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**Title:** Increasing the efficiency of laparoscopic surgical training: assessing the effectiveness of training interventions  
**Issue Date:** 2018-01-24
FEEDBACK IN THE LEARNING PROCESS OF LAPAROSCOPIC SKILLS

Based on the publication:

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Abstract

A recent Danish study showed that instructor feedback significantly reduced the duration of training time needed for acquiring laparoscopic skills. While there is a clear advantage to trainees reaching a predetermined expert level of performance more rapidly, this does not necessarily imply that the skills were also acquired more efficiently. Experiencing continual feedback while undergoing a training task could reduce the level of difficulty in performing it; the presence of an instructor can also heighten emotional tension. Both of these factors can impair the learning process. For this reason, we recommend self-directed feedback during training on complex laparoscopic skills.
Feedback in the learning process of laparoscopic skills

The value of training laparoscopic skills in a safe and controlled environment has been confirmed in several studies (Seymour, 2008; van Sickle et al., 2008). An important question when designing laparoscopic training programs is what kind of feedback is optimal for trainees. The effect of feedback depends on the timing of it and can be different for each type of task (Healy & Bourne, 2012). Delayed feedback improves feedback for mental tasks, while delaying feedback impairs performance on motor tasks.

Feedback in laparoscopy training is most effective when it is presented to the trainee shortly after making an error (proximal feedback), but not in a summary form at the end of the task (summative feedback) (Gallagher & O'Sullivan, 2012). Most virtual reality simulators which are developed for laparoscopy training present summative feedback to trainees, without any specified directions on how a mistake was caused or suggestions of any alternative better strategies. These kinds of suggestions can be given in the form of proximal feedback by an experienced instructor.

Feedback by an instructor

A recent Danish study shows that trainees require less training time to reach a predefined proficiency level when an instructor provides them with feedback (Strandbygaard et al., 2013). The authors showed this finding using a virtual reality simulator for laparoscopic salpingectomy. However, the performance score of trainees that did not receive any feedback (control group) was higher than in the group that did receive feedback. The authors attribute this result to the fact that the total amount of training needed to reach the predefined proficiency level was also higher in the control group.

This finding is in line with the idea that performance score are not the most important measure of an effective training (Mané, Adams & Donchin, 1989). Feedback by an instructor may help a trainee to reach a predefined proficiency level faster, but this does not mean a trainee also learned the tasks better necessarily. In other words: a trainee is usually quite capable to perform a complex laparoscopic task when an instructor is talking him/her through the procedure step by step, but the trainee is often not able to reproduce the same set of actions when this line of help disappears.

Because learning requires cognitive resources (next to execution/practice), the saying ‘learning by doing’ isn’t always as viable. When the scope and complexity of a task are large, the execution of a task can be a large enough tax on cognitive resources to an extent that there will be no capacity left for learning (Healy & Bourne, 2012; Paas, Renkl & Sweller, 2003).

The Danish research Group states a trainee is better off without feedback while performing simple laparoscopic tasks, while feedback on complex tasks is desirable (Strandbygaard et al. 2013). The authors state the feedback ought to be self-directed, in the sense that a
trainee can suggest themselves whenever they would like to receive feedback. In this way, a trainee can determine their own pace, which is a hallmark for the success of adaptive training towards a predefined proficiency level (Gallagher & O’Sullivan, 2012; Mané, Adams & Donchin, 1989).

**Pros and Cons**
Feedback by an experienced instructor has both advantage and disadvantages. An advantage is that an instructor can see directly what trainee is doing incorrectly and can provide specified and individual feedback. Also, interpersonal factors have an influence. A committed instructor knows the value of the learning process and cares that a trainee will be fully engaged in training. An instructor can also affirm a trainee’s progress and help to motivate whenever a trainee becomes frustrated or discouraged. However, it is undesirable that an instructor continues to talk a trainee through the procedure, providing a constant safety net. Correct instruction and continuous feedback can contribute to a trainee’s process in the sense that they do not learn any wrong habits (Healy & Bourne, 2012), but they shouldn’t cause a trainee to become dependent and unable to perform a task on their own.

The presence of an instructor has an influence on the arousal levels of a trainee. It is a well-documented finding that the execution of well learned tasks improves and the execution of poorly learned tasks deteriorates in the presence of others (Zajonc, 1965). This can be explained by the fact that a more difficult task creates a higher cognitive and emotional demand on a novice trainee than an easy task. The presence of other people creates additional arousal, which cause performance to decline. This is why most people prefer not to have any other people watching them while they are still learning a new skill. When a skill has been mastered, the observation of others has a positive effect, because it increases the engagement of the trainee. This social phenomenon has implication for designing laparoscopy training in a skillslab, but also for the traditional Halsted-model while teaching residents in the operating room (Gallagher & O’Sullivan, 2012), where even more people are usually present. This additional arousal may impair the learning process of a trainee and the safety of a patient.

Finally, the presence of an instructor costs time and money. Because trainees commonly make similar mistakes, it can often occur that instructors are finding themselves repeating similar feedback to multiple trainees. This can be solved by more efficient alternatives. Our research group tries to cover most common newbie mistakes in standardized instructional videos, which are presented to trainees multiple times during training.
Recommendation

Our advice is to apply self-directed feedback by instructors while teaching trainees challenging laparoscopic skills with a predefined proficiency level, so trainees can determine their desire for feedback themselves. Besides experienced surgeons, training alumni, lab assistants and even medical students can be recruited as instructors, granted that they possess proficient laparoscopic skills.