

# Nasofrontal Trephination (NFT), a Novel Endoscopic Approach to the Skull Base and Upper Cervical Spine: Technical Notes in a Cadaveric Model



THE OHIO STATE  
UNIVERSITY

WEXNER MEDICAL CENTER

Moataz D. Abouammo, MD, PhD<sup>1,2</sup>; Loong Siow Ping<sup>1,3</sup>, MD, Mohammad Bilal Alsavaf, MD<sup>1</sup>, Je Beom Hong, MD<sup>4,5</sup>, Yong-Li Wang<sup>1,6,7</sup>, MD, Rodrigo D. Gehrke, MD<sup>1</sup>, Kyle K. VanKoeveering, MD<sup>1</sup>, Kyle C. Wu, MD<sup>4</sup>, Daniel M. Prevedello, MD, MBA<sup>4</sup>, Ricardo L. Carrau, MD, MBA<sup>1</sup>

<sup>1</sup>Department of Otolaryngology–Head and Neck Surgery, The Ohio State University Wexner Medical Center, Columbus, OH, USA

<sup>2</sup>Department of Otorhinolaryngology–Head and Neck Surgery, Faculty of Medicine, Tanta University, Tanta, Egypt

<sup>3</sup>Department of Otorhinolaryngology–Head and Neck Surgery, Hospital Queen Elizabeth, Sabah, Malaysia

<sup>4</sup>Department of Neurological Surgery, The Ohio State University Wexner Medical Center, Columbus, OH, USA

<sup>5</sup>Department of Neurosurgery, Kangbuk Samsung hospital, Sungkyunkwan University School of Medicine, Seoul, Korea

<sup>6</sup>Department of Otolaryngology-Head and Neck, the People's Hospital of Guangxi Zhuang Autonomous Region, Nanning 530021, Guangxi, China

<sup>7</sup>Guangxi Academy of Medical Sciences, Nanning 530021, Guangxi, China

## Background

Endoscopic skull base surgery has evolved significantly, with various approaches developed to access complex lesions. Nasofrontal trephination (NFT) is a novel adjunctive technique that provides access to paramedian skull base structures and the craniovertebral junction. This approach was conceived to address limitations of existing methods, such as orbital compression risks in transorbital approaches, by shifting the entry point medially to the nasal bridge and medial canthus. NFT offers superior angulation for midline and inferiorly located lesions, including the odontoid process and C4 vertebra, while minimizing risks to critical structures.

## Methods

The study utilized a cadaveric model to evaluate the NFT technique. A 2 cm skin incision was made below the brow, extending inferomedially to expose the confluence of the frontal process of the maxilla, frontal bone, and nasal bone. A high-speed drill created a bony window, which was expanded to approximately 1.5 cm in width and 2 cm in height, with care taken to avoid the nasolacrimal apparatus. The approach allowed for instrument insertion and endoscope placement, either as a standalone corridor or in combination with the endonasal endoscopic approach (EEA). Instrument maneuverability, angulation, and reach were assessed, including vertical and horizontal movements.

