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- Traffic
- Health
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Creating A Virtual World To Train Surgeons, Develop Operations Of The Future



By Fran Berger
Beth Israel Deaconess Medical Center correspondent

Exploring new worlds – going where no surgeons have gone before. If that sounds a bit like “Star Trek,” welcome to the world of [Dr. Daniel B. Jones](#), Chief of Minimally Invasive Surgery at Boston’s [Beth Israel Deaconess Medical Center](#) (BIDMC).

Dr. Jones, who heads the hospital’s Carl J. Shapiro Simulation and Skills Center has been collaborating with engineers from Rensselaer Polytechnic Institute (RPI) to develop advanced computer simulators to both train surgeons and create a virtual world where doctors can imagine operations of the future.

With Dr. Jones and BIDMC on the clinical side and Professor Suvranu De, the Director of RPI’s Center for Modeling, Simulation and Imaging in Medicine heading up the technical, their work has spanned a decade, thanks to multi-million dollar grants from the National Institute of Health (NIH).

“It’s a continuum,” says Dr. Jones. “We started out with a simulator for training surgeons to safely perform the minimally invasive, laparoscopic gastric band procedure used to treat obesity.”

Then, with a four-year, \$2.3 million NIH grant “we have developed a simulator with the added sensation of touch to teach and offer real-time feedback.”

This virtual basic laparoscopic skill trainer or VBLaST creates an immersive environment enabling surgeons, while using the chopstick-like instruments they use in surgery, to manipulate the organs on the computer screen and to ‘feel’ the movement of both solids and liquids.

Currently being tested at BIDMC, the VBLaST will also be used to evaluate skills needed for certification that include moving a peg, cutting a circle and suturing. “It’s not there yet,” says Dr. Jones, “but it’s close.”

Using computer simulators to train has been a major step forward, says Dr. Jones. “We used to practice on animals and then eventually practice on patients. There is now a whole lot you can do between closing the textbook and before you cut a patient.”

As futuristic as this all sounds, it’s only the beginning. Thanks to a most recent four-year \$2.7 million grant from NIH, Dr. Jones and Dr. De are now in the midst of developing a touch-sensitive simulator to accelerate the development of natural orifice transluminal endoscopic surgery or NOTES.

“This is considered by some to be the next big thing in surgery,” says Dr. Jones.

The NOTES procedures involve operating on the abdomen without any external incisions, by entering and exiting the body through a natural orifice, such as the mouth. Using such a procedure would result in no external incisions or scarring, less pain and potentially fewer post-operative problems.

“NOTES is a tremendous challenge,” says Dr. Jones. “Obviously the tools we have at our disposal today are not ideal to perform such an operation. This simulator could help us develop computer models for new instruments and we could change and manipulate the models without having to create a \$65,000 mold. It’s a daunting task, but it’s cool and can be done.”

But, he quickly adds, it’s more than just designing futuristic instruments and performing today’s surgeries in a different way. It’s about fundamentally changing the world of surgery.

“Instead of finding a better way to do a single operation, we are looking at creating an entire environment for looking at our current

procedures and exploring what has yet to be discovered.”

Having the power of the simulators has been very freeing. “We can compare one way of solving a problem to another without ever subjecting an animal or patient to anything. And, of course, there are huge cost savings.”

The future of surgery, all on a computer screen?

“Step onto the holodeck,” says Dr. Jones.

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