

CHAPTER 7

SURGERY OF THE EYELIDS

Eyelid disorders are common and their treatment is often surgical. Most eyelid diseases will produce three possible effects:

1. *Cosmetic deformity.* This may vary from being mild to quite severe causing serious disfigurement.
2. *Conjunctivitis.* Eyelid diseases often cause conjunctivitis if the conjunctiva is exposed or irritated by the eyelid deformity. The patient will complain of irritation and discharge from the eye.
3. *Corneal ulcers and scarring.* The eyelid protects the cornea and severe eyelid disease can damage the cornea. The cornea may become progressively more scarred and opaque from keratitis and corneal ulcers eventually causing loss of sight. Obviously loss of sight is the most important consequence of any eyelid disease.

There are many different operations that can be performed on the eyelids. This book cannot begin to describe them all, and there are already many excellent textbooks available describing eyelid surgery. Only common conditions will be described, especially those which cause loss of sight by damaging the cornea. Upper lid entropion and trichiasis as a result of trachoma is the most important cause of corneal scarring. It is more common than all other eyelid disorders in tropical countries. Facial palsy is also important particularly in leprosy. Surgical treatment of other eyelid conditions will be discussed here in much less detail.

As with any other surgery, the surgeon must first understand the structure of the tissues (surgical anatomy) and the nature of the disease (surgical pathology) before considering the details of the individual operations.

Surgical Anatomy of the Eyelids

The eyelid tissues can be divided into four layers from front to back (figs. 7.1 and 7.2).

1. The skin
2. The orbicularis oculi muscle
3. The tarsal plate
4. The conjunctiva.

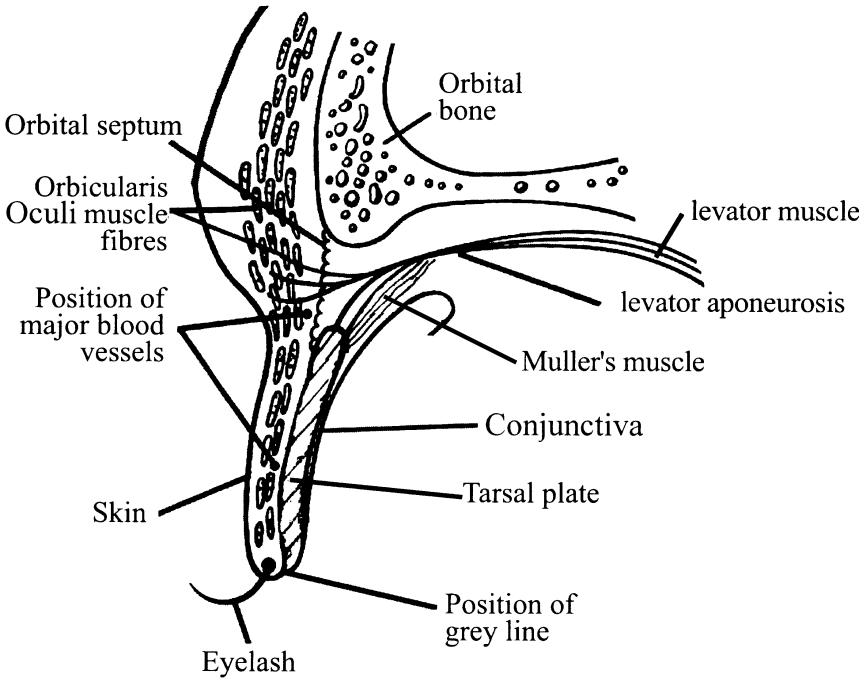


Fig. 7.1 A cross section of the upper eyelid to show its four layers. Note also the position of the orbital septum, the levator muscle and its aponeurosis, and the position of the main blood vessels

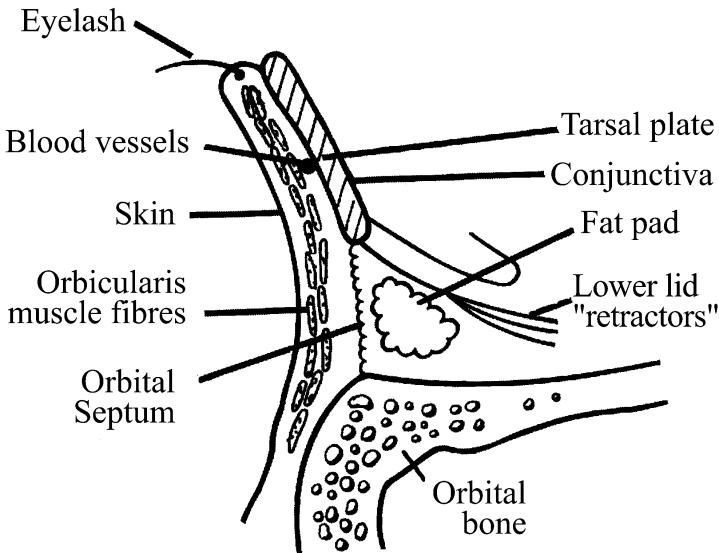


Fig. 7.2 A cross section of the lower eyelid to show its four layers. Note the position of the orbital septum and lower lid retractors

The Skin

There are several important features about eyelid skin:

- Eyelid skin, especially in the upper lid, is thinner, more elastic and more mobile than skin anywhere else in the body. It is also very loosely attached to the underlying connective tissue, so that oedema fluid or blood can easily collect under the eyelid skin. Eyelid swelling is very common after surgery or trauma and may develop following infection or inflammation near the eyelid. Eyelid oedema may also occur in systemic diseases which cause fluid retention particularly when the patient lies flat.
- There is little or no subcutaneous fat under the eyelid skin especially in the upper lid. This means the upper eyelid is a good source of skin for a free skin graft. Because the upper lid skin is so mobile and loose there is often enough to spare to fill a defect in another eyelid. There is usually no spare skin in the lower lid. In old age or after some chronic diseases like leprosy the eyelid skin, especially upper lid skin, may hypertrophy and stretch. Excess skin can easily be excised if it is causing problems.
- The eyelid has an extremely good blood supply. This means that wounds following surgery or trauma heal well and quickly without infection. Because of the good blood supply it is rarely necessary to excise traumatised or damaged eyelid tissue. It also means that free skin grafts applied to the eyelids will usually “take” satisfactorily.

In general, incisions into the eyelids should be made horizontally along the line of the skin creases. In this way they will heal well with minimal scarring. There is often spare skin in the upper lids, but by contrast there is usually none to spare in the lower lids. Therefore if any skin needs to be excised from the lower lid (for example to remove a skin tumour) it is best to make vertical not horizontal incisions to prevent contraction and ectropion.

The Orbicularis Oculi Muscle (figs. 7.1, 7.2 and 7.3)

This muscle is responsible for closing the eyelids. It forms a circular sheet of fibres that pass around the eyelids, and is inserted into the medial canthal tendon and surrounding bone of the lacrimal crest and the medial wall of the orbit. It is divided into 3 parts:

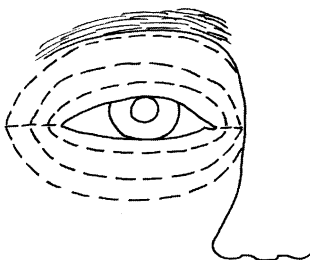


Fig. 7.3 The orbicularis oculi muscle

1. *Orbital*. The muscle fibres sweep around the orbital rim and are responsible for forced closure of the eye.
2. *Palpebral*. These muscle fibres pass over the orbital septum (the pre-septal fibres) and also over the tarsal plates (the pre-tarsal fibres). Together they are responsible for the movement of blinking. Sometimes in old age the fibrous tissue septa between these muscle fibres atrophy, so that when the muscle contracts the pre-septal portion rolls up over the pretarsal portion contributing to senile or spastic entropion in the lower lid (See fig. 7.7).
3. *Lacrimal*. These are a few fibres surrounding the lacrimal sac. They have a pump action sucking tears into the lacrimal sac and down to the nose.

The orbicularis muscle is supplied by the Facial nerve (the 7th. cranial). The nerve fibres enter the muscle from its deep surface. Local anaesthetic injections should be placed deep to the muscle in order to paralyse it.

Incision through the muscle layer should be made horizontally in the line of the fibres. Vertical incisions will damage the muscle fibres and the wound edges will tend to gape from contraction of the muscle.

The Tarsal Plates

The tarsal plates are composed of dense fibrous tissue and keep the eyelids rigid and firm. They are attached at each end to the medial and lateral canthal ligaments which join the eyelids to the bone of the orbit. The upper tarsal plate is larger than the lower. The upper lid is lifted by the Levator Palpebrae muscle which is supplied by the third cranial nerve. The muscle ends in a thin fibrous sheet or aponeurosis. This inserts into the upper border and anterior surface of the tarsal plate. It also breaks up to be inserted into the upper lid skin. Muller's muscle which is supplied from the cervical sympathetic nervous system also helps to lift the upper lid. It lies between the Levator aponeurosis and the conjunctiva and is inserted into the upper border of the tarsal plate. The lower lid has a few weak muscle fibres, called the "lower lid retractors", which also help to retract it. The Meibomian glands are embedded in the tarsal plate and produce an oily secretion which forms part of the tear film. Each gland opens on to the lid margin with a row of tiny ducts.

The Conjunctiva

The conjunctiva forms a mucous membrane lining the inside of the eyelids. It stretches from the limbus, round the conjunctival fornix and to the eyelid margin. It is very firmly attached to the tarsal plate, and chronic inflammation particularly from trachoma will cause fibrosis and contracture here, so that the tarsal plate buckles and thickens. This makes the eyelid turn inwards.

The eyelid margin where the conjunctiva joins the skin is an important area. In the middle of the eyelid margin is a line of thin skin called the "grey line" because of its colour (fig. 7.1 and fig. 7.4). It runs on the eyelid margin from the outer canthus to the inner canthus. Just in front of the grey line the eye lashes emerge through the skin of the eyelid margin. Just behind the grey line on the conjunctival side of the lid margin there are the openings of the Meibomian glands. If the eyelid

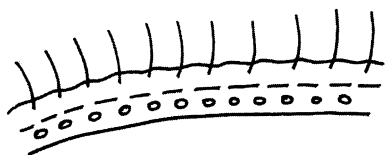


Fig. 7.4 The margin of the eyelid. The position of the grey line is shown by the dotted line

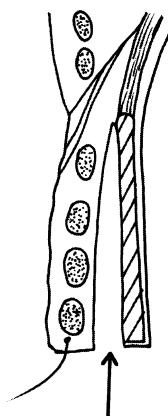


Fig. 7.5 The artificial division of the eyelid into an anterior and posterior lamella by an incision at the grey line

is massaged small beads of Meibomian secretion will appear. The tears flow along the eyelid margin from lateral to medial where they drain into the lacrimal puncta. The oily Meibomian secretions prevent overflow of tears and help form the tear film on the surface of the cornea.

An incision into the eyelid margin along the grey line splits the eyelid into 2 parts (fig. 7.5). The anterior part is the skin and orbicularis muscle with the eye lashes. It is sometimes called the *anterior lamella*. The posterior part is the tarsal plate and conjunctiva, and is sometimes called the *posterior lamella*. This is a useful plane for making incisions into the eyelid margin. It does not damage the eye lash roots or the Meibomian glands and there is relatively little bleeding. As the incision is continued in this plane it will separate the orbicularis oculi muscle fibres from the front of the tarsal plate. This artificial division of the eyelid into an anterior and posterior lamella helps in understanding the principles of entropion surgery. If this splitting is continued still further upwards it splits the levator aponeurosis into 2 parts, the front part is attached to the eyelid skin and the back part with Muller's muscle to the tarsal plate (fig. 7.5).

The eyelids have a very rich blood supply which comes from both the ophthalmic artery which is a branch of the internal carotid artery, and the facial arteries which are branches of the external carotid. The arteries run between the orbicularis muscle and the tarsal plate. There is a main artery at the lateral and medial edge of the lid, and in the upper lid these two arteries are joined together by two arterial arcades which run transversely across between the muscles and the tarsal plate. One is about 3 mm above the eyelid margin and the other just above the upper edge of the tarsal plate. In the lower lid there is one arterial arcade about 3 mm from the eyelid margin. The veins from the eyelid pass both into the facial veins which drain into the external jugular vein and the ophthalmic veins which drain into the cavernous sinus.

It is easy to anaesthetise the eyelids with local anaesthetic. Adrenaline 1:100,000 should always be added to the local anaesthetic because the lids are so vascular. For superficial surgery to the eyelids the local anaesthetic can be injected just

under the skin. For surgery to the deeper parts of the eyelids topical anaesthetic drops to the conjunctiva should also be given. If there is still some pain the anaesthesia can be increased with an injection through the conjunctiva into the conjunctival fornix. This is easily done in the lower lid. However the upper lid should be everted in order to give this injection.

Post operatively the good blood supply to the eyelids ensures good healing. There is usually some post operative haemorrhage into the tissues because the lids are so vascular and the connective tissues in the lids are so loose. Therefore good haemostasis is important particularly if the arterial arcades have been cut. To minimise post operative haemorrhage and tissue swelling some surgeons like to apply a firm pad and bandage for 24 hours after eyelid surgery. It should not be necessary to keep the eye padded any longer except in special cases (e.g. a skin graft). Always make sure that the pad is not rubbing against the cornea.

