Surgical management of upper lid entropion

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SUMMARY   One hundred and eighty-three surgical procedures were conducted on 107 patients over seven years. 91% of the cases of upper lid entropion were corrected satisfactorily with only one operation. It is postulated that this level of success is achieved by grading the degree of surgical intervention according to the clinical criteria established on systematic examination of upper lid entropion.

The lid malposition of upper lid entropion has many causes. The constant factor regardless of cause is a relative shortage of posterior lamellar lid tissue, comprising tarsus, conjunctiva, and lid retractors, in comparison with the anterior lamella of skin and orbicularis muscle. Many surgical procedures have been devised to manipulate the abnormal anatomy to try to recreate a healthier lid capable of maintaining a healthy corneal environment.[1] Unfortunately the definitive operation does not exist. The policy adopted at Moorfields Eye Hospital, London, was to try, by detailed clinical examination, to gain information on each case of upper lid entropion and adapt an already established operation to its treatment. The assumption was that the surgical principles already advocated were correct but that the variety of pathological lesions encountered created differing amounts of distortion in the tissues. It is well recognised that mucocutaneous cicatricial disease such as trachoma and erythema multiforme (Stevens-Johnson syndrome) causes upper lid entropion of varying degree. Other infective and degenerative conditions also feature as primary pathological lesions, and their effect on the lids is equally variable.

Surgical technique has been previously reviewed, and these established principles were used when attempting to correct the observed deformation of the upper lids.[1] Grading the entropion was conducted by detailed attention to the position of the meibomian gland orifices, conjunctivalisation of the lid margin, the position and direction of the lashes, palpable and visual assessment of the tarsal plate, and the presence or absence of keratin deposits on palpebral conjunctiva.[2]

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Patients and methods

A total of 107 patients were reviewed and 183 surgical corrections of upper lid entropion were carried out. The patients were not all domiciled in the United Kingdom and this is reflected in the list of pathological causes of the upper lid entropion (Table 1). The clinical assessment of each case required a standard clinical history plus detailed lid examination (Table 2).

Minimal entropion was defined by posterior migration of the meibomian gland orifices, minimal or incomplete conjunctivalisation of the lid margin, and lashes touching the globe on up-gaze. This pathological change was treated by the limited intervention of anterior lamellar repositioning (Fig, 1), The eyelid was incised and entered along the skin crease, tarsal plate was then exposed and skin undermined distally but stopping 2 mm short of the lash roots. Three or four long-acting absorbable sutures (metric size 6·0)

Table 1   *Aetiology of upper lid entropion*

Diagnosis	Number of lids
Trachoma	73
Chronic blepharoconjunctivitis	41
Erythema multiforme	14
Chemical/radiant trauma	12
Postoperative ptosis repair plus tumour excision	9
Pemphigoid	7
Mechanical	7
Postenucleation socket syndrome	6
Herpes zoster ophthalmicus	5
Cicatricial vernal conjunctivitis	5
Dysthyroid	4
Total	183

Table 2   *Management of upper lid entropion*

| Degree of entropion	Clinical signs	Operation procedure
Minimal	Apparent migration of meibomian glands	Anterior lamellar ± lid split at grey line (Fig. 1)
	Conjunctivalisation of lid margin	
	Lash/globe contact on up-gaze	
Moderate	Apparent migration of meibomian glands	Anterior lamellar reposition + lid split + tarsal wedge resection (Fig. 2)
	Conjunctivalisation of lid margin	
		or
	Lash/globe contact in primary position	Lamellar division (Fig. 3)
	Thickening of tarsal plate	
	Lid retraction	
Severe	Gross lid distortion	Rotation of terminal tarso-conjunctiva and posterior lamella advance (Fig. 4),
	Metaplastic lashes	
	Presence of keratin plaques	or
	Lid retraction causing incomplete closure	Rotation of terminal tarsoconjunctiva and posterior lamellar graft (Fig. 5)

were used to anchor the skin from just above the lashes to approximately 6 mm up the tarsal plate. Pulling these taut repositioned the anterior lamella and everted the lashes. Further eversion was achieved by splitting the lid margin at the grey line to a depth of 2 mm if this was considered necessary. The

skin was then closed with 6·0 collagen, an anchoring point for each suture being taken in the deep tissues of the wound, with incorporation of the lid retractor complex. The resultant fibrosis transmits the upper lid retractor pull to skin, helping to create a good skin crease, and increases the amount of lash eversion, especially on up-gaze.

