Reconstruction of the lower lid

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SUMMARY As the lower eyelid is frequently the site of malignant disease, lower lid replacement is a common task in oculoplastic surgery. As a rule the reconstruction of larger defects (more than one-third) can be accomplished with free grafts or with flaps. Different forms of pedicle flaps (full thickness, tarsoconjunctival, combined) from the upper lid provide better results than free grafts. A convenient method of lower lid replacement is the use of a medial pedicle rotation flap of the cheek. This has advantages over the temporal pedicle cheek flap or the frontal flap.

The commonest malignant tumour of the eyelids, the basal cell carcinoma, is often located in the lower lid (four times more frequently than in upper lid).^{1,2} Different method of partial or total lower lid replacement have been used by ophthalmic plastic surgeons. The indications, techniques, and advantages of well-proved methods entailing pedicle flaps are discussed here.

Operation techniques

Not only the size but also the location of the tumour in the lower lid determine the kind of technique which is used for reconstruction. Small (temporal) defects up to one-third of the lid length can be easily closed directly³ or in combination with a temporal advancement or rotation flap after cantholysis.⁴ The Tenzel method can also be used for coping with medial lower lid defects. In this case a pedicle flap from the upper eyelid seems more suitable.

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Esser⁵ reported the following technique. Opposite the lower lid defect a cuneiform full-thickness flap is prepared with its pedicle in the area of the upper lid margin containing the marginal vessels. The length should be less than one-third to allow closure of the upper lid defect directly. This flap is rotated 180° into the lower lid defect and fixed in two layers. This method can be used for lower lid defects up to half of the lid length (Fig. 1). After about three weeks the pedicle is cut through, and the lid margins of the upper and lower lid are readapted carefully. As this is a two-stage procedure, old people in particular are somewhat handicapped for three weeks. Another disadvantage is the potential danger of entropion, ectropion, trichiasis, or at least an unsatisfactory

Fig. 1 Case 1. 'Esser-flap' for closing a central lower lid defect in a 69-year-old female.

Fig. 2 Case 2. A tarsalconjunctival flap is prepared in the upper lid and fitted into the lower lid defect in an 84-year-old male.

Fig. 3 Case 2. Skin defect is covered with a free full-thickness transplant from upper lid.

cosmetic result with irregular lid margins, as the lid margin has to be dissected in order to prepare the flap.

Fig. 4 Case 3. Total lower lid defect after tumour excision in a 75-year-old female; medial pedicle cheek-flap outlined.

Fig. 5 Case 4. Medial pedicle rotation flap of the cheek forming the new lower lid in an 83-year-old female.

For partial to subtotal lower lid reconstruction the Köllner procedure⁶ is a useful and valuable technique. It is a two-stage procedure which can be performed without great difficulties so long as a small remnant of normal lid tissue, or at least both lid tendons, is still intact. A tarsoconjunctival flap is prepared by making a horizontal incision 2 mm above the lid margin and two vertical incisions (Fig. 2). This flap is sutured into the lower lid defect, and the skin defect is covered with a free full-thickness skin graft (Fig. 3).

Hughes⁷ modified this technique by using a double sliding flap, whereby the skin defect is closed by a vertical advancement skin flap. If any downward tension occurs in this skin flap, it might cause an ectropion after the interpallebral fissure is opened. Another disadvantage of Hughes's method is the intermarginal, transverse splitting of the lid, so that the lid margin does not remain untouched as in the Köllner procedure (Figs. 2,3). It seems to cause minimal irritation to the globe by the upper lid and accomplishes a good result for the lower lid and the lid margin.

A two-stage procedure can be avoided by means of a medial pedicle rotation flap of the cheek.⁸ In the area of the angle of nose and cheek a skin flap is prepared with its base medial from the inner canthus (Fig. 4). After temporal rotation it is fitted into the lower lid defect and anchored to the periosteum of the orbital rim. The inner lining can be provided by conjunctiva mobilised from the lower fornix. This is necessary to protect the globe and the flap.⁹ The new lid margin is formed by adapting the edge of the conjunctiva exactly and unbrokenly to the upper border of the flap. After closure of the donor area the flap is sutured into the defect (Fig. 5). A good base is provided by the cheek skin, which is tensioned towards the nose.

With this special kind of pedicle flap large medial up to total lower lid reconstructions can be accomplished without great difficulties. For large temporal lower lid defects a similar technique utilising a temporal skin flap of the cheek can be employed.² This is specially indicated when the lacrimal structures are still intact (Fig. 6). Its main disadvantages are the rough and hairy surface of the temporal cheek skin and the obvious scar (Fig. 6). In spite of 90° rotation, shrinking is tolerable, and the possible danger of inversion of the flap can be avoided by making it somewhat thicker and fixing it postoperatively with traction sutures for some days.

Because of the firmer consistency of the cheek flap a tarsal plate replacement is not required. A lower fornix and a stable lid margin can be achieved by this technique in one to two and a half years. This seems to be the most important advantage in comparison to other methods.

Imre's 'bow plastic'¹⁰ and Mustardé's procedure¹¹ allow sufficient vascularisation of the flap. But in both cases almost the whole cheek has to be undermined, and it is necessary to stabilise the lid margin

Fig. 6 Case 5. 69-year-old male with a temporal pedicle cheek flap reconstructing the left lower lid 5 months after operation.

Fig. 7 Diagram of Landolt's technique.

by means of a strip of tarsus or cartilage. Landolt's technique¹² (Fig. 7) also requires the support of cartilage, as the upper lid skin is too thin. In addition to this, problems arise in the donor area of the upper lid and in the medial and temporal canthus. Moreover in the frontal flap procedure^{9,13} extreme shrinking of

Fig. 8 Case 4. Final result 3 months after operation.

the flap and the frontally located scars cause an inadequate and disfiguring result. With the medial pedicle rotation flap of the cheek it is possible to re-establish a new lower lid with sufficient functioning for protection of the globe and for complete lid closure. The cosmetic aspect is also satisfactory, as the nasally situated scar is inconspicuous (Fig. 8) and the new lower lid has a relatively normal appearance.

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