Mega Flap for Reconstruction of Clival Defects: Cadaveric and Microvascular Dissection Study

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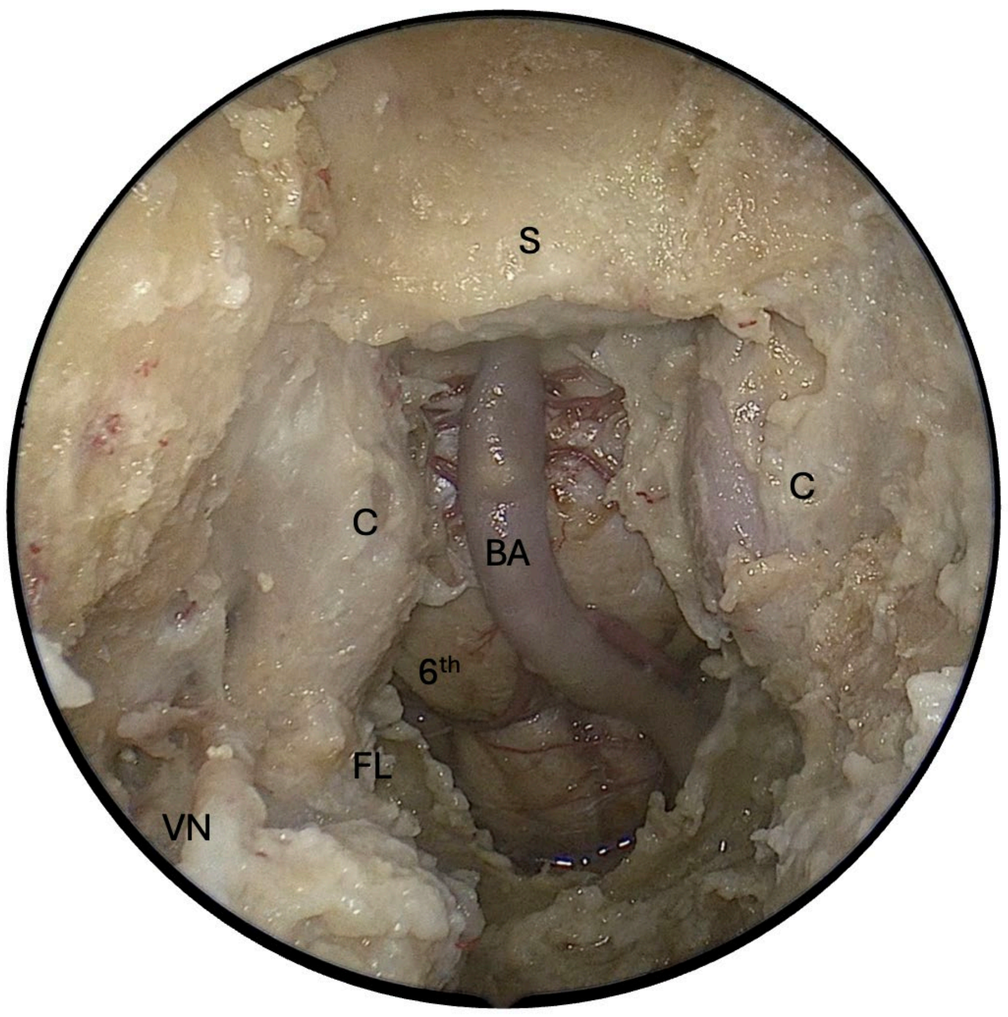


Figure 1. Endoscopic endonasal view of large clivus defect and posterior fossa.

