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updated 11:32 a.m. EDT, Thu October 18, 2007

Virtual surgery becoming a reality

STORY HIGHLIGHTS

- New virtual reality surgical procedures improving the lives of patients
- Brain surgery enhanced by virtual reality software
- Remote surgery performed between U.S. and Argentina

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By Matthew Knight for CNN

TEXT SIZE - +

LONDON, England (CNN) – Virtual reality (VR) has come along way since its conception during the 1950's when cinematographer Morton Heilig first dreamed of creating a machine which would give theatre-goers an improved sensory entertainment experience. His 1962 creation the '[Sensorama](#)' simulator earned him the sobriquet 'father of virtual reality'.



The RP-7 (far right) in action during surgery in Argentina.

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Half a century on and VR technology has well and truly come of age exercising a burgeoning influence in the fields of education and entertainment. Less well-known is the way virtual reality is transforming the delivery of services in medicine.

But surgical procedures carried out in recent weeks have demonstrated the extraordinary impact VR has made in improving the lives of patients all over the globe.

Earlier this month doctors in Argentina successfully completed a laparoscopic gastric sleeve surgery. It was the first time that Dr Sergio Cantarelli and Dr Gabriel Edidi had performed the operation. Their mentor, bariatric surgeon Dr [Alex Gandsas](#) looked on as they successfully completed the stomach-reducing procedure on a 39-year-old woman.

Nothing unusual in that you might think, but pupils and mentor never physically met. Dr Gandsas, based in Baltimore was able to impart his expertise to the doctors who were 5,400 miles away in Bahia Blanca in Buenos Aires Province thanks to the Internet and a revolutionary new robot.

The Remote Presence Robot (RP-7) which stands 5 foot, 5 inches tall, allows for high quality, real-time audio and video communication. The Sinai Hospital in Baltimore has been using the RP-7 for ward-rounds for some time, with doctors able to speak to and see their patients when they are unable to attend in person.

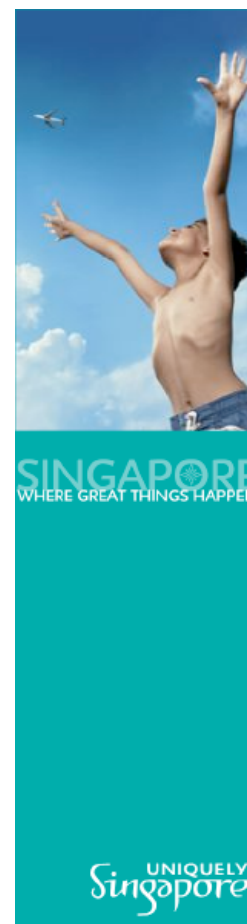
Earlier this year, Dr Cantarelli contacted Dr Gandsas hoping that he might be able to come to the U.S. to learn more about Laparoscopic surgery. "He [Cantarelli] had never done this type of surgery before," Gandsas told CNN, "And in practice, it wasn't possible for him to come over and train here. But then I had an idea," Gandsas said, "Why not use the RP-7 to mentor remotely."

Gandsas made some enquiries and managed to secure a grant from the manufacturers -- InTouch Health. So started two months of mentoring from Baltimore to Bahia Blanca. With the training complete it was time for the operation.

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"The operation generated quite a lot of interest and setting it up took quite a bit of time," Gandsas said, "But during surgery, the robot allowed me to zoom in on the patient and on the monitors to assess the situation."



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After successfully completing the 90-minute operation Dr Cantarelli was pleased to have had Dr Gandsas watching on. "Having a world expert from the United States looking over your shoulder during surgery greatly enhanced our comfort level and provided the best care for the patient," he said.

Dr Gandsas also participated in the ward rounds after the operation. The RP-7 enabled him to help out with any questions about the post-operative symptoms that the patient was experiencing.

He has two more remote surgeries lined up, which he hopes will take place in November 2007.

As for the future, Gandsas is confident that the RP-7 can be implemented on a broader scale, with what he hope will be a network of experts on hand to sort out any type of problem, wherever they are in the world.

Life saving technology

Earlier this year an Australian man had life-saving surgery to remove an aneurysm from his brain. One of the keys to the success of the procedure was the use of virtual reality software before and during the operation.

Neurosurgeon **Dr Vini Khurana** of Canberra Hospital, who carried out the procedure, told 702 ABC Sydney radio station: "We have a software program available with one of our rapid CAT scanners, which allows us to generate 3D images and then rotate them in ways that is relevant to rehearsing for a surgical approach."

Using keyhole surgery, Dr Khurana made a 1.5cm hole in the frontal bone just above the eyes. The patient -- a 77 year-old retired bus driver John James -- was asked to read words and numbers from flashcards throughout the operation so that doctors knew that the surgery was not affecting his vision.

Throughout the operation Dr Khurana had a 3D image of the patient's brain projected onto one side of his eyepiece.

"The virtual neuron vascular surgery software enabled us to rehearse the procedure and made a very positive impact on the outcome. The technology we used was quite extraordinary," he said.

Future surgical techniques

Nigel John, Professor of Computing at the University of Wales, believes that over the next decade we'll see virtual reality continuing to help with a range of surgical procedures.

"The price of VR devices is falling all the time," Professor John told CNN. "For example, the Novint Falcon [a haptic device which provides physical feedback] which is used in gaming costs around \$200. The benefits for the [UK's] National Health Service (NHS) will be huge."

Professor John, who specializes in computer graphics and medical visualization, is currently considering a proposal from Swedish scientists to create a mixed reality operating theatre.

At the moment he is researching a new medical specialty called Interventional Radiology (IR), which involves pinhole surgery using needles and catheters which are guided by touch and imaging.

The surgical procedure has many benefits for the patient -- local anesthesia, small incision, few complications, reduced postoperative pain, short hospital stay and is low cost.

As a member of the consortium CRAiVE (Collaborators in Radiological Intervention in Virtual Environments) Professor John is combining his skills with a range of specialists -- clinicians, physicists, clinical engineers and psychologists. Together they hope to implement sophisticated virtual environments designed for use in the training of radiological interventional procedures.

Computer scientists are providing surgeons with new and evermore precise tools to carry out delicate procedures. Robots remotely controlled by surgeons may well become the norm in some branches of medicine in the years to come. [E-mail to a friend](#)

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