# Effect of Instructor Feedback on Skills Retention After Laparoscopic Simulator Training: Follow-Up of a Randomized Trial

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**BACKGROUND:** Instructor feedback reduces the number of repetitions and time to reach proficiency during laparoscopic simulator training. The objective of this study was to examine the effect of instructor feedback on long-term skill retention.

**METHODS:** A 6-month follow-up of a randomized trial. Participants were surgical novices (medical students). All participants ($n = 99$) initially practiced a laparoscopic salpingectomy on the LapSim virtual reality simulator to proficiency. The intervention group could request instructor feedback, whereas the control group could not. After 6 months, the participants ($n = 65$) practiced on the simulator until they reached proficiency again. The primary outcomes were the total time and the number of repetitions.

**RESULTS:** Initially, the intervention group used significantly fewer repetitions (29 vs 65, $p < 0.0005$) and less total training time (162 vs 342 min, $p < 0.0005$) than the control group to reach the proficiency level.
At follow-up, both the groups used an equal number of repetitions (21 vs 20, $p = 0.72$) and time (83 vs 73 min, $p = 0.37$) to reach the same proficiency level.

**CONCLUSIONS:** Instructor feedback during proficiency-based laparoscopic simulator training does not affect the long-term retention of skills. (J Surg 72:53-60. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** instructor feedback, laparoscopy, proficiency-based training, retention, simulation

**COMPETENCIES:** Medical Knowledge, Practice-Based Learning and Improvement, Systems-Based Practice

## INTRODUCTION

With the increasing role of simulators in surgical education, it is essential to determine the optimal use and training strategies for these simulators. Randomized studies have demonstrated that laparoscopic simulator training shortens the learning curves for novices and reduces operating time and the risk of errors during initial operations, which have several advantages compared with the traditional, less structured apprenticeship training method.[1-3] However, when structuring surgical simulator training, it is essential that it is based on the principles of deliberate practice, distributed, and proficiency-based training to obtain the best possible outcome.[4-6]

Instructor feedback is an essential component of surgical education in the operating room. Feedback increases the efficiency and reduces the time needed to reach a predefined proficiency level when training on a simulator.[7-10] However, it is not known whether the advantage of instructor feedback is reflected in the retention of surgical skills. According to the guidance hypothesis, learners can become dependent on the additional feedback, which can affect transferability and retention of skills.[11] Therefore, retention tests are essential when investigating the effect of feedback in skills training and a better

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indicator for learning a new skill than immediate posttraining tests.[6,12-15]

The present study was a 6-month follow-up study of a randomized trial, which demonstrated that instructor feedback significantly reduced the number of repetitions and total time used to reach proficiency when training a procedural task on a virtual reality simulator.[16] The objective of the present study was to determine the effect of instructor feedback on the long-term retention of laparoscopic skills training after 6 months.

## METHODS AND MATERIALS

In the initial study, 99 participants were randomized to either an intervention or a control group. The participants trained on the VR simulator until they reached a predefined proficiency level (Fig. 1).[16] During training, both groups received the automated feedback from the simulator. The intervention group could request for 3 sessions of 10 minutes each with instructor feedback, focusing on optimal instrument handling and operational technique. All participants in the intervention

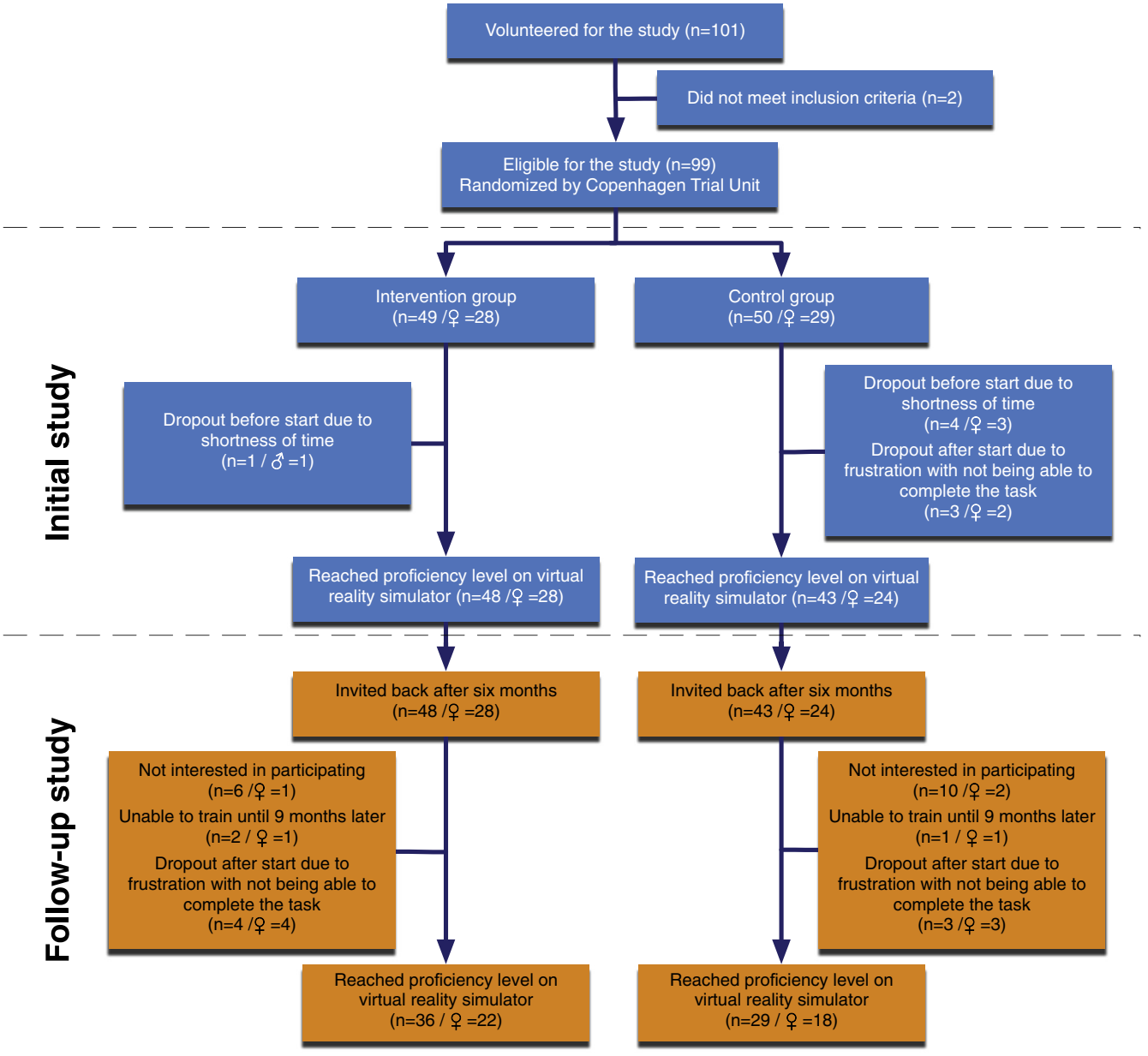


**FIGURE 1.** Participant flowchart following the CONSORT Statement (including both the initial study[16] and the follow-up study). CONSORT, Consolidated Standards of Reporting Trail.