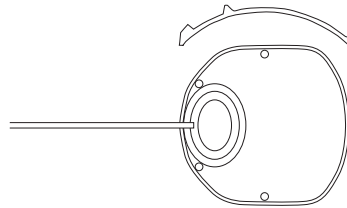


MOLTENO3[®] *Third Generation*

Glaucoma Drainage Device

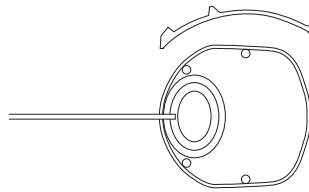
A Step by Step Guide to Inserting the
Molteno3[®] Glaucoma Drainage Device
for Delayed or Immediate Drainage
and either translimbal or pars plana insertion

GL - Single Plate 230mm²



Surface Area of Plate	= 230 mm ²
Plate Thickness	= 0.4 mm
Maximum Height of Ridge	= 1.5 mm
Maximum Length	= 16 mm
Maximum Width	= 15 mm
Tube Internal Diameter	= 0.34 mm
Tube External Diameter	= 0.64 mm
Translimbal Tube Length	= 17 mm

GS - Single Plate 175mm²



Surface Area of Plate	= 175 mm ²
Plate Thickness	= 0.4 mm
Maximum Height of Ridge	= 1.5 mm
Maximum Length	= 13.6 mm
Maximum Width	= 14.2 mm
Tube Internal Diameter	= 0.34 mm
Tube External Diameter	= 0.64 mm
Translimbal Tube Length	= 19 mm

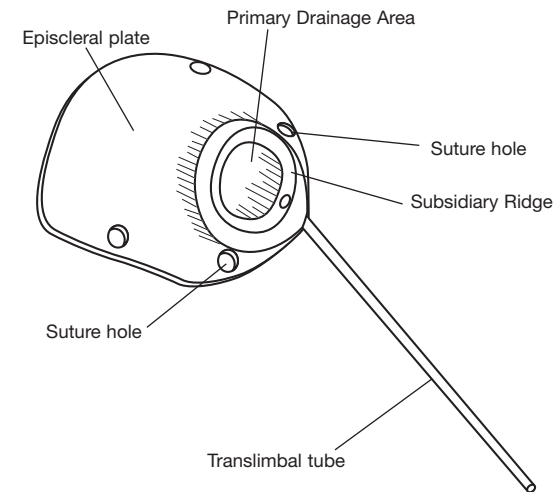
Introduction

Molteno3® glaucoma implants were developed for the treatment of severe and complex cases of glaucoma. They are now more widely used and are recommended wherever hypotensive medication or conventional drainage operation has failed or has a poor prognosis.

Indications

A patient with glaucoma needs drainage surgery. You should insert a Molteno3® Implant when:

- A previous trabeculectomy has failed
- A trabeculectomy in the patient's other eye has failed
- The patient has primary open angle glaucoma with additional risk factors such as field loss close to fixation or pseudophakia.
- The eye has glaucoma which is controlled by drops but has developed a cataract and will need cataract surgery
- The patient has uveitis
- The child has juvenile glaucoma or buphthalmos
- The patient has traumatic glaucoma
- The patient, for some reason, cannot cooperate with the medication regime.
- The patient has neovascular glaucoma



Molteno3® glaucoma drainage device.

PLEASE READ THIS FIRST

THE MOLTENO3[®] SYSTEM

An overview of the clinical management of the process of bleb formation with insertion of a Molteno3[®] Implant

This description should be used as a guide only and the surgeon must use his or her clinical judgement to match the surgery with the individual case.

The system of management of glaucoma with all Molteno Implants includes three important stages.

1. Preoperative management
2. Surgical Procedure
3. Postoperative Management

The correct management at each stage is critical for the formation of a well draining, permeable bleb capsule, which gives life long control of IOP in most cases.

1. Preoperative Management.

During the preoperative period while the patient is waiting for surgery. **BRING THE PRESSURE DOWN and KEEP IT DOWN if at all possible until the operation.** You may need to use hypotensive medication at a level that could not be tolerated long term.

2. Surgical Procedure.

USE THE VICRYL¹ TIE TECHNIQUE TO DELAY ONSET OF DRAINAGE WHEREVER POSSIBLE. This should be possible in most cases except acute conditions such as neovascular glaucoma.² The delay in the onset of drainage allows time for the tissues heal and to form a thin bleb capsule around the implant. This avoids postoperative hypotony when the Vicryl dissolves, reduces the inflammatory response which occurs at the onset of drainage and results in a more permeable bleb capsule which drains well. The use of Mitomycin C or 5FU is not recommended as it interferes with the formation of a healthy, permeable bleb capsule.

3. Postoperative management.

KEEP THE PRESSURE DOWN UNTIL THE ONSET OF DRAINAGE.

With the onset of drainage when the Vicryl tie dissolves and the tube opens, the IOP will fall to low normal levels initially. Stop hypotensive medication and use topical steroids for up to 6 weeks to keep the eye quiet.³ See Case 1, page 3.

After about 2-3 weeks **the IOP will start to rise again** sometimes almost to preoperative levels. **DON'T PANIC !** This is a normal and important stage in the process of forming a well draining bleb capsule which lasts for 5-6 weeks. It is important that the IOP should rise above the capillary pressure at this time. However if the IOP rises above 20 mmHg use beta blockers, adrenergic agents and/or carbonic anhydrase inhibitors to bring the pressure down and keep the pressure to below 20 mmHg. Often low doses are all that is required. See Case 2.

1 5.0 Vicryl, or other similar 5.0 polyglycolic acid suture will dissolve 3-5 weeks after placement within well vascularised tissue, at which time the tube will open and aqueous will flow into the preformed bleb capsule.

2 In cases of glaucoma associated with uveitis it may be necessary to use a combination of systemic anti-inflammatory agents for several weeks after the onset of drainage to keep the eye quiet and reduce the fibrous tissue deposited in the bleb capsule.

(ref: Molteno A.C.B., Dempster A.G., *Methods of controlling bleb fibrosis around draining implants.*

In K.B. Mills (ed) Glaucoma: Proceedings of the Fourth International Symposium of the Northern Eye Institute, Manchester, U.K. Pergamon Press Oxford, pp192-211, 1988.

3 Caution! TOPICAL STEROIDS MAY CAUSE ELEVATION of IOP, when used for longer than 6 weeks in patients who are steroid responders.

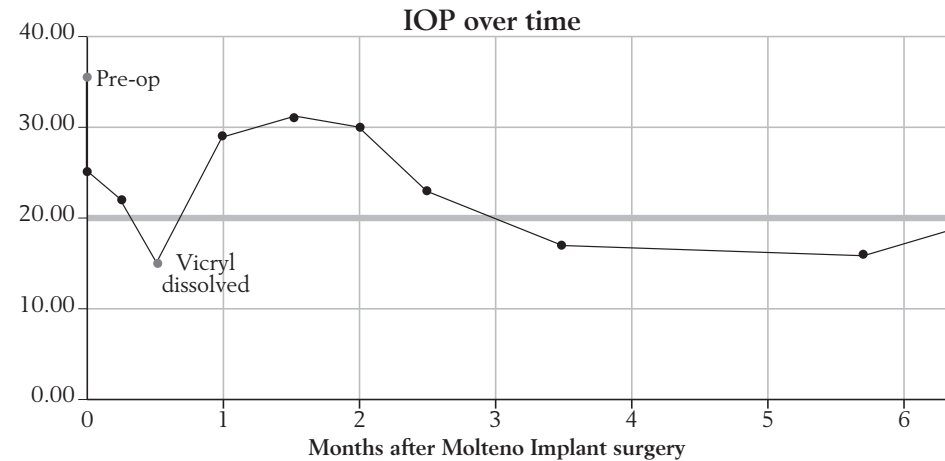
Postoperative management continued...

