

# Internal Ophthalmoplegia After Inferior Oblique Myectomy: Report of Three Cases

## İnferior Oblik Miyektomiden Sonra Görülen İnternal Oftalmopleji

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**ABSTRACT** Internal ophthalmoplegia is a rare, temporary complication of inferior oblique muscle surgery. The mechanism is thought to be excessive stretching of the nerve to the muscle with secondary trauma to the ciliary ganglion. Here we report three cases of transient internal ophthalmoplegia after inferior oblique myectomy. Case 1 was a three-year-old girl with congenital left superior oblique palsy and case 2 was a 39-year-old male with acquired right superior oblique palsy. They underwent unilateral inferior oblique muscle myectomy. Case 3 was a 10-year-old girl presenting with right exotropia and bilateral inferior oblique muscle overaction following trauma. She underwent bilateral inferior oblique muscle myectomy with horizontal muscle surgery. All three patients showed anisocoria with unilateral pupillary dilatation postoperatively. Denervation supersensitivity was detected in two cases with pilocarpin test. Pupillary function improved after 3 months follow-up in all cases.

**Key Words:** Mydriasis; ophthalmoplegia; anisocoria; strabismus

**ÖZET** İnternal oftalmopleji, inferior oblik kas cerrahisinin nadir görülen, geçici bir komplikasyondur. Mekanizmanın, sinirdeki aşırı gerilme nedeni ile siliyer ganglionda sekonder travma oluşması olduğu düşünülmektedir. Bu olgu serisinde, inferior oblik miyektomi sonrası geçici internal oftalmopleji gelişen üç olgu sunulmaktadır. İlk olgu, doğuşsal sol üst oblik felci bulunan üç yaşında bir kız, ikinci olgu ise edinsel sağ üst oblik felci bulunan 39 yaşındaki erkek hastadır. Her ikisine de unilateral alt oblik kas miyektomisi uygulanmıştır. Travma sonrası sağ ekzotropiya ve bilateral alt oblik hiperfonksiyonu ile başvuran 10 yaşında bir kız olan üçüncü olguya, bilateral alt oblik kas miyektomisi ve horizontal kas cerrahisi uygulanmıştır. Üç hastada da, postoperatif dönemde unilateral pupiller dilatasyon ile karakterize anizokori görülmüştür. İki olguda pilokarpin testi ile denervasyon hipersensitivitesi saptanmıştır. Tüm olgularda, üç aylık izlem sonunda pupil fonksiyonunda düzelme ortaya çıkmıştır.

**Anahtar Kelimeler:** Midriyaz; oftalmopleji; anizokori; şaşılık

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**I**nferior oblique myectomy is a frequently used procedure to weaken the inferior oblique muscle. The most common indications are superior oblique palsy and primary inferior oblique overaction. The most known complications of this procedure are adhesion syndrome, hemorrhage and infection.<sup>1</sup> Internal ophthalmoplegia, which is characterized by the paralysis of pupillary sphincter and ciliary body, is a rare complication of inferior oblique muscle surgery. In the literature there is only one case following inferior oblique recession and there are 5 cases following inferior oblique

myectomy.<sup>2-5</sup> Pupillary functions eventually returned to normal or near normal in all patients. Here we report 3 cases of transient internal ophthalmoplegia after inferior oblique muscle myectomy.

## CASE REPORTS

### PREOPERATIVE CASE FINDINGS

#### Case 1

A three-year-old girl presented with left exotropia, hypertropia and head tilt to right shoulder. Her visual acuity was 10/10 OU, cycloplegic refraction was +1.50 in the right eye and +1.00+2.00\*120 in the left eye. Anterior and posterior segment findings were unremarkable. She had +4 left inferior oblique overaction (IOOA) with -4 superior oblique muscle underaction, 10 prism diopters (PD) left hypertropia and 8PD exotropia at distance with prism cover test without glasses. Bielschowsky head tilt test revealed marked hypertropia while the patient's head was tilted towards to the left shoulder. Unilateral left inferior oblique muscle myectomy was planned with the diagnosis of congenital left superior oblique muscle palsy.

