Reviewer's report

Reviewer 1: Patrick J Dawes

Reviewer's report:

Question 1 - Is the question posed by the authors new and well defined? No â## the introduction does not define the question to be addressed by the research. It is alluded to in the Abstract.

The text of the introduction says: “We have studied the durability of the autogenous obliteration material and the musculoperiosteal flap in long-term. All the patients that participated the study were followed at least for 15 years. Clinical experience suggests that the configuration of the cavity changes during long-term follow-up. Parts of the cavities tend to enlarge and cavities that are difficult to treat occur [17]. We have measured the volumes of the reconstructed ear canals, and evaluated the configuration of a possible cavity and problems caused by that.”

Question 2 - Are the methods appropriate and well described? For the data collected it was necessary to examine the patients in order to have a final (latest) view of the cavity and an assessment of ear canal/cavity volume. However there was a lot of other data that may have been gleaned from the records of those not attending. That is: almost half the patients were not included but their case notes would have been available for review. There is a lot of missing data and we do not know what that may have been, yet some of it would have been retrievable as part of an â##institutional reviewâ## that would not have required ethical approval.

We have included only patient that actually participated to the study. We feel that the missing data of patients that were not seen or did not fill in the questionnaire
would add much to the problem addressed by the research

The purpose of the digital otoendoscopy is uncertain, otomicroscopy alone should be sufficient to assess the ears. Which examination technique was used for the assessment?

Otomicroscopy was used. This has been revised.

A questionnaire was used but is not shown. It is essential that this be shown and explained.

We have added the questionnaire as a table to the manuscript.

The Likert scale used for assessing the cavity jumps from minor formation of a cavity to major cavity, crusting. There is no point on the scale that indicates moderate cavity formation with no crusting. Thus the scale can only describe extremes a small or no cavity and a large cavity.

The error in the text has been revised. Scale number 3 in “moderate”. This has been revised.

Question 3 Are the data sound? The data is not well presented. From reading the paper it appears that 70 patients had 72 operations (page 7 line 4).

70 patients were evaluated and operated.

Is there a relationship between cavity/canal volume and the cavity as assessed by the Likert Scale; I would expect to see such a relationship.

We agree that it is possible to test this. However, retraction in the epitympanum may not cause a major change in the outer ear canal volume, but it can have a great clinical importance. Or a major dehiscence in the posterior wall with a large mastoid bowl might have no clinical relevance if the patient is symptom less are. So testing this hypothesis suggested by the referee does not add any information to our study. Two separate things were evaluated clinically. Tympanometry is just telling the rough volume of the cavity.

Only 59 contralateral ears had tympanometry; why is this? There should have been 140 72 = 68 ears assessed. This raises the suspicion that some of the contralateral ears may have had previous surgery and this will have affected the individuals need to use hearing aids in one or other ear. Thus hearing aid usage and cavity problems among the ears examined may relate to the condition of the other ear as much as to the condition of the operated ear.

During the follow up visits this data was not erroneously collected from all the participants. If the other ear was operated and it had an effect to hearing aid usage, patients has a possibly to comment that in the questionnaire.

The audiometric results should be presented in a table showing the Pre and Post Op AC and BC averages across 0.5,1,2,4 and well as the mean ABG. In addition post operative sensorineural hearing losses should be reported. The ABG is
shown in 10dB bins and this is correct.

We have revised the table 3 and added the data asked by the referee (Table 3a). The data is presented in the Results part.

Question 4 - Does the manuscript adhere to the relevant standards for reporting and data deposition?
As mentioned above the audiometric data is insufficient.

We have added more audiometric data (Table 3a)

The tables are poorly constructed and not all are labeled
This has been revised. The construction of the tables is now more clear and all the tables are labeled.

The questionnaire is not shown (as an appendix)
This has been added as an table.

The authors do not describe the post-operative problems following the obliteration procedure. Reference is made to the requirement for a subsequent procedure but the pathology requiring this is not described. In particular the frequency, site and depth of cavity resorption of recurrent disease is not described.

Results: “After the CWD tympanomastoid operation, 21 (30%) had a second operation to the evaluated operated ear (Table 1). One patient was operated twice and one three times. Six patients were operated due to a recurrent cholesteatoma (9%). No residual cholesteatomas were found in our material.”
The type of surgeries these 21 patients had are listed in table 2.