DO NOT USE MIOTICS OR OTHER VASODILATORS AFTER THE ONSET OF DRAINAGE as they cause elevation of IOP after glaucoma drainage surgery.

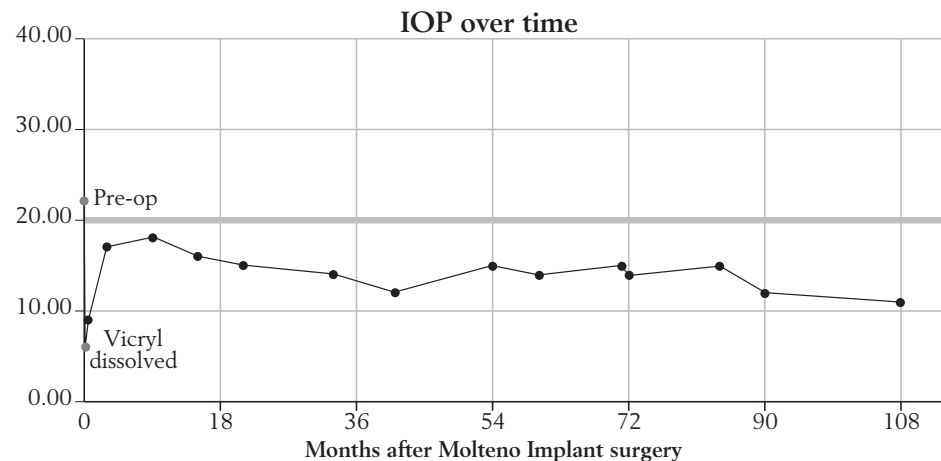
About 6-9 weeks after the onset of drainage the **IOP will begin to fall**, rapidly at first, and then more slowly to reach a stable level 3-6 months after the onset of drainage. If hypotensive medication has been used, it can be reduced gradually or discontinued once the IOP reaches around 15 mmHg.

4. Long term management.

KEEP THE PRESSURE DOWN below 20mmHg and ideally at between 12-16mmHg. The bleb capsule will gradually become more permeable and any need for hypotensive medication will reduce over time.



Case 2. Graph showing postoperative elevation of IOP in a 33 year old patient with ICE syndrome following a failed MMC trabeculectomy 2 months previously. After falling initially when the Vicryl opened the IOP rose almost to pre-op levels before being brought down to 16-17mmHg on combined medications. The IOP stabilised at around 20mmHg on Timalol 12 months post-operatively.



Case 1. Graph showing the post-operative course in an 85 year old patient after a combined cataract/Molteno Implant procedure. The pre-op IOP was 22mmHg on 3 medications including Diamox. A single plate Molteno Implant was used with a Vicryl-tie for delayed drainage. Post-operatively the IOP stabilised at 11-14mmHg on no medication for the duration of follow-up.

Guidelines for the Surgeon

Selecting size of the Implant - 175 or 230mm?

The area needed for drainage and adequate long term control of IOP depends on the patient's age, general health and the severity of the glaucoma. In general, the greater the amount of aqueous to be drained and the stronger the patient's fibrosing response to glaucomatous aqueous the greater the area needed for drainage. *As a general rule, and subject to the surgeon's experience and clinical judgement*, 175mm plate implants are used in infants under 18 months, those in frail general health or very elderly and where the eye has had a cyclodestructive operation or multiple intraocular procedures. 230mm implants are used in most younger and fitter patients and in elderly patients in good general health.

Selecting the best surgical technique - Immediate or delayed drainage?

Molteno3® Implants may be inserted for immediate or delayed drainage. Delayed drainage is recommended wherever possible as it reduces the incidence of postoperative hypotony and gives a thinner bleb lining with superior long term control of IOP.

Delayed drainage.

Drainage of aqueous may be delayed by tying an absorbable suture such as 5.0 Vicryl, the 'Vicryl-tie', around the translimbal tube of the implant close to the plate. This allows time for the formation of a thin bleb lining, the 'preformed bleb', in the tissues around the plate. During this time the IOP is controlled by hypotensive medication supplemented, if necessary, by making a relieving slit in the side of the translimbal tube the 'Sherwood slit'. This slit acts as a safety valve and releases aqueous if the IOP rises above normal levels. It ceases to function about 4 weeks after operation around the time the Vicryl-tie dissolves. When the Vicryl-tie dissolves 4 to 5 weeks after operation the tube opens and aqueous drains into the 'preformed bleb' effectively preventing post-drainage hypotony.

Immediate drainage.

Immediate drainage is necessary where the eye is acutely inflamed and when immediate reduction of IOP is required. Examples include acute neovascular glaucoma or glaucoma associated with uveitis or where the eye contains blood after trauma. Use of a Pressure Ridge Molteno® Implant in such cases reduces postoperative hypotony.

This guide describes the author's current surgical technique for inserting a Molteno3® 175 or 230mm. The important steps in the operation and postoperative management are described and the purpose of each step is clearly stated. It is important for the surgeon to understand the reason for each step so that he or she can adapt the technique to suit the individual case.

This description should be used as a guide only and the surgeon must use his or her clinical judgement to match the surgery with the individual case

Part 1. Surgical Technique for Translimbal Insertion

Surgical Instruments Required

Molteno3® 175mm or 230mm
Lid speculum
Wescott, or similar fine spring scissors
Moorfields non-toothed forceps x2
Squint hooks x2
Artery clips x2
Scalpel Plus No. 11 Bard Parker blade
Battery operated cautery
Hoskins fine non-toothed forceps
Fine needle holder
2ml syringe x3
23 gauge needle
22 gauge needle
Rycroft cannula
7.0 silk suture x1
4.0 silk suture x1
5.0 Dexon or Vicryl suture x1 (For delayed drainage only)
Blade breaker and razor blade or 30 degree diamond knife
Donor sclera or equivalent tissue
Balanced salt solution 10ml.
Subconjunctival antibiotics
Depo Medrol (methylprednisolone acetate) or equivalent

Preparation for surgery

Your aim is to minimise bleb fibrosis around the implant so that it drains well. Glaucomatous aqueous stimulates fibrosis in the episcleral tissues resulting in a thickened bleb capsule which limits drainage. If you can manage to keep the IOP below 20mmHg for 4 to 6 weeks before surgery, a thinner bleb capsule will be formed and the final result will be much better.

Keep the IOP as low as possible prior to surgery, use maximal hypotensive medication if necessary. This may include combinations of acetazolamide, beta blocker, adrenergic agents, prostaglandin analogues or miotics in doses which could not be tolerated on a long term basis.

The operation is performed on an outpatient basis in most cases. Anaesthesia may be local or general.

Step 1.

Selecting a quadrant for the Molteno3[®] glaucoma implant

Your aim is to select the quadrant which will.

- *allow good exposure.*
- *provide an intact layer of Tenon's tissue and conjunctiva with which to cover the implant.*

The superior nasal or superior temporal quadrant are preferred . In the nasal quadrant Tenon's tissue is thicker, minimising the chance of late erosion of the tube through the conjunctiva. In addition the bleb is unobtrusive in this quadrant and subsequent cataract surgery is easier. However surgical exposure is better in the superior temporal quadrant.

If the tissues of the superior quadrants are severely damaged, the inferior quadrants may be used. Note however that diplopia can occur in patients with good vision in both eyes. The incidence of diplopia may be minimised by selecting the infero-temporal quadrant in preference to the infero-nasal quadrant and suturing the plate with its anterior edge in line with the insertions of the rectus muscles.

Neovascular glaucoma

Your aim is to preserve vision by reducing the IOP to normal levels without hypotony. Cases of acute neovascular glaucoma in particular lose vision very rapidly and should be treated as emergencies.

