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online
intraoperative US
simulation session
for neurosurgeons

Alessandro Perin MD PhD

USim: A New Device and App for Case-Specific, Intraoperative Ultrasound Simulation and Rehearsal in Neurosurgery. A Preliminary Study

Alessandro Perin, MD, PhD*

Francesco Ugo Prada, MD*

Michela Moraldo, Eng[‡]

Andrea Schiappacasse, Eng[‡]

**Tommaso Francesco Galbiati,
MD***

Enrico Gambatesa, MD*

Piergiorgio d’Orio, MD*

Nicole Irene Riker, BA*

Curzio Basso, PhD[‡]

Matteo Santoro, PhD[‡]

**Torstein Ragnar Meling, MD,
PhD[§]**

Karl Schaller, MD[¶]

Francesco DiMeco, MD*

*Neurosurgery Department, Fondazione IRCCS Istituto Neurologico Nazionale “C. Besta,” Milan, Italy; [‡]Camelot Biomedical Systems, Genova, Italy; [§]Department of Neurosurgery, Oslo University Hospital, Rikshospitalet, Oslo, Norway; [¶]Neurosurgery Department, Hôpitaux Universitaires de Genève, Geneva, Switzerland

Correspondence:

Alessandro Perin, MD, PhD,

BACKGROUND: Intraoperative ultrasound (iUS) is an excellent aid for neurosurgeons to perform better and safer operations thanks to real time, continuous, and high-quality intraoperative visualization.

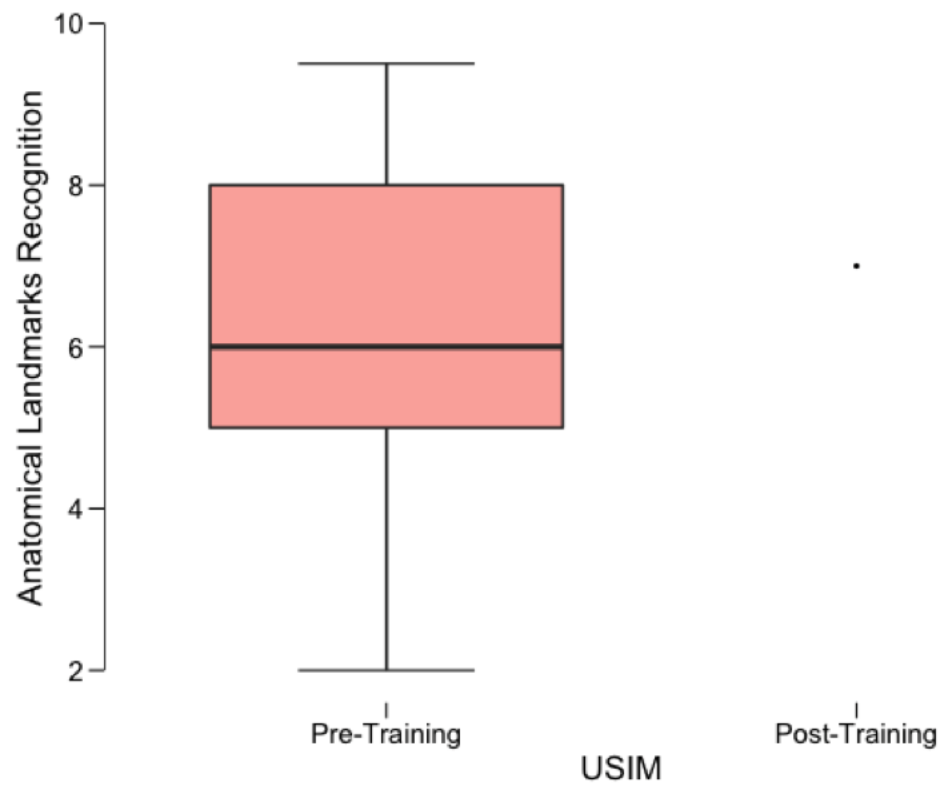
OBJECTIVE: To develop an innovative training method to teach how to perform iUS in neurosurgery.

