción: Nuestro objetivo fue validar un modelo de formación en cirugía laparoscópica para residentes de cirugía general.

Métodos: Doce residentes de cirugía general realizaron un programa formativo, consistente en una sesión teórica (una hora) y una sesión práctica en simulador (7 h) y modelo animal (13 h). En la primera y última repetición de los ejercicios y la funduplicatura de Nissen, se registró el tiempo y la puntuación de la escala de puntuación global *objective structured assessment of technical skills* (OSATS). Antes y después del curso, los participantes realizaron 4 ejercicios en el simulador virtual LAPMentor™: 1) coordinación ojo-mano, 2) coordinación mano-mano, 3) transferencia de objetos y 4) ejercicio de colecistectomía, registrándose las métricas de tiempo y movimiento. Además, rellenaron un cuestionario sobre los elementos formativos en una escala del 1 al 5.

Resultados: La última repetición de los ejercicios y de la funduplicatura de Nissen se realizaron más rápido y con mejor puntuación OSATS. Tras el curso, los participantes realizaron todos los ejercicios en LAPMentor™ más rápido, aumentando la velocidad de movimientos en todos ellos. El número de movimientos disminuyó en los ejercicios 2, 3 y 4, así como la distancia recorrida en los ejercicios 2 y 4. Los elementos del programa fueron valorados positivamente. El ejercicio de sutura fue el aspecto mejor valorado ($4,90 \pm 0,32$).
Conclusiones: Este modelo de formación en cirugía laparoscópica ha demostrado ser válido para la mejora de habilidades básicas y avanzadas de médicos residentes de cirugía general. La sutura intracorpórea y el modelo animal fueron los elementos formativos mejor valorados.

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Introduction

Different learning methods and training programmes have recently been described to gain skills in laparoscopic surgery.^{1,2} These programmes combine clinical training, such as fellowships in hospitals, and non-clinical training, such as practical modules that usually last 2-3 days, in which the use of simulators is combined with experimental models.³

The first type of training, which is mainly used in the United States and Canada, has given good training results. However, in Europe there is no common policy in this area, nor has any uniform model been suggested or developed at a community level.⁴

On the other hand, intensive practical courses are one of the training options most in demand, as they are compatible with surgeons' lack of time and meets their need for additional training in advanced techniques.⁴ Additionally, it has also been said that courses of this type should be a basic requisite for residents.^{5,6} Nevertheless, they must be validated as useful learning tools.

Parallel to the development of different training modes, methods of evaluating surgical skills have evolved that make it possible to monitor learning. Of these methods, virtual simulator metrics stand out, together with observational evaluation tools and movement monitoring systems.⁷

The aim of this study is to objectively determine the utility of our model of laparoscopic surgery training for the acquisition of skills by general and digestive surgery residents.

Methods

Study Subjects

12 residents took part in this study. They came to our centre for a basic course on laparoscopic surgery in the year 2012. The inclusion criteria were final year general and digestive surgery residents (R4 and R5) who had also performed at least 10 laparoscopic operations as the main surgeon. Before the course, the participants filled out a demographic questionnaire which also recorded information on their previous experience in laparoscopic simulation.

Training Programme

All training activities were approved by the Ethics and Animal Well-Being Committee of our Centre, and they fulfilled the requisites specified in the regulations in force at the time the study was carried out (Directive 2010/63/EU, Royal Decree 1201/2005 and Law 32/2007).

The practical courses in laparoscopic surgery lasted for 2 and a half days. The programme was based on a theoretical part (1 h) and a practical part using the Simulap® physical simulator (7 h) and experimental animals (13 h). The theoretical part consisted of sessions on training, ergonomics, instrumentation and devices, together with laparoscopic towers. The practical part in the simulator took place on the first day of the course, and exercises were performed in

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