Surgical Pathology of the Eyelids

It is important to have a clear understanding of the different words used to describe abnormalities of the eyelids.

Entropion

This means that the eyelid turns inwards so that the eyelid margin and eyelashes rub against the cornea. There are two common causes:

1. Contracture of the tarsal conjunctiva and distortion of the tarsal plate causing the eyelid to turn inwards (fig. 7.6). This is often called “cicatricial” entropion (a cicatrix is an old fashioned word for a scar). It is much more common in the upper lid than the lower. By far the most common cause in tropical countries is long-standing trachoma. Trachoma is an infection of the conjunctiva caused by

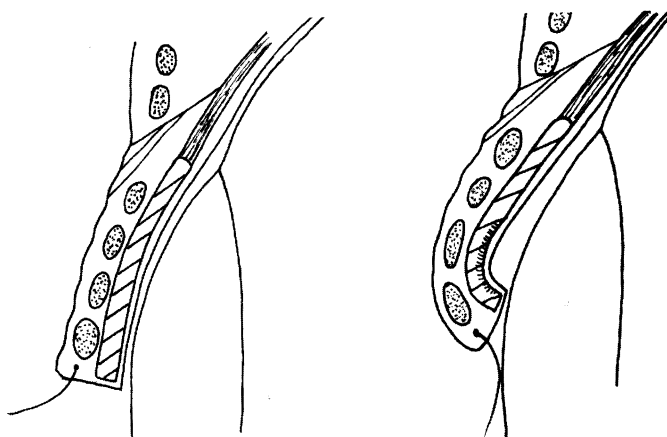


Fig. 7.6 Cicatricial entropion. The normal eyelid is shown on the left. Chronic inflammation, scarring and contracture in the tarsal plate and the conjunctiva deforms the eyelid

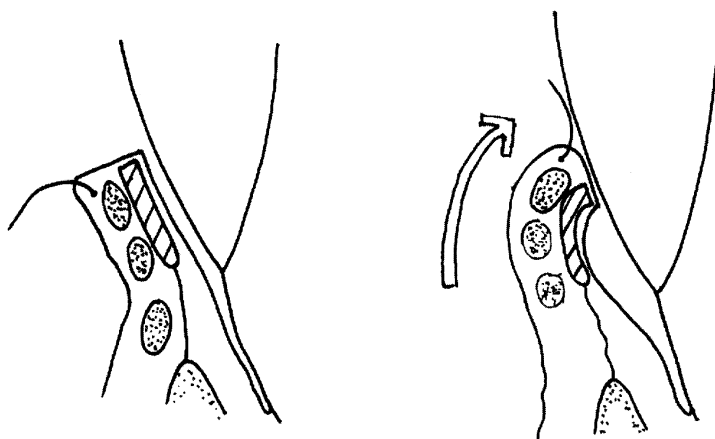


Fig. 7.7 Senile or “spastic” entropion. The normal eyelid is shown on the left. As the orbicularis muscle contracts during eyelid closure the tarsal plate buckles inwards

the organism *Chlamydia trachomatis*. There is a chronic inflammatory reaction in the tarsal conjunctiva and sub-conjunctival tissues. This inflammation leads on to scarring, particularly in the upper tarsal plate and conjunctiva. As the scar tissue contracts it distorts the tarsal plate and causes it to buckle inwards. The tarsal plate often becomes thickened as well and the Meibomian glands may be destroyed or blocked.

2. Laxity of the connective tissue and the tarsal plate of the lower lid in old age (fig. 7.7). Because the tissues are lax and the tarsal plate has lost its rigidity, when the Orbicularis Oculi muscle contracts to close the eyelids, the muscle fibres roll upwards and so the eyelid turns in. This is usually called “spastic” or “senile” entropion and only occurs in the lower lid.

Trichiasis

The normal eyelashes point forwards. Trichiasis means that some of the eyelashes are pointing backwards and so rub against the cornea. Obviously every patient with entropion will also have trichiasis. However there may be some misdirected lashes turning inwards without the whole eyelid turning in (i.e. trichiasis without entropion).

Trichiasis like entropion is usually a result of previous trachoma. Scar tissue from the chronic infection causes contracture around the eyelash roots and distorts them so the lashes point inwards.

Ectropion

This means that the eyelid is turned outwards (everted) so that the eyelid margin does not rest against the eyeball (fig. 7.8). In severe cases the eyelid will be so everted that the conjunctiva lining the inside of the lids will be exposed and face outwards. There are four causes of ectropion:

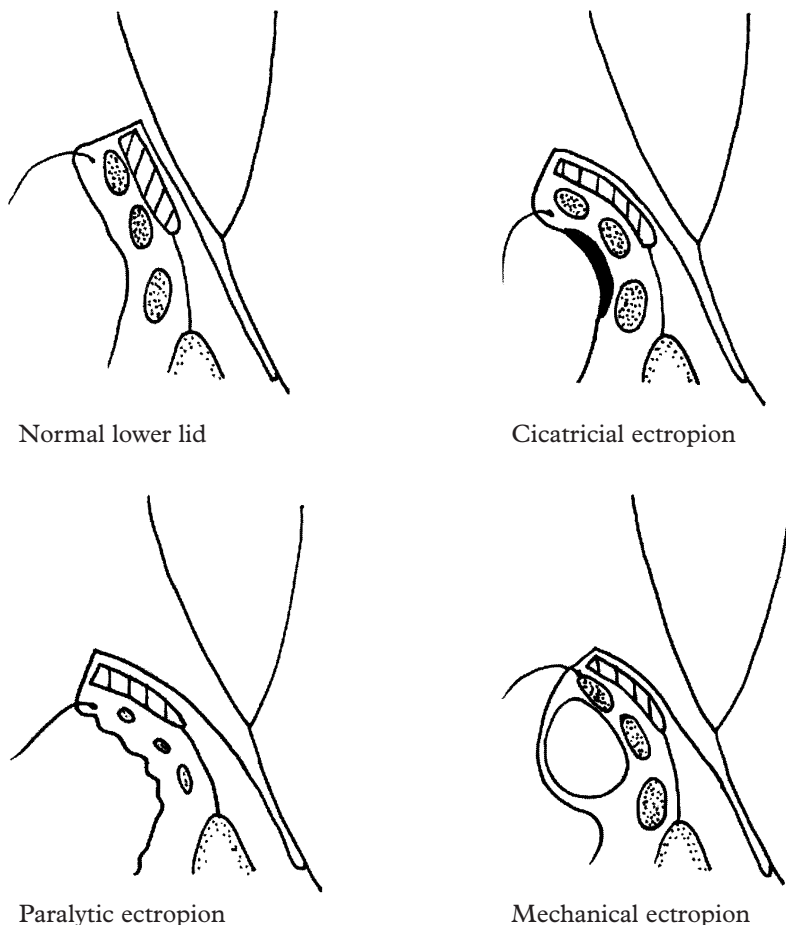


Fig. 7.8 The causes of ectropion

1. *Cicatricial ectropion*. A cicatrix is an old fashioned name for a scar. A contracture or loss of eyelid skin will cause the lid to turn outwards and is often called a “cicatricial” ectropion. It is fairly common in the lower lid because the lower lid has little or no excess skin. The lower lid does not cover the cornea, and therefore lower lid ectropion will only cause discomfort, irritation and discharge but rarely causes any damage to the cornea or loss of sight.

Cicatricial ectropion is rare in the upper lid because the upper lid has so much spare skin. If however it does occur, the cornea is unprotected and exposed, and there is a great risk of corneal ulceration and permanent damage to the sight.

There are several possible causes of eyelid skin contracture leading on to an ectropion. The commonest are:

- Burns—thermal or chemical causing destruction of the skin and subsequent scarring.
- Trauma from injury or surgery.
- Chronic skin infection or fistulas from infected nasal sinuses.

2. *Paralytic ectropion*. Paralysis of the Orbicularis Oculi muscle which closes the eye will make the lower lid sag and fall away from the eyeball. This is called a “paralytic” ectropion and is caused by a paralysis of the Facial nerve.

3. *Senile ectropion*. This results from stretching of the lower eyelid tissues in old age.

4. *Mechanical ectropion*. This is caused by a tumour or thickening of the lower eyelid which by its weight pulls the eyelid away from the eyeball.

Once ectropion from any of these causes has occurred, the exposed conjunctiva becomes chronically inflamed, thickened and hypertrophic, and in this way makes the ectropion worse.

Lagophthalmos

This is the traditional word used when the eyelids will not close due to paralysis of the Orbicularis Oculi muscle. The word literally means “eye of a hare” because the ancients thought that hares went to sleep with their eyes open. The Orbicularis Oculi muscle is supplied by the Facial nerve and so a better name for lagophthalmos is ***Facial Palsy***. In a mild case the eye will look normal, but when the patient tries to blink or close the eyes the weakness will become apparent. In severe cases the whole side of the face will be affected and droop from loss of function of the facial muscles. The lower lid will sag so it does not rest against the eye (paralytic ectropion). In this way facial palsy and ectropion often occur together. If the eyelids will not close properly there is a risk that the cornea will become ulcerated. This usually occurs when the patient is asleep and the eyelids are not closed. Corneal damage is particularly common in facial palsy from leprosy because the sensation of the cornea is also affected. In this way both the motor and sensory parts of the protective reflex for the cornea are absent. Most other causes of facial palsy do not also affect corneal sensation.

Ptos

Ptos means a drooping of the upper eyelid and it can have many causes. The most common are:

- A congenital abnormality of the levator muscle which elevates the upper lid.
- A paralysis of the third cranial nerve supplying the levator muscle, this usually causes a severe ptosis.
- A paralysis of the cervical sympathetic nerve supplying Muller’s muscle, which will cause a slight ptosis.
- Senile stretching of the insertion of the levator muscle into the upper lid.
- Myopathy or myaesthesia affecting the levator muscle.
- Trauma to the upper lid.

Eyelid Retraction

This is when the eyelids are abnormally open or retracted so that they do not close easily. It can occur when the eyelids have been scarred following disease or injury, or may be a complication of thyroid eye disease, which causes the levator muscle to become thickened and contracted.

Eyelid Tumours

A great variety of “lumps and bumps” may be found in the eyelids. They may be congenital abnormalities, cysts, inflammatory masses, benign or malignant tumours. They may arise from any of the many different tissues present in the eyelids. The most common lesion is a retention cyst of a Meibomian gland (often called a chalazion). Malignant tumours are fortunately rare, except for a basal cell carcinoma or “rodent” ulcer. This occurs almost entirely in fair skinned people and is usually a consequence of excessive exposure to sunlight.

Basic Principles of Eyelid Surgery

The reader should first revise the basic principles of extraocular surgery described in chapter 2. There are several other points worth mentioning or emphasising.

1. Always use adrenaline 1/100,000 in the local anaesthetic as the eyelid blood supply is so good.
2. Eyelid surgery is much easier if the lid is taut and fixed. This can be done for most eyelid operations with a lid guard (fig. 7.21a) or with a lid clamp (fig. 7.21b) (see page 240). As well as holding the lid steady and secure, these also help to protect the eye and especially the cornea from accidental damage during the operation. They also lessen the bleeding. The clamp should be applied just tight enough to occlude the marginal arteries, but not so tight that it damages the tissues permanently. The lid guard can be used as a lever to stretch the lid and push it forward. This will help lessen the bleeding by shutting off the marginal arteries.
3. Try to close the skin and conjunctiva so as to avoid any “bare areas” not covered by skin or conjunctiva. (In some operations this is not possible). If there is a bare area it will fill up with granulation tissue, which will later turn to fibrous tissue. This may contract causing the deformity to recur some months later. This is a particular problem with tarsal rotation operations for upper lid entropion.
4. Try to avoid sutures and especially knots on the inside surface of the conjunctiva where they will irritate the cornea.
5. Sutures which are closing skin wounds can be removed early (4 to 5 days) because the skin heals very quickly. However some sutures, especially mattress sutures, may be used to rotate or to alter the position of some tissue. These should be left in for about two weeks to ensure a permanent correction. If the

patient cannot return in two weeks then absorbable mattress sutures can be used. Buried sutures ideally should be absorbable but can be non-absorbable.

6. Make sure there is good haemostasis from the marginal arteries at the medial and lateral margins of the tarsal plates, and try to avoid excess padding of the eye postoperatively.

Entropion and Trichiasis of the Upper Eyelid

Upper lid entropion and trichiasis is nearly always a complication of trachoma. Repeated infection from trachoma can cause subsequent scarring and several different pathological changes in the lid.

- *Entropion.* The upper tarsal plate and the tarsal conjunctiva become scarred and contracted causing the eyelashes to rub against the cornea (see fig. 7.6) This is the most important complication of trachoma to affect the eyelids and one of the most common.
- *Trichiasis.* Scarring around the eyelash roots causes them to lose their alignment and some or all of them point inwards.
- *Scarring in the tarsal plate.* The tarsal plate may become thicker and the Meibomian glands may enlarge because of obstruction to their ducts and retained secretions. Sometimes the tarsal plate and the Meibomian glands may atrophy.
- *Changes to the cornea.* This is why patients lose their vision. The eyelashes rub against the cornea causing inflammation and ulceration, and this is made worse by damage to the conjunctiva and the tear film. The cornea becomes scarred and vascularised, this gradually progresses until the patient goes blind from corneal scarring.
- *Shortening and retraction of the upper lid.* This is not common but may occur especially after previous failed surgery. It will leave the cornea exposed and therefore at risk of being damaged. The treatment is discussed on page 238.
- *Stretching of the lateral canthal tendon.* This is also not common and is discussed on page 242.