Reduce the IOP as far as possible in the short period between diagnosis and surgery. Use maximal hypotensive medication if necessary. This may include a combination of acetazolamide, topical beta blockers and adrenaline, in doses which could not be tolerated on a long term basis. Intravenous Mannitol may be needed.

Use antibiotic drops prophylactically immediately prior to surgery.

Step 2. The Incision

Your aim is to expose the sclera while carefully preserving an intact layer of Tenon's tissue and conjunctiva which will later be used to cover the implant.

Grasp the conjunctiva with a non-toothed forceps. Using a fine spring scissors, make an incision through the conjunctiva and Tenon's tissue to expose the superior nasal sclera, as follows:

Start at the inferior margin of the medial rectus muscle insertion, and extend the incision to the limbus. Then cut around the limbus to a point opposite the lateral margin of the insertion of the superior rectus. From this point cut radially back to the lateral margin of the superior rectus insertion (Fig 2).

Cauterise bleeding points.

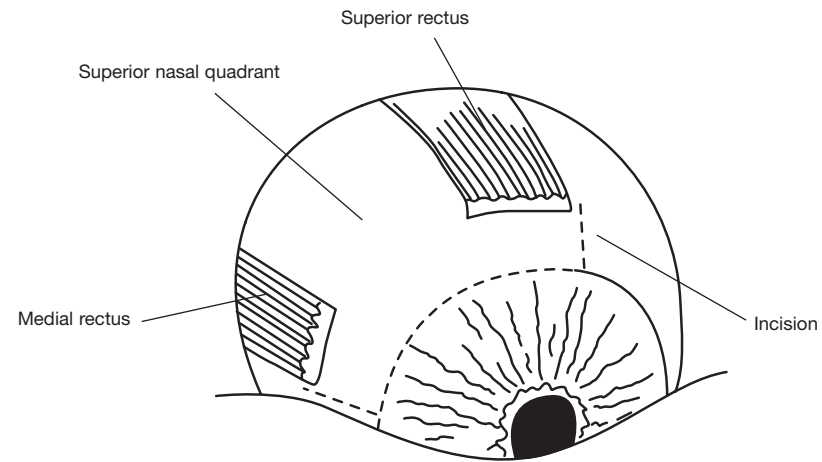


Fig. 2 The incision.
(Left Eye shown as an example)

Neovascular glaucoma

In neovascular glaucoma the extraocular tissues are fragile and bleed very readily. The AC also contains abnormal blood vessels which often bleed when the tube is inserted. These factors can make the operation technically difficult. So handle the tissues very gently. Use careful haemostasis at each stage of the operation.

Carefully cauterise bleeding points.

Step 3. Fixing the Position of the Eye and Exposing the Sclera

Your aim is to expose the insertions of the rectus muscles and the intervening sclera.

Rotate the eye downwards and laterally using two squint hooks placed under the medial or lateral and superior rectus muscle insertions (Fig 3.1).

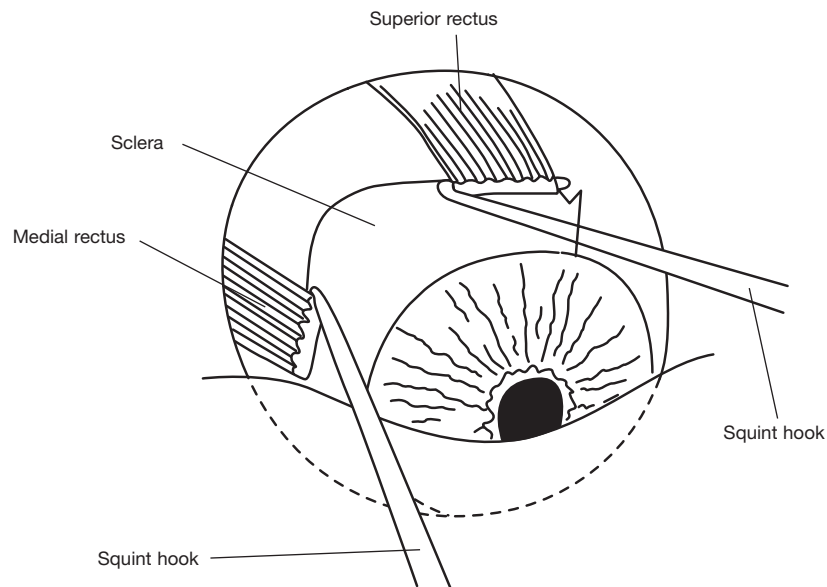


Fig. 3.1 Rotating the eye.

Fix the eye in position by passing a 4.0 silk suture under each of these rectus muscles and attach the sutures to the drapes.

Using the handle of a scalpel, gently push Tenon's tissue and the conjunctiva posteriorly, to expose the sclera for 2 to 3 mm behind the muscle insertions (Fig 3.2).

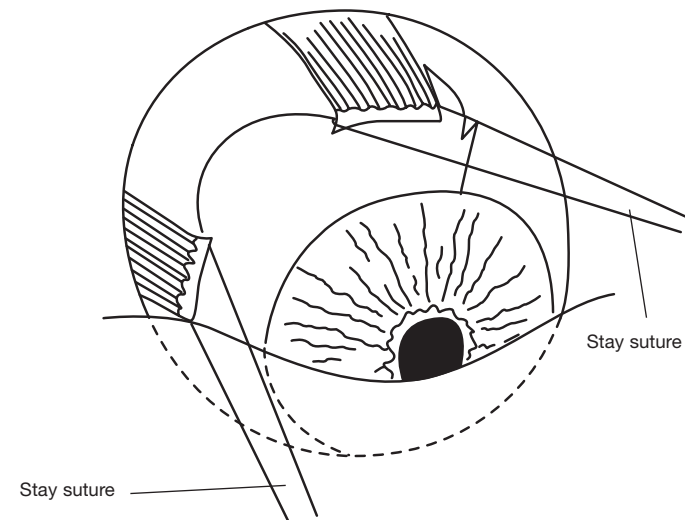


Fig. 3.2 Fixing the position of the eye.

Step 4.

Raising a lamellar scleral flap hinged at the limbus

The purpose of the flap is to:

- 1. Enable you to select the exact point at which the tube of the implant will enter the A.C.*
- 2. Provide good tissue cover for the tube.*

Note: Where the sclera is very thin, this dissection is omitted and the tube is covered by a piece of donor sclera after insertion of the tube into the A.C. (See Step 11)

Use cautery to outline three sides of a rectangular flap. The outline should extend from the limbus to a point 1 mm from the insertion of the lateral rectus muscle. From there it should pass across to a point 1 mm from the insertion of the superior rectus muscle before returning to the limbus.

Using a No. 11 Bard-Parker blade on a scalpel, make a half thickness incision through the cauterised sclera (Fig 4.1). It is important that the dissection should not be deeper than half thickness.

Using a fine Hoskins non-toothed forceps, lift the posterior corners of the flap and separate carefully from the underlying sclera using the back of a No. 11 Bard-Parker scalpel blade. Continue the dissection carefully anteriorly until it extends for 1 mm into clear cornea (Fig 4.2).

Cauterise bleeding points.

