

Microsurgical Technique

□ Definition

Microsurgical technique refers to surgical procedures performed under high magnification using an operating microscope and specialized fine instruments. It enables precise manipulation of delicate neurovascular and parenchymal structures, essential in neurosurgery, otology, ophthalmology, and reconstructive surgery.

□ Core Elements

- **Operating microscope:** High-resolution, variable magnification with coaxial illumination.
- **Microsurgical instruments:** Fine-tipped dissectors, microforceps, scissors, bipolar forceps.
- **Microsutures** and microvascular clamps in vascular procedures.
- Use of **neuronavigation**, **neurophysiological monitoring**, and **high-speed drills** when indicated.

□ Principles in Neurosurgery

- **Atraumatic dissection** and preservation of normal neurovascular structures.
- Maintenance of **clear surgical planes**, often subarachnoid or subpial.
- Precise **hemostasis** using bipolar coagulation.
- Use of **CSF drainage** and **brain relaxation techniques** to avoid retraction injury.
- **Dynamic retraction** with suction or handheld instruments rather than fixed blades.

⚙ Applications

- **Tumor resection:** gliomas, meningiomas, schwannomas.
- **Vascular surgery:** aneurysms, AVMs, bypasses.
- **Skull base surgery:** anterior, middle, posterior fossa.
- **Epilepsy surgery:** temporal lobectomy, selective amygdalohippocampectomy.
- **Spine microsurgery:** herniated discs, intradural tumors.

□ Advantages

- Enhanced **visualization and precision**
- Minimizes **neural trauma**
- Enables **complex resections or reconstructions** with low morbidity
- Facilitates **neurovascular preservation**

⚠ Limitations and Challenges

- Requires extensive **training and dexterity**
- Prolonged operating times in certain cases
- High initial investment in **equipment and infrastructure**

▢ References

- Yasargil MG. Microneurosurgery. Thieme.
- Spetzler RF, Kalani MYS. The Techniques of Microsurgery in Neurosurgery. Thieme.
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