

## Fully Endoscopic Minimally Invasive Transrectus Capitis Posterior Muscle Triangle Approach to the Posterolateral Condyle and Jugular Tubercle

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### Introduction

**Background** We evaluated a transrectus capitis posterior muscle triangle approach to the posterolateral foramen magnum, occipital condyles, jugular tubercle, and the fourth ventricle. We also assessed factors that affect the amount of bone removal required.

### Methods

**Objective** To evaluate if the proposed approach is as effective as standard open approaches to expose the lateral portion of the foramen magnum.

**Methods** The proposed minimally invasive fully endoscopic approach was performed in 15 cadaveric specimens using 4-mm (0- and 45-degree) endoscopes.

### Results

Using a 5-cm straight paramedian incision, the rectus capitis posterior minor and major muscles were partially removed unilaterally, providing a corridor through the muscles to reach the foramen magnum region. After meticulous soft tissue dissection, key anatomical landmarks can be identified such as the greater occipital nerve, the vertebral artery that wraps around the atlanto-occipital joint, and the bony protuberance that heralds the occipital condyle.

### Conclusions

The proposed endoscopic approach can provide access through the transrectus capitis posterior muscle triangle leading directly to the occipital condyle.

A stepwise approach is critical to gain a surgical corridor to the inferolateral petroclival region and the fourth ventricle

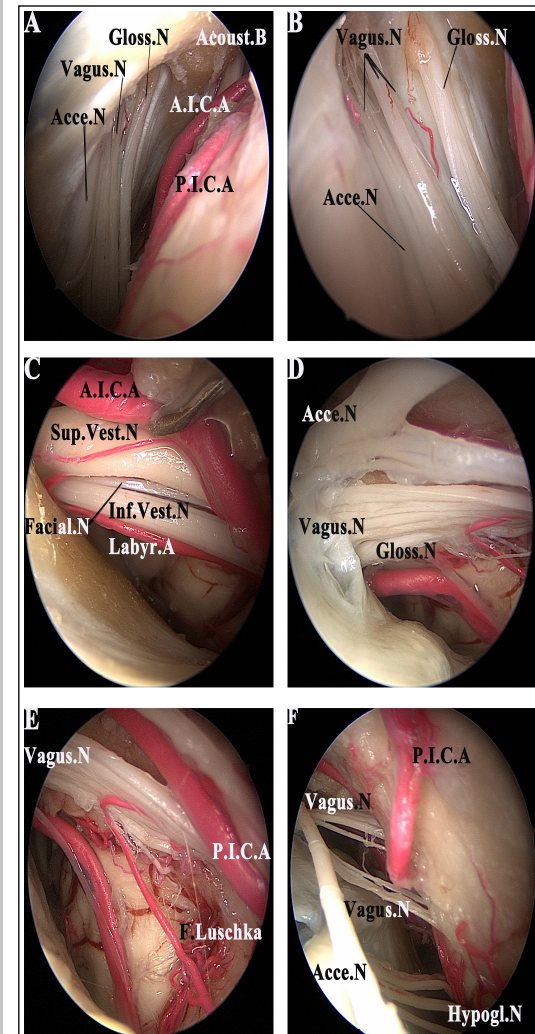
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### References

- Victor AM, Fernandez-Miranda JC, Daniel MP, et al. "Far-medial" expanded endonasal approach to the inferior third of the clivus: the transcondylar and transjugular tubercle approaches [comments]. *J Neurosurg* 2010;66:211-220
- Lan Q, Gong Z, Quian Z, et al. 's arteritis. Kato TKY. Minimally Invasive Neurosurgery and Multidisciplinary Neurotraumatology. Tokyo, Japan: Springer-Verlag; 2006:202-211
- Stippler M, Gardner PA, Snyderman CH, Carrau RL, Prevedello DM, Kassam AB. Endoscopic endonasal approach for clival chordomas. *Neurosurgery* 2009;64(2):268-277, discussion 277-278
- Borba LA, de Oliveira JG, Giudicissi-Filho M, Colli BO. Surgical management of foramen magnum meningiomas. *Neurosurg Rev* 2009;32(1):49-58, discussion 59-60
- Karam YR, Menezes AH, Traynelis VC. Posterolateral approaches to the craniovertebral junction. *Neurosurgery* 2010;66(3, Suppl):135-140
- Pirotte BJ, Brotchi J, DeWitte O. Management of anterolateral foramen magnum meningiomas: surgical vs conservative decision making. *Neurosurgery* 2010;67(3, Suppl Operative):ons58-ons70, discussion ons70

### Learning Objectives

understanding skullbase anatomy, the relationship of the nerves and muscles under the endoscope



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