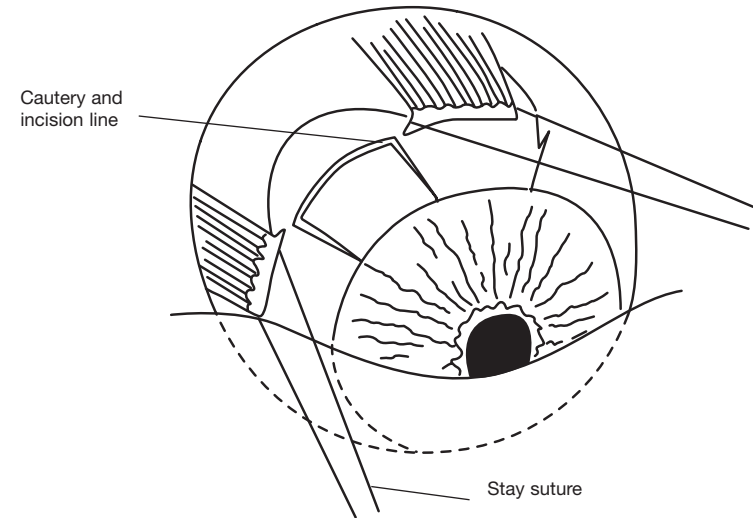


Fig. 4.1 Outlining the lamellar scleral flap.

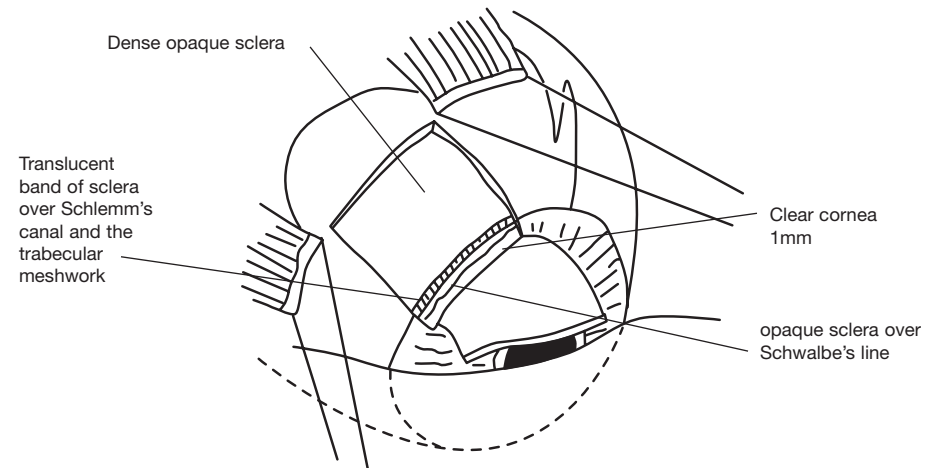


Fig. 4.2 Raising the half thickness flap and dissecting forward for 1mm into clear cornea.

Step 5. Positioning the plate of the implant

Your aim is to position the plate of the implant so that the plate lies symmetrically between the rectus muscles. In this position interference with the action of the muscles is minimised and diplopia avoided.

Using a non-toothed Moorfield's forceps, lift Tenon's tissue and the conjunctiva away from the sclera. Then pick up the plate of the implant using another non-toothed forceps and slide the implant posteriorly into Tenon's space until the anterior edge is in line with the insertions of the rectus muscles and its drainage tube extends radially forward over the limbus (Fig 5.1). When the plate is correctly placed the suture holes lie just behind the insertions of the rectus muscles.

Release the plate of the implant and with non-toothed forceps carefully pull Tenon's tissue and the conjunctiva forward over the plate to the limbus. If there is any difficulty in completely covering the plate without displacing it, there is a fold of Tenon's tissue caught behind the plate. This can be freed by grasping the plate with a non-toothed forceps and wiggling it while exerting gentle forward traction on Tenon's tissue (Fig 5.2a&b).

The plate should now be lying between the rectus muscles with its anterior portion in line with the muscle insertions. The posterior part of the plate will be partly covered on either side by the rectus muscles (Fig 5.1).

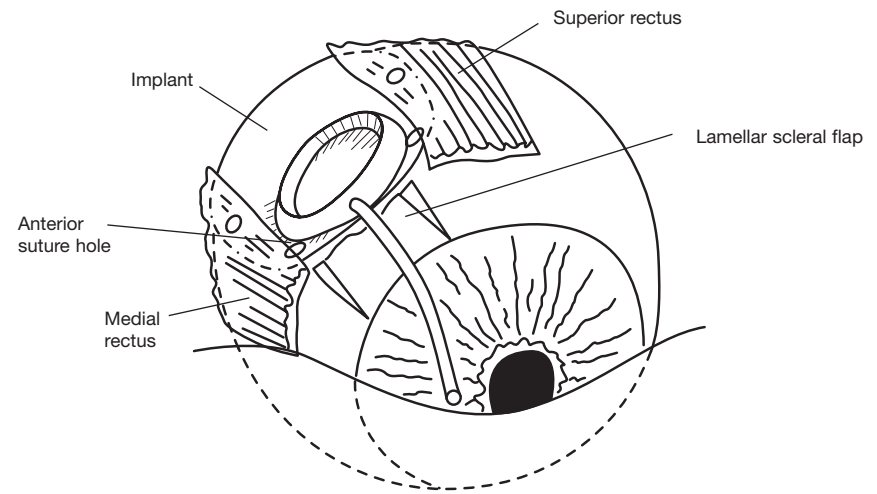


Fig. 5.1 Positioning the Molteno3® glaucoma implant symmetrically between the muscles.

Step 5. Continued...
Positioning the plate of the implant

If there is any difficulty in completely covering the plate without displacing it, there is a fold of Tenon's tissue caught behind the plate. This can be freed by grasping the plate with a non-toothed forceps and wiggling it while exerting gentle forward traction on Tenon's tissue (Fig 5.2a&b).

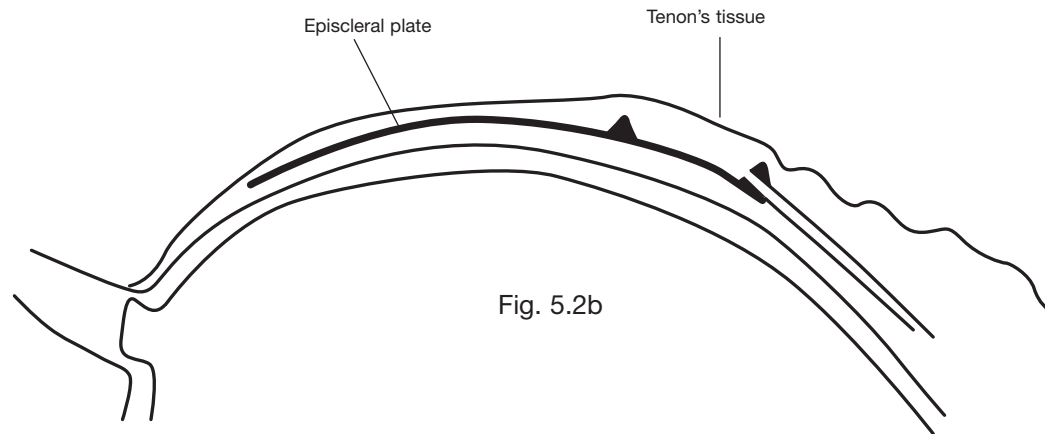
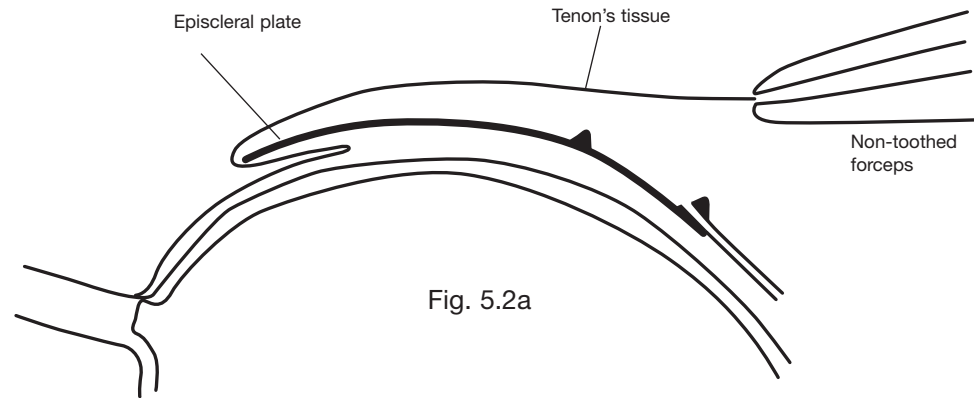


Fig. 5.2 Sectional diagram to show (5.2a) a fold of Tenon's tissue caught behind an episcleral plate and (5.2b) Tenon's tissue freed (see text)

Step 6.

