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# SURGICAL MINUTIAE

## SURGICAL APPROACH TO INFERIOR OBLIQUE WEAKENING PROCEDURES

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Inferior oblique overaction (IOOA) can occur in isolation, following superior oblique palsy or in association with esotropia or exotropia. Surgical weakening of the inferior oblique is performed to eliminate hypertropia in the primary position, the upshoot of the eye in adduction or the abduction effect in upgaze (V pattern). When IOOA results in diplopia or a compensatory head posture, surgery is aimed at eliminating the head posture and improving the field of binocular vision.<sup>1</sup>

Myectomy and recession are the most commonly used procedures for weakening the inferior oblique. Myectomy is preferred by many ophthalmologists for its simplicity and has been proven to be safe, effective and predictable.<sup>1-5</sup> The recession procedure is more complex and involves scleral suturing in a posterior aspect of the globe, but has the potential of achieving a graded amount of weakening and ensures easy location of the muscle if re-exploration were necessary.<sup>6</sup> Other less commonly used techniques include myotomy, Z-myotomy, disinsertion, denervation, extirpation and anterior transposition.<sup>7,9</sup>

The surgical anatomy of the inferior oblique muscle deserves mention. It is the shortest extraocular muscle and it passes between the inferior rectus muscle and the orbital floor to insert at the posterior aspect of the globe from a point 12 mm behind the lateral rectus insertion to a point 2 mm below and lateral to the macula via a short (2 mm) tendon which is intimately related to the lower border of the lateral rectus tendon and muscle. In the inferotemporal quadrant it lies within Tenon's space, is closely applied to the globe and overlies the vortex vein. The fascial sheath of inferior oblique muscle is fused with the inferior rectus muscle sheath and extends to the lateral rectus muscle and the optic

nerve via temporal and posterior extensions forming a double-layer intermuscular septum.<sup>7,8</sup>

A common complication following inferior oblique weakening is persistent overaction, which is thought to be caused by residual slips of uninterrupted muscle that undergo isotonic contraction to produce the same effect as the unoperated muscle. This can occur in any weakening procedure if care is not taken to ensure that the inferior oblique has been completely engaged.<sup>1,3,6</sup> Other complications include profuse haemorrhage from rupture of the vortex vein, which can occur from blindly sweeping with a squint hook, and macular damage from excessive cautery. A post-operative adherence syndrome with hypotropia and restriction of elevation can occur if care is not taken to excise the intermuscular septum from the inferior and lateral recti.<sup>6,7</sup>

The aim of the surgical approach to any inferior oblique weakening procedures, therefore, should be to provide adequate exposure of the muscle and important structures in its relation to allow easy and safe handling of tissue.

### *Surgical Procedure*

The procedure is best conducted with the surgeon positioned opposite the operated eye, and the assistant on the side of the operated eye. This allows good visualisation of the operative field, ease of access to the inferior oblique and prevents obstruction of the operating lights.

A lid speculum is inserted and Spencer Wells forceps are used to keep the eye adducted but not elevated. In this position, the inferior oblique is situated more anteriorly with respect to the globe and part of its sheath can often be visible beneath the conjunctiva in the inferior temporal quadrant (Fig. 1).

Using Moorfields forceps and Wescotts scissors, make a small incision in the inferotemporal bulbar conjunctiva and extend it concentrically with the limbus to a width of about 6–8 mm. Incise Tenon's capsule down to bare sclera and extend the incision in a similar manner following the line of conjunctival

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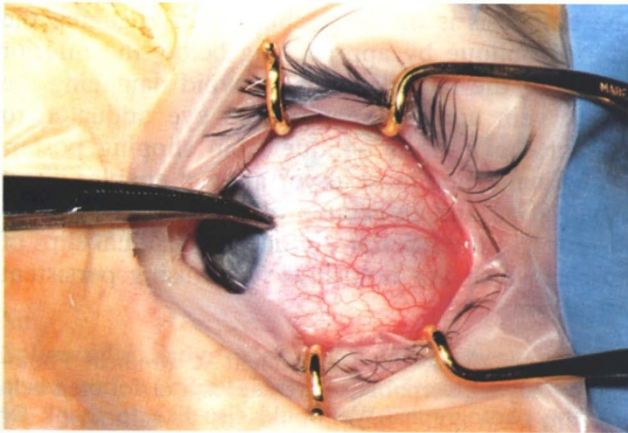


Fig. 1.

