

# OTOPLASTY TODAY: MAXIMAL BENEFIT WITH STATE-OF-THE-ART SURGERY

**Alexander Berghaus and Thomas Braun**  
review the available literature and  
discuss issues of best practice when  
undertaking otoplasty surgery



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## ABSTRACT

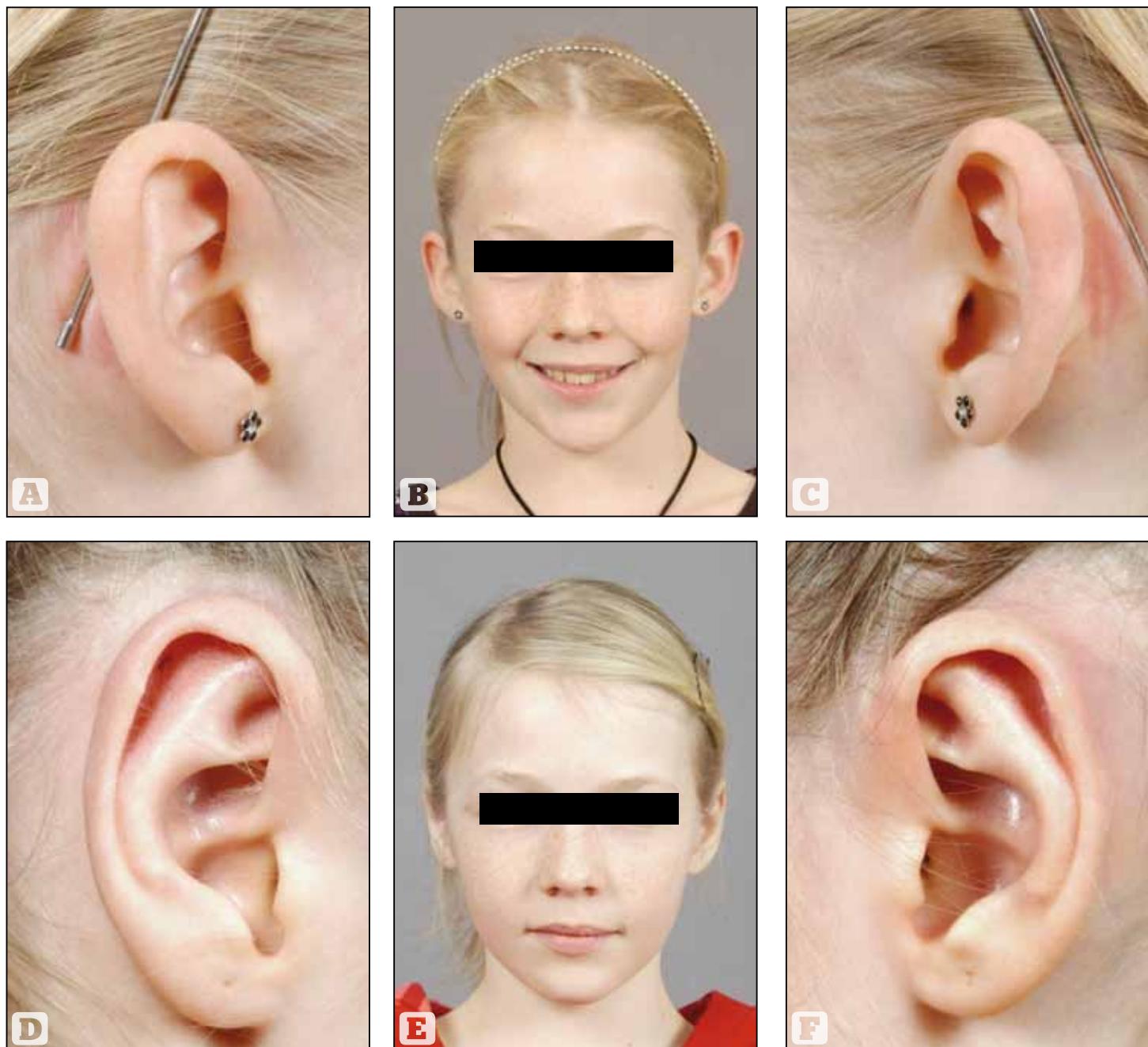
The variety of otoplasty techniques can be grouped into three basic concepts: cutting, scoring, and pure suture techniques. Not only can suture techniques effectively create the antihelical fold, correct the concha cavum and a protruding lobule, but they also have the lowest risk of undesired creases, edges, defects, or deformities that are difficult to correct. By using biocompatible suture material, complications are rare. Studies using validated tools show that successful otoplasty using suture techniques leads to a significant and long-lasting increase in the health-related quality of life of children and adults suffering from protruding ears. The authors have therefore relinquished any aggressive cutting and scoring techniques and avoid skin resections. If a revision is needed, the prospect for success is excellent owing to the preserved cartilage and skin.