Suturing the plate of the implant in position

Landmarks: The implant is correctly placed when its plate lies symmetrically between the superior and medial rectus muscles. In this position the anterior two suture holes will lie just behind the insertions of the rectus muscles.

Using a non-toothed forceps, grasp the edge of the superior rectus muscle near its insertion. Using a 7.0 silk suture, pass the needle posteriorly through the sclera at the insertion of the tendon of the superior rectus muscle and for 2mm through the superficial layers of the sclera. Pass the needle from below up through the anterior suture hole in the plate. Now pass the needle forward through 1 mm of sclera and the tendon of the muscle again. (Fig 6.1) Pull the suture tight and tie a knot.

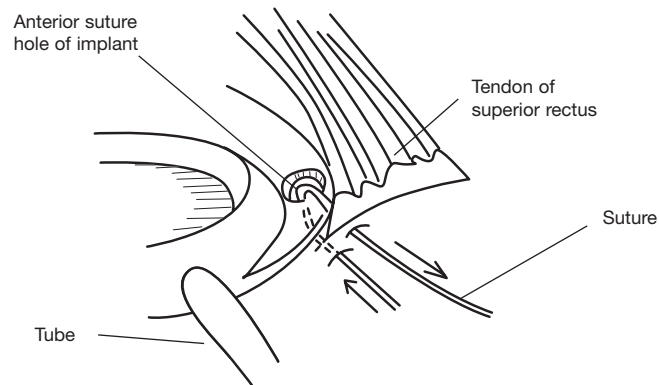


Fig. 6.1 Suturing the episcleral plate of the implant to the sclera with a mattress stitch.

Now grasp the edge of the medial rectus muscle and repeat this procedure. The plate should now be firmly fixed to the sclera just behind the rectus muscle insertions (Fig 6.2).

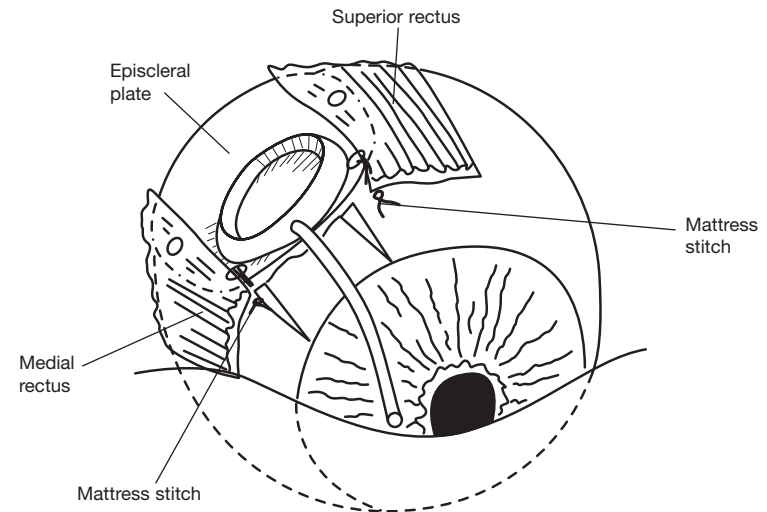


Fig. 6.2 Molteno3® sutured in position on the sclera with the episcleral plate correctly placed with its anterior edge in the line with the insertions of the rectus muscles.

Step 7.

Temporary occlusion of the translimbal tube with an absorbable suture

Temporary occlusion of the tube has two important functions.

- 1. It assists in reducing postoperative hypotony by preventing the drainage of aqueous in the immediate postoperative period.*
- 2. It allows time for a thin layer of connective tissue to develop around the plate of the implant before the tube opens and aqueous starts to drain into the bleb. The presence of the preformed bleb lining gives a less fibrosed bleb capsule with correspondingly better control of IOP than is the case with immediate drainage of aqueous.*

Take a 5.0 polyglycolic acid suture such as Vicryl or Dexon. Carefully tie it around the tube of the implant close to the plate using two half hitches to form a slip-knot which is pulled tight and locked with a third throw. It should be tied firmly enough to block the tube (Fig 7.1). Do not use catgut as it does not absorb in this situation.

TAKE CARE when tightening the suture as it can cut through the silicone tube or pull the tube off the plate if excessive force is used.

To test that the tube has been properly occluded, take a 2ml syringe filled with saline and attach a Rycroft cannula. Insert the tip of the cannula for 3mm into the open end of the tube. Try to inject saline up the tube. If the tube has been properly occluded no saline will pass through the tube. Instead, the pressure of the saline will make the tube swell slightly and saline will flow back past the cannula.

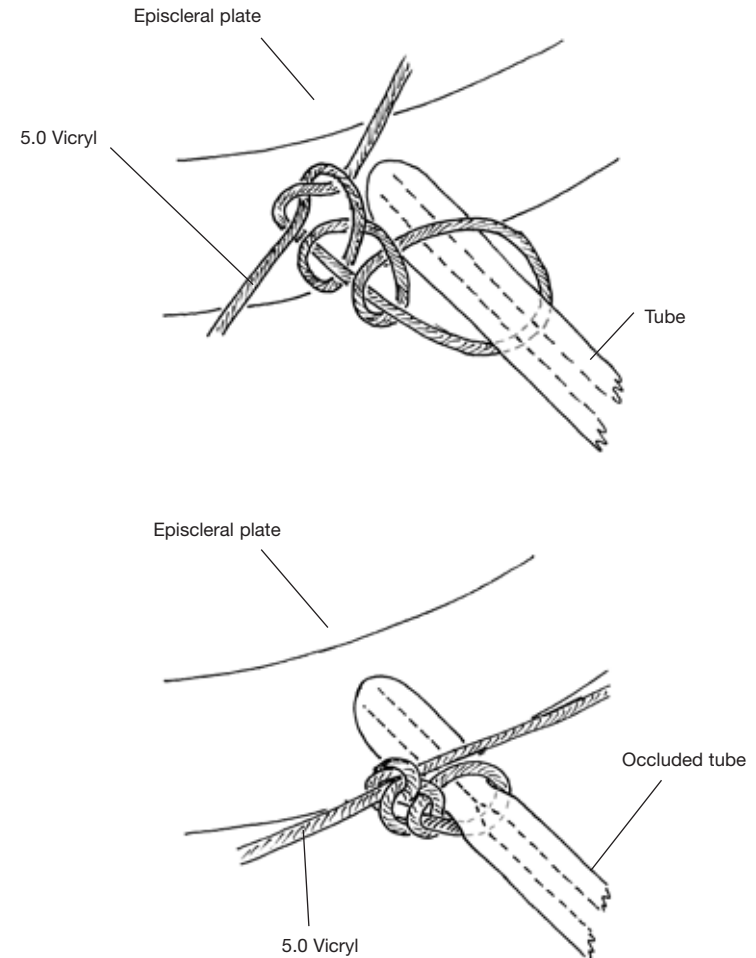


Fig. 7.1 Occluding the tube with an absorbable suture (eg 5.0 Vicryl).

Step 7b Optional Temporary Valve

Making a relieving slit in the translimbal tube: "Sherwood Slit"

The purpose of this slit is to provide temporary drainage, while the Vicryl suture is occluding the tube. The slit acts temporarily like a valve and will release aqueous if the IOP rises above normal levels. It ceases to function 3 to 4 weeks after operation, by which time the suture has dissolved and the tube has opened.