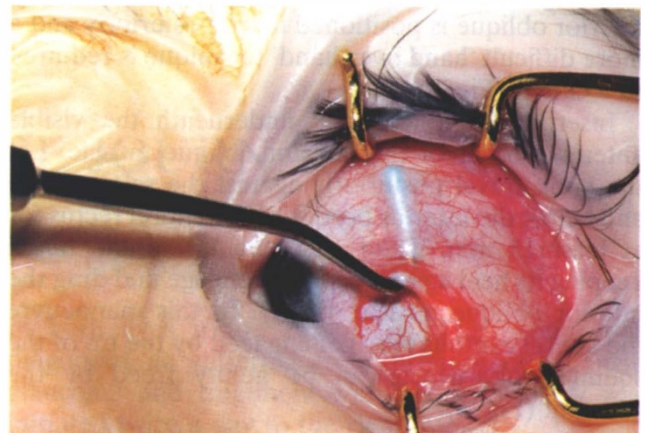


Fig. 2.

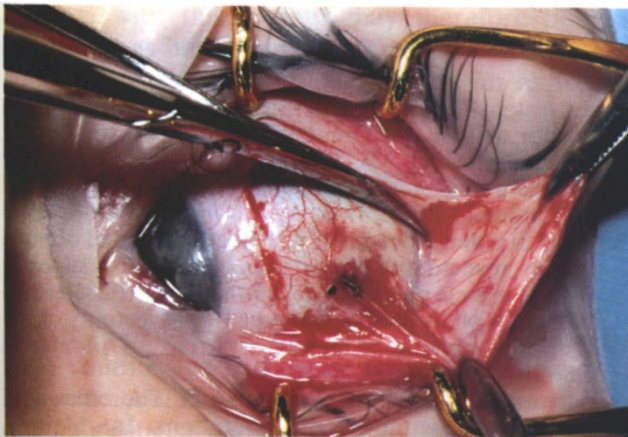


Fig. 3.

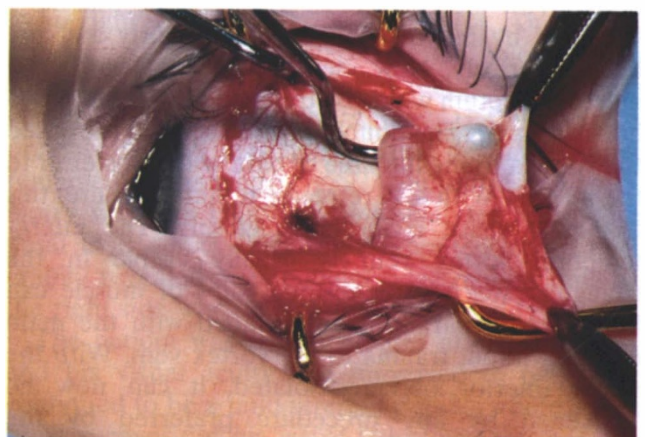


Fig. 4.

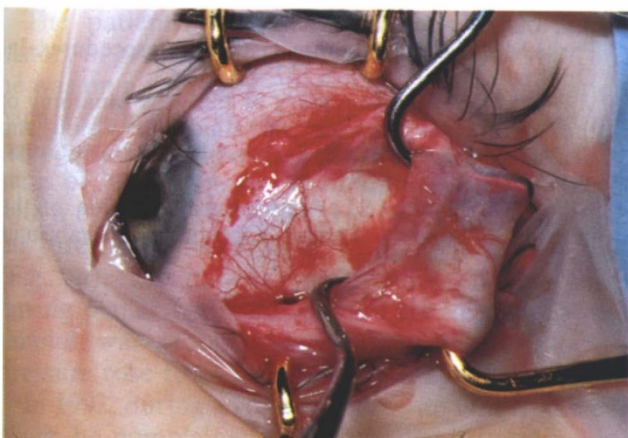


Fig. 5.

