Endoscope

The endoscope has traditionally been used in neurosurgery to access a lesion within a natural body cavity.

The neurosurgical instruments are introduced via working channels that are located within the endoscope.

The challenge has been to access and resect deep-seated intraparenchymal lesions using a minimally invasive endoscopic technique. Endoscopic endonasal trans-sphenoidal surgery has gained increasing acceptance by otolaryngologists and neurosurgeons. Surgical procedures of the skull base include exposure, resection, and base reconstruction. These approaches start at the sphenoid sinus, which provides a reference point to important vascular and neural structures. The endoscopic endonasal approach is optimal in paramedian ventral skull base tumors, allowing wide access to the ventral skull base regions and allowing early devascularization of the tumor without retraction of the brain. Limited exposure results in limited “injury” to surrounding tissue and consequently reduced post-operative pain, a shorter length of hospital stay, a reduction in the time to return to work, and decreased overall cost [1)].

It is mainly used in ventricle endoscopy.

The first endoscope is credited to Philipp Bozzini, a German physician, who demonstrated the “Lichtleiter”, a candlelit tube, in 1806 to the Academy of Medicine in Vienna [2)]. This was vastly improved in 1877 by Max Nitze, a German urologist, with the addition of lenses for magnification and an internal light source noting “to light up a room one must carry the lamp inside [3)]. ” His first endoscope used a water-cooled platinum wire for illumination but Edison's invention of the incandescent bulb in 1879 allowed the development of a cystoscope that no longer required water cooling. Using his invention, Nitze was the first person to perform endoscopic surgery with wire loops and to take endoscopic pictures. The next technological breakthrough occurred almost a century later when Harold Hopkins in 1960 vastly improved optical efficiency by inserting glass rods and neutral gas between the lenses. Around the same time, Basil Hirschowitz, an American gastroenterologist, developed a flexible endoscope using fiberoptics. The modern rigid endoscope was invented by Karl Storz in 1965 when he combined the optical rod system of Hopkins and used fiberoptics to carry illumination down to the tip of the endoscope [4)].

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see Angled endoscope

see Three dimensional endoscope

see Flexible endoscope

see Rigid endoscope

Indications

see Neuroendoscope

1)
Gao H, Liu C, Zhang Y. Neuro-endoscope for skull base tumors. Clin Neurol Neurosurg. 2018 May 14;170:102-105. doi: 10.1016/j.clineuro.2018.05.009. [Epub ahead of print] Review. PubMed PMID: 29772400.
2)
Doglietto F, Prevedello DM, Jane JA, Jr, Han J, Laws ER., Jr Brief history of endoscopic transsphenoidal surgery-from Philipp Bozzini to the First World Congress of Endoscopic Skull Base Surgery. Neurosurg Focus. 2005 Dec 15;19(6):E3.
3)
Mouton WG, Bessell JR, Maddern GJ. Looking back to the advent of modern endoscopy: 150th birthday of Maximilian Nitze. World J Surg. 1998 Dec;22(12):1256–1258.
4)
Linder TE, Simmen D, Stool SE. Revolutionary inventions in the 20th century. The history of endoscopy. Arch Otolaryngol Head Neck Surg. 1997 Nov;123(11):1161–1163.