Hold the tube steady with a fine, non-toothed forceps. Take a sharp pointed razor blade fragment, or a 30 degree diamond knife, and cut a very small longitudinal slit 0.5-1 mm in length in **one side of the tube** 2-3mm below the point of occlusion (Figs 7.2 and 7.3).

Note: It is important to make the slit no more than 1mm long on the outside. The inner length will then be about 0.5mm. With these dimensions the slit will leak aqueous when the IOP reaches 15-20mmHg.

The relieving slit was first described by Dr Mark Sherwood, Gainesville, Florida. Ref: M. B. Sherwood and M. F Smith. Prevention of early hypotony associated with Molteno® implants by a new occluding stent technique. Ophthalmology 1993, 100 (1): 85 - 90

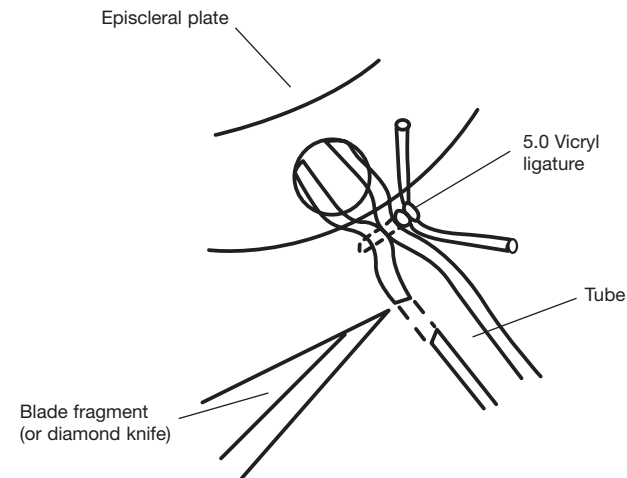


Fig. 7.2 Making a relieving slit in one wall of the tube.

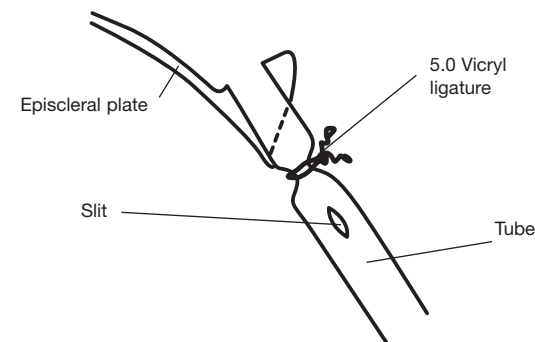


Fig. 7.3 Cross section of the episcleral plate with tube showing the slit in one wall of the tube.

Step 8. Optional - for Immediate Drainage only
Forming a pressure sensitive 'biological valve' by stretching Tenon's tissue over the Subsidiary Ridge of the Implant in cases where the Vicryl tie is not used

Your aim is to form a pressure sensitive valve to maintain the anterior chamber during the operation and to, prevent hypotony in the early postoperative period.

The pressure-sensitive valve is formed by stretching Tenon's tissue closely over the Subsidiary Ridge of the implant and suturing it securely to the sclera. The smooth, flexible tissues of Tenon's tissue adhering closely to the Subsidiary Ridge of the plate acts as a pressure sensitive "biological valve". This valve system confines the aqueous to the smaller primary drainage area within the ridge until the IOP rises sufficiently to lift the tissues off the Subsidiary Ridge allowing aqueous to drain into the main bleb cavity.

Take a non-toothed forceps and gently pull the flap of Tenon's tissue and conjunctiva forward over the episcleral plate to the limbus (Fig. 8.1). Now lift the tissues so that you can see the undersurface of Tenon's tissue where it covers the anterior edge of the plate (Fig. 8.2).

Use a non-toothed forceps to reach under the flap and grasp the underside of Tenon's tissue at the side of the Subsidiary Ridge. Stretch Tenon's tissue slightly and suture it to the sclera just in front of the plate, in line with one side of the Subsidiary Ridge, using an interrupted 7.0 silk suture (Figs. 8.2 & 8.3). Grasp the underside of Tenon's tissue again at the other side of the Subsidiary Ridge. Stretch Tenon's tissue slightly and suture it to the sclera just in front of the plate and in line with that side of the Subsidiary ridge. Tie both sutures firmly.

See also Fig P1.1: Postoperative action of the pressure sensitive valve, Pg21.

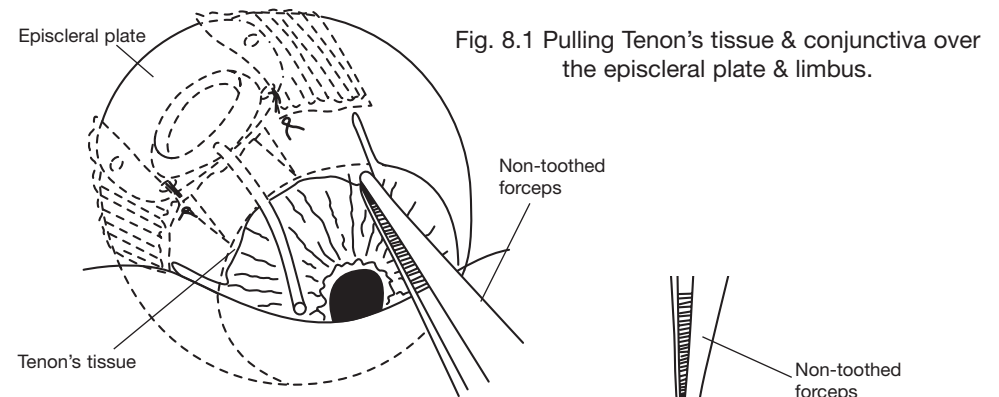


Fig. 8.1 Pulling Tenon's tissue & conjunctiva over the episcleral plate & limbus.

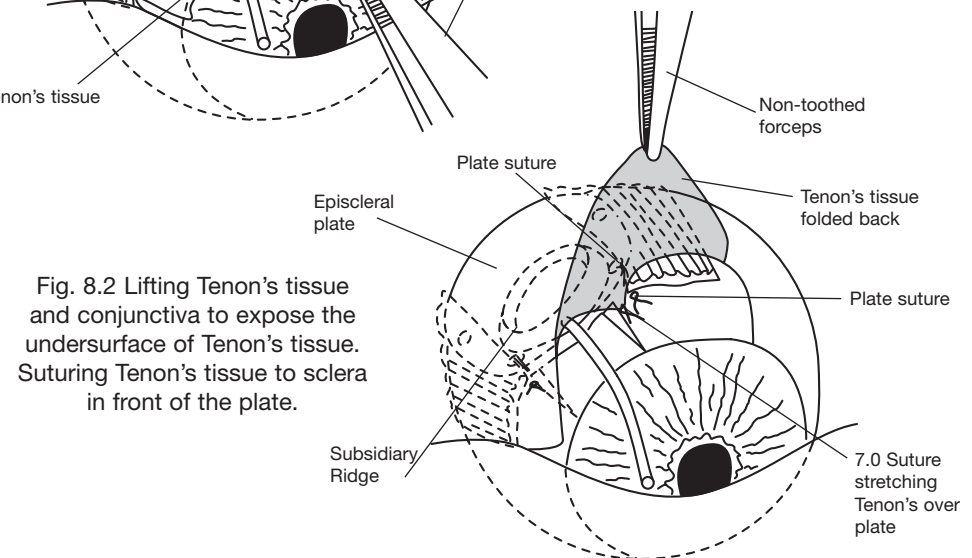


Fig. 8.2 Lifting Tenon's tissue and conjunctiva to expose the undersurface of Tenon's tissue. Suturing Tenon's tissue to sclera in front of the plate.