METHODS: Patients undergoing surgery for different brain or spine lesions were iUS scanned (before opening the dura) in order to arrange a collection of 3-dimensional, US images; this set of data was matched and paired to preoperatively acquired magnetic resonance images in order to create a library of neurosurgical cases to be studied offline for training and rehearsal purposes. This new iUS training approach was preliminarily tested on 14 European neurosurgery residents, who participated at the 2016 European Association of Neurosurgical Societies Training Course (Sofia, Bulgaria).

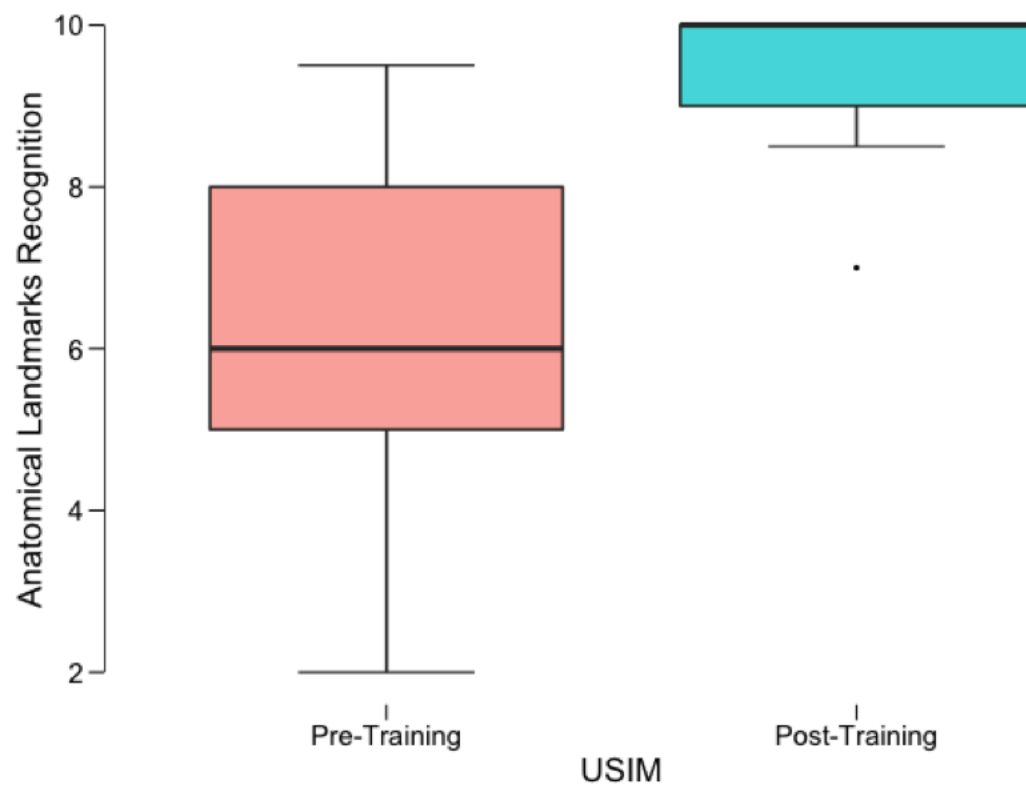
RESULTS: USim was developed by Camelot and the Besta NeuroSim Center as a dedicated app that transforms any smartphone into a “virtual US probe,” in order to simulate iUS applied to neurosurgery on a series of anonymized, patient-specific cases of different central nervous system tumors (eg, gliomas, metastases, meningiomas) for education, simulation, and rehearsal purposes. USim proved to be easy to use and allowed residents to quickly learn to handle a US probe and interpret iUS semiotics.

CONCLUSION: USim could help neurosurgeons learn neurosurgical iUS safely. Furthermore, neurosurgeons could simulate many cases, of different brain/spinal cord tumors, that resemble the specific cases they have to operate on. Finally, the library of cases would be continuously updated, upgraded, and made available to neurosurgeons.

