Revision Otoplasty

How to Manage the Disastrous Result

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Objective: To describe how severe ear deformities after otoplasty can be corrected.

Methods: The correction of creases is possible through readaptation of the cartilage edges followed by revision otoplasty using suture techniques in the reconstructed cartilage. In the case of defect formation or extreme thinning of the cartilage, an appealing auricular shape is achieved by the use of porous polyethylene implants.

Results: We have treated 12 severe ear deformities in the past 2 years with the procedures described herein. In 11 cases, there were no complications, nor was it necessary to make further corrections for cosmetic reasons.

Conclusions: Reconstructing the cartilaginous skeleton and redoing otoplasty is a recommendable procedure with a longer lasting effect than just covering creases with fascia or preserved materials. In the case of a missing ear cartilage skeleton, the use of porous polyethylene implants instead of autogenous cartilage should be considered for reconstruction.


For the correction of prominent ears, widely used methods are the Converse cutting technique,1 the Stenstrom scoring technique,2 and the pure suture techniques of Mustardé3 or Fritsch.4 All cutting or scoring techniques include the risk of formation of undesired edges, defects, or deformities to the ear being operated on.3 In extreme cases this can lead to distortions that are often difficult to correct; with cartilage-sparing suture techniques this risk is lower.5,7 In addition, inadequate application of the operation procedure, infections, and intolerance of the suturing materials can also lead to postoperative deformities after otoplasty.3 Herein, we describe how severe ear deformities after otoplasty can be corrected.

**ASYMETRY**

An asymmetrical outcome with otherwise cosmetically appealingly shaped ears—if a correction is desired at all—requires readjustment of the more prominent side with the usual techniques. Such an asymmetry alone is not considered to be a severe deformity.

**CARTILAGINOUS CREASES WITH SKELETON PRESERVED**

In the case of complete severance of the cartilage, creases and edges can develop after otoplasty. This happens especially in the antihelical fold but can also occur in the cavum conchae or in the helical rim in connection with atypical incisions and aggressive surgery. We have seen this condition mainly in patients who have undergone surgery using the cutting technique of Converse et al.1

For the correction of abnormal edges and contours, the usual recommendation is to lift the ventral skin over the defect and cover the crease with temporal fascia or preserved material.8 In our experience with such methods, at most a short-term improvement is achieved. Over time, the fascia atrophies, and...
the crease reappears. A lasting correction of these usually very disfiguring edges is achieved if, through a dorsal incision, the ear cartilage is exposed over the whole affected area and freed from the existing scars. After identifying the incision edges in the cartilage that are causing the visible crease, the incision is reopened, and the ventral skin in the immediate vicinity is detached over a width of about 5 mm, parallel to the cartilage defect. If the cuts in the cartilage are irregular, they are straightened, then readapted in the originally anatomically indicated position, and closed with a long-term, absorbable suture (eg, MAXON, United States Surgical Corp). The configuration of the ear cartilage is thereby restored to its original shape. We have therefore not found it necessary to use conchal cartilage grafts for camouflage.10 The original restoration of the ear cartilage will, in most cases, cause the auricle to stick out too much, as it did before the first operation. This is determined by intermittent intraoperative measurement of the distance of the helical rim from the skull using Wodak's method.11 If the measurement of distance (by a 1-sided measurement or by comparison with the other side) indicates that correction is needed, a revision otoplasty procedure for folding the auricle is made on the repaired ear during the same operation. In this revision situation, however, a pure suture technique without incision to the cartilage is chosen so as not to cause further weakening of the repaired cartilage. Therefore, the antihelix is folded by sutures according to Mustardé's method.3 The suture material is usually expanded polytetrafluorethylene (GORE-TEX, W. L. Gore & Associates). If necessary, an approximation of the cavum conchae to the skull is performed, as described by Goldstein12 and Furnas,13 and/or correction of the earlobe position is achieved by using a suspension suture following the recommendations of Siegert et al.14 All of the surgical steps for otoplasty in the repaired ear correspond to the procedure in a primary case. Closure of the wound is performed without any skin resection. Postoperative dressing with ointment and cotton swabs is removed after 2 days (Figure 1 and Figure 5).

DEFORMITY WITH CARTILAGE DEFECT

The situation is more difficult when, as a result of the previous operation, inadequate cartilage incisions are present, but even more so when defects in the auricular framework have
occurred because of cartilage resection. In these cases, the
deformity is usually considerably more pronounced.

As in the procedure used in patients without cartilage de-
fects, the whole residual cartilaginous skeleton of the ear is ex-
posed through a dorsal incision and freed of scars to make the
extent and the localization of the cartilage defect visible. How-
ever, simple adaptation of the incision edges of the cartilage
through sutures is impossible in this case because it would lead
to renewed and possibly increased auricular deformity. Rather,
the missing cartilage material must now be replaced. In prin-
ciple, this can be done with auricular cartilage from the other
ear, but in the case of simultaneous deformity of both ears, this
option is not available. However, the removal of rib cartilage
for the purpose of reconstruction of the auricular framework
seems to be excessive because only a small amount of material
is needed. Therefore, in this case we prefer implants made of
porous polyethylene, which can be cut precisely to fit the in-
dividual purpose.13 This material is available in different pre-
fabricated parts (Medpor; Stryker Corp), which can be used as
replacements for the ear base or for the helical rim for total ear
reconstruction.16,17 For repair of auricular defects after unsuc-
cessful otoplasty, an implant that exactly fits the defect is pre-
pared from one of these prefabricated implants as needed. Cor-
ers and edges are rounded off with a knife. Then the implant
can be used to replace missing cartilage or to strengthen car-
tilage that has been greatly thinned as a result of previous treat-
ment. Thus, the whole antihelix in a previously damaged ear
can be reconstructed. In our experience, covering the plastic
with fascia or similar material on the anterior skin surface is
not necessary. We recommend attaching the introduced im-
plant to the neighboring healthy cartilaginous skeleton with
some long-term absorbable sutures to hold it in the desired lo-
cation (Figure 5).

