Myringoplasty*

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THIS group of cases includes those in which a simple repair of the tympanic membrane was done as a single procedure and those which were the first stage of a two-stage tympanoplasty; the ossicular reconstruction or replacement forming a second stage. Any patient whose air-bone gap is 30 dB or more is regarded as likely to require a two-stage repair and therefore this possibility is discussed with the patient pre-operatively so that they may not be too disappointed if the post-operative hearing result does not immediately reach their expectations.

Apart from deafness the commonest indication is to prevent recurring infections of the middle ear which are a direct consequence of a permanent perforation; reinfection occurring either via the Eustachian tube or the external auditory meatus. Consequently, myringoplasty is occasionally done to permit patients to go swimming. As a rule, the ear should be dry for three to six months prior to surgery. Children are very liable to recurring upper respiratory infections and it is wisest to delay surgery until the child is aged ten or older. Furthermore, the child's ear should have been dry for at least one year. Occasionally, a younger child has been submitted to surgery, but only if the ear has been dry for about two years and under observation for a shorter period. Very occasionally a tympanic membrane does not spontaneously heal within three to six months after injury and myringoplasty becomes necessary.

All patients should be carefully assessed pre-operatively and particularly those who have a permanent perforation remaining after removal of a limited and accessible cholesteatoma by suction clearance, for there is a danger of enclosing a cholesteatoma by performing a simple myringoplasty. Patients on a waiting list can be kept under continued assessment while awaiting surgery.

Prior to 1961 such poor results were obtained in myringoplasties when full thickness post-aural skin grafts were used for the repair that several other methods were tried. A reasonable success could be claimed for pedicled meatal skin in small perforations, and vein grafts used as 'inlay' or 'onlay' technique in the larger perforations. Too frequently when the vein graft was placed on the deep surface of the drum it collapsed on to and became adherent to the promontory. Therefore the 'onlay' technique combined with pedicled meatal skin was adopted in 1964 (Dawes, 1968).

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The vein or fascia is placed between the lamina propria and the outer epithelial layer which had been elevated in continuity with the meatal skin.

This technique is essentially similar to that used in combined approach tympanoplasty. However, by far the majority have been done through an endaural incision (Fig. 1). Following an endaural incision a temporalis

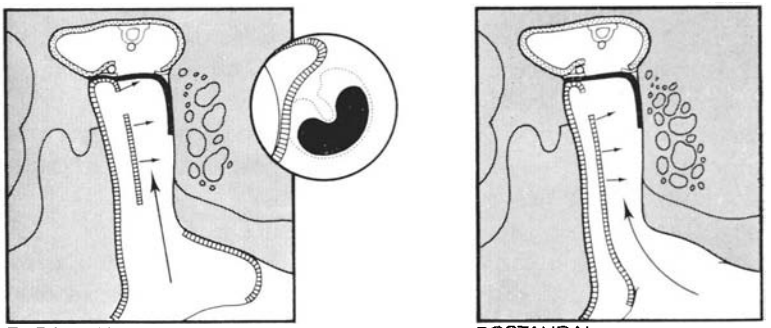


FIG. 1.
Technique of Myringoplasty by Endaural and Postaural routes.

fascial graft is cut by elevating the upper edge of the wound. The excess muscle fibres are scraped off and the graft stretched out and allowed to dry. The fibrous edge of the perforation is then excised leaving a cuff of mucous membrane projecting beyond the fibrous layer. The meatal skin is elevated in continuity with the whole of the outer epithelial layer of the drum, the pedicle being based on the 'vascular strip'. Care is necessary to raise the outer layer off the frequently narrow anterior rim of the tympanic remnant in continuity with the deep portion of the anterior meatal wall and great care is required to remove all squamous epithelium from the mucosal surface of the drum and middle ear. The shaped vein, and more recently fascia, is laid across the surface of the bared tympanic membrane being carefully positioned anteriorly to avoid blunting of the anterior angle. The excess graft is allowed to fall against the posterior meatal wall and the cuff of meatal skin is replaced over the fascia. Care is taken to preserve and replace the thin outer epithelial layer of the drum over the tympanic part of the graft. This cuff is held in position with gelatine sponge (Gelfoam). If exposure of the anterior angle is difficult the meatal skin can be cut in the longitudinal plane of the meatus and the meatal skin is then elevated in two directions both flaps being based on the 'vascular strip' (Fig. 2). In using this method a bulging bony anterior meatal wall can be lowered without endangering the meatal skin. If this still provides an inadequate exposure then the posterior margin of the entrance to the bony meatus can be removed.

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The postaural route has been reserved for those cases where there is need to explore the mastoid, particularly for those ears which continually discharge despite treatment or where there has been doubt as to whether a small inaccessible cholesteatoma was present or it was thought that a better exposure may be obtained (Fig. 1). The operation was then usually a combined approach tympanoplasty.

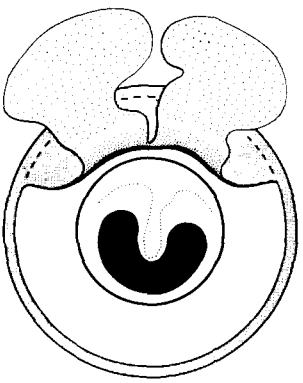


FIG. 2.
Modified technique using Endaural route.

Ballooning of the graft after placement was relieved by stopping the nitrous oxide. If this had not been successful a small antrotomy opening would have been considered.

Tympanosclerotic plaques in the drum if small have not been removed as a rule but large plaques and masses of smaller ones which fix the malleus have been. Often these hyalanotic or chalky plaques can be removed from the underlying mucosa which is largely left intact and provides a satisfactory bed for the graft.