Question 5 - Are the discussion and conclusions well balanced and adequate supported by the data?
The discussion includes/introduces material not well covered in the results. The statement “results with hearing are considered better in obliterated cavities than in open cavities(18)” has only one supporting reference and the authors make no comparison between there data and that of others.
I am unhappy about this, particularly as current opinion indicates that following an Intact Canal Wall Mastoidectomy hearing is not better than following Canal Wall Down Mastoidectomy.

This sentence has been revised: “ The acoustic properties of a obliterated cavity is considered to be better than an open cavity [18-21]. It is possible that new bone formation facilitated by a periosteal flap in the posterior part of the CWD cavity behind the facial ridge may provide acoustic properties similar to those of the normal ear canal [18,22,23].”
We have add references.
The generalization of the referee I find strange “following an Intact Canal Wall Mastoidectomy hearing is not better than following Canal Wall Down Mastoidectomy.” We are not comparing anything in our paper. Intact canal wall surgery is a totally different type of surgery compared to canal wall down mastoid surgery with reconstruction.

Removal of the posterior ear canal, thereby creating a cavity in association with meatoplasty, inevitably alters the acoustic characteristics of the ear canal. It seems that obliteration of the mastoid cavity or reconstruction of the posterior wall corrects partly the acoustic properties of the outer ear canal (Mc Elveen et al., 1982; Browning et al., 1984; Evans et al., 1989; Whittemore et al., 1998).

Materials used in middle ear reconstruction, such as tympanoplasty prostheses and a tympanic membrane graft, and also flaps used to obliterate will have an effect on middle ear resonance as well (Rosowski and Merchant, 1995; Palva, 1962; Farrior 1998; Cheney et al., 1995.

A computerized tomographic (CT) and histopathologic study shows that the cavity size of the obliterated cavities will reduced over time, in part as a result of neo-osteogenesis attributable to the perioisteal flap rotated from the postauricular area into the cavity (Kahramanyol et al., 2000). The cavity covered by a perioisteal flap is supposed to have osteoblastic activity itself, by which neoosteogenesis will be facilitated (Kahramanyol et al., 1992, 2000).

Question 6 â##Are the limitations of the work clearly stated? No

This has been revised. We have added text where we discuss the limitations of the work (page 9).

Question 7 â## Do the authors clearly acknowledge any work upon which they are building?

No â## there may be no prior line of thought

Earlier works, which describe the surgical technical that was used and shorter term follow-up studies are clearly refered both in the introduction and discussion parts of the manuscript (references 15 and 16).

Question 8 Do the title and abstract adequately convey what has been found?
Yes, the title is potentially accurate. The abstract refers to the Likert scale but the results given for this are meaningless without reading the whole article. The values for ABG are not given. As such the abstract does not clearly stand alone.

We have revised the abstract text. The values for ABG are now given in Table 3a.

Question 7 - Is the writing acceptable? Yes for the majority of the article, some of the use of English should be corrected but can probably be done by the editorial team, if the article is published. I am quite particular about how surgery is described and the use of the term â##radicalâ## with respect to a (mastoid) cavity has limited meaning. A radical mastoidectomy is a very specific procedure
which involves leaving the oval
window niche open to the environment, the middle ear cleft being sealed at the
level of the promontory; whereas a "modified radical mastoidectomy" is a
procedure whereby a cavity is created and the middle ear sealed at the level of
the facial nerve, that is the oval window niche is retained in the aerated middle
ear space. Most CWD mastoid surgery would nowadays be expected to keep the
oval window niche within the aerated middle ear. The cavity size is dictated by
either disease extent (if performing a front to back or "inside-out"
procedure) or by the size of the mastoid air cell system (if performing back to
front surgery). So the term radical cavity is, to me, meaningless.

The term radical cavity has been revised accordingly (to surgical cavity or just
cavity).

The introduction is short and does not adequately describe the aim of the study.
The introduction part has been modified to more adequately describe the aim of
the study.

This is not solely a retrospective review, the examination of the patients indicated
that there is an "objective" assessment at an end point. This effectively
excludes about half of those who had surgery but whose data may be available
through a notes review.

We feel the review of the data of excluded patients would add only very little to
the questions addressed by our research.

The questionnaire should be shown

The questionnaire has been added to the manuscript.

The results are not well presented and some material introduced in the
discussion should be described in the results.

We have revised the text of the “discussion” part.

There is insufficient audiometric detail, more information should be given about
the preoperative and postoperative thresholds, including the 4kHz BC threshold.
This information could be given in a table.

This data has been added to the manuscript. Please see revised table 3.

The complications are not adequately detailed.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of
a term, which the author can be trusted to correct)
These mistakes have been revised.