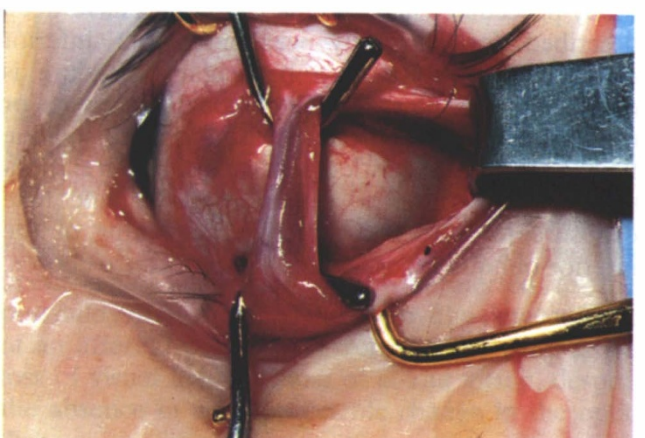


Fig. 6.

incision. Through the superior end of the incision, insert a Jamieson squint hook along the bare sclera to engage the lateral rectus muscle. Remove the Spencer Wells forceps and hold the eye in adduction with this squint hook (Fig. 2).

Extend the conjunctival and Tenon's capsule incision in a radial fashion just below the inferior border of the lateral rectus muscle. It is important to

avoid cutting the inferior oblique muscle, which can bleed profusely. Closely observe for the appearance of the anterior border of the inferior oblique muscle, approximately 10 mm behind the lower edge of the insertion of the lateral rectus muscle. The anterior border of the inferior oblique muscle is visible when the eye is in the adducted position. Take care not to let the eye elevate; when the eye is elevated, the

inferior oblique is positioned more posteriorly and a more difficult 'hand over hand' technique is required to locate it (Fig. 3).

Insert a Jamieson hook underneath the visible anterior border of the inferior oblique muscle. Let the hook travel posteriorly against the sclera along and below the inferior border of the lateral rectus for at least 15 mm. Then raise the tip of the hook, keeping its heel against sclera to engage and drag the inferior oblique muscle nasally. In this manoeuvre the lateral canthus may get engaged by the tip of the squint hook, which can be gently freed by the assistant (Fig. 4).

Remove the now redundant squint hook from the lateral rectus muscle. Insert this hook underneath the inferior oblique muscle close to the previously placed hook. With the two hooks in place, the muscle is stretched by moving one hook superiorly and the other inferiorly. Now identify the posterior intermuscular septum which is stretched between the two hooks (Fig. 5). The double-layered septum is excised to expose a triangular area of bare sclera posterior to the muscle. With a Z retractor to aid exposure, this triangular space is inspected closely. The infero-temporal vortex vein is usually visible in the triangular space. Any residual slips of muscle can be hooked separately and included with the main muscle without trauma to the vortex vein. With the whole inferior oblique isolated, it can now be weakened by any procedure preferred by the surgeon (Fig. 6).

#### *Conclusion*

Many procedures and varying techniques have been described for surgically weakening the inferior oblique. The choice of a particular procedure is often based on the surgeon's personal preference or experience. This approach, based on the unique functional characteristics and anatomical relationships of the inferior oblique, allows adequate exposure for safe and effective weakening of the inferior oblique regardless of the procedure chosen.

The emphasis is on the technique of engaging the inferior oblique by approaching below the inferior border of the lateral rectus to avoid damaging the vortex vein and by keeping the eye adducted to prevent the inferior oblique from slipping posteriorly. Finally, and most importantly, it enables direct visualisation and inspection of the triangular space posterior to the inferior oblique for residual slips of muscle, which are notorious for causing persistent overaction.

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