The surgical correction of upper lid entropion and trichiasis is a most important subject for three reasons:

1. *Blindness from trachoma is very common.*
2. *Most of this blindness can be prevented by early surgery.*
3. *Entropion and trichiasis cause a lot of discomfort as well as sight loss.*

Trachoma is the second commonest cause of world blindness after cataract and nearly all those who are blind from trachoma have had upper lid entropion for some years. If the entropion is corrected when the patient can still see, there should be no further irritation to the cornea and so no risk of the vision getting worse.

Even if the cornea is already scarred, the inflammation and scarring may gradually become less once the constant irritation from the eyelashes ceases. Therefore there may even be some gradual improvement in the vision after entropion surgery.

As well as blindness, the ingrowing eyelashes constantly rub against the very sensitive cornea, causing a great deal of irritation and discomfort. Patients who have had successful surgery for entropion are some of the most grateful, and it is still worth operating even if the eye is blind.

Trachoma surgery also has three practical problems that confront the surgeon.

1. *Trachoma is a disease of the rural areas and of poor hygiene.* Therefore trachoma surgery is often performed in poorly equipped clinics with large numbers of patients. The prevalence of blindness from trachoma appears to be falling gradually worldwide as public health is slowly improving. However there is still a huge number of patients needing entropion and trichiasis surgery.
2. *The tissues are usually scarred and inflamed.* The surgery may be quite difficult because the anatomy is distorted and the tissues bleed easily. What seems an easy operation in a textbook may not be easy to carry out in practice.
3. *There is no general agreement about the best operation for entropion.* There have been very few reliable follow up studies or comparisons of trachoma surgery and it is difficult to choose the best operation.

There are basically two possible ways of treating trichiasis and entropion:

1. To remove the lashes.
2. To operate to alter the direction of the lashes, and correct the deformity in the tarsal plate.

Removal of the lashes

This is only recommended if there is trichiasis without entropion and if only a few lashes are affected.

There are various ways of trying to remove the lashes:

- Epilation
- Cutting the lashes
- Electrolysis
- Cryotherapy
- Excision of lash follicles or small clumps of lashes

Epilation

If the offending lashes are plucked out with tweezers, the patient obtains temporary relief. Nearly always the lash grows again and the symptoms recur. It is possible for patients with only slight trichiasis to keep their eyes comfortable by repeated epilation. In some cases it is best just to give the patient or their relatives a pair of tweezers.

Cutting the lashes

Some patients cut off the offending lashes with scissors. This is worse than useless as it makes the eyelash end sharper and more irritant.

Electrolysis

The principle of electrolysis is to pass a fine needle along the eyelash up to the root of the lash. A low voltage current is then passed through this needle causing a localised burn and the lash root will be destroyed.

Method:

1. Infiltrate the eyelid with local anaesthetic.
2. Insert the electrolysis needle into the eyelash follicle along the direction of the eyelash to a depth of 3 mm. Switch on the current and tiny bubbles should appear on the surface of the eyelid where the needle enters the skin. Allow the current to flow for at least 5 seconds. Often patients feel some discomfort from the passage of current even when the local anaesthetic block is adequate.
3. If the lash root has been destroyed the lash can be lifted out of the tissues with an epilation forceps without any resistance at all. If there is some resistance the electrolysis should be repeated.
4. Continue until each ingrowing eyelash has been treated.

Repeated treatment with electrolysis may be necessary but it is a satisfactory way of removing a few ingrowing eyelashes.

Cryotherapy

Principle:

The eyelash follicles are permanently destroyed if the eyelid margin is frozen to a temperature of about -20 degrees Centigrade with a cryoprobe. What matters is the temperature of the tissues not the temperature of the probe. The best way to measure the tissue temperature is with a fine needle thermocouple inserted into the roots of the lashes. However most units do not have such a thermocouple. It is thought that freezing twice is more effective than freezing once.

Method:

1. Infiltrate the lid margin with local anaesthetic.
2. Apply the cryoprobe to the lid margin making sure the cornea is not frozen.
3. If a thermocouple is available freeze till the tissue temperature falls to -20 degrees Centigrade. Allow the tissues to thaw and then freeze again to -20 degrees Centigrade.
4. If no thermocouple is available a standard cryo unit using nitrous oxide or

carbon dioxide gas should achieve a tissue temperature of -20 degrees Centigrade in 30 seconds. Therefore freeze for 30 seconds, thaw and refreeze for 30 seconds.

5. Repeat the process wherever the eyelashes need to be removed.

The advantage of electrolysis and cryotherapy is that no surgery is performed. However there are several *disadvantages*:

- Expensive equipment is required.
- The lashes may grow again following either electrolysis or cryotherapy.
- Electrolysis often needs repeating and may be quite painful. It may remove the offending lashes but can cause scarring in the surrounding tissues so that other eyelashes start turning in.
- Cryotherapy causes quite a lot of inflammation and swelling in the eyelids. It will often produce depigmentation of the frozen skin. Rarely it can cause some atrophy of the eyelid margin.

Cryotherapy can be combined with an anterior lamellar resection to help destroy the lash roots (see page 233).

Excision of misdirected lashes

This is a possible alternative to electrolysis or cryotherapy in mild cases of trichiasis. Occasionally there are just one or two small tufts of abnormal eyelashes and it is possible to excise these lashes and their roots without affecting the rest of the eyelid (fig. 7.9).

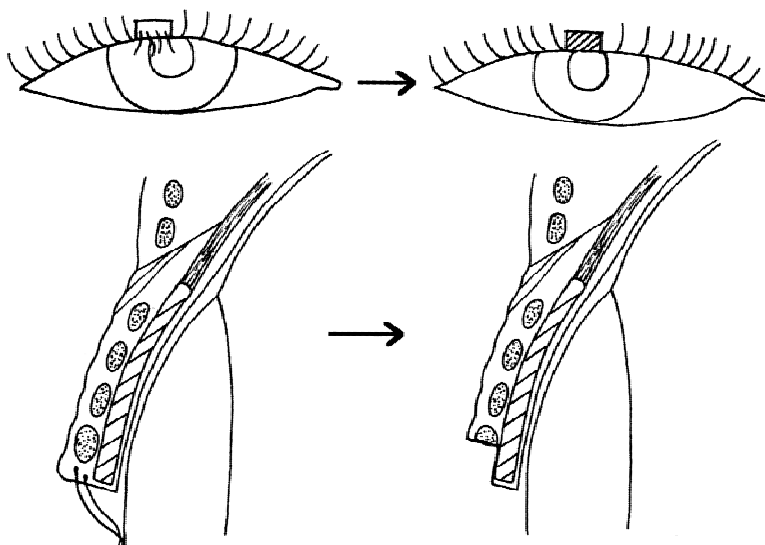


Fig. 7.9 Excising a small tuft of ingrowing lashes

Method:

1. Infiltrate the eyelid margin with local anaesthetic and adrenaline.
2. Incise along the grey line for just the length of the tuft of abnormal eyelashes to a depth of 3 mm.
3. Make 2 vertical cuts in the eyelid skin at either side of a tuft of lashes and remove the small strip of eyelid skin and lashes. Allow this small wound to heal by granulation.

Operations for Entropion and Trichiasis which realign the eyelashes

Very many operations and modifications have been described and it might be helpful to give a summary of the different types of operation and what each is trying to achieve. After that some recommended operations will be described in more detail. The reader should first revise the pathological changes caused by trachoma (page 222) and shown in fig. 7.6 and also the anatomy of the eyelid described at the beginning of this chapter. Note especially the division of the eyelid into an anterior lamella (the skin and orbicularis muscle) and a posterior lamella (the tarsal plate and conjunctiva) as already described.

There are basically six different methods for trying to realign the lashes. Some operations are a combination of more than one of these methods.

1. Anterior lamellar shortening (fig. 7.10)

The aim is to remove some skin and orbicularis muscle so as to shorten the anterior lamella and so help the eyelashes to evert. Mattress sutures placed as shown in fig. 7.17d help to maintain the everted position of the eyelid. This is an easy operation to do, but it does not correct any contracture of the conjunctiva and tarsal plate. It is therefore only recommended in mild cases of trichiasis without any entropion or serious scarring of the tarsal plate.

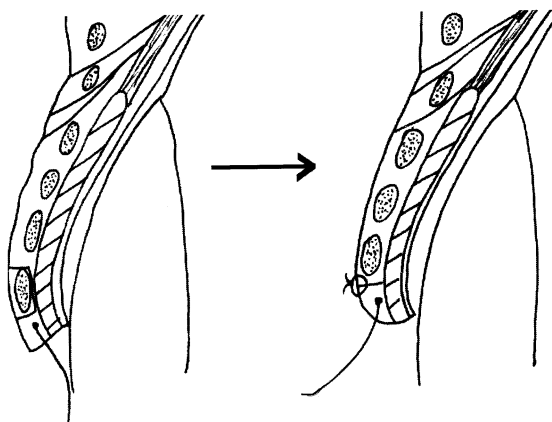


Fig. 7.10 Anterior lamellar shortening

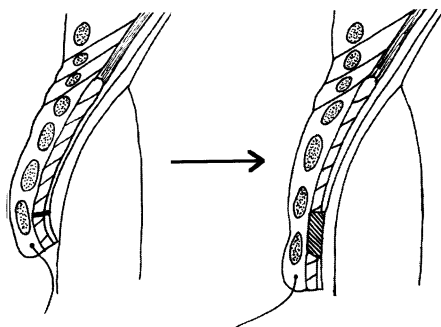


Fig. 7.11 Posterior lamellar lengthening

2. Posterior lamellar lengthening (fig. 7.11)

The conjunctiva and tarsus is lengthened with a graft. This can be of mucous membrane from the mouth or cartilage plus mucous membrane from the nose. This specifically corrects the deformity and so in theory is a good operation. Unfortunately in practice it is difficult to perform. The grafted tissue may be difficult to take, to handle and to insert and secure with sutures on the inside of the eyelid. The sutures on the inside of the eyelid may lead to irritation of the cornea. For these reasons it cannot be generally recommended. However it may be worth considering for a patient with recurrence after other operations.

3. Splitting the grey line so that lashes can rotate forward (fig. 7.12)

This will redirect the lashes successfully, and so can correct trichiasis but will not alter any entropion. The problem is how to maintain the lashes in their new position. This can be done quite easily with some kind of eversion suture. Fig. 7.12a shows an eversion suture tied over a small bolster made of gauze or cotton wool. This allows the split to fill with granulation tissue, but unfortunately the granulation tissue tends to contract so the eyelid often returns to its original shape, thus causing a recurrence. Splitting the grey line can be combined with an anterior lamellar resection for patients who have trichiasis and no entropion.

Alternatively the split can be filled with a graft of mucous membrane (fig. 7.12b). This will effectively maintain the lashes in their new position but involves all the practical problems of taking and fixing a graft. Certainly it is easier to put a graft in the eyelid margin than it is to put a graft in the tarsal plate (a posterior lamellar lengthening operation).

4. Tarsal grooving (fig. 7.13)

A wedge is cut out of the anterior surface of the tarsus. Sutures are placed to close the wedge. This also will correct the basic defect but again the correction is sometimes hard to maintain post-operatively. One disadvantage of this operation is that tissue from the tarsal plate is excised, and the Meibomian glands are divided. It is possible to excise too much tissue leaving the eyelid shortened.

Tarsal grooving combined with anterior lamellar shortening and a grey line split is an operation known as Snellen's operation. It is a popular operation and effective for trichiasis and mild entropion or entropion when only part of the eyelid is involved. It is described in detail on page 233.

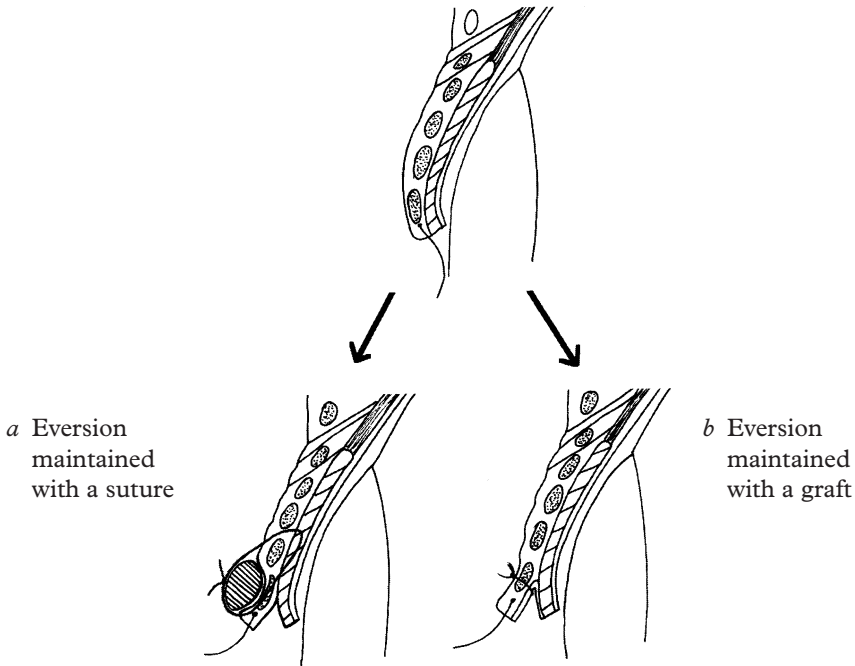


Fig. 7.12 Splitting the grey line

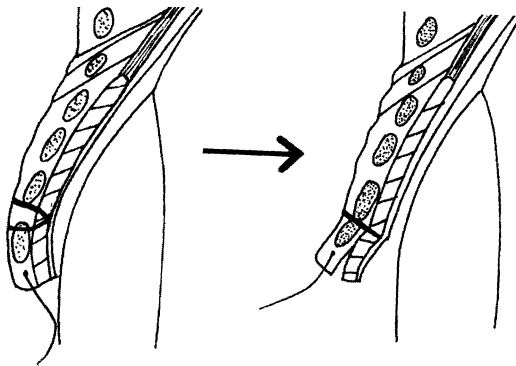


Fig. 7.13 Tarsal grooving. In this diagram tarsal grooving is combined with an anterior lamellar shortening and a grey line split

5. Tarsal rotation (fig. 7.14 and fig. 7.15)

The purpose of a tarsal rotation operation is to divide the tarsal plate just above the eyelid margin. This frees the lower end of the tarsal plate bearing the eyelashes to rotate outwards, so it can be fixed with sutures in its new position. This will correct the deformity very well and no tissue is excised or grafted which makes the operation more straightforward. There are however 3 disadvantages of tarsal rotation.

