

# Extreme lateral approach

## Extreme Lateral Approach to Foramen Magnum / Craniovertebral Junction Tumors

; Study Types Literature review, retrospective observational cohorts, surgical series

; Key References - Salas & Sekhar et al. (largest series, 69 patients, craniocervical lesions)

:contentReference[oaicite:0]{index=0} - Johns Hopkins series (meningiomas; far-lateral/reflective)

:contentReference[oaicite:1]{index=1}

; Author Affiliations Various leading skull-base centers (e.g., Johns Hopkins, Seattle, Pittsburgh)

; Journals J Neurosurg; Clin Neurol Neurosurg; Surg Neurol; others per source lists

; Purpose To evaluate anatomy, exposure, and clinical outcomes of the extreme lateral approach (ELA) in resecting ventral or anterolateral CVJ/foramen magnum lesions, comparing it to far-lateral and posterior midline routes.

; Conclusions - ELA allows wider lateral exposure via aggressive condyle/C1 removal, sometimes combined with vertebral artery transposition :contentReference[oaicite:2]{index=2}. - In >160 cases reported, mortality ~5.6%, temporary morbidity ~41.7%, permanent deficits ~14.6%—higher than far-lateral's ~21.8%/~7.5% respectively :contentReference[oaicite:3]{index=3}. - Gross total resection (GTR) rate ~74.7% with ELA vs ~93% with far-lateral :contentReference[oaicite:4]{index=4}. - Postoperative improvement seen in ~84–91% of patients, though data is inconsistent :contentReference[oaicite:5]{index=5}. - ELA is favored for complex, laterally extensive lesions, but results in more morbidity and less GTR compared to far-lateral.

## Critical Appraisal

### \* Strengths

1. Large cumulative patient cohorts ( $\geq 160$ ) with systematic data collection :contentReference[oaicite:6]{index=6}.
2. Thorough anatomical detail: aggressive condyle drilling expands surgical exposure :contentReference[oaicite:7]{index=7}.

### \* Weaknesses

1. No randomized comparative trials; data are retrospective and heterogeneous.
2. Higher rates of permanent cranial nerve deficits (~14.6%) and lower GTR (~75%).
3. Varied outcome reporting makes cross-study comparisons hard (KPS vs clinical improvement scales).

### \* Comparative Context

1. Far-lateral approach (less condyle removal) yields higher GTR (~93%), lower permanent

morbidity (~7.5%), and fewer temporary deficits (~21.8%)

:contentReference[oaicite:8]{index=8}.

2. Posterior midline route shows ~10.5% mortality historically, reinforcing lateral corridors' superiority :contentReference[oaicite:9]{index=9}.

3. For ventrolateral tumors, endoscopic endonasal approaches are emerging to avoid brainstem traction, though limited to small series and smaller lesions :contentReference[oaicite:10]{index=10}.

## Verdict

Score: **6.0 / 10** ELA offers powerful anatomical exposure for complex ventrolateral CVJ tumors but at the cost of increased bony removal, morbidity, and lower GTR compared to less invasive lateral options. Suitable for large or laterally extending lesions only.

## Takeaway for Practicing Neurosurgeon

ELA remains an important tool for challenging ventrolateral CVJ tumors when maximal exposure is required. However, far-lateral approaches should be preferred for most cases due to better safety profiles and resection rates. In selected complex lesions—especially where preoperative imaging shows ventral-lateral extension—ELA offers needed exposure but requires awareness of higher procedural risks.

## Bottom Line

Extreme lateral approach delivers extensive surgical access at the cost of greater morbidity and lower GTR than far-lateral; reserve it for carefully selected advanced lesions.

## Representative Citations

- Salas E, Sekhar LN, et al. "Variations of the extreme-lateral craniocervical approach: anatomical study and clinical analysis of 69 patients." J Neurosurg. 1999. - Bydon A et al. "Surgical outcomes of craniocervical junction meningiomas." Clin Neurol Neurosurg. 2014.

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