**P**ROMINENT EARS DO NOT HAVE ANY physiological disadvantages and are classified as only a minor auricular deformity. However, a number of studies show that the emotional stress caused by teasing owing to protruding ears leads to a decline in the patient's health-related quality of life, loss of self-confidence, social avoidance, and poor school or job performance<sup>1-3</sup>. Furthermore, attractive individuals are judged to be socially more desirable and are expected to have better prospects in both their social and professional lives<sup>4</sup>; accordingly, a negative evaluation of personal attractiveness in children is associated with dysphoria<sup>5</sup>. Therefore, as approximately 5% of the population suffer from prominent ears, otoplasty is the most common aesthetic surgery in children and adolescents<sup>6,7</sup>. ▶

**KEYWORDS**  
otoplasty, techniques, best  
practice, benefit, risks



“ A number of studies show that the emotional stress caused by teasing owing to protruding ears leads to a decline in the patient's health-related quality of life. ”



**Figure 1** An 11-year-old girl with protruding ears, preoperatively (A, B, C) and 5 months postoperatively (D, E, F). All corrections of the antihelix, concha cavum and the lobule were carried out using suture techniques only, and without any cartilage or skin resections

*I do not know whether this is a new operation for the deformity in question or not, but, if allowed to judge from a single case, I can highly recommend it.*

Ely's otoplasty was discussed in the local surgical society, and he was derided with the remark that he probably would be very busy in some years when all of his patients wanted him to bring their ears back into the old form.

Initially, the excision of postauricular skin played a significant role in otoplasty, although the famous German plastic surgeon Jacques Joseph combined this simple method with additional cartilage excisions<sup>18</sup>. Joseph, initially a bone surgeon, was expelled from ▷

Fortunately, otoplasty leads to huge increases in happiness, self-confidence and social experience, reduced psychological anxiety or depression, as well as the cessation of teasing and bullying in the majority of cases<sup>8-12</sup>. Studies using validated tools show that in nearly all patients, significant and long-lasting improvements in health-related quality of life are found when using suture techniques<sup>14,15</sup>.

### Innovative otoplasty surgeons

The American surgeon Edward Talbot Ely can be considered as the father of aesthetic otoplasty<sup>16</sup>. In 1881 he described the first otoplasty in the medical literature, closing with the words<sup>17</sup>:

▷ Berlin's Charité hospital when he started operating otoplasties.

It was to the merit of the Austrian Robert Gersuny, who pointed out the importance of the elastic restoring forces of the cartilage in 1903<sup>19</sup>. Subsequently, the first antihelical reconstructions were performed by the Americans Max Aaron Goldstein in 1908<sup>20</sup> and William H. Luckett in 1910<sup>21</sup>.

Since the 1950s, a number of ways in which to sculpt the cartilage of the protruding ear have been described. Based on the works of Oscar J. Becker<sup>22</sup>, John Marquis Converse described a procedure which included the cutting of the cartilage following the antihelix with subsequent shaping by sutures<sup>23</sup>.