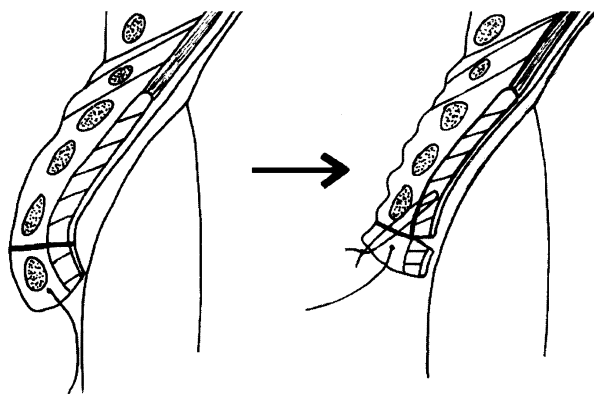


Fig. 7.14 Tarsal rotation, anterior approach.

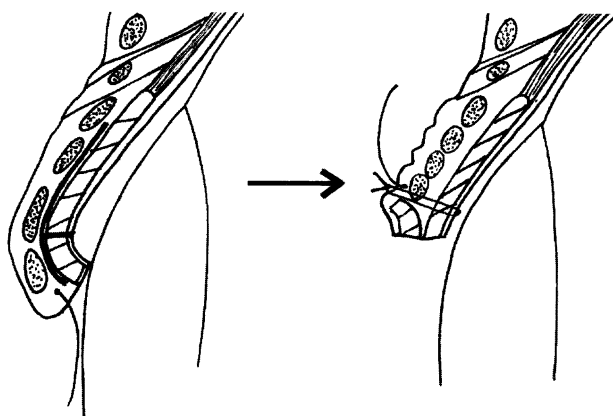


Fig. 7.15 Tarsal rotation, posterior approach.

- There is a large bare area left on the conjunctival surface. This will fill with granulation tissue and eventually become covered with conjunctival epithelium. However the granulation tissue may later contract causing a recurrence of the entropion. According to basic surgical rules it is not good to leave an area uncovered by skin or conjunctiva at the end of an operation.
- This granulation tissue may hypertrophy causing granulomas, and these occasionally prevent wound healing and need to be excised.
- The ducts of the Meibomian glands are cut through. In practice this does not seem to cause any complications, possibly because the glands are usually damaged by the inflammatory process. However in theory it must lessen the production of Meibomian secretion.

In spite of these possible disadvantages tarsal rotation is a popular operation and in a recent trial the results were better than for any other procedure. Two methods of tarsal rotation will therefore be described in detail.

Firstly, from the anterior or skin surface (fig. 7.14). This operation is called the

bilamellar rotation or Ballen operation. (Ballen was the first surgeon in the modern literature to describe it, and because both the anterior and posterior lamellas of the eyelid are divided it is called the bilamellar rotation). It is a fairly simple and straightforward operation and appears to produce fairly reliable and good results.

Secondly, from the posterior or conjunctival surface (fig. 7.15). This is called the Trabut operation, after the surgeon who described it in the nineteenth century. It is a slightly harder operation to perform but produces an extremely good reliable correction even in severe cases of entropion. It also preserves the skin and muscle layer. One advantage of the Trabut operation is that it can correct eyelid shortening (see below page 238).

6. Tarsal slide (fig. 7.16)

The lid is split from the grey line right up to the top edge of the tarsal plate into an anterior and posterior lamella. The two layers are then brought together with mattress sutures so that the posterior lamella comes further down than the anterior lamella. This automatically everts the lashes, although it does not correct the primary deformity in the tarsal plate and conjunctiva. It also leaves a bare area where there is no skin or mucous membrane on the surface of the eyelid which is a bad surgical principle. This is not an operation that has become very popular, but it is relatively easy to perform and appears in theory to be a sensible approach.

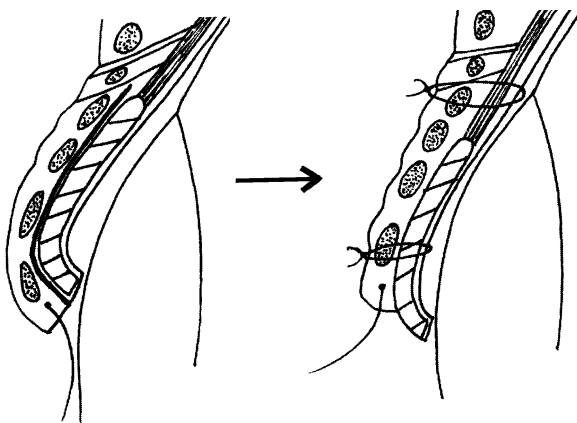


Fig. 7.16 Tarsal slide

Conclusions and recommendations

1. A **tarsal rotation** procedure is recommended if there is entropion and a significant deformity of the tarsal plate. Tarsal rotation procedures seem to give the most reliable correction. The World Health Organisation (W.H.O.) has recommended the **bilamellar rotation** (Ballen operation) for “field conditions” where a simple, easy-to-teach and easy-to-do operation is needed. It is difficult to disagree with an international organisation like the W.H.O. but the **Trabut operation** seems in some ways better than the bilamellar rotation. It does not cut right through all layers of the eyelid, and it can correct vertical eyelid shortening.

2. **Grafting operations**, either a posterior lamellar graft or grafting into a grey line split have excellent results in expert hands but are hard to perform so they will not be described in detail.
3. If there is trichiasis only and the tarsal plate is normal, a tarsal rotation operation is not recommended because it is too destructive. Instead an **anterior lamellar resection** with a grey line split is recommended.
4. **Snellen's operation** is recommended if there is trichiasis and very slight entropion, or if only a small segment of the eyelid is affected. It is also useful if the tarsal plate is very thickened. The outward rotation of the lashes from a Snellen's operation is less than from a tarsal rotation. The advantages of Snellen's operation are that it leaves no raw granulating wounds and it is useful if the tarsal plate is badly thickened.

The main disadvantages are that it does not usually correct severe entropion, and removing too big a wedge from the tarsal plate may cause lid shortening

Details of Surgical Technique

These will be given for the four operations recommended, the anterior lamellar resection, the Snellen's operation, the bilamellar rotation and the Trabut's operation.

1. The Anterior lamellar resection with a grey line split.

Indications:

This is a good operation to correct trichiasis if there is a fairly healthy and unscarred tarsal plate.

Principle:

An ellipse of skin and muscle is excised from the front of the eyelid, and a grey line split also performed. With carefully placed mattress sutures, this helps to evert the inturning lashes.

Method:

1. After injection of the local anaesthetic, a lid guard is inserted as a gentle lever to push the lid forward away from the eye by gentle pressure on the lower end of the lid guard (fig. 7.17a). This tightens the tissues and helps haemostasis. If the assistant also pulls gently on the eyelid margin with forceps this will help the exposure. An incision is made in the skin crease about 5 mm from the lid margin.
2. Cut down to the tarsal plate and separate the orbicularis muscle from the surface of the tarsal plate with blunt dissection until the black roots of the eyelashes can be seen (fig. 7.17b).
3. Now insert but do not tie a row of mattress sutures to evert the lashes. The sutures should enter the skin just above the lash line, then take a horizontal bite

Anterior lamellar resection

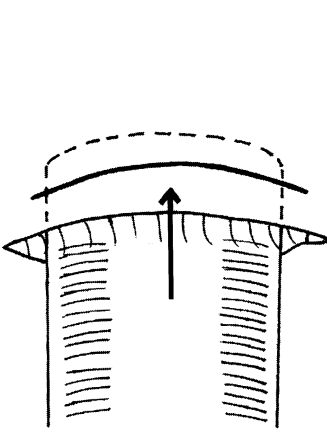


Fig. 7.17a Inserting the lid guard and incising the skin

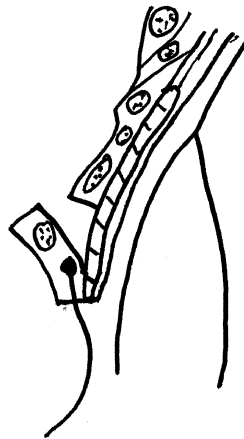


Fig. 7.17b The dissection to expose the eyelash roots

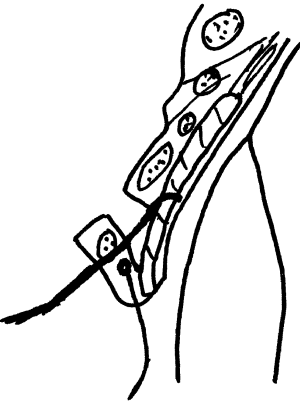


Fig. 7.17c The position of the mattress sutures

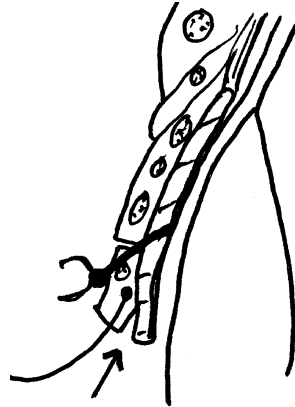


Fig. 7.17d The grey line split is made (shown by the arrow) and the mattress sutures tied

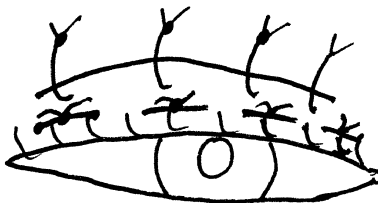


Fig. 7.17e The mattress sutures and the skin sutures tied

of the tarsal plate about 2 or 3 mm higher up, and emerge again through the skin (fig. 7.17c). About 4 mattress sutures are needed.

4. Now make an incision about 1 to 2 mm deep in the grey line with a scalpel, and tie the mattress sutures. This will both lift up the lashes and evert them (fig. 7.17d).
5. Finally an ellipse of skin 2 mm wide is excised from the lower edge of the original incision. The skin incision is then sutured (fig. 7.17e).

There is a useful modification of this operation if patients do not mind losing their eyelashes. After step 2, when the black eyelash roots can be seen, cryotherapy can be applied directly to the lash roots as described on page 224. This will destroy the lashes and lessen the risk of recurrence.

2. The Snellen operation

Indications:

Trichiasis with slight entropion or only involving part of the eyelid. Entropion with a very thickened tarsal plate.

Principle:

A wedge is excised from the front of the tarsal plate so that the margin of the tarsal plate can rotate outwards. An ellipse of skin and muscle from the front of the eyelid is usually excised also, and a grey-line split performed as well. This helps the eyelashes to evert further.

Method:

1. Step 1 is the same as for the anterior lamellar resection (page 231).
2. Step 2 is the same as for the anterior lamellar resection (page 231).
3. Keeping the lid guard in place and taut, use a scalpel blade to cut a wedge out of the tarsal plate just above the line of the eyelash roots right across the entire tarsal plate (fig. 7.18a). It is difficult to cut this wedge neatly and cleanly. It should not perforate the conjunctiva, but if it does perforate in places, it does not matter too much.
4. Insert the mattress sutures (as shown in fig. 7.18b and 7.18c). It is very important to put these sutures in correctly. They both close up the wedge in the tarsal plate and also lift the eyelashes upwards and outwards. First pass the needle through the skin just above the line of the eyelashes. Then take a short vertical bite in the main (upper) part of the tarsal plate passing the needle towards the eyelid margin. Then take a horizontal bite in the lower part of the tarsal plate just above the lashes. Where the needle comes out another short vertical bite in the upper part of the tarsal plate should be taken this time passing the needle away from the lid margin. Finally bring out the needle through the skin just above the eyelashes to complete the mattress suture. Make a row of 4 mattress sutures in all.
5. A small ellipse of skin should now be excised from the edge of the skin incision.