OVERCORRECTION OF THE AURICULAR
POSITION WITH A SMALL CONCHA-MASTOID
ANGLE AND “TELEPHONE HANDLE EAR”

A telephone handle ear deformity occurs as a result of over-
correction in the middle third of the ear and development of a
too-small concha-mastoid angle.8 When viewed from the front,
the ear loses its projection, above all in the middle third. This
deformity occurs in isolation or in combination with other de-
formities. When the distance between the helical edge and skull, according to Wodak’s method, is measured, distinctly higher values are determined at the top and bottom measuring points than in the middle.

For the correction we use discs or half-moon-shaped implants of porous polyethylene, which are set in between the concha and the mastoid to increase the distance between the ear and the skull again. Through intraoperative measurement of the helix-mastoid distance, the size of the implant to be chosen can be precisely determined. In our experience, covering such implants (eg, with fascia or periosteum, as opposed to using porous polyethylene implants for total auricular reconstruction) is not urgently necessary in this case. However, if the skin in the operation area is of low quality, or if an additional skin transplant for reconstruction of the postauricular sulcus is necessary, a pedicled flap of fascia or periosteum near the ear can

Figure 3. Deformity after otoplasty. A and B, Overcorrection of both ears, with an additional postoperative deformity on the right side. C, Result 5 days postoperatively. D, Intraoperatively, it was revealed that a cartilage bar 1-cm wide was removed in the prior otoplasty, making readaptation of the cartilage skeleton impossible. E, Insertion of the first porous polyethylene for bridging of the skeleton defect. F, Insertion of a second porous polyethylene implant for raising the concha-mastoid angle.

Figure 4. A telephone handle deformity after otoplasty with protruding helix and lobule on both sides. B, Result 6 months postoperatively after dissolving scar tissue and revision otoplasty by suture techniques.
be used for posterior covering of such an implant in the pos-
terior sulcus before it is covered with skin (Figure 1 and
Figure 5).

POSTOPERATIVE CONDITIONS WITH
CARTILAGE AND SKIN DEFECT

If, as a result of otoplasty or owing to purulent inflammation
or other complications, partial or total loss of cartilage and skin
occurs, then a partial or total auricular reconstruction is nec-
essary. In this case, we prefer surgical reconstruction with po-
rous polyethylene implants, temporoparietal fascia flaps, re-
gional skin flaps, and free skin transplants, as described in detail
elsewhere.16,17 (Figure 3).

RESULTS

We have treated 12 severe ear deformities in the past 3
years with the procedures described herein. In 11 cases,
there were no complications, nor were further correc-
tions for cosmetic reasons necessary within the 3-year
follow-up time.

In 1 case involving reconstruction of the antihelical
fold by the use of a porous polyethylene implant, the pa-
tient showed up a year later with a double skin defect of
2 and 3 mm over the reconstructed antihelix. This was
caused by laser treatment of skin irregularities in this area
by a medical practitioner, leading to skin loss and expo-
sure of the implant. The treatment in this case was re-
pair of the damaged anterior skin using an island flap from
the posterior sulcus with a broad subcutaneous pedicle.
At the same time, the implant was removed and re-
placed by a smaller one. Since that revision there have
been no further complications in this patient, who was
very satisfied with the results.

COMMENT

In our experience, covering unsightly creases of the au-
ricle after otoplasty exclusively with free fascia trans-
plants under the ventral skin has not proved to be of value.
The fascia becomes atrophied and thin over the course
of time, so that the original creases reappear. The pro-
cedure described herein—of reconstructing the cartilagi-
nous skeleton and redoing the otoplasty—although more
extensive, has a lasting effect.

The use of autogenous cartilage material instead of
a porous polyethylene implant for the reconstruction
of a missing ear cartilage skeleton has many disadvan-
tages. A new operation field must be opened, with all
the risks this entails.18 If both ears are affected by 1
auricular deformity, the respective opposing ear is, as
a rule, not available for removal of cartilage transplan-
tation material because of previous surgery. However,
harvesting a rib cartilage transplant represents an
unnecessary procedure, with a substantial risk of com-
lications despite the small volume of material that is
needed. Furthermore, it represents a cosmetic detri-
ment that must be weighed against the cosmetic
improvement in another area. Porous polyethylene, in
contrast, has been proven effective for years and can
be used without an additional burden to the patient.19
The fundamental suitability of this material has been
confirmed in reconstructive facial surgery: porous
polyethylene has been used in ear reconstruction by
one of us (A.B.) for 30 years\textsuperscript{15} with excellent long-term results in biocompatibility and stability.\textsuperscript{19}

To avoid severe ear deformities after otoplasty that are difficult to repair, we recommend the use of less aggressive suture techniques instead of cartilage incisions, scoring, or resection. Recent literature shows that excellent long-term stability is achieved with suturing techniques with no statistically significant change in head-to-auricle distances over time as long as nonabsorbable suture material is used.\textsuperscript{20} Also, postauricular skin resection should be avoided; we have not performed this procedure in primary otoplasties for the past 15 years, with no loss of quality in the results.\textsuperscript{20}

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REFERENCES