CHAPTER 3

POSTERIOR FIXATION: ADJUSTABLE AND WITHOUT POSTERIOR SUTURES

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I. INTRODUCTION

The Faden operation of Cuppers[1], suturing the extraocular muscle to the sclera posterior to the equator of the globe, has been a major contribution to surgical management of non-comitant strabismus. A major limitation of the current procedure is the lack of the ability to adjust the muscle position to achieve optimum alignment when performed in association with muscle recession. Difficulty with far posterior exposure, especially on the lateral rectus, may lead to inadequate or more anterior suturing. These problems are addressed by the technic proposed.

II. METHODS

When adjustable sutures are to be used, a limbal conjunctival incision is used. For the medial rectus muscle, exposure is made to a distance of 10 mm behind the muscular insertion. A 6-0 double armed polygalactin suture is placed in the fashion used for muscle resection, with care to fully tie the knot and be sure that the suture can not slip. The muscle and tendon anterior to the suture are excised. Each end is led through a superficial tunnel of sclera 5-6 mm posterior to the insertion (keeps the muscle from sliding verticallly up or downward) and thence up through the original insertion and tied in an adjusting knot. The muscle is placed at the largest probable recession position for possible advancement post-operatively. Because exposure is not extensive, local anesthesia may be used.

On the first post-operative day there is a substantial limitation of gaze into the field of action of the operated muscle, indicating that adhesion of the muscle to the globe at the point of insertion has already been established, with relatively little power going past this point by attachment to the sutures, which do not unroll off the sclera as would the normal tendon. This limitation persists or increases in the early postoperative period. The limitation found is more than one typically expects to see following usual posterior fixation suturing at similar distances.

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II. CASE STUDIES

Case 1

A 65 year old woman fell, developing a total and permanent right VI palsy. Following vertical muscle transposition on the right eye, 4 PD esotropia existed in the primary position, increasing to 35 PD in gaze right. Nine mm was resected from the left medial rectus, and it was recessed 5 mm. This resulted in an exotropia, and the muscle was pulled forward to a position of 1 mm recession. Eleven months later, the deviation was 4 PD exo in the primary position, 2 exo in gaze right and 6 exo in gaze left. **Comment**: A 10.0 mm retro-insertion of the entire muscle will have a large effect.

Case 2

At age 5 a girl had medial rectus recession on the left eye for a head turn, nystagmus and esotropia. The right eye had an optic nerve defect. At age 19 there was 10 PD of exo in the primary position, increasing to 30 PD with gaze right. There was a limitation of adduction of the left eye. The right lateral rectus muscle was resected 8 mm and allowed to recess 5 mm. Eight months later, the eye was in a position of 5 PD esotropia. The alignment was approximately comitant. Right gaze was limited in both eyes.

Case 3

A 20 year old woman had an amblyopic right eye with dissociated horizontal divergence of 25 PD. The right lateral rectus muscle was resected 10 mm and allowed to recess 6 mm. This had little effect in the primary position, but there was a -2 to -3 abduction defect in far right gaze. Two months later, horizontal alignment remained excellent, and the DHD could not be elicited.

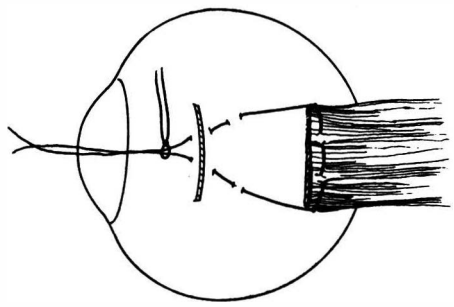

Figure 1. Scheme of recession-resection to achieve posterior fixation.

III. DISCUSSION

The lateral rectus requires suturing so that the final muscle inserts a minimum of 13 mm posterior to the original insertion, the medial 9-10 mm.

Sarnicola has addressed the problem of adjustment of the static deviation for the primary position in conjunction with the Faden operation by loosely encircling a fixation suture about the target muscle posteriorly, allowing one to pull the muscle through this suture. This technic requires posterior suturing, and firm binding of the muscle to the posterior sclera seems uncertain.

The present operation is intended for cases where adjustment is needed and for the lateral rectus, where exposure is very difficult. It does not replace the Faden procedure for most applications.

Table 1 shows results of several amounts of resection-recession which are suggested for various muscles and which are calculated from the program of Miller[3]. Notice the sensitivity of the deviation to small variations in recession of the shortened muscles. Table 2 shows that the deviation change is not so sensitive to the amount of resection.

Table 1

	Recession (mm)	Adduction 30°	Primary	Abduction 30°
Medial Rectus				
8 mm Resection	1	7 X	1 X	3 E
	2	10 X	5 X	0
	4	16 X	11 X	7 X
Lateral Rectus				
12 mm Resection	4	4 X	2 X	6 E
	6	0	4 E	13 E
	8	5 E	11 E	21 E
Inferior Rectus	Recession	Down 30°	Primary	Up 30°
9 mm Resection	0	1 H	2 Hypo	3 Hypo
	2	6 H	4 H	1 H
	4	12 H	10 H	4 H

Table 1. Calculated effect of various amounts of resection-recession for several muscles. (Deviation in prism diopters.)

Table 2

Inferior Rectus

	Recession (mm)	Down 30°	Primary	Up 30°
9 mm Resection				
	0	1 H	2 Hypo	3 Hypo
	2	6 H	4 H	1 H
	4	12 H	10 H	4 H
10 mm Resection				
	0	1 H	2 Hypo	3 Hypo
	2	7 H	4 H	0
	4	13 H	10 H	4 H
12 mm Resection				
	0	2 H	2 Hypo	6 Hypo
	2	8 H	3 H	1 H
	4	14 H	10 H	3 H

Table 2. Calculated effect of varying the amount of inferior rectus muscle excised.

IV. REFERENCES

1. Cuppers, C. The so-called Fadenoperation. Congr. Int. Strabismological Assn., 1974, p. 395, Dilffusion Generale de Librairie, Marseille.

2. Sarnicola, V. The adjustable Faden operation. Poster abstract. J. Pediatr. Ophthalmol. Strabismus 30: 401, 1993.

3. Miller, J.M., Shamaeva, I., 1994, Orbit™ Gaze Mechanics Simulation Eidactics, San Francisco.

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