Snellen's Operation

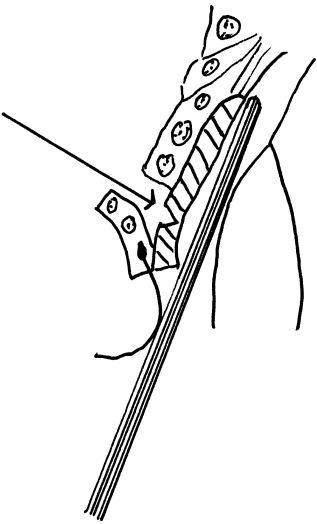


Fig. 7.18a The lid guard is in place and the wedge excised from the tarsal plate is shown by the arrow

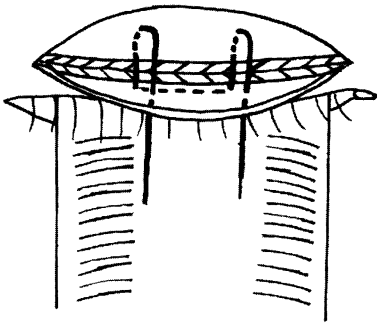
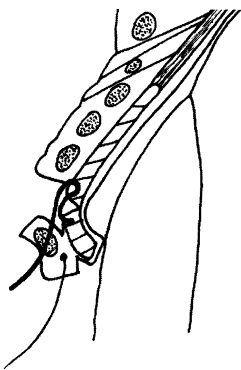


Fig. 7.18b Inserting the mattress sutures *Fig. 7.18c* Inserting the mattress sutures

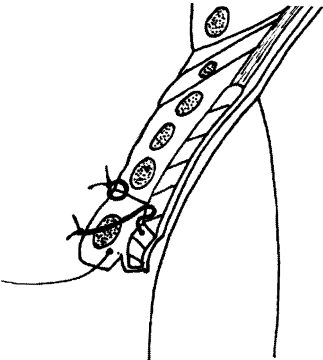
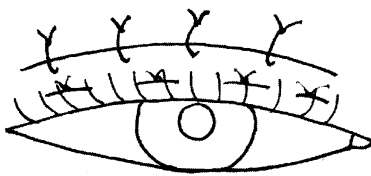


Fig. 7.18d The mattress sutures and skin sutures tied *Fig. 7.18e* The mattress sutures and skin sutures tied

6. Now make an incision 1 to 2 mm deep in the grey line and tighten and tie the mattress sutures. This should close up the wedge in the tarsal plate, lift up the lashes and also evert them. Finally close the skin incision with interrupted sutures (figs. 7.18d and 7.18e)
7. The sutures in the skin incision can be removed after 5 days. The mattress sutures should be left for at least 2 weeks. If it is not possible for the patient to return, then use an absorbable material so that the sutures can fall out in due course.

3. Division and rotation of the lower end of the tarsal plate from the conjunctival surface. The Trabut operation.

Indications:

Upper lid entropion of any severity, especially if there is eyelid shortening.

Principle:

The tarsal plate is divided from the inside, the conjunctival side. The lower end of the tarsal plate is dissected free and then rotated right round through up to 180 degrees and fixed in the new position with sutures. This will correct entropion of any severity.

Method:

1. After infiltrating with local anaesthetic and adrenaline, evert the eyelid so as to expose the conjunctival surface. The best and easiest way is to use a Cruickshank or Erhardt clamp (fig. 7.19a). This grasps the skin of the lid margin and holds the lid nicely everted (figs. 7.19b and c). If the clamp is not available the lid can be stretched over a Desmarres retractor held by an assistant, but this is not quite so satisfactory.
2. From the conjunctival surface incise the tarsal plate 2–3 mm from its margin along its entire width (figs. 7.19c and d). Cut right through the tarsal plate, but no deeper. At the medial end make a vertical cut down to the eyelid margin just avoiding the lacrimal punctum. At the lateral end extend the incision to the lid margin at the lateral canthus.
3. Grasp the proximal cut edge of the tarsal plate (the edge furthest from the lid margin) with toothed forceps, and using a scalpel or scissors dissect the front of the tarsal plate from the orbicularis muscle (fig. 7.19e). Continue separating the tarsal plate from the orbicularis muscle almost up to the upper end of the tarsal plate. There is often arterial bleeding at the medial or lateral end which may need clamping and ligating, or diathermy.
4. Now grasp the distal cut edge of the tarsal plate (the edge nearest the lid margin) with toothed forceps, and with a scalpel dissect the front of the tarsal plate from the orbicularis muscle until the roots of the eyelashes are reached (fig. 7.19f). Be very careful with the dissection at this stage. There is often bleeding at the two ends of the wound. Try especially not to damage the eyelash roots.

The Trabut Operation

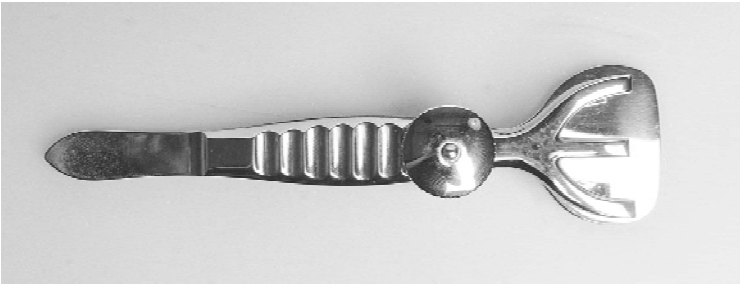


Fig. 7.19a The Cruikshank or Erhardt clamp

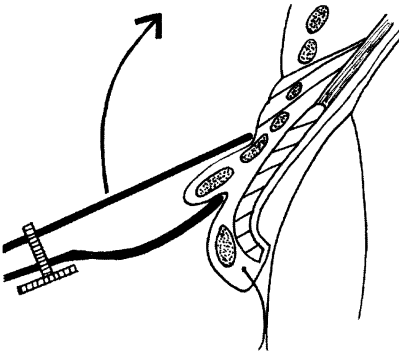


Fig. 7.19b Applying the clamp

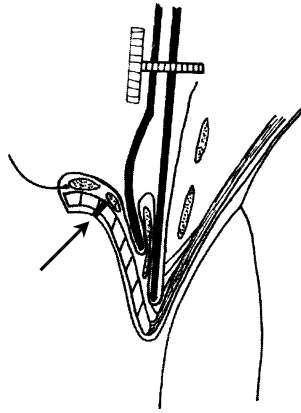


Fig. 7.19c The lid is held everted by the clamp and the position of the incision through the conjunctiva and the tarsal plate is shown

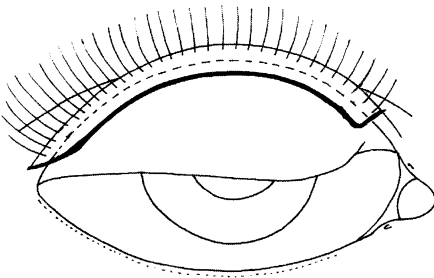


Fig. 7-19d The line of the incision through the tarsal plate

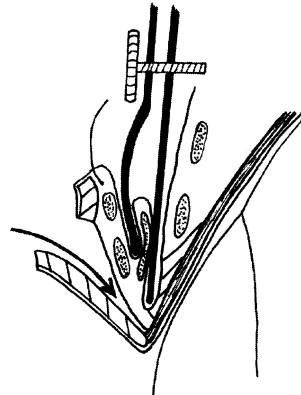


Fig. 7.19e Separating the proximal tarsal plate from orbicularis muscle. The arrow shows the plane of dissection.

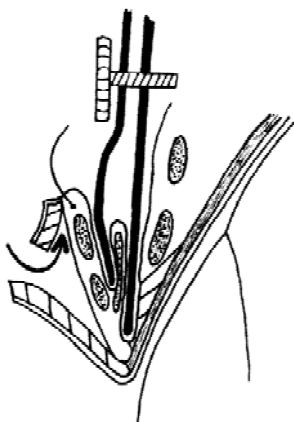


Fig. 7.19f Separating the distal tarsal plate from orbicularis muscle

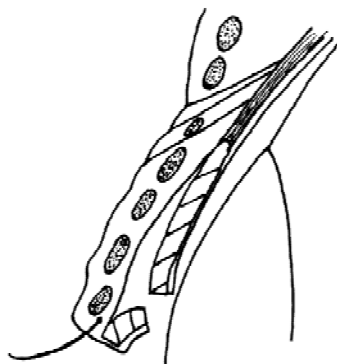


Fig. 7.19g The dissected eyelid should rest with all the lashes pointing forwards

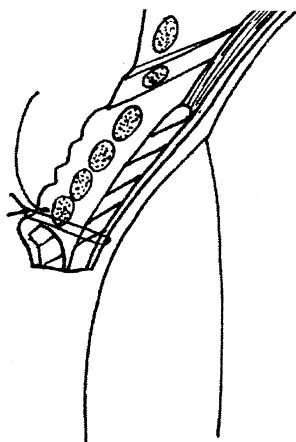


Fig. 7.19h To show the position of the mattress sutures

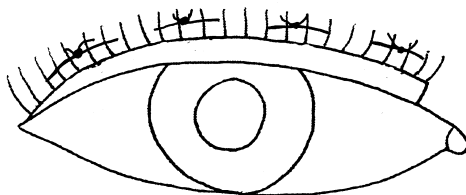


Fig. 7.19i To show the position of the mattress sutures

5. The eyelid margin should now be completely free from the rest of the tarsal plate. It should be possible to remove the eyelid clamp, and the lid should stay everted on its own with all the eyelashes pointing forwards (*fig. 7.19g*). If the eyelid margin still tends to turn in, a further dissection must be carried out to separate the front of the tarsal plate from the orbicularis muscle. Both the upper and lower part of the tarsal plate must be freed.
6. The eyelid margin is now rotated through 180 degrees and anchored in that position with a row of 4 mattress sutures. The needle should enter the skin through the lash line, and then take a horizontal bite of the main part of the tarsal plate and back out through the lash line again (*figs. 7.19h and 7.19i*). Because the skin has not been incised no other sutures are needed.

7. Post operatively the mattress sutures in the lid margin should be left for about 2 weeks or if they are absorbable they can be left to fall out spontaneously.

The Problem of Eyelid Shortening

A tarsal rotation operation will shorten the vertical length of the eyelid by about 1 to 2 mm. However a Trabut operation will usually naturally compensate for this. At step 3 (see also fig. 7.19e) the orbicularis muscle is separated from the front of the tarsal plate. Some of the fibres of the levator muscle which lifts up the upper lid are also inserted here into the front of the tarsal plate. These fibres will automatically be separated from the front of the tarsal plate by carrying out step 3 of the Trabut operation. Therefore the eyelid tends to come down a little bit and this compensates for the natural shortening produced by the operation.

A few cases of entropion may be complicated by eyelid shortening preoperatively. It may be caused by contracture of the tissues from fibrosis or by previous surgery which has failed. Eyelid shortening means that the upper eyelid does not cover the cornea properly when the eyes are closed gently as in sleep. If the eyelid closure is

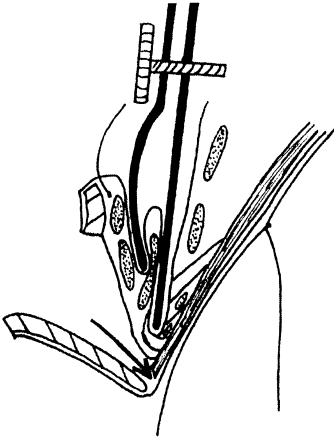


Fig. 7.20a Dividing Muller's muscle, see also fig. 7.5, page 208.

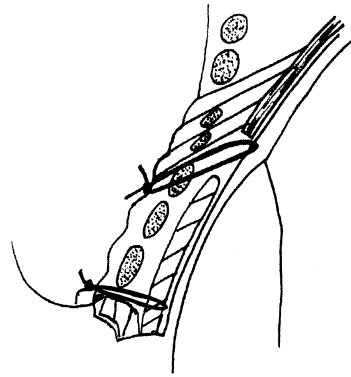


Fig. 7.20b The position of the mattress sutures to maintain the eyelid lengthening

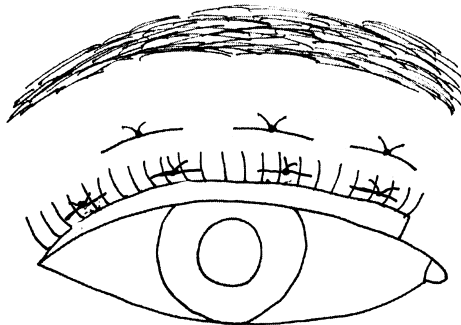


Fig. 7.20c The position of mattress sutures to maintain the eyelid lengthening

inadequate there is a great risk that the cornea will be damaged and it is important to lengthen the eyelid.

If there is obvious eyelid shortening or retraction before the operation then the levator muscle can be more extensively divided to correct this. During step 3 (fig. 7.19e) the orbicularis muscle (and with it some of the insertion of the levator muscle) should be separated from the front surface of the tarsal plate right up to the upper edge of the tarsal plate. If the eyelid shortening still doesn't seem corrected, Muller's muscle should be divided (See fig. 7.20a and also fig. 7.5 on page 216). This will lengthen the lid by about an extra 2 mm. Muller's muscle is inserted into the upper edge of the tarsal plate, and great care is needed not to divide the conjunctiva to which it is closely attached. There may be some bleeding from the upper arterial arcade which runs at this level. The correction is maintained by inserting an extra row of 2–3 mattress sutures high up in the eyelid (figs. 7.20b and c)

The main advantage of the Trabut procedure is that it produces an extremely good correction however severe the entropion may be. If eyelid shortening is a problem it can be modified to lengthen the lid a little. The main disadvantage is the large granulating area which is left on the posterior surface of the eyelid which takes a long time to heal. Occasionally small granulomas develop, which may need to be excised. Another disadvantage is that quite extensive dissection is required from the conjunctival surface so the operation is not quite so easy to perform, especially if a Cruickshank or Erhardt clamp is not available.

