Technology Innovations to be Presented at the 13th Annual International Meeting on Simulation in Healthcare

January 26th–30th, 2013
Orlando, Florida

1st Place – 1395
An iPad Simulation of Skin Prepping
Dave Lizdas, BS,1 Nikolaus Grovenstein, MD,1 Isaac Luria, MS,1 and Samsun Lampotang, PhD.1
1ANESTHESIOLOGY, UNIVERSITY OF FLORIDA, GAINESVILLE, FL, USA.

2nd Place – 975
An In Situ Tele-mentoring System for Training Endoscopic Surgery in the Operating Room
Juli Yamashita, BSc,2 Hideyuki Murata, MD,2 Koichi Tomoda, MD, PhD,1 and Kazuyasu Baba, MD.2
1OTOLARYNGOLOGY, KANSAI MEDICAL UNIVERSITY, HIRAKATA, OSAKA, JPN, 2OTOLARYNGOLOGY, KANSAI MEDICAL UNIVERSITY, MORGUCHI, OSAKA, JPN, and 3HUMAN TECHNOLOGY RESEARCH INSTITUTE, NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE/TECHNOLOGY (AIST), TSUKUBA, IBARAKI, JPN.

3rd Place – 461
Mark Bullard, MD,1 Michael Runyon, MD,1 Farhad Javidi, PhD,2 and Hendry Roberts, MD.3
1EMERGENCY MEDICINE, CAROLINAS MEDICAL CENTER, CHARLOTTE, NC, USA, 2CENTRAL PIEDMONT COMMUNITY COLLEGE, CHARLOTTE, NC, USA, and 3EMERGENCY MEDICAL DEPARTMENT, MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES, DAR ES SALAAM, TZA.

3rd Place – 1363
Testing a Hand Hygiene Compliance Monitoring System Utilizing a Depth-Sensing Camera in a Simulated Clinical Environment
David Birnbach, MD, MPH,6 Maureen Fitzpatrick, MSN, ARNP-BC,3 Ruth Thomas, MSN2 Jose Ramirez, BS,5 Jill Sanke, MS, ARNP-BC,1 Lisa Rosen, MA,2 and Illya Shekhter, MS, MBA.4
1ANESTHESIOLOGY, UNIVERSITY OF FLORIDA, GAINESVILLE, FL, USA, 2ANESTHESIOLOGY, UNIVERSITY OF MIAMI MILLER SCHOOL OF MEDICINE, MIAMI, FL, USA, 3CENTER FOR PATIENT SAFETY, UNIVERSITY OF MIAMI, MIAMI, FL, USA, 4HOSPITAL FACILITIES AND OPERATIONS, UNIVERSITY OF MIAMI MILLER SCHOOL OF MEDICINE, MIAMI, FL, USA, 5HOSPITAL FACILITIES AND OPERATIONS, UNIVERSITY OF MIAMI MILLER SCHOOL OF MEDICINE, MIAMI, FL, USA, and 6UM-JMH CENTER FOR PATIENT SAFETY, UNIVERSITY OF MIAMI MILLER SCHOOL OF MEDICINE, MIAMI, FL, USA.
An In Situ Tele-mentoring System for Training Endoscopic Surgery in the Operating Room

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Introduction/Background: On the Job Training (OJT) is indispensable to surgical training. Traditionally, an expert surgeon (a trainer) served as an assistant to a beginner (a trainee) in OJT. However, this is becoming more difficult, since recent low invasive surgery trends toward solo-surgery to reduce personnel expenses. In OJT of endoscopic paranasal sinus surgery (ESS), a typical solo-surgery, a trainer can instruct the trainee only verbally, pointing at the endoscopic monitor. This is very inefficient and can even be dangerous because surgical manual skills can not be described well verbally. When the trainee can not continue the operation, the trainer takes over the procedure. Complications may then take place because the trainer, who just watches endoscopic images, could misunderstand what is actually occur-

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ring. To make OJT in solo endoscopic surgery efficient and safe, we developed a tele-mentoring system to be used in the operating room (OR) and conducted an experiment on ESS (1 case) in 2011 at Kansai Medical University (KMU), Japan.

**Description:** The experiment was approved by Research Ethics Committees of AIST and KMU. The patient gave written informed consent. A precise 3D-printed paranasal model of the patient was developed based on the patient’s CT images prior to the surgery. Materials in this model are incisable using clinical forceps [2]. When the trainee performed ESS on the patient, the trainer simultaneously operated on the model using an identical set of surgical instruments in the same OR. Both watched the 37” HD monitor displaying four windows:

- Top left: the trainer’s endoscopic image.
- Top right: the trainee’s endoscopic image, onto which the trainer’s finger/instrument, shot with a small close-up camera under the patient model, was superimposed. Thus the trainer could point at the trainee’s endoscopic image.
- Lower left: the front-view HyperMirror [3] (HM) image, a composition of two images, shot with cameras on the top of the patient’s and the model’s head, of the trainer interacting with the patient and the trainer interacting with the model. The two images were horizontally flipped and superimposed side-by-side so that the trainer and the trainee could compare their postures and angles of their instruments as if they were reflected in the virtual “mirror” in front of them.
- Lower right: the side-view HM image, another “virtual mirror” composition of the two images, shot with cameras on the left side of the patient and the model, using chromakeying (the trainer’s image had a blue background that was replaced by the trainee’s image). The angle of depression and the insertion depth of instruments could be compared on this image.

**Conclusion:** Superimposing the trainer’s forceps image, the same kind being used by the trainee, on the trainee’s endoscopic image was very useful. Fine movement of instruments on the actual patient’s endoscopic image could be taught very easily simply by showing it. The model was so precise that anatomical landmarks could be identified endoscopically. The trainee could show a matched endoscopic image of the patient and the model thus worked as a 3D surgical navigation. After identifying such important landmarks as the lamina papyracea and skull base on both endoscopic images, the trainer resected these dangerous parts on the model and showed the orbit and brain filled with wool. Thus the trainee could safely learn spatial/anatomic limits of the procedure and see complications demonstrated on the model and compare to real anatomy. The system can provide safe and effective OJT for young surgeons; however, development time and costs of patient specific models should be reduced for its frequent use.

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**References:**


**Disclosures:** Juli Yamashita, BSc, is a stockholder/partner/owner of SurgTrainer, Ltd., Japan.