ENT Today

A New Way to Learn: Residency programs use medical simulation to fill training gaps

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by Richard Quinn

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A resident practices simulated surgery of the temporal bone.

In May, Marcelo Antunes, MD, chief resident of otorhinolaryngology-head and neck surgery at the University of Pennsylvania, was able to practice bilobed flaps on pig's feet at an ORL Rising Chief Boot Camp held at Penn Medicine Clinical Simulation Center in Philadelphia. While he had previously experienced medical simulation during his otolaryngology residency, the boot camp put the methodology in proper context for Dr. Antunes, who is particularly interested in facial plastics.

"When you think about local skin flaps, such as the rhomboid or the bilobed, they're very easy in theory," he explained. "You measure the defect, cut here, cut there and rotate the skin in. But there is a big difference when you're actually doing it, like when we did it on the pig's feet. You appreciate so much more the little nuances involved in it. You realize how much undermining of the skin is needed, and if we didn't shape the flap just right, placing the incision over the relaxed skin tension lines, it was not going to look good. That was something you would only appreciate after you do it."

Otolaryngologists say the use of simulators, from the boot camp's animal models to the most advanced mannequins and attached laboratories that can cost hundreds of thousands of dollars, has grown in academic otolaryngology programs in recent years. And now the simulation programs may be poised to grow even faster, thanks to the new work-hour rules from the Accreditation Council for Graduate Medical Education (ACGME). The new rules maintain the established cap on overall hours at 80 per week, averaged over four weeks. However, first-year post-graduates, as of July 1, are now limited to 16 hours a day, a rule that, in effect, forces a rest period.

While the new rules are aimed at reducing medical errors and adverse events caused by sleep-deprived residents, some worry that reducing a first-year's available hours will also reduce the student's level of preparedness. And that's where simulation comes in.

"I think it's going to be a hugely useful tool to help manage the limitations of the ACGME rules," said Ellen Deutsch, MD, FACS, FAAP, director of surgical and perioperative simulation at the Center for Simulation, Advanced Education, and Innovation at the Children's Hospital of Philadelphia. She was one of several otolaryngologists to organize this spring's boot camp, which drew 14 fourth-year residents. In July, 31 second-year residents attended the Second Annual ORL Emergencies Boot Camp.

"It provides some opportunities for education that are very difficult to create in other circumstances," she said. "With simulation, you can create a medical circumstance or medical condition or complete scenario without waiting for it to happen amongst the patients that you're seeing. So if there's a

particular concept that you want the residents to learn about...there are many of these that you could replicate in simulation and so instead of hoping that a person with a certain condition comes through the service, you can arrange very intentionally to represent that condition during a scheduled educational session."

A 'Paradigm Shift'

Serving as a guidepost for the implementation of the new ACGME rules are restrictions put in place in 2009 in England. There, working hours for residents were reduced from 58 in 2004 to 48 two years ago. To help offset the lack of exposure for trainees, the Royal College of Surgeons has devoted part of its building to a simulation center.

Stateside, Dr. Deutsch is chairperson of a task force of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) that is studying the use of simulation in otolaryngology residency programs to see how American otolaryngologists should address the situation. Given the nascent nature of the methodology in otolaryngology, the Academy is looking to quantify roughly how many programs use simulators, what the applications can be and what some of the best practices are.

"It's something we're looking at" too, added Jennifer Manos, RN, BSN, associate executive director for the Society for Simulation in Healthcare and manager of accreditation for the Council for Accreditation of Healthcare Simulation Programs. "... One of the big goals for the future is how does simulation impact the clinical environment?"

Sonya Malekzadeh, MD, FACS, associate professor of otolaryngology-head and neck surgery at Georgetown University Hospital in Washington, D.C., and AAO-HNS' coordinator-elect for education, said the new ACGME rules are just one facet of the changing face of surgical education. "We're seeing this paradigm shift in surgical education where that traditional apprenticeship model of see one, do one, teach one...we're not going to see that," she said.

Dr. Malekzadeh said health care reform, particularly its focus on patient safety, may drastically alter how residents are taught. "There are a lot of issues around this," she said. "Is it appropriate to let a resident do something for the first time on the patient if they've never seen it before, they've never done it before, they're not familiar with the instruments?"

