



Two-Module Endoscopic Endonasal Optic Canal Decompression: A Cadaveric Study and Illustrative Case Presentation

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Introduction

Clinical and anatomical studies indicate that decompression of the optic canal (OC) from an endoscopic endonasal perspective is primarily limited superiorly and laterally. In this study, we describe in a stepwise manner in two separate modules the standard endoscopic endonasal OC decompression and its extended transplanum modification that maximizes the degree of the bony removal and allows for expanded superolateral optic canal decompression.

Methods and Materials

Anatomical dissections were performed on both sides of two cadaveric heads to comprehensively describe both modules and to identify relevant anatomical landmarks. Validation of the degree of OC decompression relied on image guidance and the superolateral limit was confirmed through a trans-cranial approach on each side. An illustrative clinical scenario is also presented.

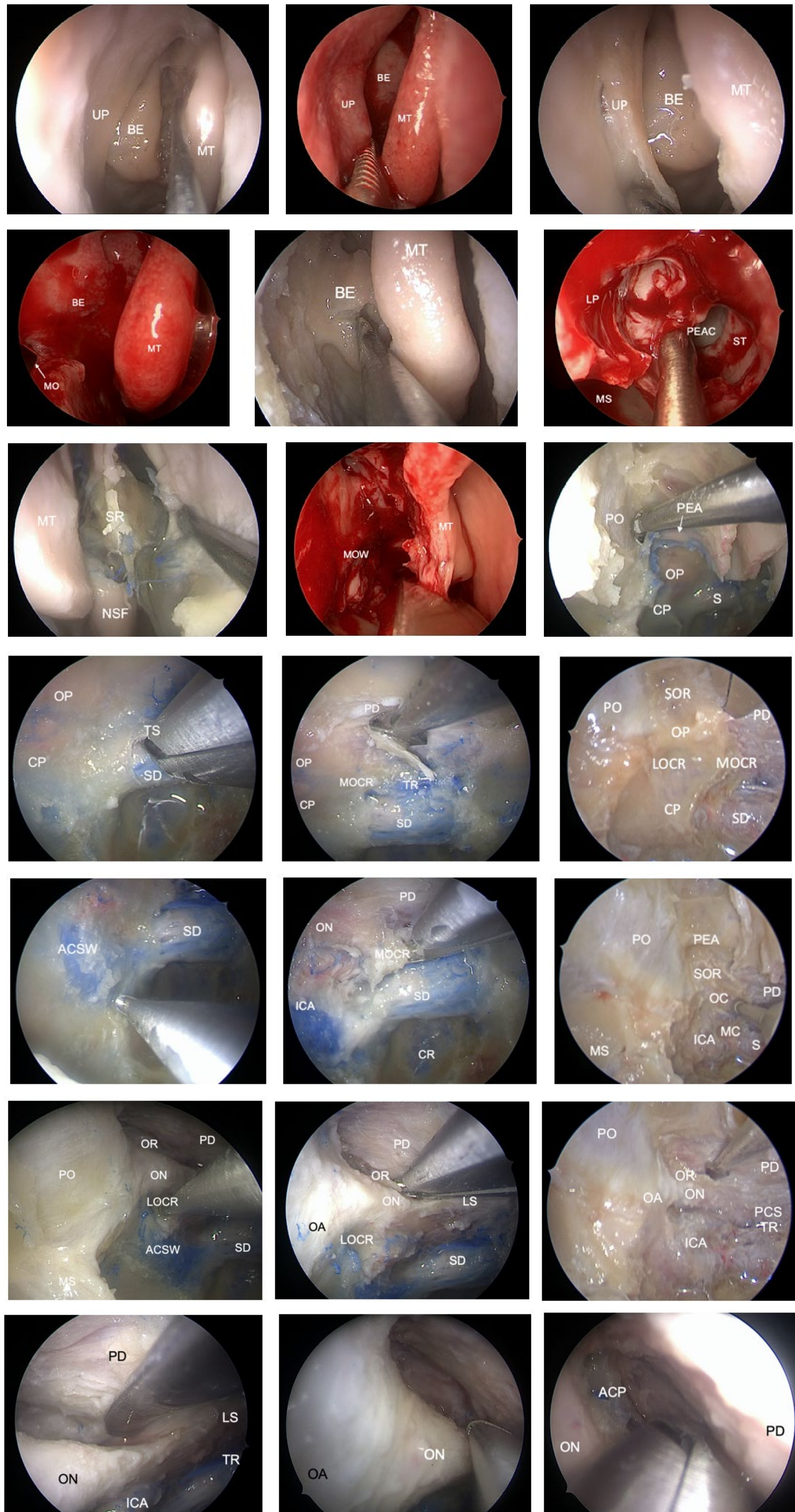


Figure 1. The phases of the extended OC decompression.