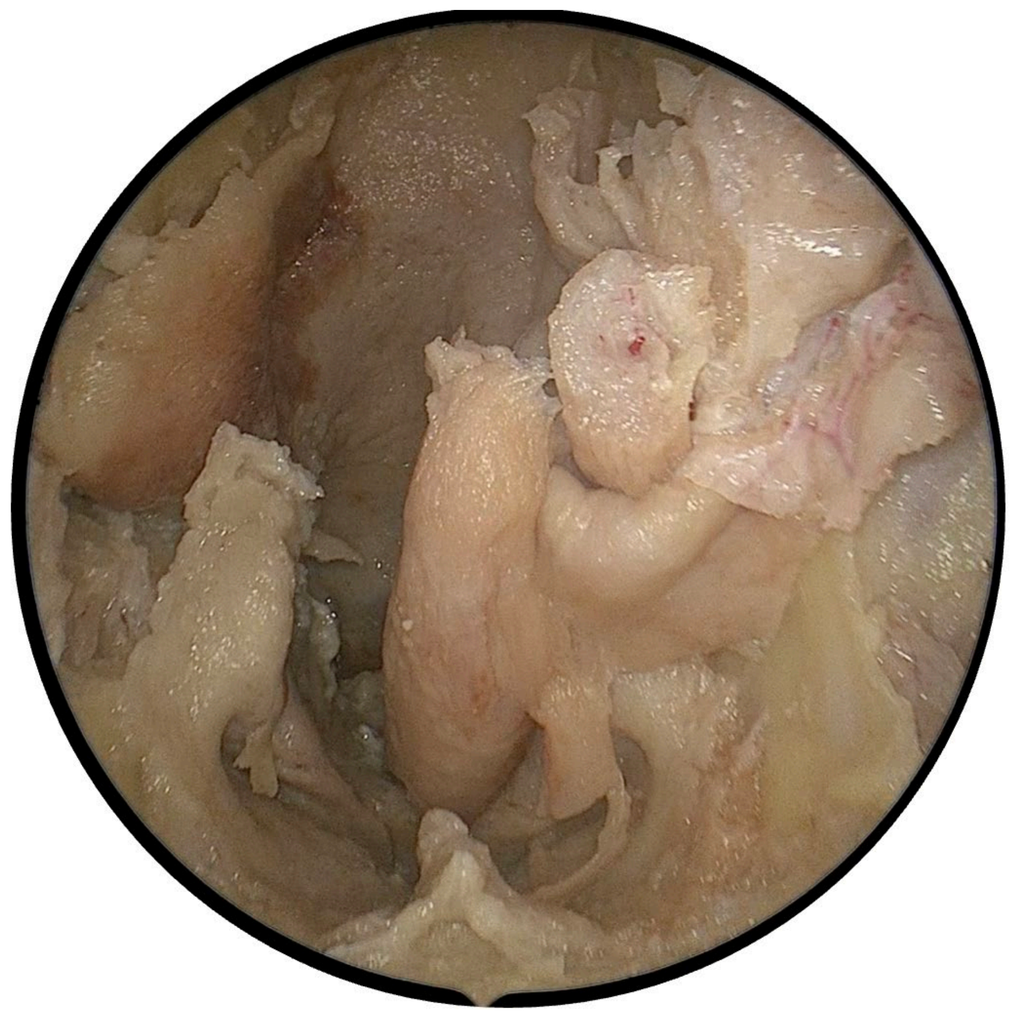


Figure 2. Endoscopic endonasal view demonstrating reconstruction of a large skull base defect with a left-sided vascularized nasoseptal “mega flap.”

Introduction

The evolution of endoscopic endonasal approaches for increasingly complex pathologies in both sagittal and coronal planes has expanded the role of vascularized flaps in skull base reconstruction. The standard nasoseptal flap, while versatile, is often insufficient for large or multidirectional defects and may be compromised by prior surgery, necessitating extended modifications. Validation of their anatomical reach and vascular reliability is essential to establish their clinical utility.