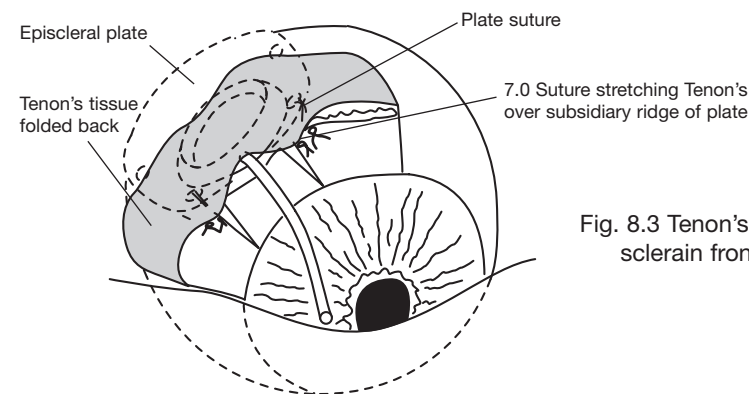


Fig. 8.3 Tenon's tissue sutured to sclera in front of the plate.

Step 9.

Trimming the translimbal tube to the correct length

Your aim is to trim the tube at 45° so that when it is inserted into the eye the bevelled tip of the tube will extend approx. 1.5 - 2mm into the AC.

The cut will be bevelled at 45° so that the open end of the tube faces forward (anteriorly). This makes it easier to insert the tube into the AC, which reduces the likelihood of damage to the corneal endothelium and helps to prevent iris blocking the end of the tube.

Lift the tube of the implant and replace the lamellar scleral flap in its bed. Place the tube of the implant so that it lies over the flap and over the limbus.

Take a pair of fine spring scissors and cut the tube at an angle of 45°, so that its point overlaps the limbus by 1.5 - 2.0mm. To do this you will have to lift the tip of the tube, **taking care not to stretch it**. The cut should be at 45°, facing forward (Fig 9.1).

IMPORTANT NOTE - It is safer to cut the tube a little too long, rather than too short, as you can always cut a little more off if necessary.

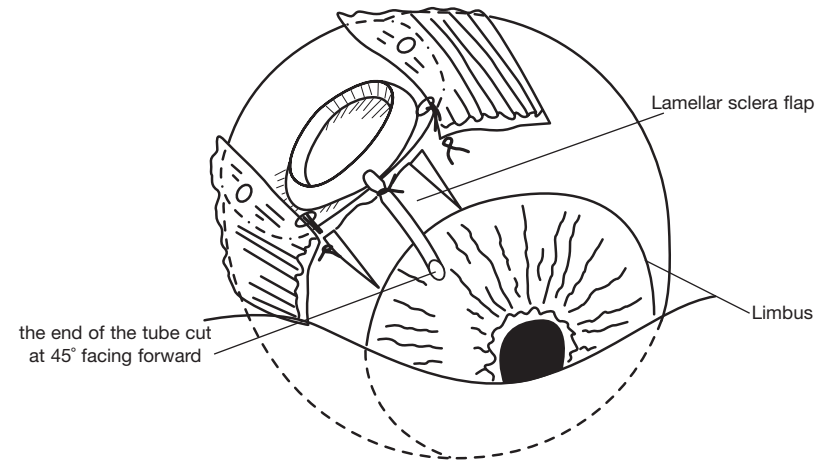


Fig. 9.1 Delayed Drainage: The tube trimmed at 45 degrees so that its point overlaps the limbus by 2.5 - 3mm.

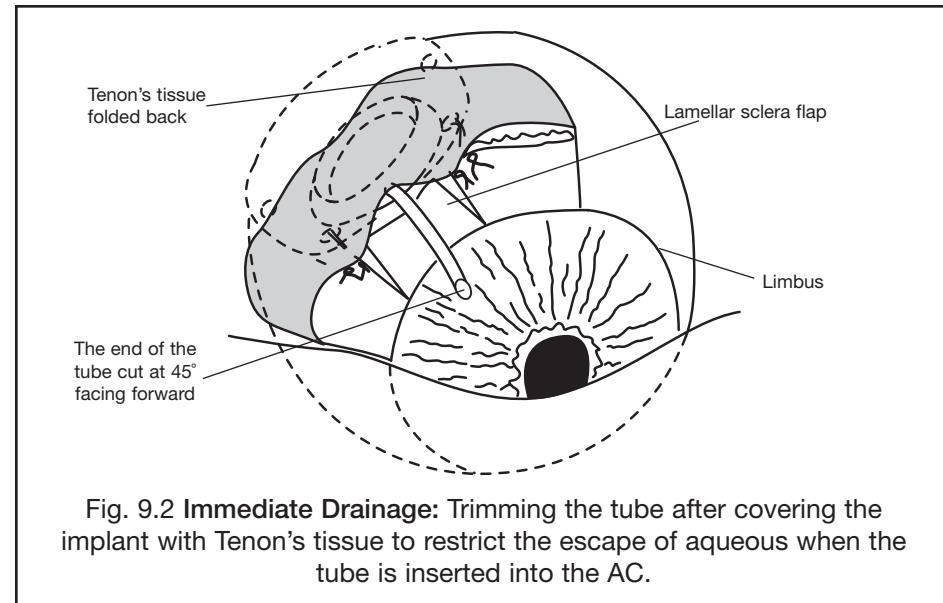


Fig. 9.2 Immediate Drainage: Trimming the tube after covering the implant with Tenon's tissue to restrict the escape of aqueous when the tube is inserted into the AC.

Step 10.

Forming a channel for the tube to pass into the AC

Your aim is to make a channel through firm sclera which enters the AC obliquely between the scleral spur and Schwalbe's line. This channel should be angled so that the tube lies in the plane of the iris. Firm sclera is chosen because it provides a watertight seal around the tube and holds it securely at the chosen angle.

Take a sharp 22 gauge needle on a 2ml syringe and use a needle holder to bend 3-4mm of the tip forward by 30 degrees (the bevel facing the direction of the bend) to form a microkeratome (Fig 10.1). Lift the lamellar scleral flap and fold it forward over the cornea.

Inspect the limbal region and identify:

- The dense opaque sclera over the scleral spur
- Slightly translucent tissue over the trabecular meshwork
- The opaque tissue over Schwalbe's line
- Clear cornea (Fig 10.2).

Start the track 1 mm from the anterior edge of the dense opaque sclera over the scleral spur (Figs 10.2 and 10.3). Use the tip of the needle microkeratome, holding it with its bevel facing forward, to make a track through the sclera into the AC. Extend the track by carefully pushing the tip of the needle forward keeping in the plane of the iris. It will pass through dense sclera, Schlemm's canal and trabecular tissue, and in some cases a neovascular membrane, to enter the AC at, or just in front of, the scleral spur (Fig 10.3). The microkeratome should be inserted far enough to make a tapered incision a little larger than the tube externally and a close fit internally.

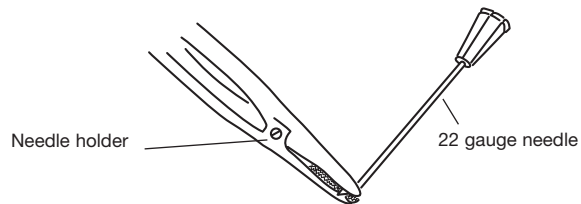


Fig. 10.1 Bending the tip of the 22 gauge needle to an angle of 30° to form a microkeratome.

Neovascular glaucoma

Some bleeding into the AC commonly occurs at this stage in cases of neovascular glaucoma. It can be controlled by injecting an air bubble into the AC to raise (maintain) the IOP. This will arrest bleeding and maintain visibility for placement of the tube.

