# Suboccipital craniotomy

- Unilateral Hearing Loss as the Sole Presentation of Extensive Intracranial Epidermoid Cyst: A Case Report
- Right Cerebellomedullary Cistern Epidermoid: Microsurgical Resection Via Far Lateral Transcondylar Approach: 2-Dimensional Operative Video
- When an aneurysm pretends to be a tumor: thrombosed posterior inferior cerebellar artery aneurysm mimicking a neoplasm in a pediatric patient. Illustrative case
- Study protocol for a randomized controlled trial comparing pulse pressure variation (PPV) and central venous pressure (CVP) guidance for fluid responsiveness assessment in neurosurgical patients undergoing posterior fossa tumor resection in park bench position
- Treatment of a Large Hemorrhagic Midbrain Cavernoma Within the Silvian Aqueduct in a Five-Year-Old Girl-A Case Report
- Mature hyperdense teratomas in the posterior fossa
- Surgical resection of cerebellum cavernous malformation via suboccipital trans-horizontal fissure approach: Two-dimensional video
- Unmasking a Hemangioblastoma: A Case of Obstructive Hydrocephalus in a 43-Year-Old Male Patient

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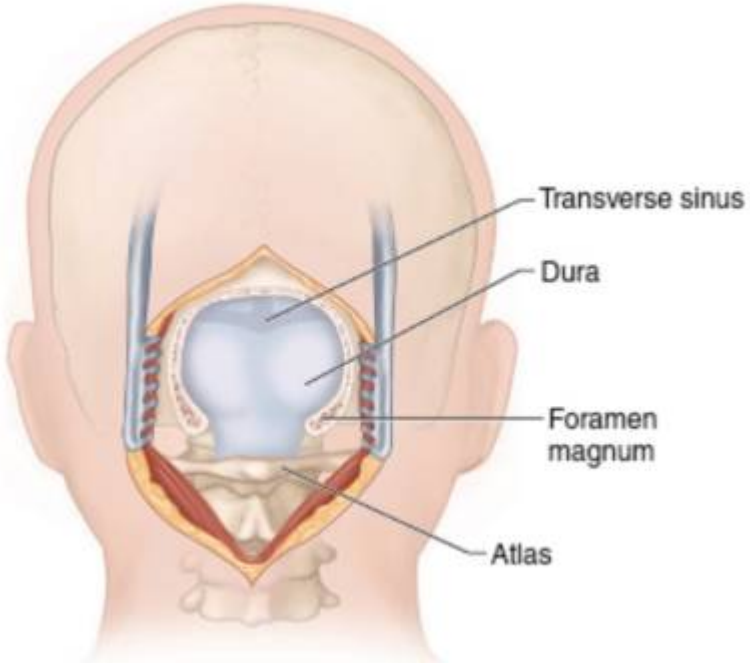


see Suboccipital approach.

see Retrosigmoid craniotomy.

see Far lateral suboccipital craniotomy

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Suboccipital craniotomy (SOC) can be classified into three types: midline, paramedian and lateral according to the site of linear incision. They are subdivided horizontally into cranial, intermediate and

caudal, while the latter of the lateral SOC should be included into the paramedian caudal one.

Sitting position for the craniotomy has several advantages over other positionings in spite of several known drawbacks especially air embolism: cleanliness of the operative field, good anatomical orientation, wider operative spaces obtained by gravitational downward displacement of the cerebellar hemisphere above all.

Linear incision is considered to have no definite drawbacks as compared with other incisions such as the horse shoe or the hockey-stick incision and rather have advantages such as enabling effective access to the surgical target by the use of navigation, simpleness of craniotomy in the opening and the closure, and less pseudomeningocele complication.

Although cranial and intermediate lateral SOCs are mainly for lesions in the upper and middle CP angle such as acoustic neurinomas or meningioma besides MVD for trigeminal neuralgia, these are applied also for cavernomas of the tectal and cerebellar peduncle, and meningiomas or chordomas of the upper and middle 1/3 of the petroclival region.

Importance of the SCTTA by cranial paramedian SOC for the management of lesions in the temporoposteromedial region including the tentorium and its incisura was emphasized and peduncular lesions at the lamina tecti and pons as well. Caudal paramedian SOC is appropriate for lesions in the lower CP angle along with MVD for hemifacial spasm and is furthermore applicable for foramen magnum meningiomas or lower clivus meningiomas by TVDRA.

Cranial midline SOC (paraculminar approach) is applicable for tumors of pineal regions and for lesions at the midbrain, thalamus, posterior part of the IIIrd ventricle. The TFUTA by lower midline SOC enables simple access to the IV ventricle and its floor for management of lesions at the tegmentum pontis such as cavernomas.

