ROSA ONE®

ZIMMER BIOMET
Moving You Forward.™

Brain

ROBOTIC ASSISTANT

FOR MINIMALLY INVASIVE NEUROSURGERY

Traditional neurosurgery is performed via a craniotomy, a maximally invasive procedure that can result in long recovery times, pain, and scarring.

ROSA ONE® Brain is a robotic solution to assist surgeons in planning and performing complex neurosurgical procedures through a small drill hole in the skull. The robotic technology enables surgeons to perform less invasive procedures than traditional craniotomies - enabling smaller incisions and potentially enhancing patient comfort.[1]

INNOVATIVE

TECHNOLOGY AND FUNCTIONALITY

Pre Operative Planning

With ROSA ONE Brain, the surgical procedure begins before the surgeon enters the operating room. Creating the surgical plan pre-operatively may reduce OR time and patient anesthesia time.

Dexterity and Rigidity

ROSA ONE's arm is engineered with 6-degrees-of-freedom, allowing exceptional dexterity and flexibility to access surgical sites. Once trajectory has been set, the rigidity of the robotic arm reduces unintended movement.

Workflow Integration

ROSA ONE features force torque sensor technology, which creates a seamless interface between surgeon and technology. The robot technology enhances the surgeon's skill, not replaces it.

Accuracy and Speed

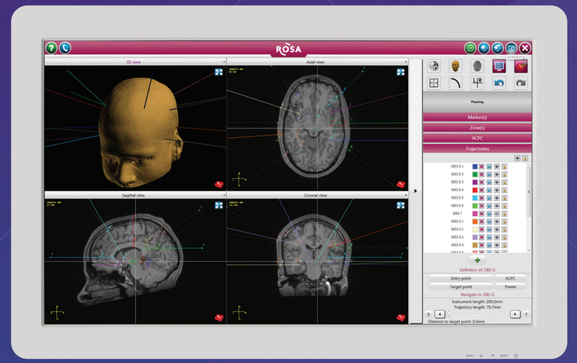
The high accuracy provided by the robotic arm[2] makes ROSA ONE an ideal platform for neurosurgery- ensuring the instruments are placed in the planned target while avoiding critical structures. The speed with which the robot can move between trajectories can lead to significant time savings in multi-implant applications.[3]

ROBOTIC

ASSISTED WORKFLOW

Step 1: Pre-Operative Planning

- Advanced planning software assists surgeons in creating detailed 3D maps of the patient's brain.
- Surgeons examine images of the brain from multiple views and use this data to develop an effective surgical strategy.
- ROSA ONE Brain works as a surgical GPS to guide the surgeon to the intended targets while avoiding critical structures.



Step 2: Minimally Invasive Registration

- Contactless registration technology pairs laser sensors with a robotic arm to record the patient's position and anatomy.
- The system executes detailed scans of the patient's facial features - matching the scan to pre-operative images. Using this technology, registration is performed without the use of invasive landmarks.
- Alternatively, traditional registration methods such as skin or bone fiducials, or stereotactic frame registration may be employed.
- Registration technology streamlines workflow – separating the image acquisition, planning, and operative phases of the procedure. Imaging and planning can be completed prior to the day of surgery.

Step 3: Accurate^2 Robotic Guidance

- Robotic technology guides surgical instruments based on pre-operative mapping and registration.
- Advanced manipulation of the force torque sensor allows the robot to act as a natural extension of the surgeon, interacting seamlessly with the existing workflow while providing valuable advantages of robotic technology.
- ROSA ONE includes assisted navigation capabilities – enabling surgeons to display and visualize instruments on patient imaging in real time.

MULTIPLE PROCEDURES

ROSA ONE Brain can assist in a variety of neurosurgical procedures, such as:

- Stereo Electroencephalography (SEEG)
- Deep Brain Stimulation (DBS)
- Stereotactic Biopsy
- Ventricular Endoscopy
- Transnasal Endoscopy

MULTIPLE

STAKEHOLDER BENEFITS

Zimmer Biomet is committed to providing value to surgeons, clinicians and healthcare providers, while simultaneously improving the lives of patients worldwide. ROSA ONE Brain leverages robotic-assisted technology to maximize accuracy[2], speed[3], and flexibility of neurosurgical procedures and help healthcare organizations manage operational costs.

PATIENT

- Minimally invasive procedure – enhanced patient comfort[1]
- Simplified pre-operative procedures
- Speed of procedures – minimizes anesthesia time[3]
- Procedure can be performed without shaving the head

SURGEON

- Data-driven informed decisions - preoperative mapping & visualization
- Simplified and streamlined workflow - mapping and registration
- Collaborative mode allows the surgeon complete control of the robotic arm
- Reduced fatigue due to shorter procedures[3]

HOSPITAL

- Reduced OR costs due to shortened procedures[3] - potential increase in OR turnover rate
- Value-based device - multiple applications on a single platform
- Enhanced community visibility as forward-thinking organization
- Minimally invasive procedures may enhance patient comfort[1] - potential to increase satisfaction

References

1. Tandon et. al. Analysis of Morbidity and Outcomes Associated with Use of Subdural Grids vs Stereoelectroencephalography in Patients with Intractable Epilepsy. JAMA Neurol. doi:10.1001/jamaneurol.2019.0098 • 2. ROSA ONE Brain Performance Bench Testing, 510(K) Premarket Notification, K182417 • 3. Gonzalez-Martinez et. al. Technique, Results, and Complications related to Robot-Assisted Stereoelectroencephalography. Neurosurgery 78:169–180, 2016.

For more information on on ROSA ONE® Brain and other Surgery Assisting Technologies, please contact us at:

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