Moderate entropion was diagnosed when, in addition to the early changes detailed above, there was either lash-globe contact in the primary position or thickening of the tarsal plate. Surgical management of this stage of entropion can also be by anterior lamellar repositioning as described above, including the lid splitting procedure. However, if the tarsus is thickened, as it usually is in trachoma, a tarsal wedge resection can be performed as well. In this procedure a horizontal wedge-shaped defect was cut along the length of the tarsus. The lid-everting sutures that anchor lid skin high on the tarsal plate were placed on either side of the defect in such a manner that, when pulled taut, closure of the defect was attained (Fig. 2).

In addition to the structural distortion of the lid margin in this degree of entropion there can also be lid retraction. This is caused by a relative shortage of posterior lamella compared with anterior lamella due to cicatricial change in the tarso-conjunctival layer. To allow the posterior lamella to advance behind the anterior lamella the procedure of anterior lamellar repositioning and lid split was expanded to include dissection of levator aponeurosis and Müller's muscle from the tarsal plate and conjunctiva. The tarso-conjunctival layer was then advanced. Alternatively, when lid retraction was quite marked, a lamellar division was required. In this procedure the anterior and posterior lamellae were separated by an incision along the grey line of the lid margin. The plane of dissection was then continued up the tarsal plate until

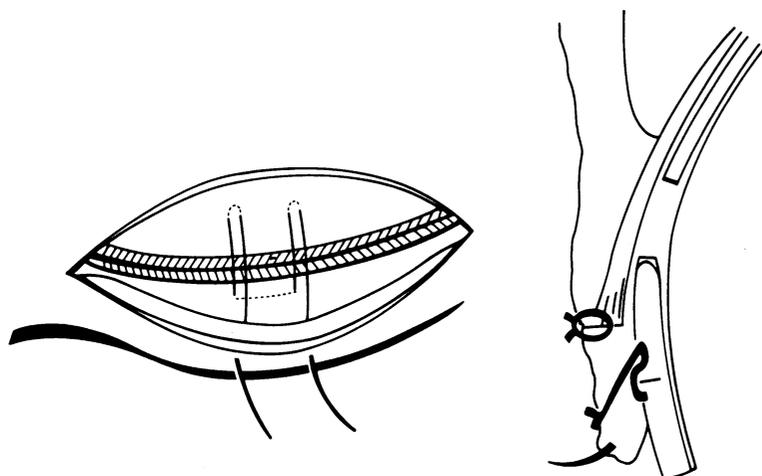Fig. 1   *Anterior lamellar reposition and lid split*
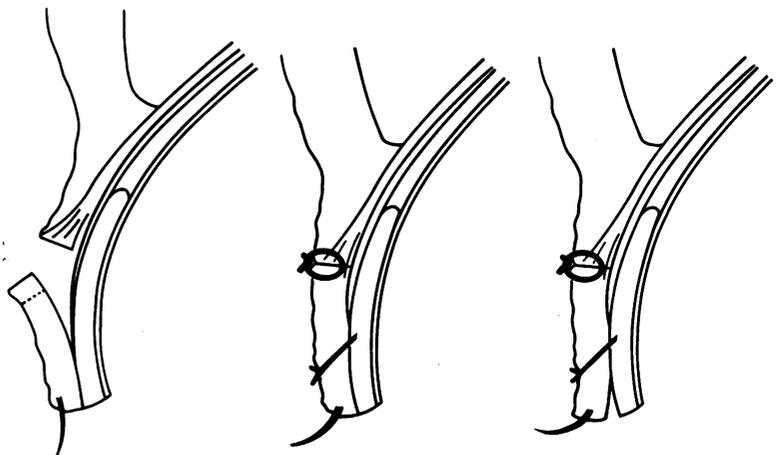
Fig. 2 *Anterior lamellar reposition, lid split, and tarsal wedge resection.*

the anterior insertion of the levator aponeurosis was dissected free from the tarsus. The surgical plane gained was between aponeurosis and Müller's muscle. The latter was dissected from the top of the tarsal plate and underlying conjunctiva, which then allowed the posterior tarso-conjunctival layer to be advanced. The lamellae were then held in position by using three double-armed 4·0 (metric size) absorbable sutures, such as collagen, which were passed through the lid from conjunctiva to skin. A 6·0 (metric size) suture was used to close the wound edge between anterior lid margin and advanced tarsus. The bare area of exposed tarsus was covered with an

Fig. 3 *Lamellar division with mucous membrane graft covering the exposed tarsus.*

autogenous graft of mucous membrane as depicted or left to granulate and heal by secondary intention (Fig 3).