## Results

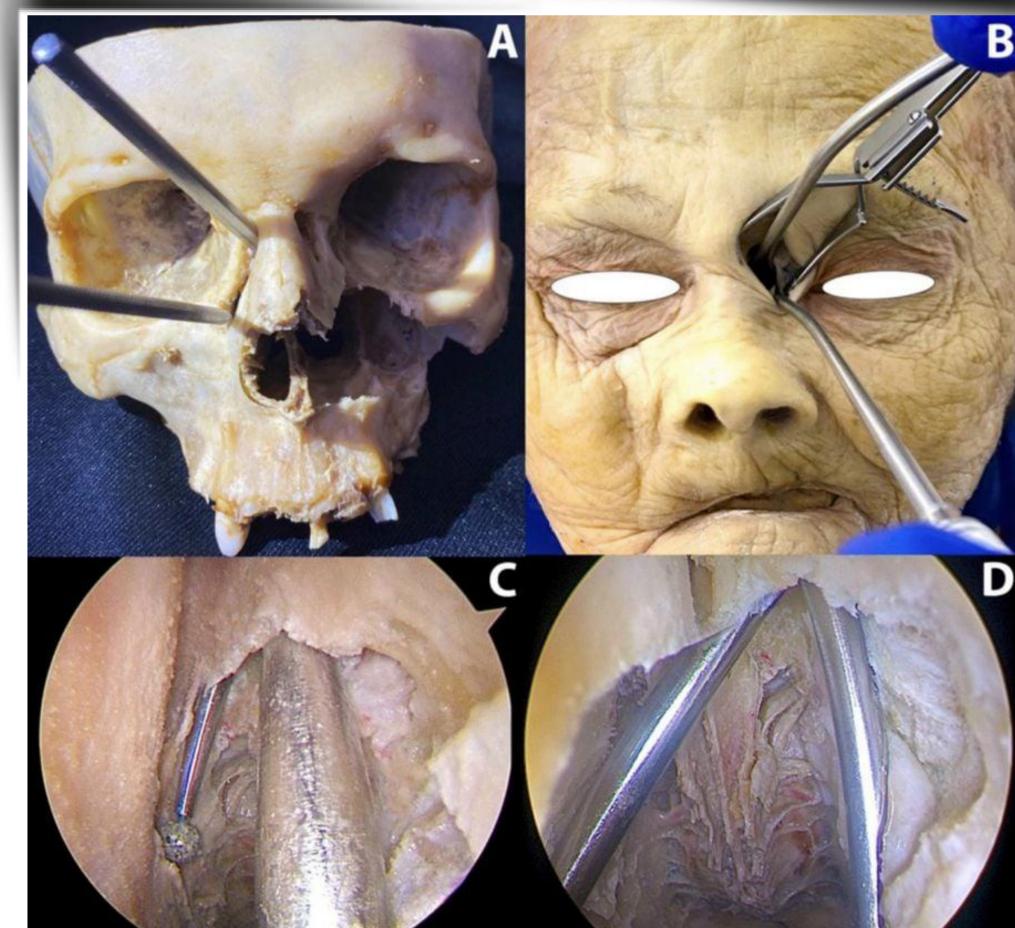
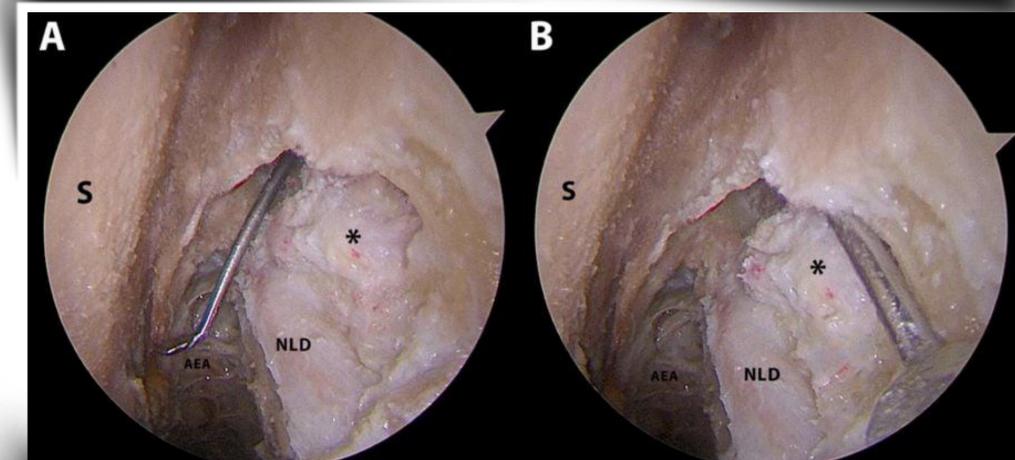
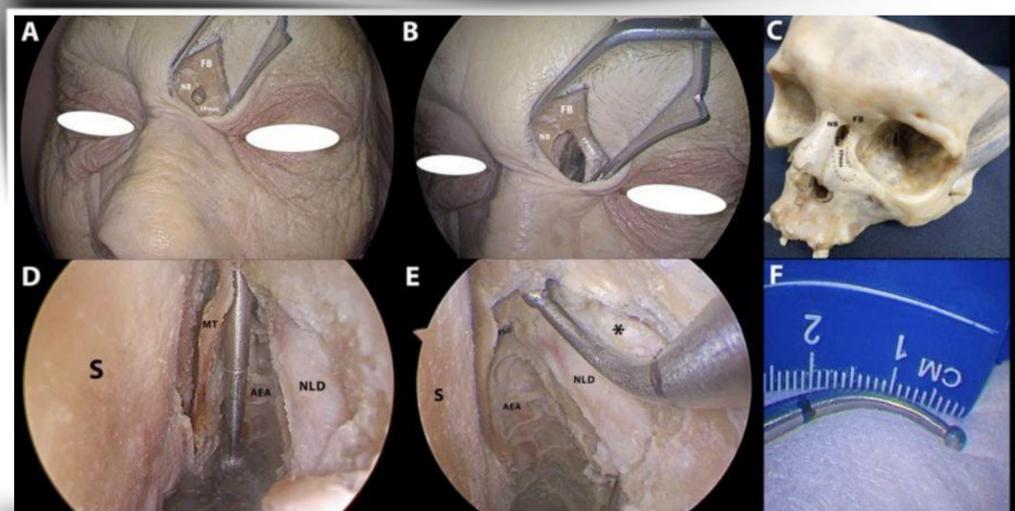
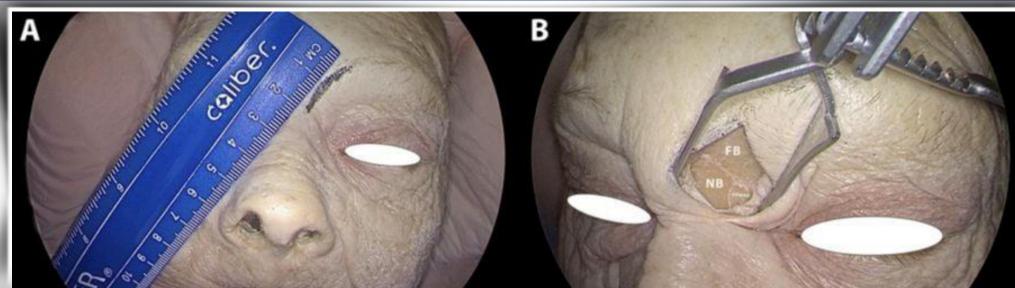
NFT provided favorable vertical angulation ( $113.64^\circ \pm 29.45^\circ$ ) for accessing midline lesions, with successful cadaveric reach to the rostrum ( $40.04 \pm 4.97$  mm), odontoid process ( $97.38 \pm 8.74$  mm), and contralateral foramen lacerum ( $73.76 \pm 5.47$  mm). The approach enabled access to the lateral recess of the sphenoid, petrous apex, jugular tubercle, and craniovertebral junction. However, limitations included reduced instrument maneuverability due to the bony confines and potential instrument fencing. The proximity of the nasolacrimal duct and the need for a facial incision were noted as drawbacks.

## Conclusion

Nasofrontal trephination is a promising adjunct to existing skull base approaches, particularly for paramedian and inferiorly located lesions. While it does not replace primary techniques like EEA, it enhances surgical options by providing superior angulation and minimizing risks to critical structures. Further clinical studies are needed to validate its efficacy and refine instrumentation to overcome current limitations. NFT represents a valuable addition to the skull base surgeon's armamentarium, offering a safe and effective alternative for challenging anatomical targets.

## References

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A, Instruments insertion via an NFT entry in a skull; B, Instruments insertion via an NFT entry in a cadaver; C, Vertical movement of instruments via the NFT; D, Horizontal movement of instruments via the NFT.