Scoring of the anterior cartilage surface in a longitudinal sense to strengthen the folding of the antihelix was published in 1963 by Vasant Chongchet<sup>24</sup> and Sten Stenström<sup>25</sup>.

Concomitantly, with the propagation of the cutting and scoring techniques, Jack C. Mustardé rediscovered the folding of the antihelix only by sutures<sup>26</sup>, a method already known to Hippolyte Morestin<sup>27</sup> and Luckett<sup>21</sup> more than 50 years previously.

Although almost 100 techniques to operate on protruding ears have been published<sup>28</sup>, today the variety of different otoplasty techniques can still be grouped into three basic concepts: cutting, scoring and pure suture techniques.

## Otoplasty is more than folding the antihelix

The most frequent form of deviation leading to a protruding auricle is an insufficiently shaped or distinctive antihelix. In some cases, there is an additional hyperplasia of the conchal cavum, which is usually only a pseudo-hyperplasia owing to a missing antihelix, while a real hyperplasia is very rare. Also, a prominent lobule can pose an independent problem.

### Correction of the concha cavum

Sickle-shaped resections of the lateral aspects of the concha cavum or even resections of large parts of the concha cartilage, are used in combination with the Converse technique, or as a separate procedure to correct a hyperplastic concha cavum.

However, this is unnecessary in most cases as only a pseudo-hyperplastic concha cavum is present with the main deformity being an underdeveloped antihelix. Only in rare cases of real hyperplasia, can a sparing resection be indicated. Usually, the cutting edges of the cartilage are subsequently sutured together.

Another method to flatten a protruding concha cavum is via cavum rotation (or conchal setback). This technique uses concha-mastoid sutures, thus bringing the antihelix edge closer to the skull. These sutures were described at the beginning of the 20th century by Morestin<sup>27</sup> and Goldstein<sup>20</sup>, and popularised by David W. Furnas since 1968<sup>29</sup>. Caution must be taken not to confine the external auditory canal.



**Figure 2** Aggressive cutting or scoring otoplasty techniques bury the risk of asymmetry and undesired edges or creases, which are difficult to correct and often cause an appearance which is more annoying than the preoperative state of protruding ears

### Correction of the protruding lobule

A number of techniques are known to correct a protruding lobule, most of them using skin resections<sup>28</sup>. An elegant and effective method was described by Ralf Siegert, who used a special mattress suture to fix the subcutaneous layer of the lobule to the concha cartilage<sup>30</sup>.

### Skin resection: is it really necessary?

From the early beginnings of otoplasty, it became routine to resect a more or less broad strip of skin in the course of the postauricular skin incision. This procedure is the result of the idea that an excess of skin will be present after otoplasty, and that the suture being under tension will help in approximating the auricle to the skull. Although it was recognised more than 100 years ago that corrections of the skin are of minor impact on the position of the auricle<sup>9</sup>, many surgeons continue to routinely resect skin when performing otoplasty. This is also surprising since it is well known that a skin suture under tension is a risk factor for the development of keloids, a dreaded complication of otoplasty<sup>31</sup>. Owing to excessive skin resection, an effacement of the postauricular sulcus can result, therefore hampering the wearing of spectacles or hearing aids.