4. Bilamellar or full thickness tarsal rotation (Ballen operation)

Indications:

Entropion of any severity

Principle:

The eyelid is divided transversely through all layers. The lid margin can then be resutured in an everted position.

Method:

1. After infiltration with local anaesthetic and adrenaline a lid guard or spatula is inserted between the eyelid and the eyeball (fig. 7.21a). If the assistant presses gently on the lower end of this, it will act as a lever pushing the eyelid forward and tightening it. This helps to prevent bleeding. Alternatively a large lid clamp (fig. 7.21b) will both secure the lid and prevent bleeding. However using a lid clamp makes it difficult to reach the lateral and medial ends of the lid which are caught in the clamp. The incision may need to be extended when the clamp has been removed. The W.H.O. description of the operation uses artery forceps at the medial and lateral end of the eyelids both to fix the lid and prevent bleeding (fig. 7.21c).
2. Make a transverse skin incision 3–4 mm above the lid margin the whole length of the lid, and down to the tarsal plate.

The Bilamellar rotation or Ballen Operation

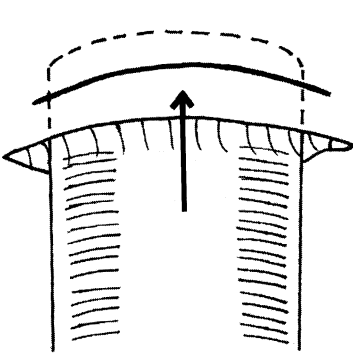


Fig. 7.21a The skin incision using a lid guard

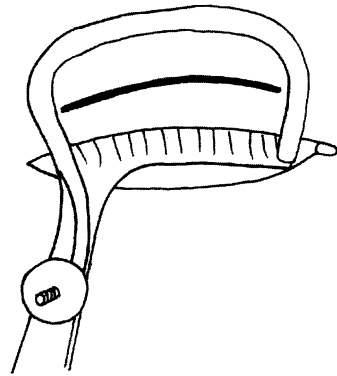


Fig. 7.21b The skin incision using a lid clamp

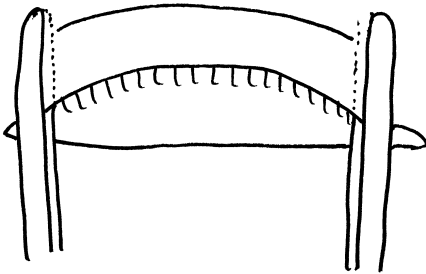


Fig. 7.21c To show the skin incision using two artery forceps

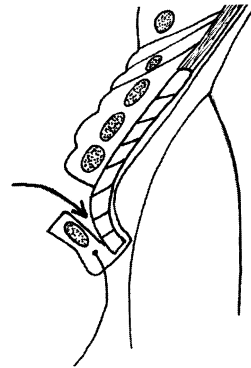


Fig. 7.21d Dissection through the skin and muscle

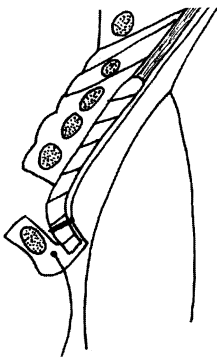


Fig. 7.21e To show the incision through the tarsal plate and conjunctiva

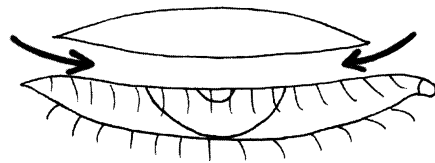


Fig. 7.21f The blood supply to the separated eyelid margin

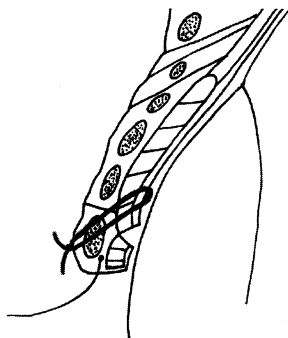


Fig. 7.21g The position of the mattress sutures to evert the lid margin

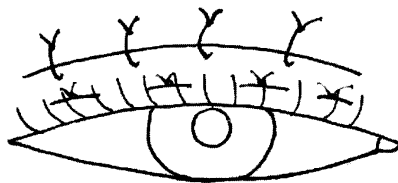


Fig. 7.21h The mattress sutures and the sutures closing the skin incision

3. Separate the orbicularis muscle fibres from the surface of the tarsal plate towards the margin of the lid until the lash roots are just visible (fig. 7.21d). This will be about 2–3 mm from the lid margin.
4. Cut right through the tarsal plate and conjunctiva at this level 2 mm from the lid margin (fig. 7.21e). This incision must be started with a scalpel. It can be completed with either a scalpel or scissors. Take great care that this incision runs exactly parallel with the lid margin just above the eyelash roots and that it runs the whole length of the lid. Check for bleeding and ensure haemostasis especially at the lateral and medial ends of the incision. Remember that the blood supply to the eyelid margin will now come from either end of the separated strip of eyelid tissue. Therefore take great care not to damage the tissue at each end of the lid margin (fig. 7.21f).
5. Place 4 mattress everting sutures from the skin just above the lashes, into the upper tarsal plate and back through the skin (fig. 7.21g and h). Tie the stitches snugly and the eyelid should freely evert. Aim for a slight overcorrection so that the lid margin appears slightly everted. If the entropion appears under- or overcorrected at this stage the stitches should be readjusted. If they are placed higher up in the tarsal plate the correction will be increased and if they are placed lower down in the tarsal plate the correction will be diminished.
6. Place interrupted skin stitches to close the incision (fig. 7.21h).

The main advantage of this operation is its simplicity. It has produced good results under “field” conditions. Even in ideal circumstances operations are not as easy as the diagrams in a textbook and therefore the simplest operation is often the best. Entropion surgery is often carried out in far from ideal circumstances where simple operations have even more advantages.

The main disadvantage is that it leaves a granulating wound on the conjunctival surface of the lid like the Trabut operation.

Post operative care

Post operative care for all the operations described is identical. Antibiotic ointment is always applied to the eye. A pressure pad and bandage is usually applied for 24 hours to minimise bleeding. There is often considerable post operative swelling, and applying a firm pad and bandage will minimise this swelling and prevent early eyelid movement. Once the pad has been removed the eye should be kept open and antibiotic ointment applied. Skin stitches can be removed after five days but the mattress sutures which are used to hold the eyelid everted should be left for at least 2 weeks. If absorbable sutures are used they will cause a little more tissue reaction than either silk or polypropylene sutures, but eventually they will fall out so the patient will not have to return for removal of the mattress sutures.

Stretching of the lateral canthal tendon

Some patients may have suffered with upper lid entropion for many years, and the constant irritation and squeezing of the eyelids may cause stretching of the lateral canthal tendon so that the eyelid becomes very loose and floppy. The entropion should be corrected but it may be helpful at the end of the operation or later to tighten the lateral canthal tendon. fig. 7.29 shows how to expose the tendon. A non-absorbable suture can then be placed from the lateral edge of the tarsal plate into the periosteum at the lateral orbital margin to tighten up the tendon.

Lower Lid Entropion

Entropion of the lower lid is usually caused by stretching and atrophy of the lower lid tissues as a result of degeneration from ageing. Several different changes occur together.

- There is atrophy of the tarsal plate so it buckles inwards when the orbicularis muscle contracts on eyelid closure.
- Atrophy of the septa between the muscle fibres in the orbicularis causes the muscle to bunch up and roll in on lid closure.
- Horizontal stretching or laxity of the lower lid makes it weak and floppy.

The best way to test for horizontal stretching of the lower lid is to pull it downwards away from the eyeball. If on releasing it does not snap back into place, there is horizontal lid laxity.

Many different procedures have been described to tighten up the lower lid. One fairly easy and successful operation is a transverse full-thickness lid incision closed with everting mattress sutures, known as the Wies procedure. If there is horizontal lid laxity, and in most cases there is, some tissue should be excised at the same time to tighten the lid.

The Wies Procedure

Principle:

A transverse incision is made through all layers of the lower lid. Everting mattress sutures are then placed across the incision. The scar of the incision helps to stop

The Wies Operation for lower lid entropion

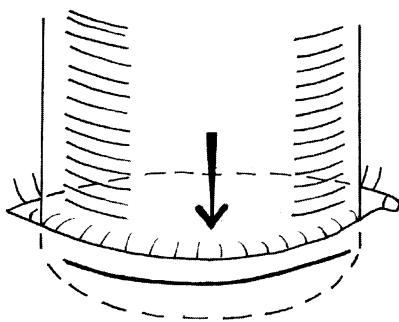


Fig. 7.22a The skin incision using a lid spatula

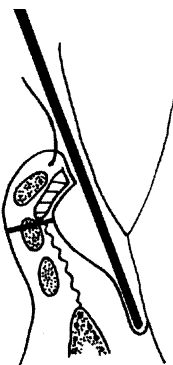


Fig. 7.22b The position of the incision

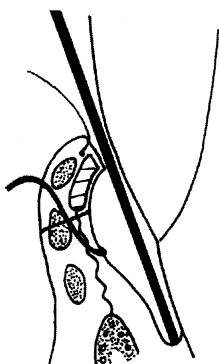


Fig. 7.22c The position of the mattress sutures

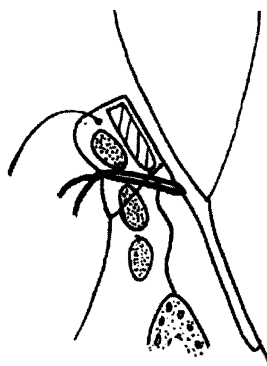


Fig. 7.22d The lid margin everts as the mattress sutures are tightened

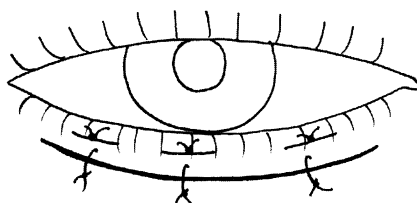


Fig. 7.22e The mattress sutures and the sutures closing the incision

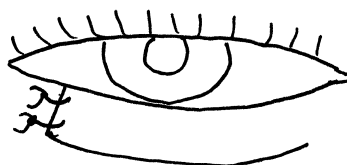
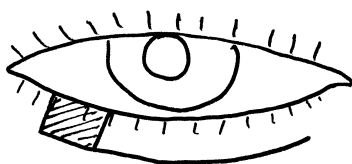


Fig. 7.22f To show the piece of tissue from the eyelid margin which is excised to correct horizontal lid laxity

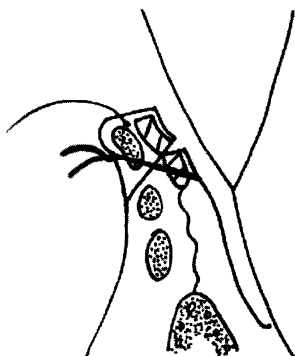


Fig. 7.22g The position of the eyelid incision and mattress suture for cicatricial entropion of the lower lid

the muscle fibres rolling up. The evertor sutures help correct the entropion. At the same time the weak muscle fibres called the retractors of the lower lid are tightened. This holds down the lower border of the tarsal plate and stops the lid turning in.

Method:

1. After injecting the tissues with local anaesthetic and adrenaline, either insert a lid guard between the lower lid and the eye (fig. 7.22a) or clamp the lid with a broad lid clamp (fig. 7.23a). These tighten and stretch the lid making the surgery easier. They also stop bleeding and protect the eye.
2. Incise horizontally through all layers of the lid 4–5 mm from the lid margin with a scalpel (fig. 7.22a and b). The line of incision should be at the lower end of the tarsal plate. It may be easier to complete the incision with scissors.
3. Apply 3 or 4 evertor mattress sutures of 4“0” or 5“0” catgut. These go through the skin just below the lash line, then into the conjunctiva fairly far down towards the inferior fornix and then back through the skin again just below the lash line (fig. 7.22c).
4. Remove the lid guard or clamp, and then tighten and tie the mattress sutures (fig. 7.22d) starting from the lateral end so the lid is just everted giving a slight ectropion. This will correct itself within a few days. Then suture the skin incision with interrupted sutures (fig. 7.22e). Usually there is no need to pad the eye. The skin sutures can be removed after a week but the mattress sutures should be left to fall out. (If they are non-absorbable they should be left in for at least two weeks to encourage some scar tissue to develop which strengthens the lax tissues).
5. If there is horizontal lid laxity, about 3mm of the lid margin should be excised after step 2 (fig. 7.22f). The cut edges of the eyelid are then sutured before proceeding to step 3.

Cicatricial lower lid entropion

Occasionally lower lid entropion can be caused by scarring and contracture of the conjunctiva and tarsal plate. In other words cicatricial entropion may occur in the lower lid just as in the upper. Cicatricial entropion of the lower lid can be corrected by a similar operations to the Wies operation for senile entropion. However at step 2 the eyelid should be incised horizontally through the scarred tarsal plate about 3 mm from the lid margin as shown in Fig. 7.22g. (Compare this with the incision shown in fig. 7.22b.) The everting mattress sutures should be placed in the lower part of the tarsal plate, as shown in fig.7.22g, rather than in the conjunctiva below the tarsal plate.