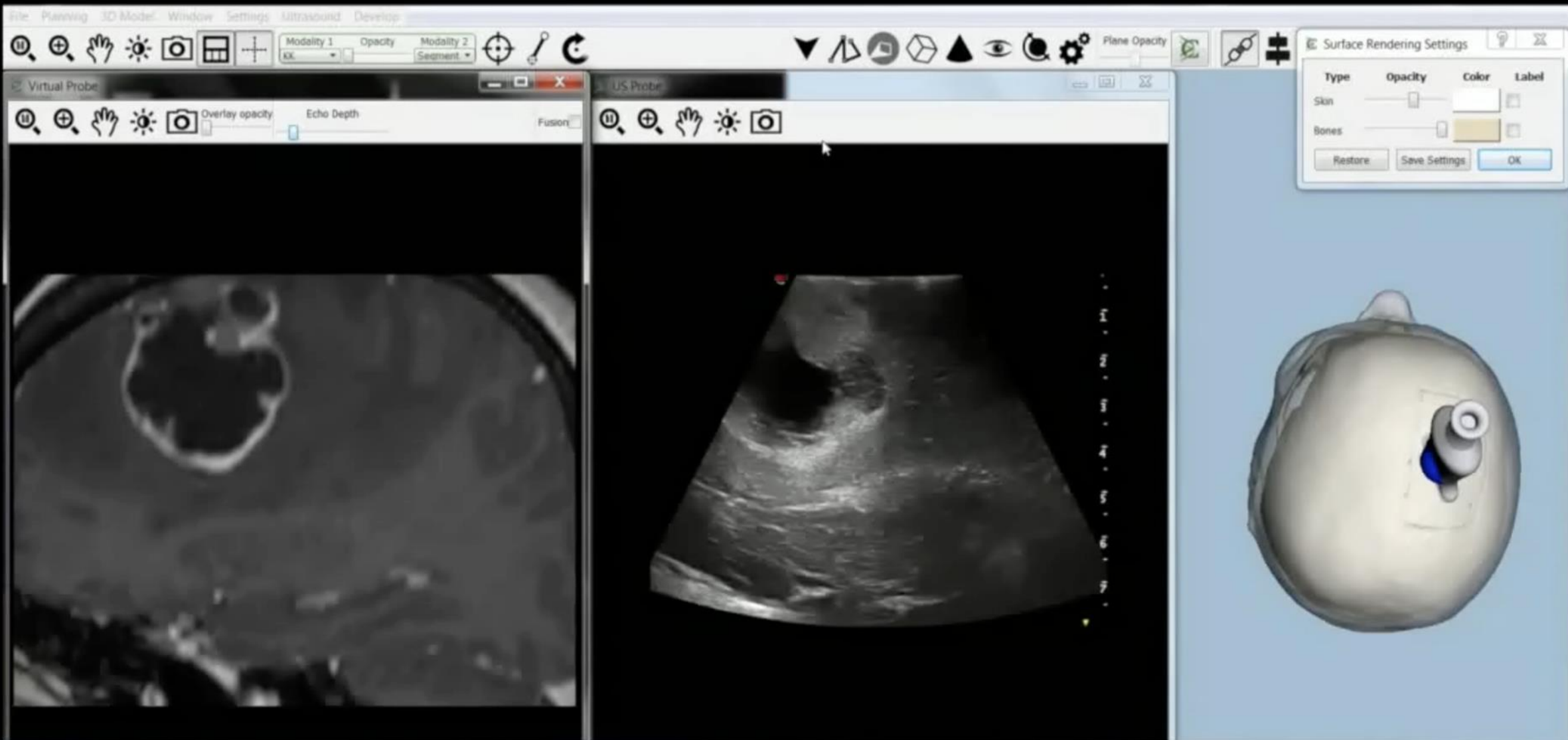
KEY WORDS: Intraoperative Ultrasound, Neuro-oncology, Neurosurgery, Rehearsal, Real-time Imaging, Simulation, USim



N = 152
p < .001



N = 152
p < .001



Pre-operative MR

Intra-operative US



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4000



Alessandro Perin

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Dr Sandeep G C Thank u

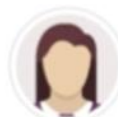
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