Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

Novel Surgical Simulator for Neuro-endoscopic training

Category

Technology: Surgical training simulator
Developed: 2017

Problem

Lack of training simulators for neuroendoscopic surgeries hindering the use of minimally invasive brain surgeries

Technology Overview

A cost-effective specialized simulator for neuroendoscopic training

IP Status

- US provisional filed
- Available for Exclusive or Non-Exclusive Licensing

Value Proposition

- Brain superstructures
- Skill stations
- Refined training program

Market Attractions

- Neuroendoscopic training
- Medical school training

Contact

Doreen Molk
Doreen.molk@ucdenver.edu
Ref# CU4484H

CU Innovations
13001 E. 17th Place
Suite W5130, Aurora, CO 80045

t. 303-724-0221
f. 303-724-0816
innovations.ucdenver.edu

Problem: Endoscopy is a minimally invasive (MI) medical procedure that is used for the diagnosis, prevention, and treatment of complications in the internal organs of the body. Neuroendoscopic procedures are used to perform brain tumor, brain cancer, traumatic brain injury (TBI) and stroke-related surgeries.

The neurology endoscopy market[1] is believed to be gaining momentum with a compound annual growth rate (CAGR) of 5.1% from 2018 to 2023. The main driver of the growth is favorable government initiatives, demand for brain surgeries, and the benefits of endoscopic surgeries over conventional brain surgeries. The major factor hindering the growth of this market is lack of trained neurologists. As of 2012, it is estimated that there are around 3600 neurosurgeons practicing in the US and 174 in Canada. 102 accredited neurosurgical residency training programs in the U.S. with approximately 1,200 total trainees produce 160 graduates annually. Training surgeons in the use of endovascular neurosurgical equipment currently occurs either in the operating room, on real patients, or in a lab using cadavers. Cadaveric training is expensive and low fidelity. Therefore, there is an unmet need for a cost-effective surgical simulator specialized for neuroendoscopic training.

Technical Solution and Key Value Propositions: A novel surgical simulator specialized for neuroendoscopic training has been developed by a research group led by Dr. Wagner at University of Colorado. The simulator consists of a series of skill stations (not pictured), a brain model with superstructures and pathologies (pictured in Figure 1), and a training program for assessing performance and training efficacy. The superstructure consists of 3 interlocking pieces that secure replaceable membranes for use in training. Additionally, pathologies (cysts/tumors) may be attached to the superstructure and changed out as desired.

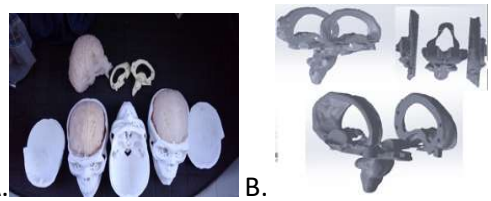

Figure 1: Endoscopic Neurosurgery Trainer (A) and superstructures (B).

Outcome for a post-course survey for 8 surgeons demonstrated 1. performing endoscopic procedures in the simulator is like in real patients; 2. an improvement of neuroendoscopic skills was observed as the result of the training; 3. they would use it for neurosurgical resident training for endoscopic skills.

Key Documents and Sources:

1. Business wire: https://www.businesswire.com/news/home/20180906005408/en/Global-Neuroendoscopy-Market-2018-2023-CAGR-Grow-5.1
2. "Neurosurgical trainer for minimally invasive (endoscopic) brain surgery." Provisional patent application filed December 1st, 2017; available under CDA.