UNIVERSITY OF BRESCIA

PhD Program
in
TECHNOLOGY FOR HEALTH

SENSORIZED SIMULATOR FOR ENDOSCOPIC ENDONASAL TRANSSPHENOIDAL SURGERY

PhD Candidate: Giacomo Santona

Email: *g.santona@unibs.it*

XXXVII Cycle

Tutor: Prof. Francesco Doglietto

Co-tutors: Prof. Antonio Fiorentino and Prof. Mauro Serpelloni

Background

Classical training in neurosurgery is still largely based on initial experience in the operating room. The cadaver laboratory allows the acquisition of basic technical skills and of normal anatomy. Its use is limited, as pathology cannot be simulated effectively and consistently; furthermore, anatomy laboratory has high costs.

Objectives

The objective of the research is to develop a sensorized and customizable training simulator where surgeons can practice, in a safe environment, the endoscopic endonasal transsphenoidal approach to remove pituitary tumors.

Methodologies

In the era of 3D printing, it is possible to fabricate customized models that effectively replicate normal anatomy as well as pathology. This technology was used to create a modular and customized model for training in endoscopic transsphenoidal surgery, a novel, minimally invasive surgery that has a steep learning curve.

The aim of this project is to optimize this model and to further advance it, by adding sensors that will continuously detect the surgical instruments position during the simulation of different surgical tasks.

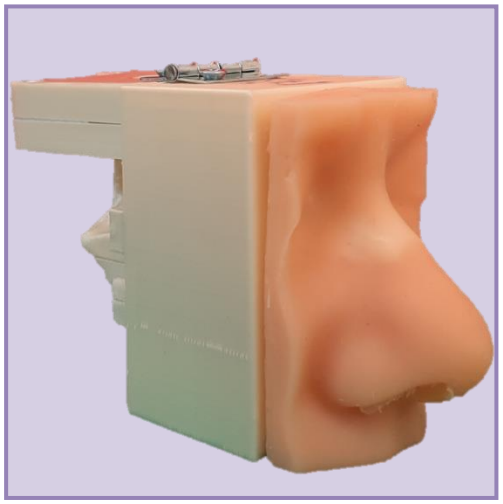

FIGURE 1 *A PROTOTYPE OF THE TRAINING SIMULATOR*

Expected Results and Impact

The simulator will be able to evaluate the quality of the performance of a novel neurosurgeon, as compared to the experienced. The aim is then to create and validate an innovative training simulator that will be used to advance technical skills before the entrance in the operating room of the surgeon in training.