

LENGTHENING OF RECTUS MUSCLES IN STRABISMUS SURGERY*† WITH A DESCRIPTION OF A NEW MUSCLE CLAMP‡

BY

G. C. SOOD, S. R. K. MALIK, G. GUNGULI, AND S. CHOWDHARY

Department of Ophthalmology, Maulana Azad Medical College, New Delhi, India

MUSCLE weakening operations are standard procedures in strabismus surgery. Except in tenotomy, sutures are required to be passed into the sclera, when there is a risk of choroidal perforation. A new and safer procedure for weakening a rectus muscle by lengthening it is described below.

Surgical Method applied to the Lateral Rectus Muscle

The lids are separated by an eye speculum and the eye is turned in by a 3-0 black silk suture passed through the episclera on the temporal aspect of the cornea. A conjunctival incision about 15 mm. long is made 3 to 4 mm. behind the insertion of the muscle with slight concavity directed towards the cornea. The lateral rectus is defined, lifted over two strabismus hooks, and cleaned. Two longitudinal incisions are then made in the tendon with a bent iris repositor so that three strips are formed of approximately the same width (Fig. 1).

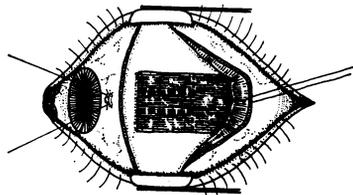


FIG. 1.—Incisions in lateral rectus muscle.

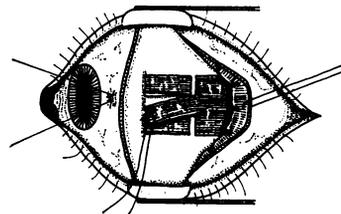


FIG. 2.—Severance of three strips of muscle, and insertion of suture in central strip.

The incisions should be about 2.5 mm. longer than the actual lengthening required in the particular case.§

A suture is then passed through the distal end of the centre strip, which is severed close to its point of insertion on the globe (Fig. 2), the free end being held in the special muscle clamp (described below) at right-angles to the blades.

The proximal ends of the outer strips are then cut with the tenotomy scissors (Fig. 2). The central strip is retracted, and the ends of the three strips are held in the muscle clamp in a Y-shaped formation (Fig. 3). The three strips can then be sutured together by passing an 8 mm. corneo-scleral needle, threaded with 6-0 silk or catgut, down through the open slots in the blades of the clamp and up again (Fig. 3, opposite). The lengthening thus obtained is shown in Fig. 4 (opposite).

The conjunctival incision is closed in the usual way with a continuous suture.

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§ Because about 1.5 mm. of the muscle is lost during suturing and about 1 mm. by joining in the peripheral strips (see Fig. 3).

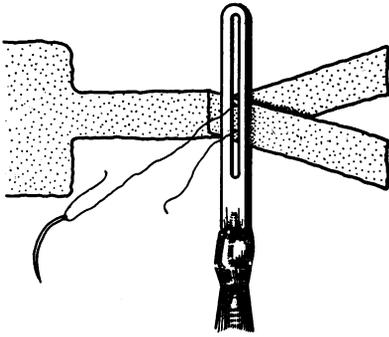


FIG. 3.—Strips of muscle held in clamp, with suture inserted through slot.

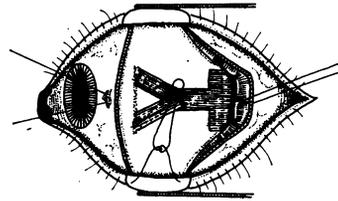


FIG. 4.—Lengthening of muscle, with suture ready to be tied down.

The Special Clamp (Figs 5 and 6)

The jaws are about 12 mm. long and 2.25 mm. wide with a longitudinal slot about 7×0.75 mm. A lock regulates the pressure according to the thickness of the muscle. The chief advantages of this clamp are that it saves time in placing the suture, prevents fraying of the cut ends of the muscle, and permits exact measurement of the amount of lengthening.

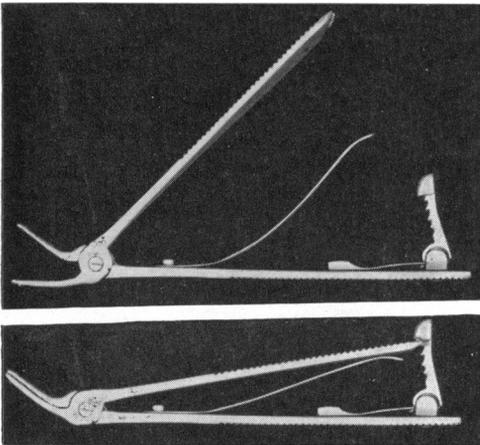


FIG. 5.—Side view of muscle clamp, showing lock open and shut (two-thirds actual size).



FIG. 6.—Drawing of clamp to show construction.

Practical Experience

Lengthening of the lateral rectus by from 6 to 11 mm. was carried out in thirteen cases of exotropia and four of marked exophoria. In six cases both the lateral rectus muscles were lengthened. The results were comparable to those of a recession operation. 1 mm. effective lengthening corrected an exotropia of 1 to 2 degrees. In no case was there any limitation of abduction.

In two cases of exophoria in which one lateral rectus muscle was operated on, slight exophoria persisted but the asthenopic symptoms disappeared. These two patients were later given convergence exercises on the synoptophore.

Lengthening of the medial rectus by from 4 to 7 mm. was carried out unilaterally in six cases of esotropia, and in one case bilaterally in two sessions.

This method gave a correction of 2 to 3 degrees for each millimetre of effective lengthening. No weakness of convergence occurred in any case.

The cosmetic effect was extremely gratifying in all cases and there were no complications.

Discussion

Tenotomy of the medial rectus is rarely attempted because the results are so unpredictable (Spaeth, 1944; Stallard, 1958; Arruga, 1962); it may cause weakness of convergence, secondary divergence, or unsightly retraction of the inner canthus.

Tenotomy of the lateral rectus, though sometimes performed, may cause diplopia and limitation of abduction. Partial tenotomies give uncertain results; there may be unwanted rotational effects (Spaeth, 1944) or blood may fill the gap and be converted to fibrous tissue (Stallard, 1958). Lindner's controlled tenotomy is likely to result in attachment of the muscle in a different plane, introducing vertical or torsional deviation. Jameson (1922, 1925, 1931) first described a recession operation (which was later modified), wherein the muscle was re-attached behind its original attachment by passing sutures through the sclera. Scleral sutures, however, may cause choroidal perforation (Spaeth, 1944; Havener and Kimball, 1960; Philps, 1961) leading to panophthalmitis. Moreover, the eye may become vertically displaced once the horizontal muscle is completely detached (Abrams, 1965), and there is a risk of scleral thinning, ectasia, and perforation.

Summary

- (1) A new technique of weakening the rectus muscles by lengthening is described.
- (2) The original insertion of the muscle is maintained and no suture is passed through the sclera.
- (3) There is thus no risk of choroidal perforation or malplacement of the muscle and more liberal correction is possible.
- (4) Lengthening of the lateral rectus muscle is recommended in divergence excess (exotropia and exophoria) and of the medial rectus muscle in convergence excess (esotropia and esophoria).

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