A more severe lid disturbance can be manifest as a totally disorganised margin with metaplastic lashes and trichiasis, definite or gross lid retraction, and keratin formation in plaques on the palpebral conjunctival surface. This last pathology is an inconsistent finding, but its presence restricts the choice of surgical procedure. Regardless of imposed constraints, surgery must be concentrated on the posterior lamella. A lamellar division may be suitable if no keratin deposits are present on the posterior lamella, but often more radical surgery is required. Alternatives that were used in treating these severely distorted lids were the procedures that require rotation of the distal tarso-conjunctiva, which forces any metaplastic lashes or keratin deposits to face away from the cornea.[34] An incision was made across the posterior surface of the lid 3 mm from the inner margin, cutting through tarsus. Once the plane between anterior and posterior lamellae was exposed, dissection proceeded as in the lamellar division. Tarsus and conjunctiva were advanced and held in position by through-the-lid 4·0 collagen sutures, and the distal portion of tarso-conjunctiva was rotated through 180° and sutured directly to the front surface of the advanced raw tarsal plate (Fig. 4). If the tarso-conjunctival layer would not advance sufficiently, a posterior lamellar graft was inserted between the two cut edges of tarsus (Fig. 5). The distal fragment in this case needed only to be rotated through 90°. Graft material was usually autogenous auricular cartilage, but other materials were also used such as buccal mucous membrane, nasal septal cartilage, and stored sclera, and in some unilateral cases tarsus from the opposite healthy lid was used in preference to the foregoing alternatives.[24]
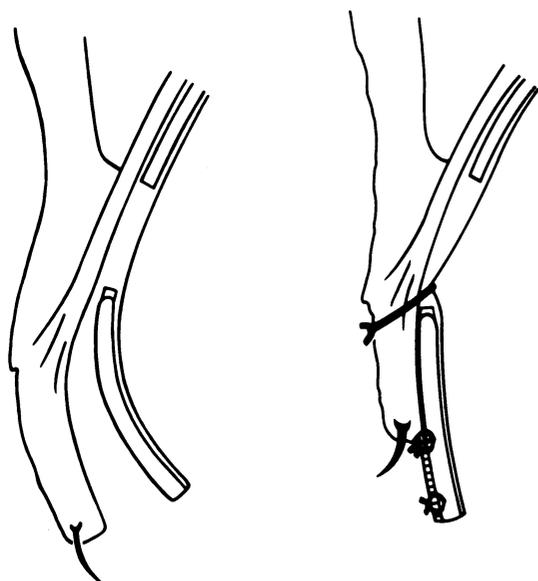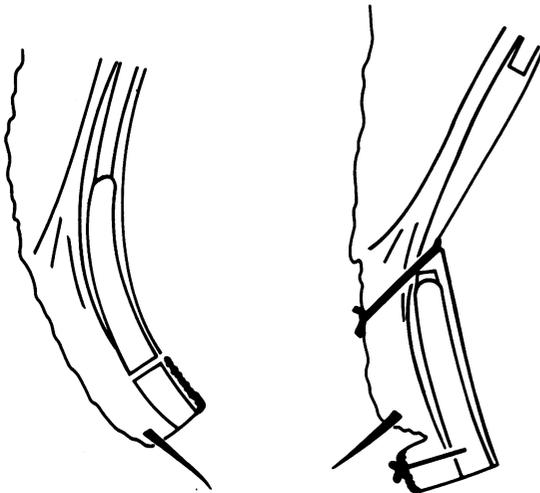
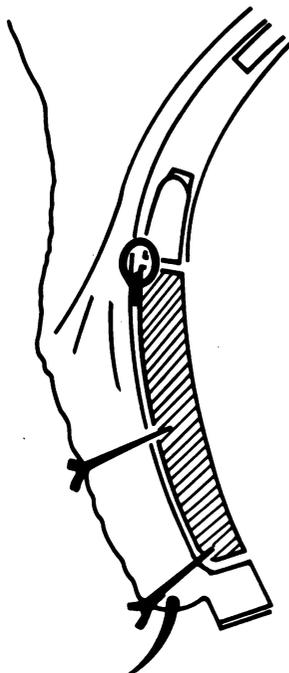Fig. 4 *Rotation of terminal tarso-conjunctiva containing keratin plaques and posterior lamellar advance.*

Fig. 5 *Rotation of terminal tarso-conjunctiva and posterior lamellar graft of auricular cartilage.*

Results

The causes are listed in Table 1. There was a disproportionately high number of cases in which trachoma dictated the need for surgical correction–40%. This reflected the international and tertiary referral pattern of patients at this hospital. The next largest group, which was composed mainly of London's indigenous population, was chronic blepharoconjunctivitis–23%. The remaining groups were made up of small numbers of cases. Fourteen operations were carried out on patients suffering from erythema multiforme, and 12 were on patients that had been subjected to some form of trauma. Only nine cases were considered iatrogenic in that they followed ptosis surgery or upper lid reconstruction. The seven operations on cases with mechanical causes were a combined blepharoplasty and anterior lamella repositioning, and these were due to dermatochalasis. Four operations were performed on patients with dysthyroid ophthalmopathy.