#### Case 2

A 39-year-old male presented with exotropia and hypertropia in his right eye following head trauma 10 years ago. His visual acuity was 10/10 OU. He had unremarkable anterior and posterior segment findings with 10PD exotropia, 8PD hypertropia and IOOA in the right eye with no remarkable head tilt. Cranial magnetic resonance imaging (MRI) revealed normal findings. Unilateral right inferior oblique muscle myectomy was planned with the diagnosis of acquired right superior oblique muscle palsy using Parks' 3 step test.

#### Case 3

A 10-year-old girl presented with right exotropia and bilateral inferior oblique muscle overaction. She had decreased vision and deviation in her right eye after a head trauma 3 years ago. Direct and indirect light reflexes were positive. Visual acuity was 0.2 in her right eye and 1.0 in her left eye. She had a pale optic disc and 30PD V pattern exotropia with bilateral +3 IOOA with no head tilt. Bilateral inferior

oblique muscle myectomy with horizontal muscle surgery was done.

### SURGICAL TECHNIQUE

The preferred inferior oblique muscle weakening procedure was myectomy. This surgical procedure was performed as follows: Under general anesthesia, inferior oblique muscle was isolated via a fornix incision. The muscle was dissected from surrounding tissues, checked for posterior fibres, clamped, myectomized and cauterized. Conjunctiva was closed with 8.0 absorbable sutures. In all cases, the operation was completed without any complications.

### POSTOPERATIVE FOLLOW-UP

All three patients showed anisocoria with unilateral pupillary dilatation unresponsive to light and near on postoperative day 1. The pupils were responsive to pilocarpine 2%, visual acuities were stable, optic nerve and posterior segment findings were unremarkable. In case 1 (Figure 1) and 2, pilocarpin (0.125%) test revealed denervation super-



**Figure 1:** A. Pupillary dilatation in the left eye of Case 1 after surgery B. and pupillary constriction in the left eye 30 minutes after instillation of 0.125% pilocarpin showing denervation hypersensitivity in the left eye, the right pupilla does not respond to diluted pilocarpin.

sensitivity. In all patients pupillary function eventually improved after 3 months follow-up (Figure 2).

## DISCUSSION

Internal ophthalmoplegia is the paralysis of pupillary sphincter and ciliary body. It causes loss of pupil dilatation and accommodation. Rarely, it may be seen as a complication of inferior oblique muscle surgery. The ciliary ganglion receives preganglionic fibers from the region of the oculomotor nucleus and sends postganglionic fibers via short ciliary nerves to the constrictor muscle of the iris and circular fibers of the ciliary muscle.<sup>6</sup> The mechanism of internal ophthalmoplegia after inferior oblique muscle surgery is thought to be excessive stretching of the nerve to the muscle with secondary trauma to the ciliary ganglion.<sup>3</sup>



FIGURE 2: Reversal of anisocoria 3 months after the operation.

Bajart and Robb reported three cases of internal ophthalmoplegia following inferior oblique myectomy in 1979.<sup>3</sup> Since then only two cases have been reported. In the former 3 patients, accommodation returned to normal but in two of them mild anisocoria persisted. In the 4<sup>th</sup> case anisocoria was slowly disappeared and the pupillary reflexes returned to normal.<sup>4</sup> Accommodation improved at 10-month follow-up. The test with pilocarpin also revealed denervation supersensitivity of iris sphincter and ciliary muscle. In the 5<sup>th</sup> case, there was also denervation supersensitivity in the affected eye.<sup>5</sup> All pupillary functions returned to normal at the five-month follow-up. Biedner et al. reported a case of internal ophthalmoplegia following inferior oblique recession.<sup>2</sup> They showed persistent anisocoria and denervation supersensitivity two years after surgery. In our patients, anisocoria began to recover by the first month and pupillary function eventually improved after three months.

There is no definite treatment for the condition. Short term use of topical pilocarpine can provide symptomatic relief by reducing anisocoria, photophobia and blurred vision. Avoiding excessive stretching of the inferior oblique muscle may be helpful in prevention of the ciliary ganglion damage.

Briefly, ciliary ganglion damage and internal ophthalmoplegia should be kept in mind as potential complications of inferior oblique myectomy.

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