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Online Only Main Article

Tragal cartilage harvesting and 'in the ear' earphones: a pilot study

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Abstract

'In the ear' headphones are held in position by the cartilaginous skeleton of the pinna. The tragus is an important part of this skeleton and plays a significant role in holding these devices in place. We designed a retrospective case–control study to determine whether the harvesting of tragal cartilage had any effect on the ability to wear 'in the ear' earphones. Fifty patients who had undergone ear surgery requiring harvesting of tragal cartilage, along with 50 age-matched controls who had undergone similar procedures without tragal cartilage harvesting, were sent a questionnaire about their experiences with 'in the ear' earphones both pre- and post-operatively. Ten of the 12 patients in the tragal harvesting group who had used earphones pre- and post-operatively had had problems with earphones post-operatively, which in eight cases were due to pain or the devices falling out. Of the 12 respondents in the non-tragus group, only one had similar problems ($p < 0.05$). Tragal harvesting may affect the ability of patients to wear certain types of headphones post-operatively and this should be discussed pre-operatively with the patient.

Key words: Ear, External; Surgical Procedures, Operative; Morbidity; Instrumentation

Introduction

Ever since the introduction of the personal stereo, in the form of the Walkman® by the Sony Corporation (Tokyo, Japan), a device which all but replaced other portable music systems, the need for headphones has been increasing. Although many different designs of headphone exist, including those worn over the head or clamped to the pinna, the most popular is the variety that is worn in the ear (Figure 1). This type of 'in the ear' earphone is held in place by the cartilaginous skeleton of the ear, with the tragus playing a particularly important role. Postings on music websites, where much of the discussion about such things takes place, contain many messages from people who complain that their ears are not able to accommodate this variety of earphone.[1,2]

Being unable to wear this sort of device could be considered to have an important effect on the lifestyle of someone who listens to a lot of music during the course of their day. Although alternative devices do exist, none are as unobtrusive, comfortable and easy to store as the variety shown in Figure 1. Perhaps the most popular personal stereo currently manufactured, the iPod® (Apple, Cupertino, CA, USA) comes equipped with this variety of earphone as standard.

Owing to the potential importance of patients' ability to wear these devices, it can be argued that this is something we should tell our patients before we commence ear surgery in which there is a potential to disrupt the cartilaginous skeleton that supports these headphones. Harvesting of tragal cartilage is well described, particularly for the reconstruction of the tympanic membrane[3] and in revision ear surgery,[4] but this is potentially threatening to the cartilaginous skeleton that keeps earphones in the ear.

We set out to assess the impact that tragal cartilage harvesting has on the ability to wear 'in the ear' earphones.

Methods

The case notes of 50 consecutive patients fitting the inclusion and exclusion criteria, who had undergone tragal cartilage harvesting as part of their surgery, were retrieved. Patients were sent a questionnaire (Appendix 1) that enquired about their use and experience of earphones both pre- and post-operatively.

The inclusion criteria for the tragal cartilage group comprised patients who had undergone middle-ear

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FIG. 1
'In the ear' earphones.

surgery in which the tragal cartilage had been used as a source of graft material, via a postauricular or permeatal approach. The inclusion criteria for the control group comprised age-matched patients who had undergone similar surgery but without cartilage harvesting and tragal cartilage disruption, either for perichondrium or cartilage harvesting.

The exclusion criteria comprised: enlargement of the lateral part of the bony canal; use of an endaural incision; performance of a meatoplasty as part of the procedure; previous ear surgery involving procedures fitting the exclusion criteria; and patients who had undergone surgery within three months prior to the study.

Patients who did not respond to the questionnaire were sent a reminder after two weeks and then contacted by telephone.

Statistical analysis

Data were collected and entered into a Microsoft® Access 2003® database imported into the Statistical Package For The Social Sciences® software (SPSS Inc, Chicago IL, USA) version 11.0 for analysis. Complication rates were compared using a chi-square test.

Results

Of the 50 questionnaires sent to each group, we received 40 replies from the tragal cartilage group (80 per cent) and 41 from the control group (82 per cent). Demographics in each group were similar.

Of the 12 respondents in the tragal group who had used earphones pre- and post-operatively, 10 had complications related to the earphones (eight patients found they fell out and two found them too uncomfortable to wear post-operatively). Of the 13 respondents in the control group, only two had complications (one patient found that earphones fell out and another found them too uncomfortable).

Although the difference in total complication rates was not statistically significant, difference in the rate of earphones falling out was significant ($p < 0.05$).

Discussion

Although the harvesting of tragal cartilage for use as a graft in otological surgery is a useful technique, disruption of the tragal cartilage may cause problems with the part of the cartilaginous skeleton of the pinna that holds modern 'in the ear' earphones in place. Owing to the fact that other sources of cartilage, such as from the fossa triangularis,[5] are readily available, it may be advisable to use these sources where possible when a patient intends to use 'in the ear' earphones post-operatively.

Limitations of the study

Owing to the fact that the exact harvesting technique was not often mentioned in the operation notes, the complication rates of various different techniques of tragal harvesting could not be determined. Although statistical significance was reached, the small numbers involved in this study mean that prospective research, involving more patients, should be done into this area to more reliably assess the impact of tragal harvesting.

Conclusion

The harvesting of tragal cartilage may prevent patients from wearing 'in the ear' earphones, and this should be considered pre-operatively and discussed with the patient as a potential complication. Other sources of cartilage should be considered if the risk of post-operative problems related to the wearing of earphones is to be reduced.

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Appendix 1. Questionnaire about the use of earphones following ear surgery

Please answer the following questions regarding your use of earphones that you place *in* your ear. These questions are only about the type of earphones that you wear in your ear, not over your ear or over your head. A picture of an example of the type of earphone we mean is printed on the next page.

Questions about before your operation (please circle the correct answer):

Have you ever used this type of earphone before your last ear operation? YES/NO

If you have used them, were you able to wear them comfortably? *(please circle all that apply)*:

YES
NO, they were uncomfortable/painful
NO, they would fall out

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NO, there was another reason: . . . . . .
. . . . . .
Questions about after your operation (please circle the correct answer):
Have you used this type of earphone after your last ear operation? YES/NO
If you have used them, were you able to wear them comfortably? *(please circle all that apply)*:
YES
NO, they were uncomfortable/painful
NO, they would fall out
NO, there was another reason: . . . . . .
. . . . . .

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