Mr J H F Batstone (*Department of Plastic Surgery, Churchill Hospital, Oxford, O X3 7LJ*)

Surgery of Agenesis of the External Ear

The Problem, the Possibilities and the Philosophy

Agenesis and microtia may be unilateral or bilateral and have an incidence of 1/20 000. The typical vestige is a lobulated structure set vertically on the side of the head and, commonly, there is no external meatus.

Treatment possibilities concern appearance and function, of which the latter implicates the otologist. With appearance the choice lies between surgical reconstruction, an artificial ear and concealment by hair. Reconstruction involves four or five operations, and these of sufficient intricacy to render an elegant outcome unpredictable. In spite of appreciating this, it is perhaps surprising how the majority of parents settle enthusiastically for surgery, clumsy though the product may be. It seems that some form of living, ear-shaped appendage (if only to bulge out the hair or support spectacles) is better than none, and certainly in children the hazards of a stuck-on ear are usually rejected. This is not so much the case in adults where prostheses may well have a part to play.

Long hairstyles have shaded the different attitudes towards reconstruction in boys and girls, and the surgeon has now to reconsider his philosophy. Hair camouflage can either provide an excuse for doing nothing for all, or it may group all cases into a single category where ambitious reconstruction is generally recommended. Now hair cover can be invoked as a helpful agency in blurring surgical imperfections. By thus taking on all comers and accepting the inevitable quota of discouragement the chances of producing better results will be increased.

Technical Considerations

Utilization of local tissue: With the usual vestigial complement (Fig 1A), the aim, at the first operation, should be a correctly-positioned lobule, a prominent tragus and a deep concha.

The lobule is attained by transposing the lower part of the vestige to a 45° angle with the vertical. The tragus can usually be constructed from the upper vestige, and correct positioning may involve transposition, rotation or island flap designs (Fig 1B). The concha is fashioned by excavating a disc of soft tissue down to mastoid periosteum.

Material for the ear skeleton: Experience has confirmed that autogenous cartilage is still the tissue of choice. Homologous cartilage has a high absorption record. Carved silastic has proved a disappointment. In the majority of trial cases its use has led to exposure and ultimate removal.

One of the important attractions of autogenous cartilage is that inadvertent exposure is not a prelude to rejection. Amongst the detractions are the chest wall scar and the occasional incidence of partial absorption.

Cutting and carving the cartilage graft: A 4 inch (10 cm) curved incision near the medial costal margin of the opposite side can include a central ellipse of skin in case an extra Wolfe graft is necessary later.

The rectus sheath and muscle is split longitudinally, and retraction exposes the 6/7 synchondrosis on which a tracing is marked of a normal ear template. The eighth cartilage is exposed and the internal oblique muscle insertion detached. Access is now gained to dissect out the requisite block from behind under direct vision without risk of puncturing the pleura.
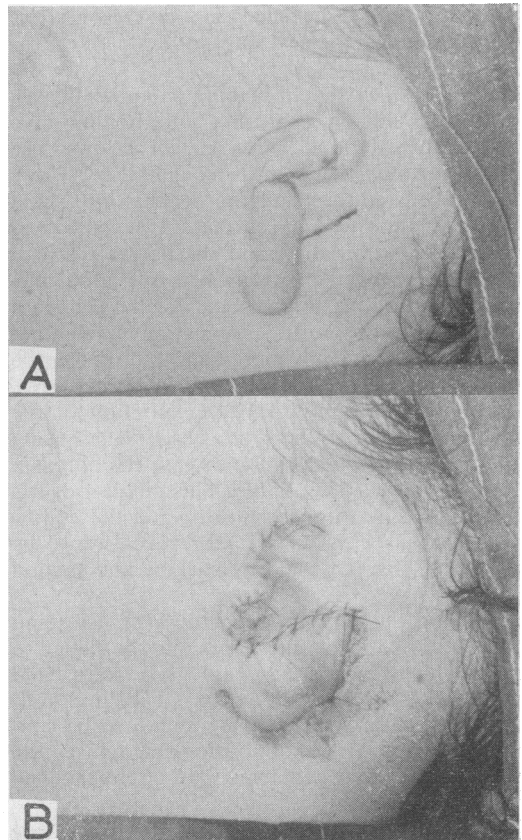