Of the 183 surgical procedures carried out only 17 required further surgical intervention. This is a recurrence rate of 9% over a seven-year period with a mean follow-up time of three years, the minimum follow-up period being just 10 months on six occasions. A recurrence was classified as a return of symptoms plus clinical evidence of further lid distortion resulting in lash inversion or corneal epithelial change. All cases were reviewed at least once in the first postoperative year, and none of the recurrences occurred within the first nine months postoperatively. Thus the initial surgical procedures did not appear faulty: 36 operations were followed by further attention to aberrant or metaplastic lashes by means of electrolysis or cryotherapy (Table 3). Forty patients have been fully discharged, and, of the remaining 67 under continuing outpatient review, 43 are using topical lubrication of methylcellulose or polyvinylpyrrolidone (Table 4).

Table 3 *Results of upper lid entropion surgery*

	No. of operations conducted	No of recurrences	No. of lids with aberrant lashes postoperatively
Group A	94	10	20
Group B	49	5	8
Group C	40	2	8

Table 4 *Disposal of patients*

Discharged and no topical therapy	Regular follow-up	Using topical therapy in regular follow-up
40	67	43

Discussion

The range of pathology associated with upper lid entropion in this study is interesting. There are the two large groups of trachoma and chronic blepharoconjunctivitis, but in addition it is of interest to note the less common conditions. Dermatochalasis and dysthyroid ophthalmopathy are examples of conditions usually associated with other lid signs and other more specific operative procedures. Patients with ocular pemphigoid, although representing a large clinical group, were not subjected to many entropion repairs, as the condition is rarely static enough to consider surgical intervention as definitive treatment. In some severe cases of vernal conjunctivitis there appeared to be enough residual fibrous contraction to precipitate a frank entropion requiring repair. Usually herpes zoster ophthalmicus is associated with cicatricial ectropion, but a small group of lids developed the opposite problem, requiring attention to an entropion. The other four pathological groups of erythema multiforme, chemical/radiant trauma, postoperative entropion, and postenucleation socket cases were less unusual and could be anticipated as potential sources of surgical material.

In considering the efficacy of surgical intervention it is important to be aware that in most cases the primary pathology is unfortunately not at an end stage when the first surgical procedure is necessary. What has been shown by the 9% recurrence rate is that it is possible to alter a lid's response of entropion to a variety of pathological causes by graded surgical intervention. It would appear that in 91% of cases it is possible satisfactorily to influence lid position in order to create a healthy corneal environment, which is the main victim when entropion exists. Most of the causes of cicatricial mucocutaneous disorders affect the goblet cells and accessory lacrimal glands. Therefore it is gratifying that after surgery most tear films appear clinically to improve, but more specifically 60% of patients postoperatively require no artificial addition to what basic tear production they possess (Table 4).

In the past various authors have advocated a specific definitive entropion correction, and the current history of entropion repair dates from the mid-nineteenth century.[3 5-7] In this department the established surgical principles and procedures have been accepted but modified. After systematic clinical assessment the pathological change in an upper eyelid is graded, and an appropriate but usually limited operation is then devised to suit the circumstances. This approach would appear to be justified by the success rate recorded in this retrospective study. The lowest recurrence rate was in the group where the most radical surgery was performed. This probably reflects not only the efficacy of technique but that the most gross lid disturbance will be at the end stage of the pathological process, so that little or no progression of cicatrisation will occur. No distinct pathological cause appeared to be prevalent in the patients requiring further attention to individual lashes or small numbers of recurrent or metaplastic lashes. The method of removing these by either cryotherapy or electrolysis was not solely dictated by the operator's preference but also by surrounding circumstances. Lids that had either graft material in the posterior lamella or a substantial amount of normal lashes had electrolysis performed to remove aberrant single lashes, whereas if the lash population was of poor quality and no graft had been used then cryotherapy was employed.[8]

Electrolysis was also preferred when dealing with pigmented lids, as there was no risk of the cosmetically distressing pigment loss that may occur when using cryotherapy. Both methods were used, overall, an equal amount and with similar success.

This retrospective study does not present any new surgical procedures but tries to apply established techniques in an ordered fashion. It is considered that the systematic approach of clinical analysis influencing surgical procedure has been vindicated. The criteria detailed earlier are regularly identified either by naked eye or with the slit-lamp biomicroscope. As such the clinical assessment allows consistency in grouping lids according to deformity and in so doing indicates the best possible surgical approach for repair of upper lid entropion.

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