

## Medial Rectus Muscle Injury Complicating Functional Endoscopic Sinus Surgery

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**Key words:** functional endoscopic sinus surgery, medial rectus muscle, strabismus, diplopia

*IMAJ 2005;7:270–271*

During the last few years, functional endoscopic sinus surgery has become the primary surgical approach for treatment of obstructive sinus disorders. However, a variety of orbital complications has been reported, including nasolacrimal duct injury, orbital hemorrhage, optic nerve damage, and extraocular muscle injury. There are only a few reports of medial rectus muscle injury in the literature [1–4]. We report a case of MR injury after FESS and discuss the possible mechanisms of this complication.

### Patient Description

A 48 year old man underwent bilateral FESS for recurrent ethmoid sinus polypoidosis. During surgery, arterial bleeding was observed and controlled with diathermy. The patient awoke with nasal bleeding, left periorbital and subconjunctival hemorrhages, and diplopia. Examination showed normal visual acuities of 6/7.5 OU without afferent pupillary defects. No proptosis was found. A constant exotropia of the left eye measuring 45 prism diopters in the primary position was due to severe paralysis of the left medial rectus muscle. The left eye was capable of limited adduction but could not reach the midline. There was no abduction deficit. Intraocular pressure and fundus examination were normal in both eyes. Computed tomography did not show intraorbital hemorrhage or damage to the MR. Eight days after the FESS procedure, the patient was taken to the operating room for exploration of the nasal cavity because of recurrent nasal bleeding. No active bleeding but only clots were observed. During the follow-up period the periorbital and subconjunctival hemor-

rhages resolved, but the left exotropia and adduction deficit remained. Repeated magnetic resonance imaging of the orbits showed no apparent MR damage. After waiting 2 months for possible spontaneous recovery and because the clinical picture remained unchanged, we decided to perform exploration of the left MR under general anesthesia. Forced duction test showed normal left abduction and partial adduction deficit. Conjunctival peritomy of 360° and identification of the four rectus muscles were performed. The MR was dissected and found to be of normal appearance and wide, not transected, not entrapped within the bony orbital wall defect, and without any irregularities along its surface. Twenty millimeters posterior to its insertion, moderate fibrosis and scar tissue involving the muscle was noted, which extended posteriorly. After releasing the muscle from the surrounding scar tissue and since no direct injury to the left MR was observed, we performed lateral rectus recession of 10 mm and MR resection of 7 mm. Today, 9 months after the strabismus surgery, there are no complaints of diplopia; stereopsis is normal, and the eyes are well-aligned in the primary position.

### Comment

The incidence of MR injury during FESS appears to be very low [3]. Although there are no reported incidence statistics of this complication, using a large referral center as an example, one case of MR injury occurred out of 735 FESS procedures during a 5 year period [3]. MR is the most commonly injured extraocular muscle following FESS. After surgery, muscle injury should be suspected if the patient has double vision and is unable to adduct the involved eye. The possible mechanisms of

injury include direct laceration, neurovascular interruption, or development of adhesions with adjacent structures [4].

Huang et al. [3], in the largest reported case series of MR injury complicating FESS (30 cases from 10 centers), described four patterns of injury. Pattern I cases show a large-angle exotropia (>25 prism diopters) and marked adduction deficit with relatively intact abduction and little or no entrapment, and is typically associated with complete transection of the mid-portion of the MR muscle. Pattern II cases show moderate to large-angle exotropia, with combined adduction and abduction deficits, suggesting partial MR transection or severe contusion. Pattern III cases show a small-angle exotropia and marked abduction deficit, suggestive of a grossly intact or modestly contused muscle but marked MR entrapment within the bony orbital wall defect. Finally, pattern IV cases show only mild degrees of orbital misalignment caused by muscle contusion. Our patient presented with a large-angle exotropia, with marked adduction deficit and normal abduction, but no damage to the MR muscle was found on exploration. Thus, our patient was similar to pattern I cases, but without transection of the muscle.

Neurovascular damage seems to be the cause of the clinical picture in our patient, and is consistent with the scar tissue and fibrosis involving the MR that was found 20 mm posterior to the MR insertion and extending posteriorly.

Post-FESS CT of the orbit is important to rule out the presence of orbital hemorrhage, which can cause loss of vision due to secondary compressive optic neuropathy. CT also helps in assessing the medial wall bony defect and the gross appearance of the MR and surrounding orbital soft tissues. Magnetic resonance imaging can

MR = medial rectus

FESS = functional endoscopic sinus surgery

add more data on the status of the muscle but it is not conclusive. Sometimes, as in our case, with normal appearing MR on CT and magnetic resonance imaging, exploration of the muscle remains the only way to verify the possible alterations of the muscle, entrapment and/or surrounding scar tissue. The timing for surgical exploration in cases with no apparent muscle damage on imaging techniques is not clear. Some authors suggest waiting up to 2–3 months for possible spontaneous improvement [3]. In our case, exploration of the muscle was performed 2 months after FESS, and only mild fibrosis of MR was observed, without contracture. On the other hand, some authors advocate prompt surgical evaluation in the first 2–3 weeks to prevent muscular fibrosis [5].

In conclusion, a history of diplopia

following FESS and an adduction deficit is strongly suggestive of MR damage. Prompt CT evaluation for possible intra-orbital hemorrhage and evaluation of the MR is advised. In cases without apparent muscle damage, either conservative or surgical evaluation of the MR is recommended. A close collaboration between ophthalmologists and otolaryngologists is crucial for the management of this complication. The patient should be informed about possible ocular problems resulting from ethmoid sinus surgery.

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