



SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Department of Biomedical Engineering

Vision Tit 2

Vision Title 3

Course Name: **Robotics and Automation in Medicine**

TITLE : Neurosurgery



Introduction to Neurosurgery

History of Neurosurgery

- Neurosurgery has a long and fascinating history, dating back to ancient times. In ancient Egypt, surgical tools were used to treat head injuries and other neurological conditions. In the 19th century, advances in anesthesia and surgical techniques made it possible to perform more complex neurosurgical procedures.
- In the 20th century, the development of new imaging technologies, such as CT scans and MRI, revolutionized the field of neurosurgery. Today, neurosurgeons use a variety of modern techniques, including minimally invasive surgery and stereotactic radiosurgery, to treat a wide range of neurological condition



DEFINITION

- Neurosurgery is the branch of medicine that deals with surgery of the nervous system. The nervous system is made up of the central nervous system and the peripheral nervous system.
- Neurosurgery or neurological surgery, known in common parlance as brain surgery, is the medical specialty concerned with the surgical treatment of disorders which affect any portion of the nervous system including the brain, spinal cord and PNS.





IMPORTANCE OF NEUROSURGERY



- Neurosurgery plays a critical role in the treatment of many serious and life-threatening conditions. By using advanced techniques and technologies, neurosurgeons are able to perform complex surgeries with greater precision and accuracy, resulting in better outcomes for patients. Additionally, advances in neurosurgery have led to new treatments and therapies for a wide range of neurological conditions, improving the quality of life for millions of people around the world.



ROBOTICS IN NEUROSURGERY



- Robot-assisted neurosurgery uses an advanced surgical tool called ROSA Brain to perform minimally invasive procedures in the brain. ROSA stands for robotic operating surgical assistant. It combines a robotic arm with the ability to get detailed pictures of your child's brain.
- Robotic surgery provides several benefits, such as remote control of the surgical procedure, higher quality, more accurate vision of the surgical site, motion scaling, higher accuracy of the surgical incision, and a higher degree of freedom.
- Robotics is a fast-moving discipline, which – in tandem with advances in artificial intelligence and machine learning – is transforming the practice of neurosurgery. There is hope that robotics will eliminate mechanistic errors, reduce operating times and provide the same or even greater resective margins with minimal-access surgery.



ROBOTICS IN NEUROSURGERY

- **Personalized Surgical Planning**

- Robotics in neurosurgery has the potential to revolutionize personalized surgical planning. By using advanced imaging techniques and machine learning algorithms, surgeons can create detailed 3D models of the patient's brain and plan surgical procedures with greater precision and accuracy

- **Improved Precision**

- Robotic systems in neurosurgery can also improve precision and reduce the risk of complications. By using robotic arms and other advanced technologies, surgeons can perform complex procedures with greater control and accuracy, resulting in better outcomes for patients.



Robotic Technology in Neurosurgery



Advantages

Improved precision and accuracy in surgical procedures, resulting in better outcomes for patients.

Reduced risk of complications and infections, as the robotic system is less invasive and can be controlled remotely.

Increased efficiency and productivity, as the robotic system can perform repetitive tasks with greater speed and accuracy.

Limitations

High cost of equipment and maintenance, which can limit access to robotic technology for some hospitals and clinics.

Limited flexibility and adaptability, as the robotic system may not be able to perform certain procedures or adapt to unexpected situations.

Potential for technical malfunctions or errors, which can compromise patient safety and outcomes.



