VR goggles: A reality for recovery

Primary care physician James Daniels, MD, and sports psychologist Lindsay Ross-Stewart, PhD, want to change how rural patients recover from hip or joint replacement surgery using virtual reality goggles.

Thanks to a collaboration grant from SIU Medicine and SIU Edwardsville, Drs. Daniels and Ross-Stewart will test whether a combination of guided imagery and virtual reality goggles can help patients recover. Ross-Stewart, an expert in imagery research at Southern Illinois University Edwardsville, says the low-cost technology could help participants regain their independence, reduce the perception of pain and lead to faster recoveries.

"This grant will not only lead to a new and innovative way of helping patients recover from total hip or knee surgery, there is great potential to use this for veterans who are dealing with orthopaedic conditions, including limb amputation." Dr. Daniels, SIU family medicine physicians Amit Sapra, MD, and Dae Jeong, MD, and Orthopedic Center of Illinois orthopedic surgeon Gordon Allen, MD, will recruit 40 or more participants for the study.

Before undergoing surgery, participants will wear a head mount with two cameras and film themselves doing the prescribed physical therapy exercises. The research team will use this footage to create first person, three dimensional videos for participants to watch using virtual reality goggles following surgery.

To enhance the immersive simulation of the virtual reality goggles, participants will listen to guided imagery, such as, "See and feel being able to complete the exercises" and "You are comfortable as you push yourself." "When participants hear this guided imagery script, it's an experience that mimics real life," says Dr. Ross-Stewart. "We can be aware of 'seeing' an image, feeling movements as an image, or experiencing an image of smell, tastes or sounds without actually experiencing the real thing."

"Imagery-assisted virtual reality has the potential to radically change the way after-surgery patient care is prescribed," adds Dr. Daniels, director of the sports medicine fellowship at the SIU Center for Family Medicine in Quincy. "We believe it will decrease the patient's pain perception and that patients will feel more confident in their ability to complete rehabilitation and complete daily tasks without falling."

Drs. Daniels and Ross-Stewart will track participants' recovery and pain perception for four weeks following surgery to assess the technology's usefulness. If successful, Dr. Daniels hopes the pilot study will open the door to future collaborations and exploratory research grants.

Tinnitus Measurement System Advances

Jeremy Turner, PhD, an internationally recognized tinnitus researcher, and his co-inventor, Michael Kinder, are developing the world's first objective tinnitus measurement system, an invention Turner created during his employment at SIU School of Medicine. He has licensed the technology through OtoScience Labs, and SIU researchers are testing the system. The system was featured on *Innovations with Ed Begley Jr.*

NEW TECH COULD REVOLUTIONIZE VATS

For patients living with early stage lung cancer, treatment may involve what's known as video-assisted thoracoscopic surgery, or VATS. But expert surgeons like SIU Medicine's Traves Crabtree, MD, were frustrated by the limitations of the approach.

"Although excellent for pelvic or abdominal surgery, the long, rigid camera rod adopted from laparoscopic techniques is not ideal for VATS," Dr. Crabtree explains. Because of the rigid equipment, patients may suffer nerve damage. The current system is cumbersome for surgeons, who must rely on a second camera operator for assistance.

That's why Dr. Crabtree is developing a new surgical device: a multifunctional camera system that can be mounted outside of a single incision over the rib cage. Dr. Crabtree plans to attach several small, high definition cameras to the end of flexible, adjustable arms that can be controlled by a single surgeon.

"Having multiple cameras would provide the surgeon the opportunity to view structures from different angles throughout the chest on a multi-monitor screen," Dr. Crabtree explains. "We could then move the camera heads and pan in or out or side to side for a more focused view within the chest cavity."

SIU Edwardsville computer programmer Timothy York, PhD, will assist Dr. Crabtree in developing the prototype video camera system and write the software for precise control of the system.

The duo, who received a SIUSOM-SIUE Collaboration Support Grant to fund their project, will test their device and software using a synthetic model of the lung Crabtree previously designed.

"If we can demonstrate the feasibility of our camera system on this simulation model, our future plans would be to apply it ultimately in live human surgery," says Dr. Crabtree. "This technology could dramatically change how we perform VATS operations immediately and may even allow for performance of more complex lung surgeries through VATS in the future."