Study Questions for the discussion of two middle-ear modeling papers.

In Zwislocki figure 2, one of the rules we have suggested for acoustic circuits is broken. What is the broken rule?

Describe in words the function of each of the boxes of figure 2.

Assuming that the primary function of the middle ear is to conduct sound power to the cochlea, what is the primary distinction between the uncoupled ear drum (box 2) and the incudo-stapedial joint (box 4) and boxes 1 and 3.

How does Zwislocki simplify the circuit in Figure 2 for various pathological conditions? What is the effect of removing the incus? What is the effect of otosclerosis which immobilizes the stapes?

Figure 3 describes several zeros in impedance. What happens at these zeros?

What determines the frequency limits of Zwislocki’s measurement procedures?

Rosowski and Merchant?

Figure 4: What is a stapedotomy?

What is the effect of varying stapes prosthesis area on the volume velocity of the stapes? How is this effect manifest? Specifically, does a reduction in prosthetic area produce an equal reduction in prosthetic volume velocity? What is the area of the normal footplate?

Would you expect a larger than normal footplate to produce larger than normal volume velocities of the stapes?

Why is human middle ear function relatively insensitive to increases in ossicular mass and decreases in middle ear volume?

What is a tympanoplasty?

Why does a type IV tympanoplasty work?