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Letter to the Editor Regarding Todt, Basta and Ernst, “Does the surgical approach in cochlear implantation influence the occurrence of postoperative vertigo”

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Dear Editor,

In their interesting report on vestibular function before and after cochlear implantation via either the “anterior” or “round window” insertion approach, Todt, Basta and Ernst conclude that “the used round window approach for electrode insertion should be preferred to decrease the risk of loss of vestibular function and the occurrence of vertigo.” [1]

Figure 1 in the article (reproduced in Figure 1AB below) suggests that what the authors call an “anterior” cochleostomy is actually anterosuperior (or anterosuperolateral) of the round window niche. The electrode insertion trajectory implied by that figure would pass through the scala media and/or scala vestibuli, as illustrated by the 3D Virtual Temporal Bone data set published by Wang, *et al* (Figure 1C) [2,3]. The high rate of vestibular injury Todt *et al* observed when using that approach likely reflects violation of the membranous labyrinth.

The approach Todt *et al* call a “round window” cochleostomy in Figure 1B seems closer to the anteroinferior cochleostomy advocated by a majority of surgeons for safe entry into the scala tympani. [4] By entering the scala tympani anteroinferior of the round window, one can insert the electrode along a trajectory tangential to the axis of the lumen of the scala tympani’s basal turn, minimizing risk to the basilar membrane, membranous labyrinth, modiolus and saccule.

Many otolaryngologists interpret “round window insertion” to mean insertion of the electrode array through the round window without making an anteroinferior cochleostomy into scala tympani. A minority of surgeons use this technique.[4] Depending on the electrode’s trajectory through the facial recess, round window insertion can lead to deflection off the anteroinferior lip of the niche, modiolar impact and cephalad deflection of the electrode into the vestibule.

Ambiguity of nomenclature regarding cochleostomy sites partly results from the convention of using only one or two dimensions to describe inherently three-dimensional (3D) directions and distances. For example, when viewed in 3D using the Virtual Temporal Bone tool, 2–4 the “inferior cochleostomy” advocated in a helpful recent publication by Adunka *et al* [5] arguably starts anteroinferolateral of the round window membrane while the “anteroinferior cochleostomy” against which they caution starts more nearly anterolateral. An analogous problem arises in describing the size and growth of vestibular schwannomas. Hopefully, a transition toward using 3D descriptors when necessary to convey anatomic subtleties will become more common as texts and journals evolve from images on paper toward web-accessible interactive 3D renderings.

Literature Cited

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Figure 1.

Panels AB – Approaches to the cochlea defined by Todt, Basta and Ernst, reproduced from [1]. (A) Location of the “anterior” cochleostomy. (B) Location of the “round window” cochleostomy.

Panel C – Images from the 3D Virtual Temporal Bone data set [2,3,4] oriented to correspond to the extent possible with the view in Figure 1AB. Cochleostomy site 1, which corresponds to the “anterior” approach of Todt *et al*, directs the electrode into the hook region of the scala media (bright pink). Site 2, which corresponds to the “round window” approach of Todt *et al*, is closer to the approximate centroid of cochleostomy sites reported in a recent survey of neurotologic surgeons [4] (site 3), except that it passes through part of the round window. Inset at upper right shows the 3D Virtual Temporal Bone viewer’s corresponding skull orientation.