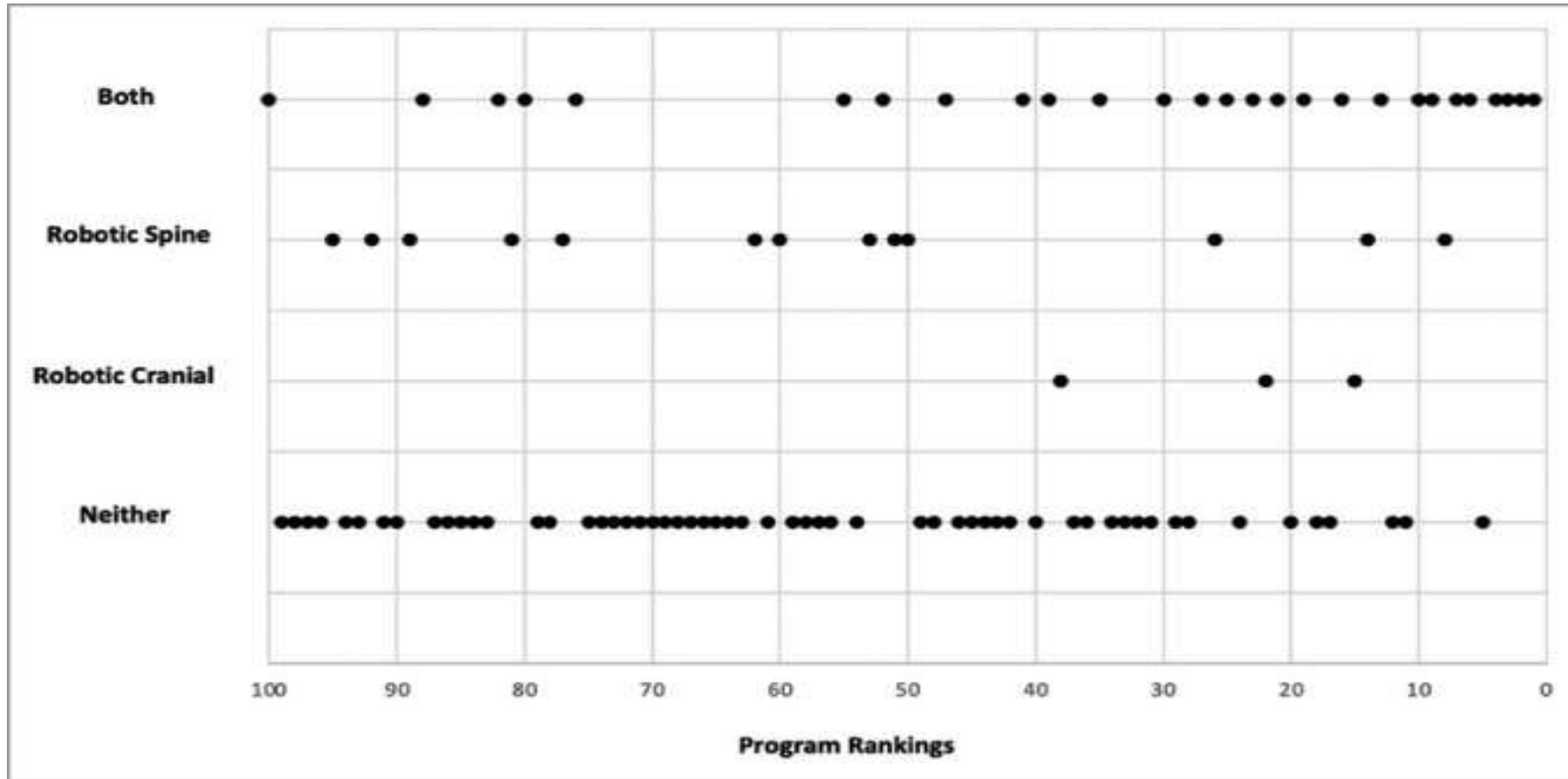
CHALLENGES AND LIMITATION



- Implementing robotics in neurosurgery presents several challenges and limitations, including:
- Cost: Robotic systems can be expensive, and the cost of training and maintaining them can be prohibitive for some hospitals and clinics.
- Technical considerations: Robotic systems require a high level of technical expertise to operate, and there may be limitations in terms of the types of procedures that can be performed using robotics.
- Patient safety: There are concerns about the safety of using robotics in neurosurgery, particularly in terms of the potential for errors or malfunctions during procedures.



ROBOTICS NEUROSURGICAL PROGRAM





Thank You!