Reviewer’s report

Reviewer 2: Dirk Beutner

Reviewer’s report:

1. Please include a short statement to the surgical obliteration technique performed. What technique is used for meatoplasty? Do, and how do they cover epitympanic bone pate?

We have added text to describe the used technique in more detail.

Meatoplasty ws not originalluy included in this technique. It was performed in six cases, with variable techniques: semicircular incision at the meatus region to remove part of the conchal cartilage and soft tissue, or conchal cartilage was partially resected postauricularly with soft tissue.

2. What is the diameter of the entrance of the ear canal? This relationship between entrance and cavity is key for a dry and selfcleaning cavity and in evaluating the volume of the cavity. The entire paper lacks a discussion of this issue.

Actually the diameters of the entrance of the ear canal were measured (be using 3 different size ear speculums, 6mm, 8mm, 10mm or more, but this data was not originally included into this paper.

We have added this data to the manuscript (in the material and methods part, results and discussion)

Our patients were followed for a long time and if the meatoplasty was not done during the analyzed surgery (in six cases it was), it was done later on so that the debridements would be possible. There were no continuous problems with debridements or a discharging ear with a very small diameter entrance to the ear canal at the last follow-up visit.

The current diameters show no relationship between measured diameters of the entrance, cavity formation in the outer ear canal or cavity volume. We feel this data is irrelevant, and it is not included in the text.

Our results show that it is advisable to do a meatoplasty in this kind of CWD surgery, which was not recognized earlier at our department.

3. Without providing detailed data to ossicular reconstruction techniques and relate hearing results to the tympanogram, the ABGs are of limited use, besides long term stability. The paper would definetely benefit from this analysis.

The focus of our manuscript is not in results with hearing. Further analysis of audiological data would not add anything to the problem addressed by the research. The ABG’s just show the long/term stability of the obliteration and reconstruction. The mean AC, BC and ABG levels have been added to the
manuscript. Ossicular chain was reconstructed either during the analyzed surgery or in a later tympanoplasty with autologous ossicular bone or autologous cortical bone (this sentence has been added to the manuscript).

4. The authors do compare the cavity size (n=72) with the contralateral ear (n=52). This is acceptable in cases of an unoperated contralateral ear. But within the study group (n=70), at least 2 of them probably underwent surgery of the contralateral ear. Please provide some information on that.

n should be 70 in the operated group, this mistake has been revised. N in the contralateral ear is 59, as stated in the text.

5. How do they standardize tympanometry. Because deeper insertion of the device can account for smaller volumes. Furthermore, how do they test in case of the perforation?

This is true. However, we believe that this causes only little bias to the data. We tried to use as large ear pieces in the tympanometry as possible. Otomicroscopy was used to evaluate the tympanic membrane and outer ear canal. In this material only one tympanic membrane perforation was seen in a largely non-aerated tympanum

6. CDW should be CWD in Table 1

This has been revised

Reviewer’s report
Reviewer 3: John L Dornhoffer

Reviewer’s report:
Minor essential revisions

……..First of all, as this is a surgical outcomes report, a little more detail concerning the surgical technique is warranted in the material and methods section……..

……the reader will be interested in where the chips are place and how they utilized with the bone pate. How large are the chips? Are they place more in the sinodural angle with pate more near the TM? Also how is the Palve flap kept in place? Is packing used? Only a short addition is necessary, but it needs to be added…………..

We have added a description of the surgical technique used..

……..Secondly, 133 patients were operated on, 94 agreed to participate, but 70 actually did. This represents only about one half of the patients, and one has to wonder about selection bias with those that didn’t participate. Are the good results more likely to participate? This is a problem with every retrospective long-term study, and is largely unavoidable, but the fact has to be mentioned in
the interpretation of the results………

We have added text to discussion to recognize this problem.

I think the actual questionnaire should be included as a figure so we can see what questions are asked and how they are scored.

The actual questionnaire has been added to the manuscript.

In the results the patient population is confusing. It says 20 patients were previously operated, but in the table the number comes out at 27. Part B of table 1 says 22 patients had revision after mastoid obliteration, but in the text, it says 21.

This has been revised.

The last paragraph of the discussion is a little confusing. The last sentence should perhaps read, “An attempt was made to perform the CWD with obliteration as a single stage surgery, but revisions were required in 22 patients with 6 exhibiting recurrent cholesteatoma. Also in this paragraph, it says “six revisions radical operations (8%)…. it is 9% in the table.

This sentence has been changed accordingly. Also 8% has been changed to 9%.