

Frontolateral Approach for Resection of Giant Olfactory Groove Meningiomas

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Introduction

Olfactory groove meningiomas (OGMs) are slow-growing extra-axial tumors arising from the **dura overlying the cribriform plate**.

Giant OGMs (>6 cm) pose significant surgical challenges due to proximity to **critical neurovascular structures**:

- Optic nerves & optic chiasm
- Anterior cerebral arteries (ACAs)
- Anterior communicating artery (ACom) complex
- Internal carotid artery (ICA)

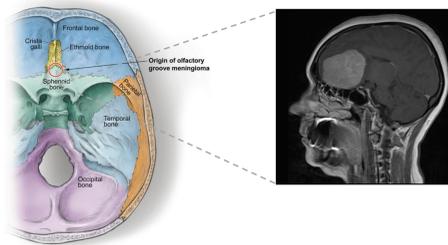


Figure 1: Olfactory groove meningiomas commonly arise from the dura mater overlying the cribriform plate in the anterior cranial fossa.¹

Surgical Approaches

We propose the **frontolateral approach as a more effective approach** compared to bifrontal

- **Offers visualization of critical structures** earlier in the surgery
- Favorable complication profile when compared with bifrontal exposure
- **Higher rates of gross total resection (GTR)**

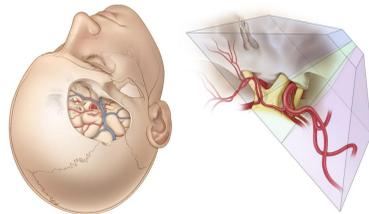


Figure 2: Illustration showing frontotemporal approach with sphenoid wing removal. Provides early and direct visualization of critical neurovascular structures, including the optic nerves, circle of Willis, and ACom complex, which helps minimize the risk of neurovascular injury.²

	Bifrontal (traditional)	Frontolateral / Pterional
Exposure	Wide, direct midline access	Lateral corridor; adequate for giant OGMs
Frontal & Sagittal sinuses	Often transected → ↑ CSF leak, infection risk	Preserved → ↓ CSF leak risk
Neurovascular visualization	Delayed view of optic chiasm, ACom complex	Early view of optic nerves, circle of Willis, ACom
Operative time	Longer	Generally shorter
Retraction-related edema	More retraction-related edema	Minimal frontal lobe disruption; less edema

Table 1. Comparison of the bifrontal and frontolateral approaches for resection of giant olfactory groove meningiomas. The table highlights differences in surgical exposure, timing of neurovascular visualization, frontal sinus involvement, risk of retraction injury, operative time, and complication profile.

Case Presentation

Presenting symptoms:

44-year-old female with

- Progressive visual loss
- Gait instability
- Personality changes
- Long-standing anosmia

Imaging:

MRI showed a 7.2 cm enhancing anterior cranial fossa mass with suprasellar extension.

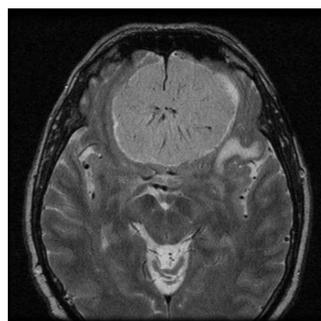


Figure 3: Representative preoperative MRI in a patient with giant OGM

Procedure: Left frontolateral craniotomy. Simpson grade I resection (complete removal including dural attachment and involved bone).

Outcome: Frontolateral resection achieved:

- MRI confirmed GTR
- No postoperative deficits
- Significant visual improvement at 3 months

Methods

Study design: Retrospective review of 18 patients with giant OGM (>6 cm) resected at Carle Foundation Hospital (2013–2025)

Cohort: 128 meningioma → 25 giant → 18 giant OGM (see Figure 4).

Approaches: Bifrontal/bicoronal (n=8) vs lateral (pterional + frontolateral, n=10).

Data: Demographics, imaging, Simpson grade, complications, follow-up.

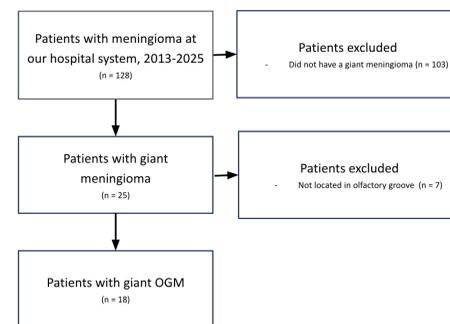


Figure 4: Study cohort selection. 128 patients with intracranial meningiomas were treated at our hospital system between 2013 and 2025. Patients were excluded if they did not have a giant meningioma (tumor size <6 cm; n = 103) or if the giant meningioma was not located in the olfactory groove (n = 7).

Results

18 patients with giant OGM were included:

- **GTR:** 75% bifrontal vs 90% lateral; subtotal resection in 1 per group.
- **Deficits:** 1 transient deficit (10%) in lateral group; no long-term deficits in either group.

	Bifrontal	Frontolateral / Pterional
n patients	8	10
Male gender	2 (25)	5 (50)
Age (yrs), mean ± SD	70 ± 9	62 ± 19
WHO Tumor Grade		
1	4 (50)	6 (60)
2	2 (25)	4 (40)
3	2 (25)	0
Extent of resection		
Gross total	6 (75)	9 (90)
Near total	1 (12)	0
Subtotal	1 (12)	1 (10)
Transient post-op deficit	0	1 (10)
Long-term post-op deficit (>3 mo)	0	0

Table 2. Comparison of patient characteristics and surgical outcomes by approach. Baseline demographics, tumor grade, extent of resection, and postoperative deficits for patients undergoing bifrontal (n = 8) versus lateral (pterional + frontolateral, n = 10) approaches for giant OGM. Compared with bifrontal cases, the frontolateral group was younger on average had no WHO grade 3 tumors, achieved a higher rate of gross total resection (90% vs 75%), and had only one transient postoperative deficit, with no long-term deficits observed in either group.

Conclusion

Our series supports the frontolateral approach is a **reliable and effective option for resection of giant olfactory groove meningiomas**.

- Favorable for early neurovascular identification
- Associated with high rates of gross total resection
- Associated with low postoperative morbidity

Limitations: This is a retrospective, single-center study with a limited sample size. Future work will include a multi-institutional meta-analysis to validate findings in a larger cohort.

References:

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4. Hentschel & DeMonte. FOC. 2003;14(6).

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