Fig 1A, *typical microtia with the incisions marked for forming lobule and tragus.* B, *the completed first operation showing formation of lobule, tragus and concha*
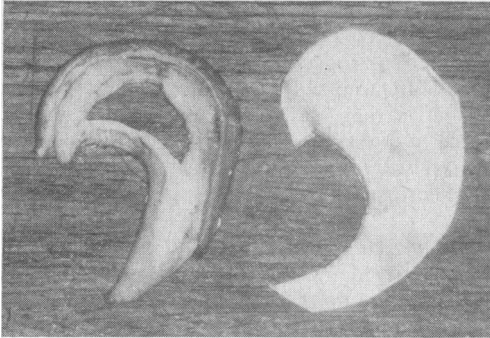
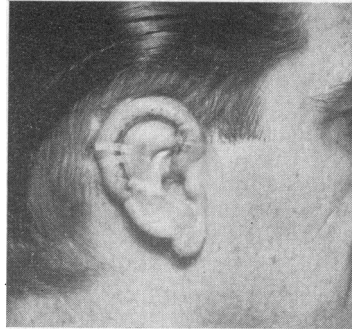Fig 2 *The carved cartilage graft and template*

Fig 3 *Helix and sulcus constructed with a clavicular flap*

Carving consists mainly of confirming the template outline and cutting out a window between helix and antihelix. These two important profiles may be emphasized and stabilized by attaching additional cartilage strips prepared from the eighth cartilage (Fig 2). The extent of this emphasis at the helix margin will depend on whether a tubed pedicled flap or free graft is contemplated at the next stage.

The contour conflict: In making an authentic ear, success pivots on capturing and holding two critical ridges and their associated hollows. The ridges are helix and antihelix and the hollows the subhelix groove and the conchal cup. Skin shortage and tenting set these two objectives necessarily at variance, and the natural wish to tackle them together at any one operation may be over-ambitious, and account for the incidence of cartilage exposure and attenuation in a number of cases. It is probably more logical to stagger the contouring efforts at the several staged procedures.

Following, for instance, the initiation of the conchal hollow at the first operation, a strong additional contribution comes with the antihelix strut of the cartilage graft. This single ridge is accentuated by through suturing and the hollow deepened if necessary by more excavating, by additional free graft and by packing and suction drainage.

Because the other two contours of helix and groove are so often elusive, it may be better to ignore them at the cartilage graft stage, and utilize all the available skin for concha and antihelix only. The peripheral contours can be considered at the later, mobilization stage, when the ear is brought out with extra skin of either tubed flap or free graft.

Flaps and grafts for elevating the ear: The choice is difficult, in that both techniques have virtues and vices, and surgeons are divided as to which is preferable.
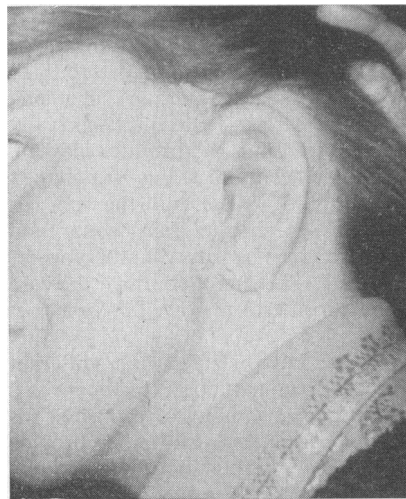

Fig 4 *The value of a clavicular flap when there is no initial lobule vestige*

Flaps are fickle and difficult to handle, and, for the donor site scars to lie hidden under the collar, four stages are necessary to complete the migration. Clavicular skin provides the best colour-match, and a fine 4–5 inch tube is raised superficial to platysma. This is brought up to the ear apex via an interim attachment to mastoid skin within the hairline.

Skin grafts on the other hand are easier to handle and can be applied in two operations. However, the colour-match may be indifferent and their powerful tendency for contraction on the comparatively delicate framework can lead to distortion. The postauricular sulcus and the helix rim and groove contour can also be gradually obliterated.

