

Lateral Orbitotomy in the Management of Challenging Exotropia

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Introduction : The surgical management of recurrent exotropia that defies treatment by standard surgical techniques, is one of the most difficult problems facing the strabismus surgeon. The lateral rectus muscle keeps pulling the eye back to exotropia following surgery, and further surgical procedures on this muscle become very difficult.

Purpose: We present an unorthodox surgical approach, to reach the posterior segment of the lateral rectus through a lateral orbitotomy, to manage these difficult cases of recurrent exotropia if standard surgical techniques are consistently inadequate .

Methods : A review of the records of two patients with recurrent exotropia, following repeated standard surgery was done. Both patients underwent a lateral orbitotomy in order to reach the posterior segment of the lateral rectus (LR), after an anterior approach had been demonstrated to be inadequate due to shortening/fibrosis of the anterior part of this muscle following repeated surgeries. Patient number one (#1) had exotropia following retinal detachment repair, and the second patient (#2) had a complete third nerve palsy and traumatic optic neuropathy, leading to blindness and exotropia in that eye.

Results: Both of the patients achieved satisfactory ocular alignment following surgery. These results were stable for 15months in patient #1 and 5 years in patient #2. No major complications occurred.

Conclusion : Lateral orbitotomy for posterior lengthening/extirpation of lateral rectus in resistant exotropia, when a standard anterior approach for surgery consistently fails and is unlikely to succeed, is a safe and effective surgical procedure for restoring ocular alignment in persistent exodeviation.

Introduction: Surgical treatment of large angle exotropia frequently requires large lateral rectus (LR) muscle recessions, as part of the surgical plan to regain good ocular alignment. In some challenging cases of exotropia, such as in third nerve palsy, sensory exotropia and Duane syndrome, new alternative surgical techniques have been described in order to obtain and maintain alignment of the eye¹⁻⁶.

There are still cases where the unopposed LR keeps pulling the eye back to exotropia, where all available techniques have been either tried or, are not feasible anymore due to shortening/scarring of the lateral rectus muscle. The aim of this study was to describe and evaluate the results of a new surgical approach for inactivation of the lateral rectus muscle (after being unsuccessfully operated on several times) by its posterior lengthening or excision of a segment of muscle through a lateral orbitotomy.

Methods: The records of two patients with recurrent large angle exotropia were reviewed. Both patients underwent a lateral orbitotomy⁷⁻⁸, to reach the posterior segment of the lateral rectus muscle. The LR function was modified by either a posterior lengthening or extirpation of the muscle.

Case #1

A 59 year old man had an ocular history of right eye trauma at age nine with retinal detachment repair (silicone band and explant). At age 21 he underwent his first exotropia surgery. At age 41, a recurrent retinal detachment occurred, with further retinal surgery. His visual acuity was 6/12 in his right eye (with a +9.00 D contact lens) and 6/6 in his left eye. He had a 50 Δ exotropia in his right eye, and complained of diplopia when wearing the contact lens. In 1997 the patient underwent a right eye lateral rectus exploration, where the muscle was found "superglued" to the sclera, and dissection was not feasible due to scarring. Several options were offered to the patient to improve the right eye alignment, including botox injection to LR, and fascia lata to tether the eye³ (both procedures in the right eye), and surgery for exotropia in his left eye. The patient declined surgery to his left eye, and did not want the right motility to be affected by the fascia lata procedure. A possibility of lengthening the right LR further back in the orbit was raised, using a spacer. A lateral orbitotomy was performed with lengthening of the posterior segment of the LR with a temporal fascia spacer of approximately 12mm length. At 18 months after surgery, a small, stable angle of residual exotropia was found (20 PD exotropia), with improved cosmesis and near normal versions (figure 1).

Case #2

A 55-year old male patient had an ocular history of left eye blindness (due to traumatic optic neuropathy) and left third nerve palsy following an accident at age 18. He underwent strabismus surgery 4 times (since age 20) with recurrent left eye exotropia. On presentation (age 50) his visual acuity was 6/5 in his right eye and no light perception (NLP) in his left eye. Ocular movements showed underaction of superior, medial and inferior rectus (consistent with third nerve palsy). Force generation test showed no medial rectus force generation, and forced duction test revealed no restrictions in left eye

movements. Krimsky test exhibited left eye exotropia of 70 Δ. A left LR disinsertion and suturing to the periosteum was planned^{1,2}. At surgery, the muscle was found 10 mm behind the original insertion, and it was not possible to suture it to the periosteum because it had been shortened. The anterior 10 mm of LR was excised and residual LR injected with Miochol. A left medial rectus (MR) resection of 6 mm was performed. Though the week 1 result was excellent, there was a quick recurrence of his exotropia. Ten weeks after surgery there was a left exotropia of 50 Δ. MRI of orbits showed reattachment of LR stump to the sclera near the level of the equator. Patient requested further surgery in order to reach cosmetic alignment. Lateral orbitotomy was performed, with excision of left posterior LR remnants (15-20 mm). On subsequent follow-ups the patient had a left exodeviation of 18 PD and remained stable for 5 years (figure 2). The patient was very pleased with the improved appearance.

Lateral Orbitotomy technique (figure 3): A skin incision is made in the lateral portion of the upper lid crease, and extended infero-laterally in a skin fold towards the zygomatic arch. The lateral orbital rim is exposed by raising skin and muscle flaps, and the periosteum over the rim incised and elevated, exposing the entire lateral rim and the inner aspect of the lateral orbital wall. Bone cuts are made using a saw just superior to the level of the zygomatic arch and at about the level of the zygomaticofrontal suture. The lateral wall is out-fractured, removed and kept in moist gauze. The periorbita is incised at the level of the lateral rectus muscle, the LR is identified, and elevated on a squint hook. It may be divided and a spacer added, or a segment maybe excised.

TO harvest the temporal fascia, the skin and muscle flap of the incision is dissected posteriorly beyond the lateral orbital rim to expose the anterior portion of the temporal fascia. A strip about 8 - 10 mm wide and of about 15 mm length is harvested by sharp dissection. The lateral rectus muscle is exposed in the standard fashion used in a lateral orbitotomy, with a squint hook passed under its belly approximately at the junction of its middle and anterior third. Two sutures of 5/0 polyester are placed in its superior and inferior border behind the squint hook before dividing the belly these sutures are then used to attach the fascial graft to the posterior stump of muscle, and the anterior end of the graft sutured to the anterior stump of muscle in the same manner. At the end of surgery the periorbita is sutured, the bone is positioned back in place and sutured with heavy nylon through small burr holes. The periosteal lining is resutured, and the skin closed in layers.

Results Two patients with recurrent large angle exotropia, following multiple surgical procedures for ocular alignment, underwent further surgery using this alternative technique for difficult exotropia cases. Both of the patients achieved a cosmetically satisfactory ocular alignment following surgery. These results were stable for 18 months in patient #1 and 5 years in patient #2. No major complications occurred.

Discussion The surgical management of recurrent exotropia is one of the most difficult problems facing the strabismus surgeon, where any further surgical procedures on the

lateral rectus become very difficult, due to scarring and shortening of the muscle. Lateral orbitotomy is a difficult procedure that should only be performed by a trained oculoplastic surgeon. Lateral orbitotomy for posterior lengthening/extirpation of lateral rectus in resistant exotropia, is a novel, safe and effective surgical procedure for restoring ocular alignment in persistent exodeviation, and may be a useful addition to the current surgical techniques for management of strabismus secondary to third-nerve paralysis and other conditions resulting in resistant and recurrent exotropia.

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