

# Posterior Fossa Craniotomy for Tumor Removal Leads to Fewer Complications than Craniectomy: A Single Center Prospective Study in a Consecutive Series of 152 Patients.

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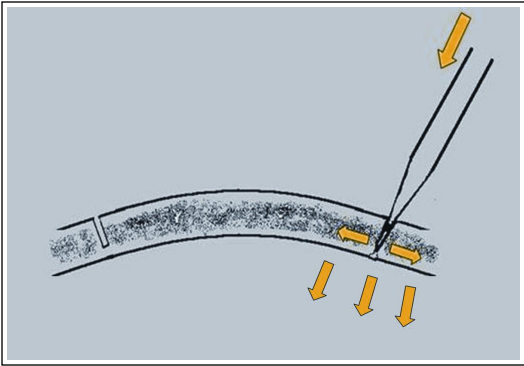


## Introduction

Posterior fossa surgery traditionally implies permanent bone removal. Although suboccipital craniectomy offers an excellent exposure, it could lead to complications. Thus, in many centers, craniotomy is considered a valuable alternative to craniectomy. The objective of this study was to compare the post-operative complications after craniotomy or craniectomy for posterior fossa surgery. Thus, in many centers, craniotomy is considered a valuable alternative to craniectomy.

## Methods

Data were prospectively collected for a consecutive series of patients who underwent either posterior fossa craniotomy or craniectomy for tumor resection. Patients were divided into two groups based on the surgical procedure performed and safety, complication rates and length of hospitalization were analyzed. Craniotomies were performed with Control-Depth-Attachment drill and chisel, while craniectomies with perforator and rongeurs.



## Results

One-hundred-fifty-two patients were included in the study (craniotomy n=100, craniectomy n=52). No dural damage was detected after bone removal in both groups. Total complication rate related to the technique itself was 7% for the craniotomy group and 32.6% for the craniectomy group ( $p<0.0001$ ). Pseudomeningocele occurred in 4% vs. 19.2% ( $p=0.0009$ ), CSF leak in 2% vs. 11.5% ( $p=0.006$ ) and wound infection in 1% vs. 1.9% ( $p=0.33$ ), respectively. Post-operative hydrocephalus, a multi-factorial complication which could affect our results, was also calculated and occurred in 4% of the craniotomy vs. 9.6% of the craniectomy group ( $p=0.08$ ). The mean length of in-hospital stay was 9.3 days for the craniotomy group and 11.8 days for the craniectomy group ( $p=0.10$ ).

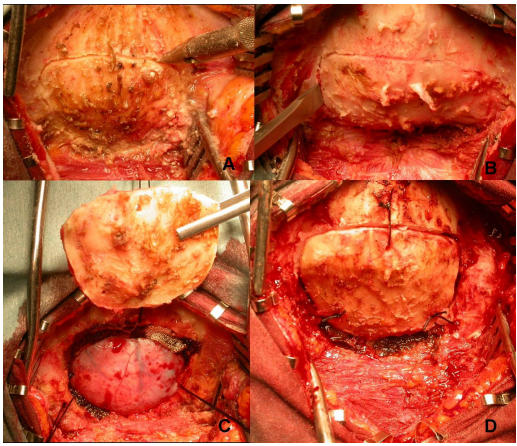
## Conclusions

The present study suggests that fashioning a suboccipital craniotomy is as effective and safe as performing a craniectomy; both procedures showed similar results in preserving dural integrity, while post-operative complications were fewer when a suboccipital craniotomy was performed.

### "WEDGING EFFECT"

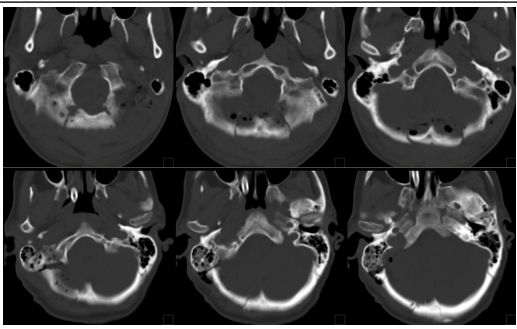
Explanatory rendering showing chisel penetration causing the "wedging effect", i.e. distracting the bone flap from the native skull and preventing the chisel from penetrating too deeply as well as detaching the underlying dura to avoid dural tears.

## SURGICAL TECHNIQUE



A: a thin osteotomy is performed with the CDA through the outer table and the cancellous bone; B: complete osteotomy through the inner table is carried out with a thin bladed chisel; C: dural strip and bone flap creation; D: repositioning of the bone flap, fixed with thick silk stitches.

CT scan showing a midline (A) and a lateral retrosigmoid (B) suboccipital craniotomy.



## References

**DiMeco et al:** Craniotomies without burr holes using an oscillating saw. *Acta Neurochirurgica* 146:995-1001, 2004.  
**Gnanalingham KK, et al:** Surgical procedures for posterior fossa tumors in children: does craniotomy lead to fewer complications than craniectomy? *Journal of Neurosurgery* 97:821-826, 2002. **Samii M, Matthies C:** Management of 1000 vestibular schwannomas (acoustic neuromas): Surgical management and results with an emphasis on complications and how to avoid them. *Neurosurgery* 40:11-21, 1997.

Table 1: Patients' features

	N° of patients (%)	
	Craniotomy	Craniectomy
patients	100	52
male	48 (48)	18 (34,6)
female	52 (52)	34 (66,4)
age mean (years)	39,3	46
range	5-81	13-81
SD	±18,6	±15,6

Table 2: Tumor histotypes

Tumor type	Craniotomy (%)	Craniectomy (%)
Schwannoma	33 (33)	21 (40,4)
Meningioma	24 (24)	12 (23,1)
Epydermoid cyst	11 (11)	1 (1,9)
Hemangioblastoma	8 (8)	4 (7,7)
Metastasis	6 (6)	6 (11,6)
Low-grade glioma	6 (6)	2 (3,8)
High-grade glioma	7 (7)	1 (1,9)
Medulloblastoma	2 (2)	3 (5,8)
Ependymoma	3 (3)	2 (3,8)

Table 3: Post-operative complications

Complication	N° of complications (%)		p value
	Craniotomy	Craniectomy	
Pseudomeningocele	4 (4)	10 (19,2)	0.0009
CSF leak	2 (2)	6 (11,5)	0.006
Wound infection	1 (1)	1 (1,9)	0.33
Total	7 (7)	17 (32,6)	<0.0001
Hydrocephalus	4 (4)	5 (9,6)	0.08

Table 4: treatment of post-operative complications

Complications	Craniotomy	Craniectomy
Treatment		
Pseudomeningocele	4	10
Transcutaneous needle aspiration + SpD + pressure dressing	0	1
Transcutaneous needle aspiration + LP + pressure dressing	1	1
Transcutaneous needle aspiration + pressure dressing	2	8
Pressure dressing only	1	0
CSF leak	2	6
Stitches + SpD + pressure dressing	2	6
Hydrocephalus	4	5
VPS	4	5

Table 5: In-hospital length of stay

	Craniotomy	Craniectomy
Days in hospital (mean)	9,3	11,8
Days in hospital (median)	7	7
Range	3-56	3-120
SD	±8,6	±16,8
p value	0.10	