Christine Franzese, MD, FAAOA, associate professor and residency program director of otolaryngology and communicative sciences at the University of Mississippi Medical Center in Jackson, and co-creator and immediate past chair of the Society of University Otolaryngologists-Otolaryngology Program Directors Organization (SUO-OPDO), said the combination of duty-hour restrictions on first-year residents and potential reductions in federal funding may spur discussions about how to tweak residency training. Those conversations will likely include whether otolaryngology training should be reduced to four years from five. "If that happens, simulation becomes an extremely efficient way to train a resident," she said.

The benefits of simulation as a training tool are not limited to just procedures and techniques. Otolaryngologists also believe role-play scenarios can help teach teamwork, cooperation and bedside manner. Standardized patients, specially-trained people skilled in both play-acting a medical malady and assessing a resident's reaction, can even portray family members to give young physicians practice in dealing with non-clinical discussions.

Among the best advantages is the use of simulation as a post-event educational session. Dr. Deutsch said the so-called debriefing allows for review of a range of issues, from technical care (Was the procedure performed well?) to medical management (Did the resident prescribe the right medication and in the right dose?) to personal approach (How well did participants communicate with others?).

"While you can debrief after clinical experiences, oftentimes, the practical necessities of needing to address the next patient concern that's on your list makes that difficult," Dr. Deutsch said. "But with simulation, debriefing is usually budgeted in to the time allotment so that it becomes part of the exercise. That's a very important part of the learning process."

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A resident uses a temporal bone surgery simulator to perform a mastoidectomy, complete with image guidance feedback for anatomy.

Cost-Benefit Analysis

The potential of simulation may be boundless, but the ability for teaching hospitals to pay for and implement the approach is not. And those are just two of the challenges that will arise as simulation becomes more and more popular.

"My institution is not buying a $250,000 simulator for ENT," Dr. Malekzadeh said. "It's just unrealistic. ... [Simulation programs] are proving that they're valuable in terms of attaining proficiency, and now we're starting to see the transfer of skills to the operating room, but it's the availability of those products."

Kelly Malloy, MD, assistant professor of otorhinolaryngology-head and neck surgery at the Hospital of the University of Pennsylvania in Philadelphia, said another limitation of simulation is at the top end of training. Simulators cannot yet help prepare otolaryngologists for all complex treatments.

But a potential answer to both cost and complexity issues is the use of low cost and low technology tools like task trainers or other so-called simple simulators. Dr. Malekzadeh herself has invented several inexpensive tools and encourages other otolaryngologists to look into all types of simulation, not just high-end technology. "When people say simulation, they immediately jump to high tech, high fidelity, virtual reality, super computer technology. That's not [always] the case," Dr. Franzese said. "Low tech stuff is just as valid as high tech stuff. I think sometimes, especially when these smaller programs hear simulation, they assume it's got to be high tech. There aren't any studies or literature to say that high tech simulation is better than low tech. It's just cooler. ... Are we getting more bang for buck? It seems like we should, but we don't really have any proof that that's the case."

In cases where expensive technology is necessary, Dr. Malekzadeh suggested pairing with other departments that use simulation to spread the cost. That can help persuade hospital administrators that the product or program is an interdepartmental resource worth its carrying cost. "ENT is a small specialty," she said. "So [hospital administrators] are not going to invest $250,000 in ENT simulation products. However, they will buy equipment that anesthesia can use and ENT can use and general surgery can use and emergency medicine can use. I think they're willing to invest in simulation and to buy products that serve a larger group of people."

Dr. Malloy said the boot camps that she and Drs. Deutsch and Malekzadeh have organized promote the potential uses of simulation and could help to promote their value as well. There are boot camps for both junior and senior residents, but the events have also drawn strong attendance and interest from faculty around the country wanting to learn more about how to implement or expand simulation programs at their respective institutions, she said.

The important thing to remember, however, is that simulation is still just one tool in a residency program's toolbox, she added. "I'm not sure simulation can ever really replace the actual act of treating a patient and performing a procedure," Dr. Malloy said. "But this is designed to enhance and prepare." **ENT TODAY**
