

# Trabeculectomy

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In recent years attention has been directed away from the established procedures of fistularization towards surgery involving Schlemm's canal and the adjacent structures. The incidence of complications, both short-term and long-term, which are liable to occur from a direct communication between the anterior chamber and the subconjunctival space has stimulated the search for a drainage process which might be considered more physiological.

To achieve this, the procedures of trabeculotomy (Redmond Smith, 1960, 1962, 1969; Strachan, 1967; Harms and Dannheim, 1969), sinusotomy (Krasnov, 1968), and trabeculectomy (Cairns, 1968, 1969; Watson, 1970) have been described. It is the object of this paper to describe and discuss a simple method of trabeculectomy based upon the technique described by Cairns (1969) and modified by Watson (1970).

## Technique

General anaesthesia is normally used but standard local anaesthetic techniques are also satisfactory. A 6 to 7-mm. limbal-based conjunctival flap is turned down over the cornea and the limbus is cleared of Tenon's capsule. A scleral trapdoor 5 mm. wide and extending 4 mm. posteriorly from the limbus is dissected forwards to hinge anteriorly at the 12 o'clock position on the globe.

The bed of this trapdoor now consists of the deep sclero-trabecular lamella, and a 5 × 2 mm. rectangle of this lamella is marked out with a razor-blade fragment, the posterior incision being made along the line of the scleral spur. The sides of this rectangle are carefully deepened, preferably under microscope control, until penetration occurs.

If the iris prolapses at this stage, a peripheral iridectomy is performed immediately. If not, then the rectangle of tissue is seized with fine-toothed forceps and removed by elevating it away from the anterior chamber and severing any attached points with the tip of the razor blade. If not already done, a peripheral iridectomy is then performed after prolapsing the iris by slight pressure on the posterior lip of the wound.

The scleral trapdoor is closed with four to six virgin silk sutures. The conjunctival flap is sutured, atropine and neomycin are instilled, and the eye is padded. All cases are dressed 24 hours later and the patients are allowed out of bed.

All patients are observed for several days preoperatively as in-patients on maximum medical therapy. The preoperative ocular tensions are the average of the last five readings taken during routine twice-daily phasing with a Schiötz tonometer. The postoperative figures are the average of the last two tensions recorded in the out-patient department.

Three groups of patients are included in this study, representing all those who have had simple trabeculectomy or trabeculectomy combined with cataract extraction at this hospital, from the date the procedure was first adopted 2 years ago.

## Results

### (1) CHRONIC SIMPLE GLAUCOMA

The results of trabeculectomy in 29 eyes with chronic simple glaucoma are recorded in Table I. A filtering bleb formed in 21 of the 29 eyes, which were the most favourable as regards the postoperative ocular tension. In three eyes with no subconjunctival bleb, the postoperative tension remained above 21 mm.Hg.

**Table I** *Chronic simple glaucoma—29 cases*

Ocular tension (mm.Hg)	Number of cases		Filtering bleb			Complications		
	Preoperative	Postoperative	Present	Sclerosed	Absent	Choroidal effusion and shallow anterior chamber	Flat anterior chamber	Increased cataract
6-10	0	3	1	0	2	0	0	0
11-15	0	11	11	0	0	1	0	1
16-20	9	11	9	2	0	1	0	1
21-25	4	2	0	1	1	0	0	0
26-30	14	1	0	0	1	0	1	0
> 30	2	1	0	0	1	0	1—later phacotoxic glaucoma	

### (2) CHRONIC OR ACUTE ANGLE-CLOSURE GLAUCOMA

The results of trabeculectomy in 26 eyes with chronic or acute angle-closure glaucoma with peripheral anterior synechiae are recorded in Table II.

**Table II** *Acute or chronic angle-closure glaucoma—26 cases*

Ocular tension (mm.Hg)	Number of cases		Filtering bleb		Complications		
	Preoperative	Postoperative	Present	Absent	Choroidal effusion and shallow anterior chamber	Flat anterior chamber	Increased cataract
6-10	1	8	8	0	0	0	2
11-15	1	9	7	1	1	0	0
16-20	3	8	2	7	0	0	0
21-25	10	1	0	1	0	0	0
26-30	4	0	0	0	0	0	0
> 30	7	0	0	0	0	0	0

A filtering bleb formed in seventeen of the 26 eyes and all had a postoperative ocular tension below 20 mm.Hg. None of the eyes with a postoperative tension above 20 mm.Hg had a filtering bleb.

The figures in Tables I and II are inadequate for any positive conclusions to be drawn, but certain inferences may be made:

(a) Using the operative technique as described, it would seem that the formation of a subconjunctival drainage bleb has significance in the control of tension. A postoperative bleb is recorded in 64 per cent. of cases of chronic simple glaucoma described by Watson and 72 per cent. of our cases of chronic simple glaucoma; nevertheless, we can substantiate Watson's report that the blebs develop later and are smaller than those seen with a conventional fistularizing technique.

(b) The immediate postoperative complications of shallow anterior chamber and choroidal effusion are very considerably reduced.

(c) The late complications of bleb perforation, hypotony, and endophthalmitis cannot be assessed at this stage, but if the bleb is less conspicuous it is possible that these complications will occur less frequently than with conventional techniques.

(d) The high incidence of controlled tension in the cases with filtering blebs and of poor control in those without blebs suggests that the main factor in tension control is subconjunctival filtration rather than direct drainage into the cut ends of Schlemm's canal.

(e) In one instance, during the course of postoperative gonioscopy, a reflux of blood was seen to emerge from a cut end of Schlemm's canal. This is an event which had not been previously recorded and it was seen only once in our series. It is interesting to note that this patient, who had no bleb, was operated on 18 months ago, and that her average postoperative ocular tension is 20–21 mm.Hg without any medical therapy.

### (3) CATARACT EXTRACTION COMBINED WITH TRABECULECTOMY

This group is too small for valid comment, but the absence of complications so far is encouraging (Table III).

**Table III** *Combined operation of lens extraction and trabeculectomy in seven cases*

Ocular tension (mm.Hg)	Number of cases		Filtering bleb		Complications
	Preoperative	Postoperative	Present	Absent	
11–15	0	3	2	1	Nil
16–20	1	1	0	1	Nil
21–25	3	2	0	2	Nil
26–30	1	1	0	1	Nil
> 30	2	0	0	0	Nil

### Summary

The results of trabeculectomy in reducing the intraocular pressure have proved gratifying, but the postoperative appearances suggest that the end-result in many cases may be due partly to direct filtration into the subconjunctival space rather than to drainage into the opened ends of Schlemm's canal. That the latter form of drainage is possible has been demonstrated by the observation of blood issuing from the cut ends of Schlemm's canal in one patient 18 months after surgery.

**References**

- CAIRNS, J. E. (1968) *Amer. J. Ophthalm.*, **66**, 673  
——— (1969) *Trans. ophthalm. Soc. U.K.*, **89**, 481  
HARMS, H., and DANNHEIM, R. (1969) *Ibid.*, **89**, 491  
KRASNOV, M. M. (1968) *Brit. J. Ophthalm.*, **52**, 157  
SMITH, R. J. H. (1960) *Ibid.*, **44**, 370  
——— (1962) *Trans. ophthalm. Soc. U.K.*, **82**, 439  
——— (1969) *Ibid.*, **89**, 511  
STRACHAN, I. M. (1967) *Brit. J. Ophthalm.*, **51**, 539  
WATSON, P. (1970) *Ann. Ophthalm. (Chicago)*, **2**, 199