

# Surgical trainees retain information, master skills better when honed beyond proficiency

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Researchers from Drexel University, Philadelphia, have found that when surgical trainees train beyond competence using a simulator, they retain information longer and master surgical skills better than those who stop practicing when they achieve an initial level of proficiency. Their study findings were presented today at the 2015 Annual Clinical Congress of the American College of Surgeons during a Posters of Exceptional Merit presentation.

"With all the changes now happening in [surgical education](#), there is an urgent need to improve and maximize the way we teach residents," said lead study author Andres E. Castellanos, MD, FACS, Director of Minimally Invasive Surgery and Robotics at Drexel University College of Medicine. "Our aim is to determine how we can improve surgical education. We need to understand the best way to help people continue to learn and be better surgeons, then translate that into better quality care."

Today, surgical training programs use a variety of virtual world platforms to help trainees acquire knowledge and hone surgical skills in common procedures. By and large, the standard approach is for trainees to practice on a 3D virtual world simulator until competence is achieved in one area, then stop and move on to the next procedure.

The aim of this pilot study was to evaluate the effect of overlearning, or learning beyond the point of proficiency, on laparoscopic skill retention in a simulated cholecystectomy model. Cholecystectomy is a common

surgical procedure performed to remove a diseased gall bladder.

The study involved 20 general surgery and emergency medicine residents. Of those, 10 were randomized to a control group and 10 to an overlearning group. The residents completed a laparoscopic cholecystectomy on a LapSim virtual reality simulator. Both groups practiced on the simulator in a continuous session until they achieved proficiency, which was defined as a total simulator score greater than or equal to 80 percent. That score is equivalent to 80 percent of the skill level of an expert surgeon.

The overlearning group, after achieving proficiency, continued to practice uninterrupted, performing the same number of task repetitions it took to reach a total score of 80. Thus, the surgical trainees in the overlearning group practiced twice what it took to achieve initial proficiency (or 100 percent overlearning).

The surgical performance metrics created by the researchers included a global score, total-time, tip trajectory, and right/left and tissue penetration. Skill retention in both groups was assessed at one, four, and 12 weeks after baseline.

Overall, the study showed that overlearning not only decreased the learning curve, but improved overall scores in how the surgical trainees performed. The group that put in the extra effort to overlearn retained their skills better. The overlearning group as a whole had a significantly better global score than the control group (76 vs 68). The overlearning group also finished their procedure at a pace approximately 20 percent faster than the [control group](#), they did a better job of preventing errors, and they had fewer mistakes.

"We want to raise the standard. Using this approach of overlearning, we make people work a little harder initially, but as our study shows, we can

actually decrease the learning curve this way," Dr. Castellanos said.

Until now, no one really looked at the effect of overlearning on surgical skill retention. This study gives researchers an overall look at the effectiveness of training beyond the point of proficiency.

"If you continue to practice beyond proficiency, you will have better skill retention. This is important because we now have 80-hour work week restrictions for residents," Dr. Castellanos said. "But our point of view is that we can still teach these skills. We just have to think outside the box and change our techniques a little to make the way we teach more efficient and effective."

Moving forward, the researchers said they have plans for larger studies. "In addition to overlearning, we are looking at how the residents train. If we combine overlearning with starting residents doing more complex things early in their training, we think we can train a more efficient and better surgeon," Dr. Castellanos said. "We certainly hope our research will change things. Our group is working on different studies that will pull all of this data together and may eventually lead to a better surgical curriculum."

Provided by American College of Surgeons

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