The sutures are removed on the fifth post-operative day, but the Gelfoam dressing is left untouched for four to six weeks. All patients are given a broad spectrum antibiotic in prophylactic dosage or higher dosage if infection is already present.

If the hearing result is not satisfactory the ear is re-explored six to twelve months later. Pre-operative manometric measurements of Eustachian tube function have not been done for they do not necessarily influence the need for surgery nor do they predict the post-operative result. Collapse of the graft on to the medial wall has usually been the result of bad placement of the graft and when it has occurred it has not meant that re-operation would be a failure.

During surgery the ossicular chain can be inspected by lifting the annulus but overmanipulation of the ossicles has been scrupulously avoided. Generally it has been thought inadvisable to remove bone from

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the postero-superior margin to obtain a better view of the ossicles as it is intended to do the ossicular repair at a second stage.

Of 319 myringoplasties performed during 1964–70 (Table I), 262 were done by myself or the present Senior Registrar by this method. The remainder were done in a variety of ways each in too small a number by different members of the Department to be of value in assessing the results, although 70 per cent of the grafts took. Among this miscellaneous

TABLE I.

1964–1970	
Total number of cases ..	319
Personal Series:	214
Vein grafts	40
Fascial grafts	174
Senior Registrar (Fascial)	48

group were the successful use of a fat-plug method for very small perforations and one interesting case in which after preparation of the bed, the graft was not placed in position because of marked bleeding; the drum spontaneously healed within two months. The spontaneous healing is similar to that which occurs in a short period after injury, and has been seen in other cases where the graft was inadvertently removed or fell into the meatus after a too-early post-operative toilet.

Forty-eight cases using vein with pedicled skin were done during 1964–5 (Table II). The initial failures were due to incorrect placing of the

TABLE II.

VEIN GRAFTS 1964–1965.

Year	No. of Cases	Initial Failures	Late Failures
1964	19	2	2
1965	21	2	2

Graft take at 3–4 months .. 90 per cent
Total success of myringoplasty 80 per cent

graft and the late failures followed otitis media or non-infective necrosis in which one or more perforations appeared in the graft as late as 18–24 months post-operatively. These late failures and the ready availability of temporalis fascia persuaded me to change the graft material.

Table III records the use of fascia but the only method worth analysing is the standard technique already described (Table IV). Mere moisture of an otherwise satisfactory middle ear mucosa was not considered a bar to simple myringoplasty for all cases were done under a broad spectrum antibiotic cover, but doubtful cases had a combined approach. Only four

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grafts failed to take completely; in two there was a partial take and it is assumed that either an inadequate bed had been prepared or the graft inaccurately placed or displaced by packing. In the other two, the grafts looked satisfactory for as long as three months, and then disintegrated. Three more cases failed due to a post-operative otitis, one of these occurring as late as three months after surgery. These cases were left with either a

TABLE III.

FASCIAL GRAFTS IN MYRINGOPLASTY.

Pedicled Skin with Fascia	210
Personal	162
Senior Registrar ..	48
Combined approach tympanoplasty	8
Free meatal skin with fascia ..	4

TABLE IV.

FASCIAL GRAFT FAILURE IN PEDICLED SKIN GROUP.
(Partial takes are regarded as failures)

Personal (*162 cases*)	
Early group (within 6 months)	
Rejection 4 (2 recognized as late as 3–4 months)	
Post-operative infection 3 (1 occurred 3–4 months)	

smaller or equal sized perforation. Therefore the graft take during the first four months was almost 96 per cent. Of the eight late failures recorded in Table V only one was the result of infection. Other cases developed

TABLE V.

FASCIAL GRAFT FAILURE IN PEDICLED SKIN GROUP.

Personal (*162 cases*)	
Late group	8
	– 5 at 6–8 months
	– 3 at 1–2 years
The graft take is 95·5 per cent at 4 months	
Total success overall is 90 per cent	
Senior Registrar (*48 cases*)	
Initial take	92½ per cent
Late success	86 per cent

otitis media but showed a complete recovery. Five of these failures were a gradual and usually progressive necrosis of the graft developing after six to eighteen months. Necrosis may be partial or total or may occur in more than one part of the graft. Two of the classified failures had very minor non-progressive defects. Overall the success rate of graft take was 90 per cent.

Among this series were included failures of previous techniques and several of the recorded failures have since been successfully treated by re-operation.

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The Senior Registrar's (Mr. A. R. Curry) cases are included separately to illustrate the results of the method in another's hands.

Little or no post-operative care is required. Occasional epithelial pearls have been seen to migrate towards the drum margins in those cases where the epithelium had been incompletely elevated. These tiny pearls cause no trouble and are easily pricked out with a fine needle. At a second stage procedure in one of the personal series a small cholesteatoma was found enclosed in the sinus tympani. One of the senior registrar's cases failed because a cholesteatoma had formed from the squamous epithelium which extended inwards beyond the edge of the perforation or it had been overlooked.

No serious increase in sensori-neural loss occurred as a result of surgery although one patient who had a dead ear pre-operatively had a myringoplasty to prevent recurrent infection of the middle ear. Dead ears following myringoplasty have been seen as a second opinion, and these seem to follow overmanipulation of the ossicular chain or a severe post-operative infection and perhaps indiscriminate use of powerful suction in the neighbourhood of the round window.

One may conclude that temporalis fascia is an excellent graft material for tympanic repair when used as an 'onlay' technique. Hough (1970) has a 99 per cent take using fascia as an inlay technique. Most failures seem to be due to inadequate preparation of the graft bed, inaccurate placing of the graft, post-operative infection and poor selection of cases.

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