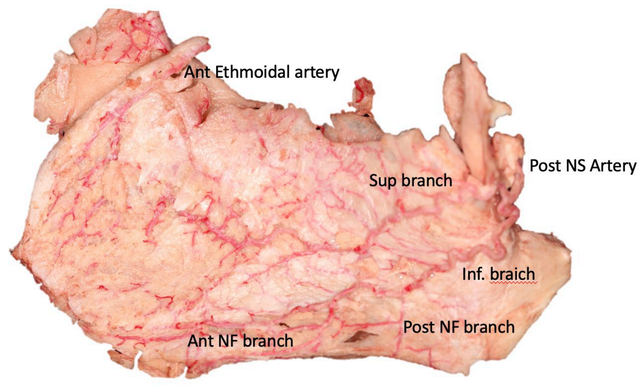
Methods and Materials

Two cadaveric heads underwent endoscopic endonasal dissection to harvest extended combined nasoseptal, nasal floor, and lateral nasal wall flaps (Mega Flap [MF]). Large bilateral clival defects involving the upper, middle, and lower clivus were created (Figure 1). MF length, width, and reach were measured relative to the clival defect. Microvascular dissection was performed to identify pedicle dominance, branching patterns, and anastomotic channels.

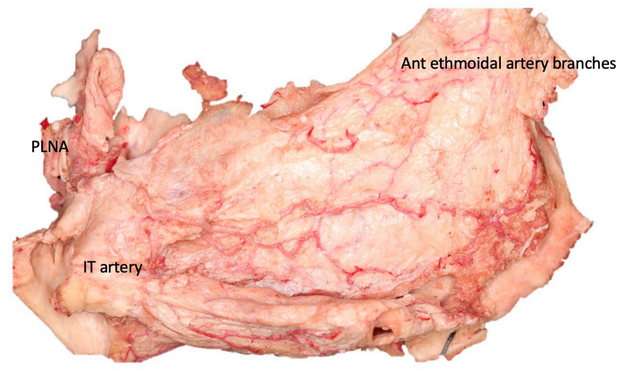
Results

Extended MF were harvested successfully in all specimens and demonstrated sufficient length and width to achieve complete clival coverage (Figure 2). Microvascular analysis revealed a dual-pedicle blood supply from the sphenopalatine artery: the posterior septal artery as the dominant pedicle (Figure 3A) and the inferior turbinate artery providing supplementary branches (Figure 3B). Anastomotic channels reinforced the perfusion of the septal, lateral, and inferior portions of the flap (Figure 3C). This architecture ensured robust and redundant vascularity.

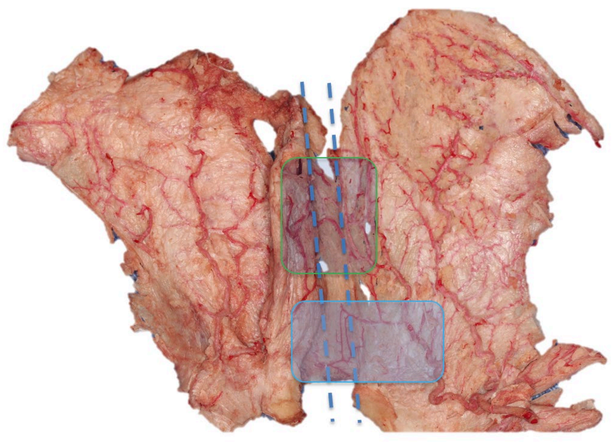
Figure 3. Anatomical dissection images demonstrating the vascular anatomy of the mega flap.



(A) Left-sided view showing the superior branch, inferior branch, anterior nasal (AN) branch, and posterior nasal (PN) artery branches.



(B) Right-sided view highlighting the branches of the inferior turbinate artery.



(C) Inferior perspective of the flap demonstrating vascular distribution along the nasal floor mucosa.

Conclusions

The MF provides reliable anatomical coverage for large skull base defects. Its dual-pedicle vascular supply, confirmed by microvascular dissection, supports its potential as a durable reconstructive option after expanded endonasal approaches to the skull base.

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