



## PERSPECTIVE

## Brief Note on Neurosurgery and its Methods

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### Description

The medical specialty of neurosurgery or neurological surgery, also known as brain surgery, is concerned with the prevention, diagnosis, surgical treatment, and rehabilitation of disorders affecting any part of the nervous system, including the brain, spinal cord, central and peripheral nervous systems, and cerebrovascular system.

### Neurosurgery methods

In modern neurosurgery, neuroradiology procedures are employed to diagnose and treat patients. Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Magneto Encephalography (MEG), and stereotactic radiosurgery are examples of computer assisted imaging. Intraoperative MRI and functional MRI are used in several neurosurgical procedures.

In conventional open surgery, the neurosurgeon drills a wide hole in the skull to gain access to the brain. Microscopes and endoscopes are currently being employed in techniques that involve smaller apertures. Small craniotomies, along with high-resolution microscopic viewing of neural tissue, produce outstanding results. Open approaches, on the other hand, are still commonly employed in trauma and emergency circumstances.

In several parts of neurological surgery, microsurgery is used. In EC-IC bypass surgery and restorative carotid endarterectomy, microvascular techniques are applied. Aneurysm clipping is carried out under microscopic vision. Microscopes or endoscopes are used in minimally invasive spine surgery. Microsurgery is used in procedures including microdiscectomy, laminectomy, and artificial disc replacement.

Neurosurgeons can use stereotaxy to address a small target in the brain through a small aperture. This is utilised in functional neurosurgery, such as in the case of Parkinson's disease or Alzheimer's disease, when electrodes are

implanted or gene therapy is administered with high level of accuracy.

Intraventricular haemorrhages can potentially be successfully evacuated using a mix of open and stereotactic surgery. Surgical navigation, computer-assisted surgery, guided surgery, and stereotactic navigation are all terms used to describe traditional surgery that uses image guidance technologies. Image-guided surgery systems, such as Curve Image Guided Surgery and Stealth Station, use cameras or electromagnetic fields to capture and relay the patient's anatomy and the surgeon's precise movements in relation to the patient to computer monitors in the operating room, similar to a car or mobile Global Positioning System (GPS). These powerful electronic devices are utilised to help orient the surgeon with three-dimensional views of the patient's anatomy, including the tumour, both before and during surgery. Real-time functional brain mapping has been employed to identify specific functional regions using electrocorticography.

Neurosurgeons frequently use minimally invasive endoscopic surgery when it is appropriate. Pituitary tumours, craniopharyngiomas, chordomas, and the closure of CSF fluid leaks are all treated using endoscopic endonasal surgery. Intraventricular bleeding, hydrocephalus, colloid cysts, and neurocysticercosis are all treated *via* ventricular endoscopy. Endonasal endoscopy is sometimes performed in collaboration with neurosurgeons and ENT surgeons. Neurosurgeons treat craniofacial diseases and disturbances in cerebrospinal fluid circulation, and they occasionally collaborate with maxillofacial and plastic surgeons.

In the treatment of tumours and AVMs, neurosurgeons collaborate with radiation oncologists to use stereotactic radiosurgery. Gamma knife, Cyberknife, and Novalis Radiosurgery are among the radiosurgical techniques employed. Aneurysms, AVMs, carotid stenosis, strokes, spinal abnormalities, and vasospasms are all treated with endovascular

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image guided operations in endovascular surgical neuroradiology. Endovascular procedures include angioplasty, stenting, clot retrieval, embolization, and diagnostic angiography. The insertion of a Ventriculo-Peritoneal shunt is a routine

technique in neurosurgery (VP shunt). This is commonly used in paediatric treatment to treat congenital hydrocephalus. Normal pressure hydrocephalus is the most prevalent reason for this surgery in adults.