UNIVERSITY OF BRESCIA

PhD Program
in
TECHNOLOGY FOR HEALTH

BRAIN RETRACTION: dynamic-mechanical characterization of brain tissue and development of novel devices

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XXXV Cycle

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Background

Endoscopic skull base surgery (ESBS) is a new evolving field to access the skull base and intracranial areas in a minimally invasive way. Operations complexity has been increasing significantly as the advantages of endoscopic vision are being applied to different skull base area to treat complex intracranial pathologies. With the increase in the time of surgery, the need for an endoscope holder has become evident. Robotics has been applied to multiple surgical specialties, but commercially available robotic systems indeed have not been designed for ESBS and show several limitations when applied to it.

Objectives

Recently a hybrid robotic solution for ESBS has become available for clinical practice in endoscopic skull base surgery. The first our goal is to implement robot controls with head movements in order to validate and optimize it. Another objective is to test and validate its use also in ventricular surgery. The third object is to exploit endoscopic vision also in transcranial surgery designing work chambers perfectly suitable for introducing the endoscope easily while providing safety for the surrounding brain.

Methodologies

The possibility of carrying out part of this project also in the Brescia Anatomy Laboratory would allow to respect the Lancet criteria of phase 1 of research development in surgery as established by the evidences in literature. Therefore, achievement of our project objectives would allow us to scientifically test and validate a wider use of the hybrid robot by bringing innovations to the future of neurosurgical techniques.

Expected Results and Impact

To achieve these results, multidisciplinary team collaboration is essential. We foresee in the near future the clinical application of “hybrid” robot-assisted endoscopic cranial surgery.