Pentagonal Wedge Excision

If the lower lid is very lax or if the entropion has recurred after the above operation then a *Pentagonal Wedge Excision* will tighten the lid and in this way correct the entropion (fig. 7.23). One way of demonstrating lid laxity is to pull the lower lid

Pentagonal Wedge Excision for senile entropion

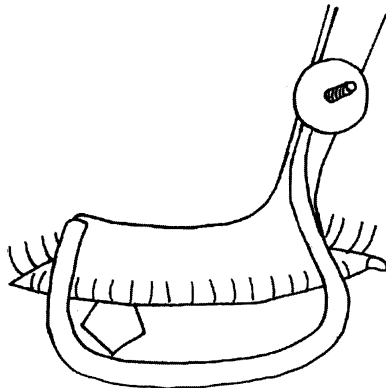


Fig 7.23a The skin incision using a lid clamp

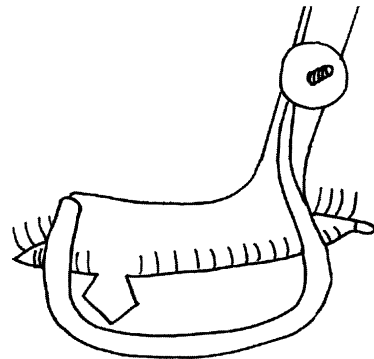
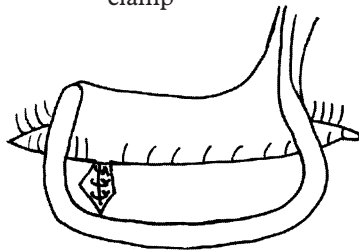


Fig. 7.23b The full thickness wedge of eyelid removed



7.23c Suturing the tarsal plate

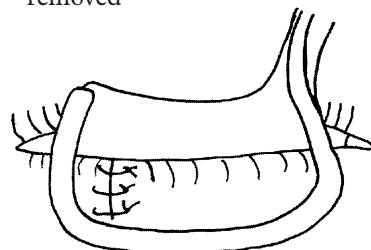


Fig. 7.23d Suturing the skin

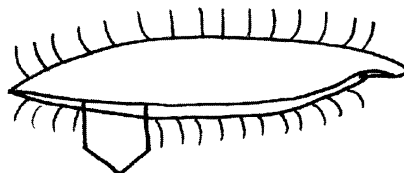


Fig. 7.23e Eyelid excision for senile ectropion

downwards away from the globe. It should spring back to rest snugly against the globe. If it does not there is lid laxity.

Method:

1. After local anaesthetic and adrenaline injection insert a lid guard or lid clamp (fig. 7.23a).
2. Excise a full thickness pentagon of tissue from the lateral part of the eyelid using scissors (fig. 7. 23b). Each edge of the pentagon should be about 4 mm long. The two edges of the wound should come together so the lid rests firmly against the eye but is not under excessive tension.
3. Suture the deep layer (the tarsal plate and conjunctiva) with interrupted absorbable sutures (fig. 7.23c). Make sure that the knots are not on the conjunctival surface or they will irritate the eye. The eyelid margin must be very carefully sutured so that the two edges come together without a notch. Then suture the skin using interrupted sutures (fig. 7.23d). The segment that is removed from the eyelid is deliberately shaped like a pentagon. In this way the lower part of the tarsal plate is tightened more than the margin of the tarsal plate. This helps prevent the tarsal plate from rolling over, which happens in entropion.

A similar operation will cure lower lid ectropion due to eyelid laxity. However for this a segment of the eyelid removed should not be a pentagon but a slightly different shape (fig. 7.23e).

Ectropion

For a cicatricial ectropion resulting from scarring of the skin 2 procedures will be described, the Z plasty and the skin graft.

The Z plasty

If there is only a localised linear scar it may be possible to release the contracture caused by the scar with a Z plasty (fig. 7.24).

Method:

Two triangular flaps of skin are cut either side of the scar and the triangles transposed after undermining the skin flaps. The effect of this is that the scar is lengthened and tissue brought in from the sides. In fig. 7.24 the scar line EF is made longer and the distance CD is made shorter. It is possible to make several Z-plasties rather than just one along the line of a scar. If the scar is very thick, it may help to excise the scar itself with parallel incisions down each side of it, before carrying out the Z-plasty.

Skin graft

If there is an extensive loss of skin, a skin graft is necessary. Because the blood supply to the lids is so good a full thickness graft will usually take but make sure the graft contains no fat.

The Z Plasty

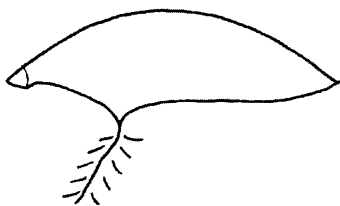


Fig. 7.24a The shortened scar

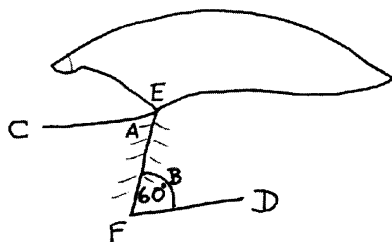


Fig. 7.24b Marking out the Z with cuts at 60 degrees to the scar line

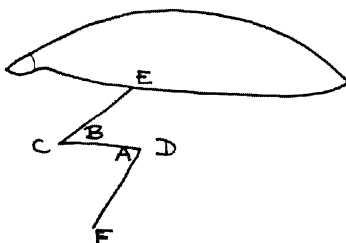


Fig. 7.24c Transposing the flaps after they have been undermined

Skin Graft

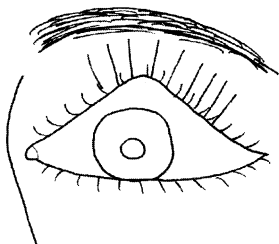


Fig. 7.25a Cicatricial ectropion of the upper lid



Fig. 7.25b Incision along the edge of this scar to free the lid margin leaving a bare area to be grafted

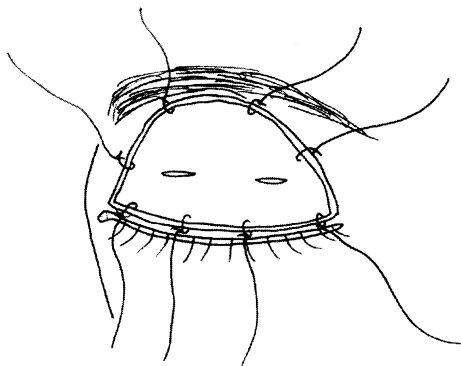


Fig. 7.25c Suturing the graft in place and making two small holes in it

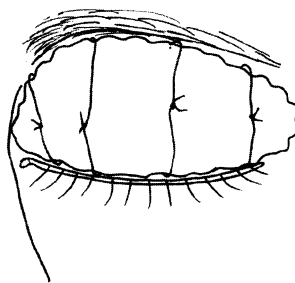


Fig. 7.25d The sutures tied over a bolster

Method:

1. Prepare the bed for the graft. Incise along the edge of the scar so as to free the tissues completely (fig. 7.25b). Make absolutely sure there is no bleeding from the bed where the graft will be placed. Haemorrhage will separate the graft from its bed and cause it to fail. The other common cause for graft failure is infection in the bed of the graft.
2. A piece of sterile silver paper or similar material is cut to match the shape of the area to be grafted. This is used to make sure that the donor skin is the right shape and size. The donor skin will shrink by 10% and so should be cut slightly larger than the defect.
3. Cut the graft. The best donor site is the upper lid if you are *sure* there is enough skin to spare. If the lower lid is being grafted with skin from the upper lid on the same side, a small pedicle can be made which ensures the blood supply of the graft remains intact. If there is any doubt about using skin from the upper lid the next best site is the area immediately behind the ear. This of course must be a free graft. Having cut the graft using a scalpel and scissors make sure there is no fat on its undersurface, and if there is trim it off. This is done by laying the graft skin side downwards on a board and using scissors to trim off any subcutaneous fat. Keep the graft moist in normal saline and close up the defect in the donor site.

For a very large defect a split skin graft from the arm or the thigh may be needed if there is not enough skin behind the ear.

4. Apply the graft to the graft bed and suture it in place (fig. 7.25c). Keep some stitches long and use these to tie a bolster of moistened sterile cotton wool or Vaseline gauze over the graft (fig. 7.25d). This is to keep the graft in place resting tightly on the graft bed. Make 2 or 3 small holes in the graft to drain any possible haematoma.
5. Apply a bandage and leave for at least 5 days. Remove the bandage and the bolster with very great care. Some surgeons advise systemic antibiotics to prevent the graft becoming infected.

Senile Ectropion

If the ectropion is due to laxity of the lower lid a wedge can be excised usually from its lateral end as already described.

Tarsorrhaphy

A tarsorrhaphy closes the eyelids with sutures. It is usually performed to help protect the cornea from ulceration when the eyelids will not close following a facial palsy. Leprosy patients are particularly at risk because they often have no corneal sensation as well as a facial palsy. Sometimes a tarsorrhaphy is done to close the lids temporarily to help a long-standing corneal ulcer to heal.

The position and size of the tarsorrhaphy will vary according to the disease. Nearly all patients with a permanent facial palsy will benefit from a permanent lateral tarsorrhaphy of about one third of the total eyelid length. Many will also benefit from a medial canthoplasty to tighten the inner end of the eyelid as well. Sometimes the lower lid becomes very stretched with a permanent facial palsy causing ectropion and these patients may also need a wedge excision to tighten up the lower lid (see fig. 7.23e, page 245).

A temporary tarsorrhaphy to heal a chronic corneal ulcer is usually done near the centre of the lids to keep them closed.

There are other more complex operations described in order to restore the ability of the eyelids to shut. The two most popular are either to use the temporalis muscle and tendon to close the eye when the temporalis muscle contracts, or else to insert the hypoglossal nerve which supplies the tongue muscles into the facial nerve of the same side. These are both highly specialised procedures.

Lateral tarsorrhaphy

Suturing together the lateral ends of the eyelids is both an effective and easy treatment for facial palsy.

Method:

1. Incise along the grey line for the lateral one-third of the length of the eyelids. For a permanent tarsorrhaphy excise a triangle of skin and eyelashes from the lower lid and a corresponding triangle of tarsal plate and conjunctiva from the upper lid (fig. 7.26a).
2. Overlap these two triangles, and sew them together with mattress sutures. To provide a wide area of pressure these sutures may be tied over a small rubber bolster (fig. 7.26b). Leave the sutures for 2 weeks.
3. For a temporary tarsorrhaphy incise the grey line of each eyelid but do not excise any tissue. A temporary tarsorrhaphy may be at the lateral end of the lid for facial palsy or in the middle of the lid to heal a chronic corneal ulcer. Insert mattress sutures over bolsters to join the two raw surfaces (fig. 7.26c).

Many leprosy patients and some patients with other neurological diseases may have corneal anaesthesia as well as a facial palsy, thus putting the cornea at very great risk of damage. These patients may need a very large lateral tarsorrhaphy and also a further tarsorrhaphy medial to the pupil, just leaving a tiny hole in the lids to see through (fig. 7.26d). It is better to look as if the eye is almost shut than to go blind from exposure changes to the cornea. When doing a medial tarsorrhaphy near the lacrimal puncta or canaliculi great care must be taken not to damage the lacrimal passages.

