The Visibility of Optic Nerve via Endoscopic Transnasal Approach in Combination with Medial Orbitotomy: An Anatomical Study

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Introduction

For excellent visualization of the optic chiasm and optic canal, the endoscopic partial transethmoidal transsphenoidal approach offers an **excellent route for decompression** of the optic canal for pathologies that affect these structures. In combination with medial orbitotomy opic nerve can be decompressed more laterally and even intraorbitally.

Methods

Using the standard endoscopic transnasal approach in 3 thiel-fixed cadaveric skulls (6 optic nerves), after sinus-sphenoidectomy we identified the optic canal and opticocarotid recess carefully considering the bony landmarks. After thinning and removal of bony structures over this canal, optic nerve decompression extended from the medial (sellar) part to the lateral part **endoscopically**. Then additionally we performed modified **killian incision** and removed lamina papyracea achieving more visibility of optic nerve intraorbitally. During each step we measured the length of visualized optic nerve using flexible ruler under endoscope view and compared the length of optic decompression with and without combined approach. **(Figure 1,2)**

Results

Our visual findings confirmed decompression of the optic nerve, **extending from optic chiasm to annulus of zinn.** Length of decompression included the chiasma, intracranial part, entire intracanalicular part and intraorbital part.
Our combined approach increased the length of intraorbital decompression.
Our study confirmed the efficacy of the transnasal endoscopic transsphenoidal resection **in combination** with medial orbitotomy in optimal optic nerve decompression particularly intraorbital part.

Figure 1

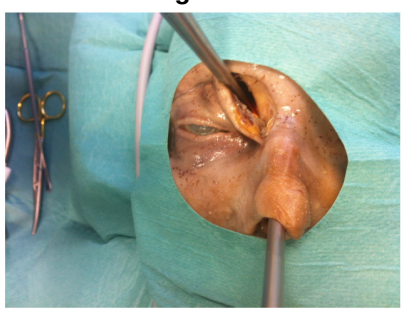

Figure 1: After using the standard endoscopic transnasal approach in thiel-fixed cadaveric skulls, additionally we performed modified killian incision and removed lamina papyracea achieving more visibility of optic nerve intraorbitally.

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Figure 2

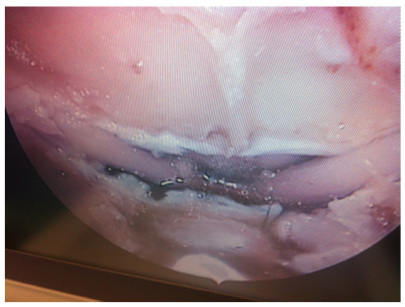

Figure 2: The visibility of optic nerve after performing combined approach. This combined approach increased the length of intraorbital decompression.

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Conclusions:

This combined approach achieved extensive bony decompression of the optic canal **not only intracranially but also intraorbitally**.
Clinical efficacy, in terms of visual outcome requires further anatomical and clinical evaluation.
Specific examples of pathology addressed with the procedure and the **associated morbidity** would be compelling.

Case presentation from the related literature:

A 64-year-old man with a known history of diabetes and hypertension presented with a 2-day history of sudden decreased vision in the right eye. Computed tomography showed a contrast-enhancing orbital apex mass in the right orbit abutting the medial and lateral portions of the optic nerve with extension to the posterior ethmoid and sphenoid sinuses; the lamina papyracea was also eroded. (Figure 3)

Figure 3:

a Axial contrast CT scan of the orbit showing a right orbital apex mass (white arrow) abutting the right posterior ethmoid and sphenoid sinuses. Lamina papyracea was eroded. A combined lateral orbitotomy and transethmoidal orbital apex drainage and decompression were performed to eradicate the orbital apex abscess. Drained pus cultured **Aspergillus.**
b Axial T1 contrast MRI scan (3 months after surgery) showing residual inflammatory and infective changes (black arrow) at the right orbital apex just anterior to the cavernous sinus (white arrow).

Figure 3

Reference of this case:
Combined Lateral Orbitotomy and Endoscopic Transnasal Orbital Decompression in a Case of Orbital Aspergillosis with Impending Intracranial Invasion
Jeffrey C.W. Chan, Derek K.H. Yu, Dennis L.Y. Lee, V.J. Abdullah, Kenneth K.W. Li
Case Rep Ophthalmol. 2012 Sep-Dec; 3(3): 418–423. (with permission)