### Relinquishment of aggressive otoplasty techniques

In most cases, a surgeon will adopt the technique from his/her senior or teacher. This can lead to the passing down of methods from one generation of surgeons to the next, independent of their risks or effectiveness. It is important to consider that otoplasty is an aesthetic operation, which is predominantly performed in children, who must cope with the result for the rest of their lives. Therefore, possible complications of otoplasty are of paramount importance. While minor complications such as postoperative pain and hypersensitivity, relapse or asymmetry, thread granuloma, othematoma, or scar and small keloid formation, if handled adequately by the experienced surgeon, do not threaten the beneficial effect of otoplasty<sup>15</sup>, difficult or impossible to reverse complications must be taken seriously as auricular deformities after failed otoplasty often result in an appearance which is more striking and unfortunate ▷

## Key points

■ Otoplasty using suture techniques is both safe and effective for correcting the antihelix, the concha cavum and the lobule. It leads to a long-lasting increase in patients' health-related quality of life

■ The routine use of cutting or scoring techniques, as well as skin resections, seems out-dated owing to significant risks of severe deformities difficult or impossible to reverse

■ A clear trend can be seen in otoplasty in favour of less aggressive operation techniques, which has also been made possible by the availability of modern biocompatible suture materials



► than the preoperative state of protruding ears<sup>32</sup> (Figure 2). Compared with all cutting or scoring techniques, the risk of undesired edges, defects, or deformities that are difficult to correct is lower with cartilage-sparing suture techniques<sup>7,33,34</sup>. The authors therefore recommend otoplasty using suture techniques in particular. Any resection, incision or scoring of the cartilage, as well as skin resection, should be avoided if possible, to reduce the risk of a postoperative auricular deformity that is difficult to correct.

### State-of-the-art otoplasty using suture techniques

The authors invariably recommend performing suture techniques in their own patients, following the modern concepts of Mustardé<sup>26</sup>, combined with concha-mastoid sutures and a rotation of the concha cavum<sup>29</sup>. In cases of a protruding lobule, this deformity is also corrected with a single suture<sup>30</sup>. The authors access the cartilage via a postauricular incision in the area of the antihelical sulcus, and almost never excise the skin before closure.

Understandably, results of this technique are dependent on the optimal position of the sutures, as well as the long-term biocompatibility of the suture material. In the past, suture complications were named as a major disadvantage of the Mustardé technique<sup>33</sup>. Suture material with low biocompatibility caused intolerance reactions with inflammation, and in some cases even abscess formation. Furthermore, some

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surgeons did not recognise that the use of absorbable suture material is not indicated when performing otoplasty with the Mustardé technique. Owing to the elastic restoring forces of the cartilage, relapses were common.

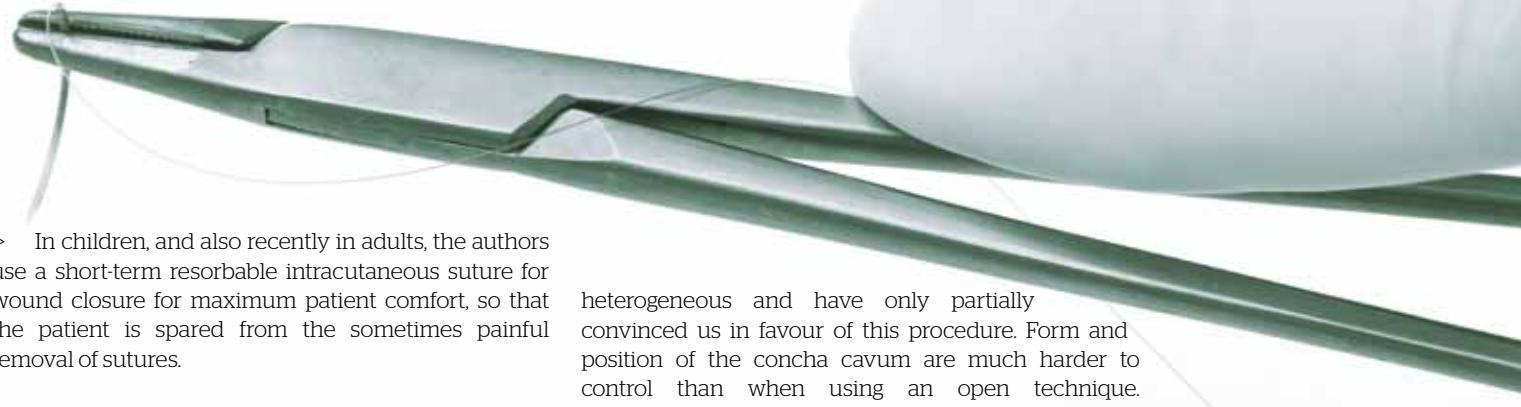
Fortunately, technical advances have led to a huge decrease in problems with suture materials. The modern surgeon has access to suture material with long-term biocompatibility and good knotting characteristics, so thread granulomae and inflammations have become something of a rarity.