Tarsorrhaphy

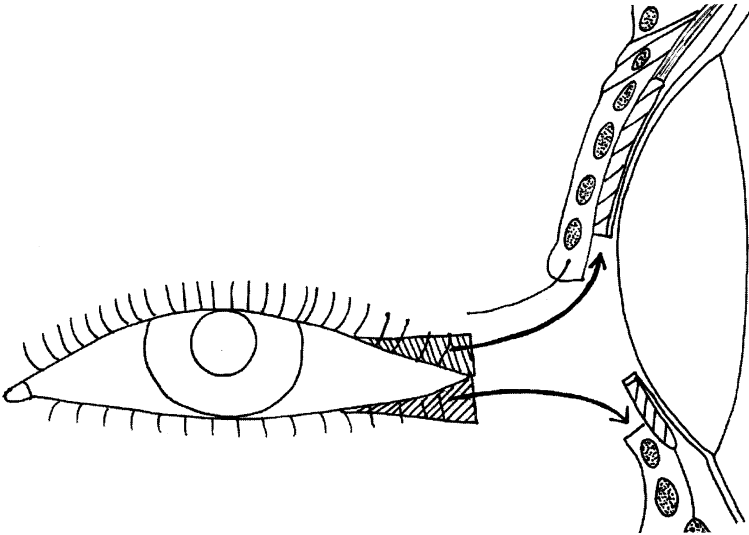


Fig. 7.26a Lateral tarsorrhaphy to show the tissue excised

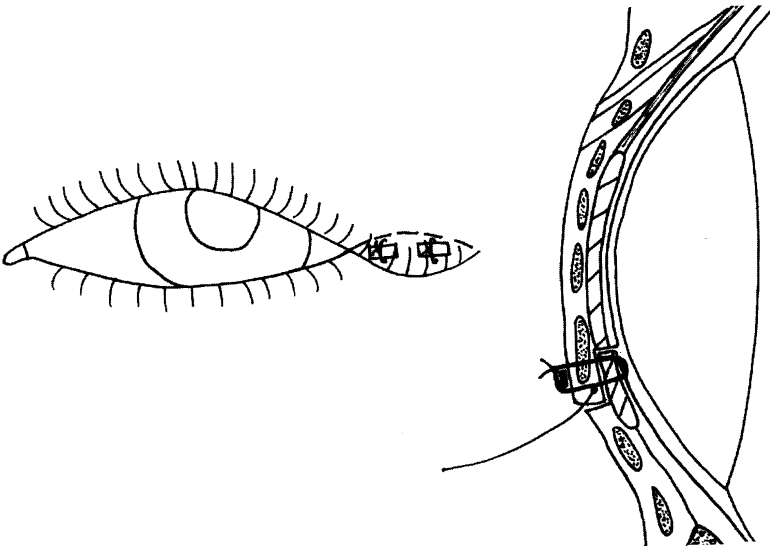


Fig. 7.26b Lateral tarsorrhaphy. The lids are sutured together with mattress sutures over a small bolster

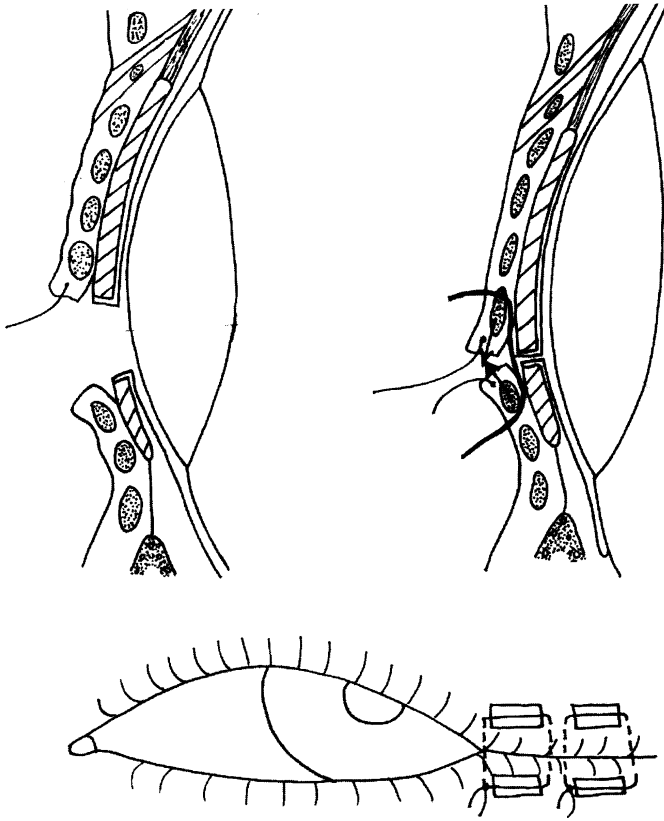


Fig. 7.26c Temporary tarsorrhaphy

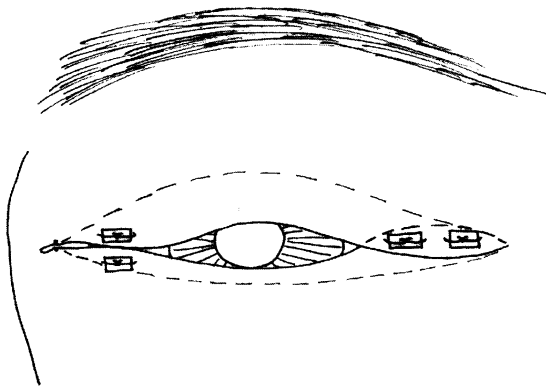


Fig. 7.26d Extensive lateral and medial tarsorrhaphy for severe corneal exposure and corneal anaesthesia

Medial Canthoplasty

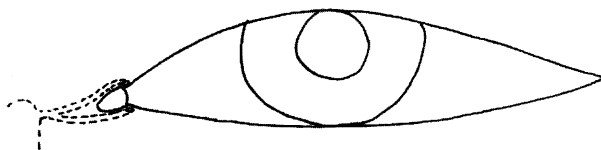


Fig. 7.27a The lacrimal canaliculi are very close to the margin of the eyelid

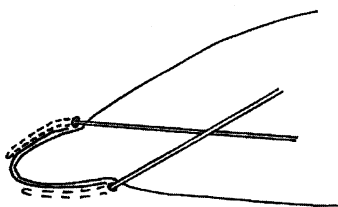


Fig. 7.27b The incision with a probe in each canaliculus

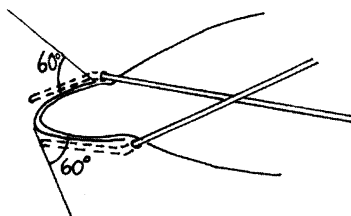


Fig. 7.27c Cutting the flaps for the Z plasty

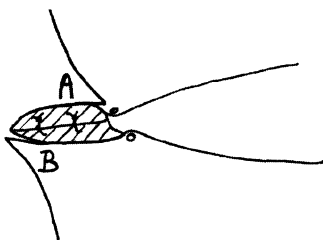


Fig. 7.27d Suturing the conjunctival surfaces



Fig. 7.27e Transposing and suturing the flaps of skin

Medial Canthoplasty

Even after a successful lateral tarsorrhaphy many patients still have slight ectropion of the inner end of the eyelid. This causes excessive watering of the eye because the lacrimal punctum does not touch the globe. Also the lacrimal pump is not working because of the facial palsy. A medial canthoplasty is a simple way of helping tear drainage in a patient with permanent facial palsy. It tightens the medial end of the lid and also brings the lacrimal punctum up against the eye.

Method:

1. Make a shallow cut along the medial edge of each eyelid medial to the puncta. Take very great care not to damage the lacrimal canaliculi which are close to the edge of the eyelid. Lacrimal probes must first be placed in the canaliculi to identify and protect them from damage (fig. 7.27b).
2. A small Z plasty is now marked out on the skin by incising as shown to make two small skin triangles (fig. 7.27c). These small triangles of skin are dissected free.

3. The two conjunctival surfaces are sewn together with very fine absorbable sutures (Fig. 7.27d).
4. The two skin flaps are transposed and sutured as shown (fig. 7.27e). This pulls the lower punctum up and in towards the eye.

The drainage of tears may be helped by enlarging the lower lacrimal punctum with a punctoplasty (see page 288).

It is possible to do a tarsorrhaphy medial to the pupil but lateral to the puncta for very severe cases of corneal exposure and damage (fig. 7.26d).

Meibomian Cyst

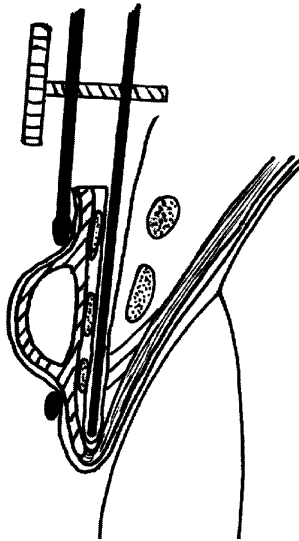


Fig. 7.28a Incision and curettage of a Meibomian cyst

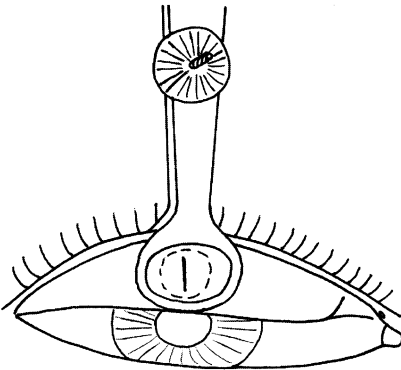


Fig. 7.28b Applying the clamp and incising into the cyst. Make the incision vertical and avoid the lid margin.

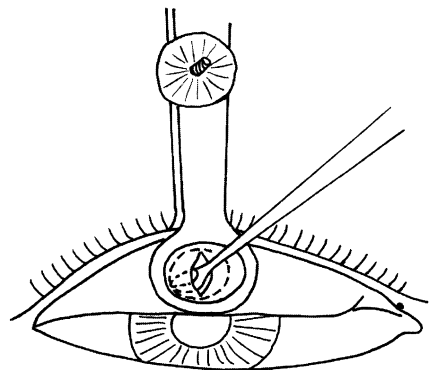


Fig. 7.28c Curetting the cyst

Meibomian Cysts

These are very common and often get better spontaneously with time. They can be incised and curette quite easily.

1. After infiltration with local anaesthetic and adrenaline apply a Meibomian clamp and evert the lid (fig. 7.28a).
2. Incise vertically through the conjunctiva into the tarsal plate (fig. 7.28b) and use a curette to scoop out the cyst contents (fig. 7.28c).
3. Apply a pad until the bleeding stops and then give antibiotic ointment twice daily.

Treatment of Eyelid Tumours

The management of many eyelid tumours is quite complex and will depend basically on the nature of the tumour, its site and its size. Because it is a complex subject only the basic principles will be described here.

The type of tumour

The majority of eyelid tumours are benign and excision is the recommended treatment for them. If histopathology services are available it is very helpful to carry out a small biopsy first to know what the nature of the tumour is and plan appropriate treatment. The most common malignant tumour is a *basal cell carcinoma* or rodent ulcer which is found in fair skinned races when exposed to excessive sunlight.

When suspecting a malignant tumour, a rim of about 4 mm of healthy tissue should also be excised to make sure all the tumour cells have been removed. When excising a basal cell carcinoma it is better to excise too much tissue and leave the patient with a scar, then to excise too little and risk tumour recurrence. This is especially true for young patients with basal cell carcinoma. If the luxury of a local pathology service is available, these cases are best managed with frozen section histology at the time of the operation.

The site

Tumours involving only the skin can usually be removed without excising the deeper tissues of the lid. Any lower lid skin excision should be repaired with a vertical suture line to prevent ectropion. An upper lid skin excision can usually be repaired with a horizontal suture line unless there is extensive skin loss. If there is extensive skin loss a graft is necessary (see page 246). Tumours near the lid margin, especially basal cell carcinomas will require full thickness lid excision.

The upper lid is essential for a healthy cornea but the lower lid can be sacrificed without loss of sight. Therefore the lower lid can be used to repair the upper lid, but usually not the other way round. Lesions of the medial end of the lids are difficult to excise because of the risk of damaging the lacrimal canaliculi.

The size

Up to one third of the total length of the lid can be excised and the wound closed with direct sutures in 2 layers. A lateral cantholysis will help to bring the wound

Lateral cantholysis

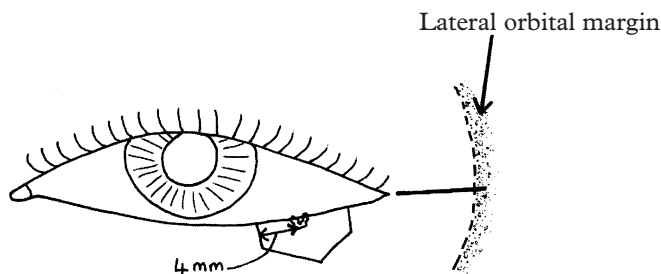


Fig. 7.29a Incising over the lateral canthal tendon

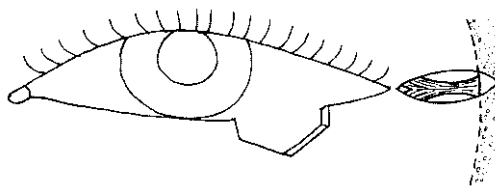


Fig. 7.29b Identifying the tendon

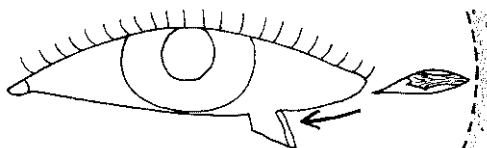


Fig. 7.29c Cutting the tendon to the affected eyelid will mobilise that eyelid

edges together. This is done by making a horizontal skin incision in the region of the lateral canthus (figs. 7.29a and b) and then dividing with a vertical cut the lateral canthal tendon of the affected lid (see fig. 7.29c).

If more than a third of the upper lid has been removed a rotation flap from the lower lid can be used to help fill in the defect. When planning this flap be very careful to take it from the correct part of the lower lid so that it will rotate properly into the defect. Alternatively tissue can be transferred from the lower lid to the upper by an advancement flap. After 3 weeks the pedicle for either of these flaps can be divided.

If more than a third of the lower lid has been removed, a rotation or an advancement flap from the upper lid can be used to fill the defect. However the upper lid is more important to the health of the eye than the lower. Therefore this may not be appropriate, and must be done very carefully so as not to damage the healthy upper lid. A rotation flap from the cheek can also be used to replace the lower lid. It may be lined with mucous membrane from the mouth. There are many possible flaps recommended for different types of eyelid defects.

For further reading:

1. There are many text books on eyelid surgery, but “A Manual of Systematic Eyelid Surgery” by J.R.O. Collins, Churchill Livingstone. 2nd Ed. London 1989, is strongly recommended.
2. The W.H.O. have produced a monograph entitled “Trichiasis Surgery for Trachoma – the Bilamellar Tarsal Rotation Procedure” W.H.O. Geneva 1993. It describes in detail this one operation to correct upper lid entropion which is such a major cause of blindness.