



RECONSTRUCTION OF THE LOWER LID

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Reconstruction of the full-thickness of an eyelid, or a part of an eyelid, whether upper or lower, must have at least two basic layers; a mucus-secreting lining layer, and a skin covering layer. Of equal importance, however, is a stable margin—that is a margin which will neither turn in and perhaps come to irritate the cornea, nor out, producing ectropion and the possibility of epiphora; and in the case of the lower lid, one which will not gradually sink down in time under the dual effects of gravity and the ageing process. The gradual stretching of tissues which these two factors produce is a problem which is met with in all facial reconstructive procedures, and if the surgery which is so meticulously planned and carried out is to withstand permanently the effect of these forces, special steps must be taken to counteract them: and this certainly applies to reconstructive operations involving the lower lid.

It might help us to understand better what these steps should be if we look for a moment at how nature prevents, in a normal lower lid, the stretching and sagging which these forces would otherwise produce. Of the various constituents of an eyelid, whether upper or lower—skin, orbicularis muscle, tarsal plate, conjunctiva—the tarsal plates are considered to be the most rigid, and because they are misleadingly called 'plates', they are often thought of as giving vertical support to the eyelids. If one examines closely their structure, however, we find that, except for a narrow strip along the margin itself, they are (to quote Whitnall) 'not solid plates, but...hollowed out by a series of (some 25-30) large glands... of enormous size', and the compact connective tissue of which they are composed is merely a thin stroma acting (again to quote Whitnall) as a capsule to these glands. The tarsal plates of themselves—even the broader upper one—when dissected free of skin and orbicularis muscle, have no more rigidity than a full thickness graft of post-auricular skin, and there is nothing in their make-up which would entitle us to expect they could provide a permanent support for the pretarsal part of the lid.

If one seeks clinical evidence that, in the lower lid, the tarsal plate provides no *permanent* support, one has only to consider the degree of stretching of the margin and the pre-tarsal part of lid that takes place in involutionary (senile) ectropion, and even more so in 7th Nerve Palsy. It must be obvious that the *only* factor counteracting the stretching forces of gravity and time is the constant tonic action of the orbicularis muscle—and it is important to remember that it is this continuous *tonic* contraction of the muscle, not the reflex or the voluntary contractions which is responsible for providing the permanent support which prevents the lid from stretching and becoming unstable. If this is the case in a normal lid, how much more will it be the case in a reconstructed lid, or a part of a lid?

The provision of the two basic layers does not in itself present a serious problem; there are at least three sources for obtaining the lining layer, and a multitude of sources for obtaining the skin covering layer, both in the form of free grafts and flaps—which, by definition must retain a continuous blood supply. By using various combinations of these sources literally dozens of techniques have been described for providing the basic layers with which to build up full thickness defects of the lower lid, and by far the greatest problem is to provide permanent support to counteract the stretching forces which, without such support, in time will inevitably produce an unstable, sagging margin, and reduce what was initially an apparently adequate lid reconstruction to something which is definitely inadequate.

Obviously, the most physiological way in which this could be done would be to incorporate a normal functioning layer of orbicularis muscle in the reconstructed part, and there have indeed been several experimental procedures which attempt to do this reported in the past few years. The results, although promising in the short term in more or less marginal lesions, have still to stand the test of time over a number of years, especially in vertically extensive reconstructions. The problem is not the technical one of bringing the muscle flap into the area, but is one of retaining all of its nerve supply intact so that it will not simply act as an imperfectly-functioning static sling, which could stretch in time, or a muscle which reacts to reflex and voluntary stimuli but does not retain the continuous tonic contraction which is so important.

Apart from these experimental procedures, one of the techniques which at the present time is widely used is the Landolt-Hughes operation in which a flap of upper lid conjunctiva and the upper part of the tarsal plate is brought down as a lining layer—the upper lid margin is preserved intact so as to reduce post-operative retraction of the upper lid. The flap is then covered by a skin graft

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or a skin flap, and after a period of several weeks its base is divided and the new margin revised. With purely marginal tumours it can certainly produce a reasonable immediate appearance, but because tarsal plate has no permanent supportive quality the margin is basically unstable and may gradually sink down or become everted. In addition, some retraction of the upper lid is usually present (as can be seen even in Hughes' own marginal cases). Where the resection extends vertically beyond 6 or 7 mm the lack of support in the reconstructed part of the lid becomes very obvious with the above technique, and in rarer cases where most of the lower lid has to be reconstructed the result may be totally unacceptable, either because of the sinking down of the unsupported lower lid or because of the retraction, and even entropion, of the upper lid.

One method of preventing the sinking down of a reconstructed lid is to insert into the reconstructed area some substance which will provide permanent, rigid support. Inert materials such as plastics are unsuitable as they almost always tend to erode through the scar along the margin: auricular cartilage may well give good support for some time, but being an elastic-fibrocartilage it tends gradually to lose its supportive action as it slowly stretches; and of course it cannot be covered or lined with a free graft. True cartilage, on the other hand, as from the nasal septum, does not undergo any such deformation, and it can be removed, without leaving any perforation, with a layer of mucosa still adherent to one side—a circumstance which has the great advantage of enabling it to be used, not only to provide permanent vertical support, but a mucus-secreting lining at the same time; and furthermore, by turning a fringe of the mucosa over the top edge of the cartilage a mucous membrane covered, stable margin is created which will prevent squamous epithelium from ever turning inwards and irritating the cornea.

It cannot be emphasised too strongly that it is of the greatest importance that the cartilage must always rest on a permanently supportive base, however, and in marginal lesions extending some distance *horizontally* but where not more than 6 or 7 mm of lid must be sacrificed vertically, the nasal cartilage/mucosa graft must be large enough to rest on functioning orbicularis muscle. A bi-pedical flap of pre-septal skin and orbicularis muscle is brought down from the upper lid to form a highly vascular covering layer, and the pedicles can be divided and returned after two weeks.

Where the defect extends *vertically* rather than horizontally, and particularly where it extends vertically more than 7 mm, a different approach should be used. Defects of up to a quarter of the horizontal width of an eyelid can be closed by direct suturing in layers, and in older patients, if the lower crus of the lateral canthal ligament is divided a defect of up to a third may often be closed direct.

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For defects which cannot be closed direct without undue tension, the skin lateral to the lateral canthus can be rotated, using an upward-curving incision, towards the nasal side after resection of an inverted triangle below the defect. This of course means that there will be a small sector of the lid at the lateral side which has to be reconstructed, but where the defect in the lid is not more than a half lining can usually be obtained from the surrounding conjunctiva; if necessary, however, a small graft of buccal mucosa or, because it shrinks less, nasal septal mucosa, can be used.

If the defect is greater than a half, a larger rotation flap, dissected in the face lift layer of subcutaneous fat, will be required, and a composite nasal septal graft, the cartilage of which will rest on the orbital margin, is used to provide permanent support, lining, and a stable margin to the reconstructed sector.

In very large reconstructions, and even where a complete new lower lid must be produced, the technique can still be used with a correspondingly larger composite graft and a rotation flap which might involve a large part of the cheek. Although this may seem a formidable procedure to those with limited experience of this type of surgery, I can think of no other technique for large lower lid reconstructions that will provide permanent support and stability of the margin comparable to this single-stage operation.