For these reasons, the authors have relinquished all aggressive cutting or scoring techniques and invariably use suture techniques, not just for folding of the antihelix. The good controllability of sutures when combined with intraoperative measurements of the distance of the auricle to the skull, according to Wodak<sup>35</sup>, helps to achieve a symmetrical result. Only in very rare cases with extremely stiff cartilage or real hyperplasia of the cavum conchae, can careful scoring or cutting of the cartilage be necessary.

The widespread procedure to correct a large-looking concha cavum by cartilage resection, sutures and cavum rotation often leads to a narrow, long auricle, and in some cases, to severe deformities. As the same considerations with regard to the risks of aggressive procedures hold true as for the antihelix, the authors almost invariably correct the concha cavum with sutures between the cartilage and the periosteum of the mastoid. The contents of the postauricular groove (postauricular muscle and fibrofatty tissues) are removed beforehand to enhance the controllability and the approximating effect of the sutures. For these sutures the authors use long-term absorbable material and start antero-medially, followed by latero-dorsal sutures if necessary. Therefore, the external auditory canal is not narrowed.

Surgical techniques using cartilage or postauricular skin resection to correct a protruding lobule often look promising in the schematic drawings of surgical textbooks, but are disappointing in practice. Fortunately, it has been shown that the lobule can be relocated in an approximated position with good controllability and long-term stability by a cleverly positioned suture<sup>30</sup>. Basically, this suture is a modified Mustardé suture with the lateral fixation point the soft tissue of the lobule or the helical cauda, rather than the helical rim. For this very effective suture, the authors use non-resorbable material.

For the further minimisation of risk, the authors avoid postauricular skin resections when performing otoplasty. The skin always smoothly attaches itself to the auricle in the postoperative course, so the postauricular sulcus maintains its typical depth. With this course of action, keloids have vanished from the spectrum of postoperative complications. If a revision is necessary, the prospect for success is excellent because of the preserved cartilage and skin. ▶



► In children, and also recently in adults, the authors use a short-term resorbable intracutaneous suture for wound closure for maximum patient comfort, so that the patient is spared from the sometimes painful removal of sutures.

### **Swathe**

Postoperatively, only a light swathe is necessary after otoplasty. The auricle can be covered with cotton, held by a light gauze bandage for a few days. To avoid trauma of the recently operated auricle, such as twisting, the authors recommend wearing a headband during sleep for 2 weeks. In children especially, the swathe can have some protecting effect, but it is not intended to form the auricle, which is only achieved by adequate surgery. A bandage that is too compressing can put the final result at risk<sup>36</sup>.

**“To avoid trauma of the recently operated auricle, such as twisting, the authors recommend wearing a headband during sleep for 2 weeks.”**

heterogeneous and have only partially convinced us in favour of this procedure. Form and position of the concha cavum are much harder to control than when using an open technique. Furthermore, Fritsch recommends weakening the cartilage by repeated penetration with a hollow needle, which is again a rather aggressive treatment of the auricle. Therefore, the access via a postauricular incision, but without any skin resections, seems more favourable.

### **Conclusions**

In recent years, a clear trend can be seen in otoplasty in favour of less aggressive operation techniques, which has also been made possible by the availability of modern biocompatible suture materials.

► **Declaration of interest** None

► **Figure images 1 and 2** © A. Berghaus and T. Braun

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