# Endoscopic Keyhole Supracerebellar Transtentorial Approach for Posterior Temporal and Inferior Occipital Lesions

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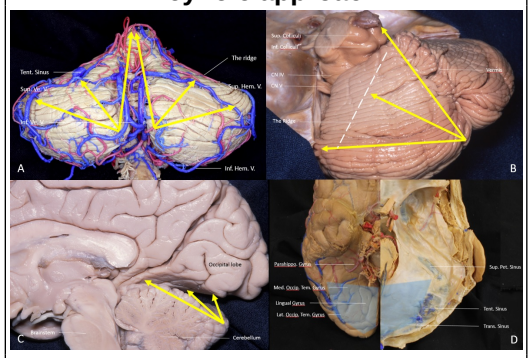
Resection of inferior temporal and occipital lesions can result in morbidity due to their proximity to visual tracts, Wernicke's area, and the vein of Labbé. In an attempt to mitigate this risk, we have explored using transtentorial approaches. We compared the area of surgical cadaveric exposure of keyhole supracerebellar transtentorial (SCTT) approaches using 0o endoscopes, and report clinic cases.

In cadavers, three different variations of the SCTT approach were performed: 1) median, 2) paramedian, and 3) lateral. A 2.5cm wide x 2.0cm high keyhole craniotomy was performed on cadavers for each approach. the median SCTT keyhole approach traversed the thickest bone and muscles, narrowing the range of bilateral surgical view obtained with this approach. Inferior vermian veins obstruct the medial entry point in this approach. Also, the convex shape of cerebellum hinders the anterolateral surgical view. Because of these limitations, the median SCTT keyhole approach allows adequate surgical view only to the posterior part of inferior occipital region. The paramedian SCTT approach provides a surgical view for inferior occipital region lesion resection except for the tentorial incisura region. After cutting the tentorium, the access yields sufficient angles for resecting dural-based tumors or parenchymal lesions located above the petrous part of temporal bone, and mediobasal temporal lobe lesions. The lateral SCTT approach gives access to lesions located close to the tentorial incisura. A surgical angle to access the mediobasal temporal region can be achieved also after incising the tentorium. The thickness of muscles and bone dissected in this approach are least when compared with paramedian and median approaches. On patients' CT images (n=20) confirmed cadaveric study findings: inion bone thickness is 17±4mm and midline muscle thickness is 19±4mm, which are thicker than the same level paramedian and lateral part of skull and muscles (paramedian bone thickness 7±2mm, muscle thickness 15±4mm; lateral bone thickness 7±2mm, muscle thickness 10±3mm) (P<0.05). Comparative patient cases included 2 supratentorial tentorial meningiomas and 1 hippocampal cavernous malformation removed using the paramedian SCTT keyhole approach, and 1 occipital glioblastoma removed using the lateral SCTT keyhole approach. All cases used neuronavigation for preoperative surgical planning, and gross total resection of lesions was achieved in all cases without added deficit.

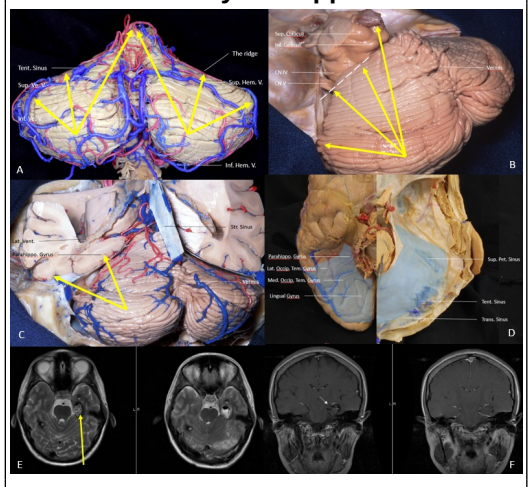
SCTT approach is a safe and valuable for resection of posterior temporal and inferior occipital lesions. Carefully selected keyhole SCTT approaches in combination with endoscopic technique allow surgeons anatomic advantages in accessing these difficult lesions.

**The endoscopic cadaveric median SCTT keyhole approach**



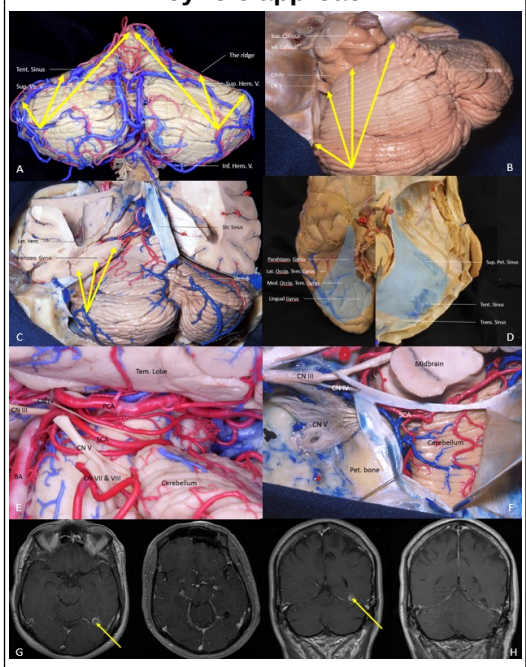
A, B, and C: Yellow arrows show the surgical trajectories of median SCTT keyhole approach. D: The surgical region (blue area) best visualized through the endoscopic median SCTT keyhole approach.

**The endoscopic cadaveric paramedian SCTT keyhole approach**



A, B, and C: Yellow arrows show the surgical trajectories of paramedian SCTT keyhole approach under the 0o endoscope. D: Surgical region (blue area) of cadaveric paramedian endoscopic SCTT keyhole approach.E and F: illustrative case

**The endoscopic cadaveric lateral SCTT keyhole approach**



A, B, and C: Yellow arrows show the surgical trajectories of the lateral SCTT keyhole approach.D: Surgical region (blue area) of endoscopic lateral SCTT keyhole approach. E and F: The anatomy around tentorial incisura. G and H: illustrative case.

**Skin, muscle, and bone thicknesses for median, paramedian, and lateral SCTT keyhole approaches on CT scan (n=20)**

| Thickness (mm) | Median | Paramedian | Lateral |
|---|---|---|---|
| Skin | 10.4±3.0 | 11.4±3.4# | 10.1 ±3.6 |
| Muscle | 18.7±4.0* | 14.9±3.6# | 9.6±3.4 |
| Bone | 17.0±4.0* | 6.8±2.1 | 7.0±2.1 |

Table 1: Skin, muscle, and bone thicknesses for median, paramedian, and lateral SCTT keyhole approaches on CT scan (n=20).

* Inion bone and the midline muscle thickness are thicker than the same level paramedian and lateral part of skull and muscles (P<0.05) respectively.

# Paramedian skin and muscle thickness are thicker than the same level lateral part of skull and muscles (P<0.05) respectively.