Results

In the first module a standard OC decompression is performed consisting of two phases: 1) Sinonasal- orbital phase: Unilateral access allows for complete ipsilateral sphenoidectomy, 2) OC phase: The inferomedial aspect of the OC is drilled usually from a lateral to medial direction. This module yielded a 198-degree of OC decompression. The extended OC decompression is divided in the following 5 phases: 1) Sinonasal- orbital phase: middle turbinectomy, wide posterior septosphenoidectomy and ipsilateral medial antrostomy facilitate higher endoscope position and medial orbital wall resection, 2) Sella-tuberculum- planum phase: The bone overlying the sella, tuberculum, and ipsilateral planum sphenoidale is removed, 3) OC- carotid- medial opticocarotid recess (MOCR) phase: The OC is egg-shelled under copious irrigation and the carotid is exposed. The MOCR is removed after disconnection from its four attachments, known to be the optic, tuberculum, carotid and sella, 4), Lateral opticocarotid recess (LOCR)- optic roof (OR) phase: The LOCR corresponding to the optic strut is hollowed out and outfractured, maximizing the OC decompression. Mobilization of the planum dura facilitates OR decompression utilizing drilling and Kerrison rongeurs, 5) Anterior clinoid process (ACP) phase: ACP removal is attainable only when sufficient OR hyperostosis enables access to the ACP. With this module a 275-degree of OC decompression was evident (Figures 1,2). In a representative case a 58-year-old woman underwent extended OC decompression through EEA due to a RT ON lesion most consistent with a nerve sheath meningioma. Postoperative imaging revealed a 277-degree decompression of the ON, and the patient was discharged on post-op day 2 with improved visual symptoms (Figure 3).

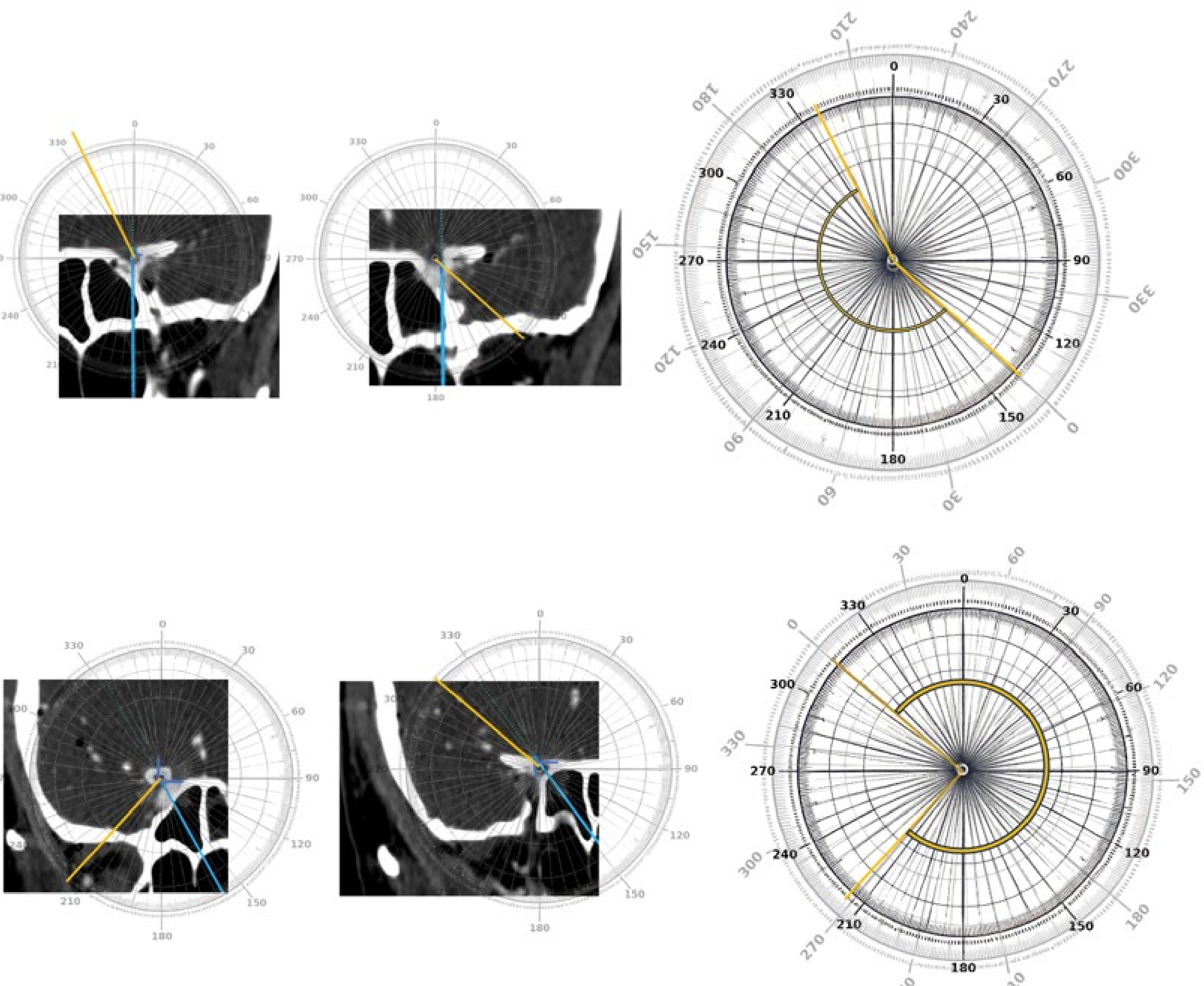


Figure 2. Measurement of the degree of OC decompression in the standard (above) and extended (below) OC decompression.



Figure 3. Illustrative case. Pre-op MRI and post-op CT scan with measurement of the degree of OC decompression.

Conclusions

The extended endoscopic extradural OC decompression is an effective and applicable technique that should be incorporated into the contemporary surgeon's arsenal. Implementing the previously analyzed five-phase technique in our clinical practice has significantly enhanced clinical outcomes.

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