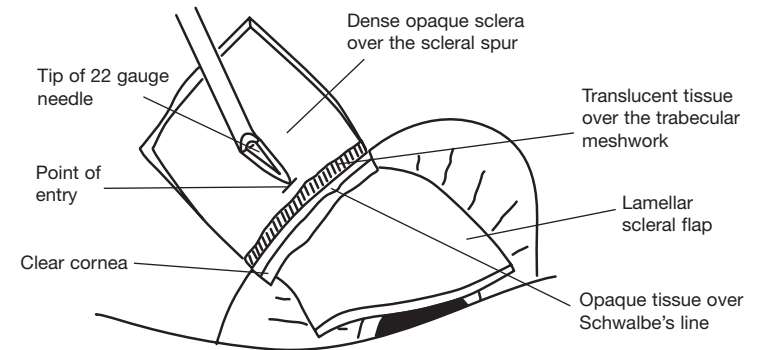


Fig. 10.2 Point of Entry through the bed of the scleral flap.

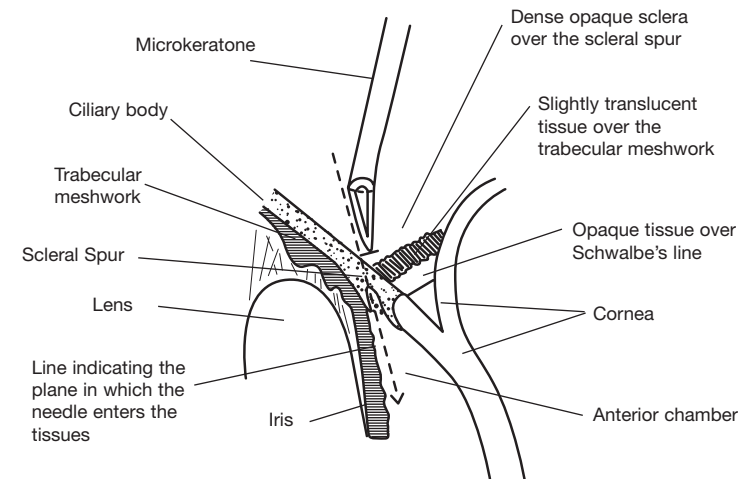


Fig. 10.3 The track of the needle through the tissues into the anterior chamber.

Step 11.

Inserting the translimbal tube into the AC

Your aim is to pass the tube through the needle track into the AC so that it lies well away from the cornea and parallel to the plane of the iris. The tube should fit snugly into the needle track so that aqueous does not leak past the tube.

Take a Rycroft cannula on a 2ml syringe, insert it into the AC through the needle track and withdraw 0.5ml aqueous from the AC. Inject a bubble of air with a Rycroft cannula to reform the AC. (This allows you to see the tube and to check that it is correctly placed after it is inserted into the eye.)

Grasp the tube with a fine non-toothed forceps and feed it carefully down the needle track (Figs 11.1 and 11.2). This may be difficult because the tubing is soft and also because the track tends to close.

If the tube won't pass into the AC. Use the microkeratome again to dilate the track a little more. Then pass the tube down the enlarged track.

When you have the tube in the AC, check that the position of the tube is correct. It should lie well away from the cornea and in the plane of the iris. It can touch the iris but should not dig into it. (Fig 11.2).

If the position of the tube is not correct pull it out and make a fresh track more anteriorly or posteriorly as necessary. It is not necessary to suture the old track as inserting the tube into the new track will close the old track.

Proceed to Step 12 only when you are satisfied with the position of the tube

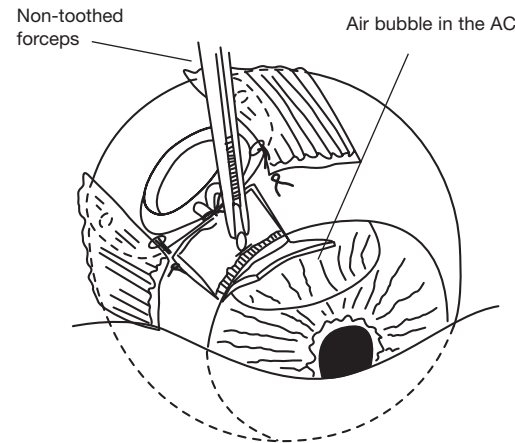


Fig. 11.1 Delayed Drainage: Inserting the tube into the needle track.

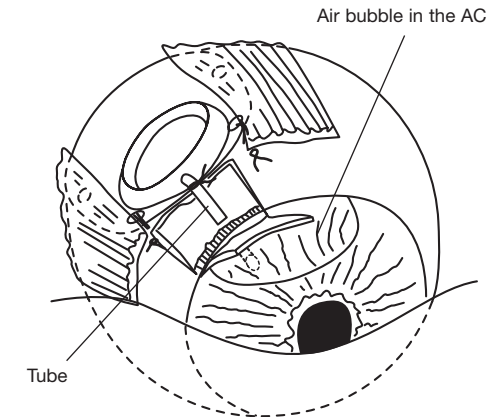


Fig. 11.2 Delayed Drainage: Feeding the tube down the needle track into the AC.

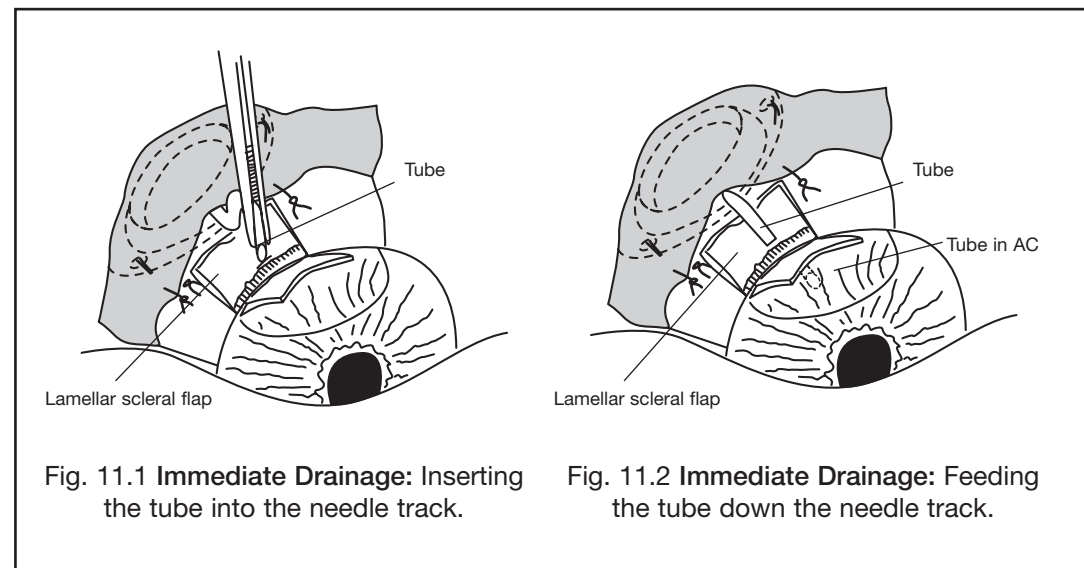


Fig. 11.1 Immediate Drainage: Inserting the tube into the needle track.

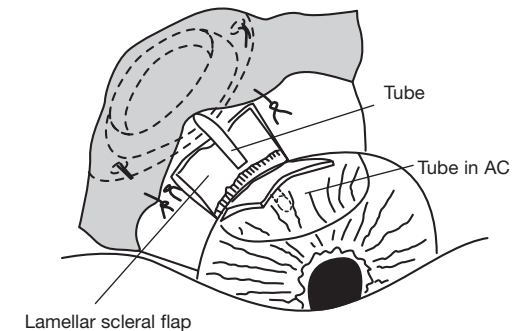


Fig. 11.2 Immediate Drainage: Feeding the tube down the needle track.