Comment on "A Systematic Review on Complications of Tissue Preservation Surgical Techniques in Percutaneous Bone Conduction Hearing Devices"

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Letters to the Editor

COMMENT ON ''A SYSTEMATIC REVIEW ON COMPLICATIONS OF TISSUE PRESERVATION SURGICAL TECHNIQUES IN PERCUTANEOUS BONE CONDUCTION HEARING DEVICES''

To the Editor: With great interest we read the recently published systematic review by Verheij et al. (1) reviewing skin-related postoperative complications of tissue preservation surgical techniques in percutaneous bone conduction hearing devices implantation. A total of 18 studies were included in data extraction, of which 10 studies who compared a number of non-skin-thinning techniques with several skin-thinning techniques. Most important outcomes were the number and degree of postoperative skin-related complications reported by the Holgers' classification (2) and other clinical complications such as skin overgrowth and implant extrusion not resulting from adverse skin reactions. We highly support the initiative for writing this systematic review regarding tissue preservation techniques and the review gives a good overview of all studies on tissue preservation to date. On the other hand, we would like to discuss some of our concerns since several factors influencing skin-related complications were not addressed.

In the review, to start with, no distinction is made between different types of abutments, i.e., the part of the implant in direct contact with the skin. All different currently available abutments were included in the review, amongst others the previous generation BA210, and more recently developed BA300 (all Cochlear BAS, Sweden) and Ponto (standard and wide implants) (Oticon Medical, Sweden). It has been shown in a long-term follow-up study that the BA300 implant with all titanium abutment resulted in significantly less Holgers 2 or higher skin reactions compared with the also all titanium BA210, using an identical skin-thinning technique (3). On the contrary, the new BA400 is not all-titanium but has a hydroxyapatite-coating and is designed to prevent skin overgrowth and trapping of debris, therefore, hypothesized to reduce soft tissue reactions. However, it could be argued that these abutments have an even greater tendency to develop biofilms due to pathogenic micro-organisms on the hydroxyapatite surface (4). A prospective comparative clinical trial, assessing incidence and severity of adverse skin-related complications for both abutments, i.e., all-titanium versus coated, using the same surgical technique, is lacking. Therefore, differences in (currently) available abutments could influence outcome and should, therefore, be mentioned.

Another factor that has not been addressed in the review is abutment length. Before the introduction of non-skin-thinning techniques it has been shown that in implantation with skin-thinning immediate use of an 8.5 mm abutment, instead of a 5.5 mm abutment, decreases postoperative rates of infection, skin overgrowth, and need for revision surgery due to wound complications (5). In addition, studies that used the 8.5-mm abutment after failure of the 5.5-mm abutment, have shown to be successful in preventing the need for additional surgical intervention in most patients with postoperative soft tissue overgrowth (6,7). Since the introduction of non-skin-thinning techniques, abutments up to 12 mm are available nowadays. Although no studies have assessed the impact of abutment length in this technique, it clearly indicates that abutment length should be mentioned as possible factor influencing skin-related complications apart from the surgical technique used.

The authors conclude that tissue preservation surgical techniques are suggested to have at least similar complications rates compared with skin-thinning techniques, based on 10 studies who compared a soft tissue preservation technique with a skin-thinning technique. However, eight of these comparative studies use a less than ideal control-group, including dermatome technique, inverted-J technique, and skin flap technique or test-groups with a variation on the preservation technique, like a (modified) punch technique (8–15). Hence, by comparing groups with two or more differing variables, i.e., different incision technique and either skin reduction or preservation, no conclusions can be made on the impact of tissue preservation alone. Only the studies by den Besten et al. (16) and Martinez et al. (17) compare groups with identical linear incision techniques, therefore, both groups only differed in tissue preservation or reduction. This was mentioned briefly in the discussion by Verheij et al. (1), however, we think that this is key in the results and should be emphasized in interpretation of the overall conclusions. Martinez et al. (17) showed that, although the Holgers' grade was always worse in the standard technique (Holgers' score 3 was 28% versus 7% at 1 wk), the complication rate was not statistically significant between the two groups at any time during follow-up. den Besten et al. (16), however, reported more skin-related complications in the soft tissue preservation group compared with the soft tissue reduction group after 6 months follow-up. Conclusive evidence and long-term follow-up are lacking, therefore, currently no firm conclusions can be

drawn regarding the effect on skin-related complications by the technique tissue preservation alone.

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RESPONSE TO COMMENT ON ''A SYSTEMATIC REVIEW ON COMPLICATIONS OF TISSUE PRESERVATION SURGICAL TECHNIQUES IN PERCUTANEOUS BONE CONDUCTION HEARING DEVICES''

In Reply: With great interest we read the letter to the editor regarding our systematic review on skin-related postoperative complications of tissue preservation techniques in percutaneous bone conduction hearing device implantation. The overall conclusion of our systematic review was that complications after tissue preservation techniques are limited and that these techniques may have some important advantages such as fast healing and lower pain and numbness (1). The authors of the letter raised important points and concerns regarding our review.

First, the authors addressed the lack of emphasis on studies comparing a skin preservation technique with a skin reduction technique in our review. We agree that ideally a study comparing techniques varying only in skin reduction or preservation is most valuable. However, the impact of tissue preservation compared with tissue reduction technique was not the scope of our review. Our aim was to assess the safety of the preservation of tissue during a bone conduction device implantation.

Secondly, the authors of the letter mentioned that our review did not make a distinction between different abutments, in type or in length. We did not include this in our data analysis because it falls out of the scope of our review. However, we agree that different types or lengths of abutments could influence postoperative outcomes. Unfortunately, most authors we reviewed varied the length of abutment according to each patient's need (2–15). In addition, in seven of our included studies the type of abutment was not mentioned (1,7,8,12,15–17). Furthermore, (a selection of) patients in the studies by Dumon et al. (5), Iseri et al. (10), Jarabin et al. (11), and Wilkie et al. (14) were implanted with a hydroxyapatite-coated abutment. As mentioned by the authors of the letter to the editor, a hydroxyapatite coating is