Statistics of a series of consecutive 1,573 surgical cases in the sitting position (1994-2003) are presented including detection rate of air embolism on the anesthetic charts.

Air embolism was most frequent (21%) in the lateral SOC as compared with other SOCs (8.8% on the average). This happened during the extradural procedures in 80% and in 20% in the intradural procedures. Some important technical managements of bridging veins, venous plexus and cerebellar retraction are discussed in carrying out the SOCs [1)].

# Complications

# 1. Neurological Complications

- **Cerebellar Mutism Syndrome (CMS)** - More common in pediatric patients, characterized by speech impairment, emotional lability, and motor deficits.
- **Brainstem Injury** - Can lead to cranial nerve palsies, respiratory depression, and autonomic dysfunction.
- **Cerebellar Swelling or Hemorrhage** - May cause posterior fossa syndrome with ataxia, dysmetria, or obstructive hydrocephalus.
- **Hydrocephalus** - Resulting from impaired cerebrospinal fluid (CSF) dynamics due to tumor resection, blood products, or arachnoid scarring.
- **Cranial Nerve Dysfunction** - Particularly affecting CN VI, VII, IX, X, and XII, leading to

dysphagia, dysphonia, or facial weakness.
- **Hearing Loss** - Damage to the cochlear nerve, often from manipulation near the cerebellopontine angle.

## 2. Vascular Complications

- **Vertebral Artery Injury** - Can cause life-threatening hemorrhage or posterior circulation stroke.
- **Venous Sinus Injury** - Damage to the transverse or sigmoid sinuses can cause massive hemorrhage or venous infarction.
- **Posterior Inferior Cerebellar Artery (PICA) Infarction** - This leads to Wallenberg syndrome (lateral medullary syndrome) with symptoms such as ataxia, vertigo, and dysphagia.

Variability in the location of the torcular can be observed in congenital cranial malformations. This study explores the feasibility of conducting posterior fossa surgery in cases of an extremely low-positioned torcular. A suboccipital craniotomy was performed on a patient with an extremely low torcular, without any associated cranial malformations. A left cerebellar hemisphere tumor was accessed through the narrow space (20 mm) between the low torcular and foramen magnum. The left cerebellar hemisphere tumor was resected. The patient experienced a favorable postoperative course with no complications. Significant variability in the location of the torcular can appear in patients without cranial malformation. This is the first report demonstrating the applicability of suboccipital craniotomy in patients with an extremely low torcular [2)]

## 3. Infectious Complications

- **Meningitis** - Risk due to CSF leaks or wound infections.
- **Wound Infection** - May progress to osteomyelitis or abscess formation.
- **Cerebrospinal Fluid Leak** - Can lead to pseudomeningocele or meningitis.

## 4. Surgical Site-Related Complications

- **Pseudomeningocele** - CSF accumulation due to improper dural closure or leak.
- **Dural Sinus Thrombosis** - From excessive retraction or sinus injury.
- **Wound Dehiscence** - Poor healing, especially in patients with diabetes or prior radiation.
- **Postoperative Pain and Occipital Neuralgia** - Due to muscle dissection or occipital nerve injury.
- **Cerebellar Sag or Syndrome of the Trephined** - Rare but can occur if excessive CSF drainage postoperatively.

## 5. Systemic Complications

- **Deep Venous Thrombosis (DVT) / Pulmonary Embolism (PE)** - Due to prolonged surgery and immobility.
- **Respiratory Complications** - Aspiration pneumonia from cranial nerve dysfunction.
- **Hypertension and Hemodynamic Instability** - Due to autonomic dysfunction or excessive

intraoperative fluid shifts.

## Prevention and Management

- **Meticulous surgical technique** to minimize vascular and neural injury.
- **CSF diversion techniques** (EVD, VP shunt) in cases at risk for hydrocephalus.
- **Postoperative imaging** (CT/MRI) to assess for hemorrhage, edema, or ischemia.
- **Early rehabilitation** to improve neurological recovery and prevent DVT.
- **Careful dural closure and lumbar drainage** in high CSF leak risk cases.
- **Infection prophylaxis** with perioperative antibiotics.

1)
Yonekawa Y. [Operative neurosurgery: personal view and historical backgrounds (8) suboccipital craniotomy-sitting position-linear incision]. No Shinkei Geka. 2011 Aug;39(8):789-809. Japanese. PubMed PMID: 21799230.
2)
Zuo D, Zheng W. Suboccipital Craniotomy in the Presence of Extremely Low Torcular Herophili. J Craniofac Surg. 2025 Mar 18. doi: 10.1097/SCS.0000000000011241. Epub ahead of print. PMID: 40100161.