In this series our emphasis has been, until recently, on use of clavicular flaps. This was because of the general impression that, although flaps are undoubtedly too bulky and heavy-looking, they may perhaps contribute on average
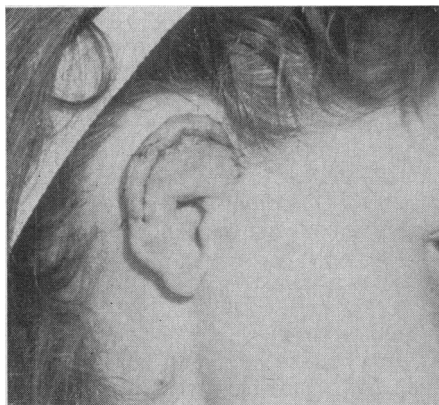
Fig 5 *The more delicate effect of split skin graft, rather than flap, for elevating the ear*
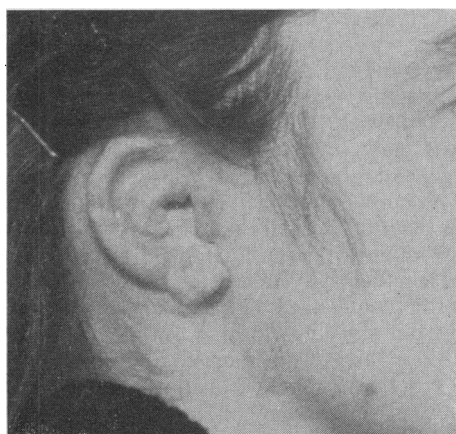

Fig 6 *Reconstruction in a girl using cartilage and split skin graft*

to a smoother, better contoured, better coloured and more durable result than free grafts (Fig 3). It has been felt that, whereas the best free graft-treated ears may have the more authentic and delicate finish, this could not always be relied upon, and the average case has been less satisfactory.

Certainly where the cartilage graft has become attenuated, as has been the occasional experience, or where there is no lobular tissue, free grafts have less to offer and flap tissue may be preferable (Fig 4). In a number of cases an improved result may come from use of flap and graft.

In general, however, enthusiasm is veering now towards free grafts, largely because of the greater chance of achieving delicacy instead of bulk (Fig 5) and because of the considerable bonus of eliminating a number of operative stages. Instead of what might be six operations, it is feasible to think in terms of three or four. Of these it is safer

to allow two for the ear elevation and do only one half at a time. The contraction tendency in the postauricular sulcus can be offset by the technique of forming a fistula through the graft to the conchal floor. In girls clavicular scars are unacceptable and free graft elevation is, invariably, the method of choice (Fig 6).

Timing of Operations
Timing is aimed at a completed ear by school age, and work, therefore, will usually start between the ages of three or four years. Team work with the otologist is imperative and in the bilateral cases priority is given first to considerations of function.

Mr D O Maisels
(*Liverpool Regional Hospital Board
and Liverpool United Hospitals*)

**The Surgery of Abnormalities of the
External Ear Excluding Agenesis**

Abnormalities of the external ear cover an enormous spectrum of deformities even after agenesis is excluded. There are two varieties of congenital deformities of the ear as there are for all tissues and organs. In the first place there are those abnormalities which are not peculiar to the region under consideration such as hæmangioma, lymphangioma and other varieties of nævi. Secondly there are the specific deformities of the region or organ.

No further consideration need be given to the first group; the main emphasis of this paper being on three relatively uncommon deformities of the second group, namely cryptotia, lop and/or cup ears and radial folds.

For the sake of completeness one should perhaps mention such other deformities as those of the lobes which may be large, split or absent, large ears, displaced and ectopic ears and the prominent or bat ear. Other problems include congenital pits and accessory auricles as well as several other unclassified deformities.

Hereditary Factors
It as been shown quite clearly (Rogers 1968) that a significant number of ear deformities run in families, the degree of penetrance varying a good deal. Thus of the twelve cases of cryptotia seen by the author, there were two at least in whom the mothers had similar if less marked deformities. Apart from this type of very clear hereditary relationship there are some deformities in which several types of deformity tend to recur either singly or together in several members of the family. Thus one finds protruding ears associated