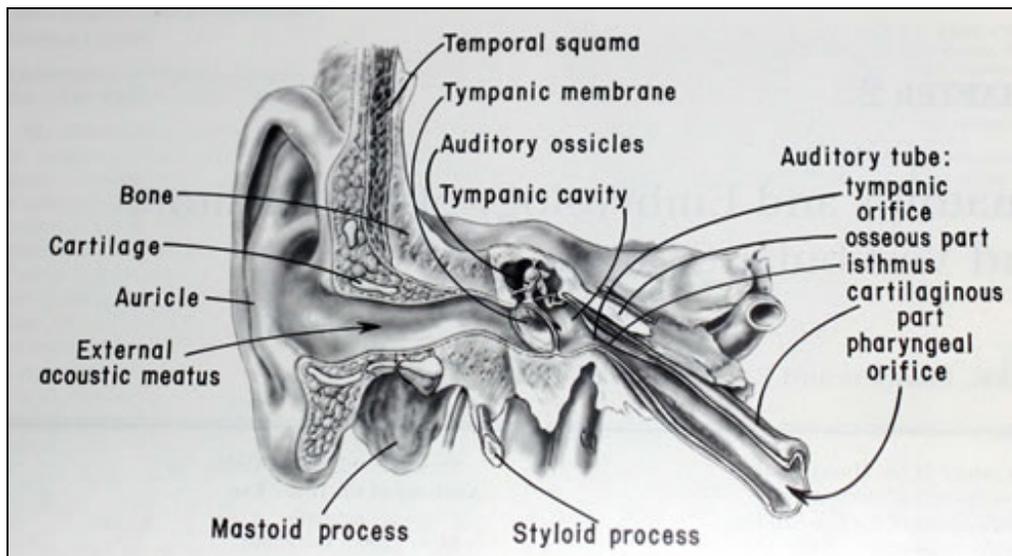


Anatomy of the Ear

The temporal bone houses the structure commonly known as the ear. The temporal bone consists of an outer bony structure that is part of the skull and part of the skull base. It meets with several other bones that are part of the skull and the skull base. Within the temporal bone and at its varied boundaries are noted the carotid artery which goes up into the base of the temporal bone, courses through it and exits up at the front of the temporal bone to proceed on to give blood to the central nervous system. The jugular vein which takes the blood back from the brain area exits at the temporal bone lower level and courses through and indents a portion of the temporal bone (see figure 1).



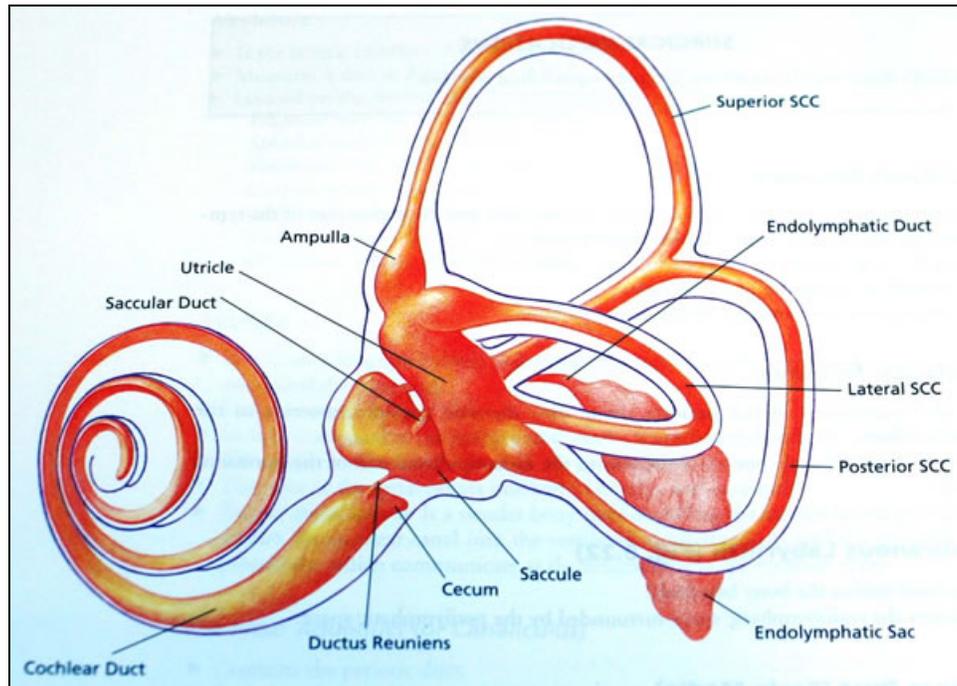
In regard to what is commonly felt to be the ear, there is an outer ear, a middle ear and an inner ear. Taking the outer ear first, we see the pinna or the ear cosmetically speaking, which resides on the lateral temporal bone. It leads to the external auditory canal which is part of the outer ear structure. That canal is skin lined and ends at the

tympanic membrane, or eardrum, the outer surface of which is skin lined. The tympanic membrane has a middle portion, which is fibrous tissue and an inner layer which is mucous membrane, the same sort of mucous membrane, generally speaking, as occurs in the rest of the airway, including the sinuses and the lungs. There are obviously differences among these but they are basically mucous-producing lining cells within the under-surface of the drum in the middle ear. Thus, the outer ear ends at the outer surface of the tympanic membrane. The skin lining should be intact and should stop at that level.

The middle ear consists of the inner surface of the tympanic membrane, the surrounding mucous membrane of the air-containing middle ear in which the ossicles or “little bones” of hearing, the malleus, incus and stapes reside. The stapes is the smallest and is the one that seats itself at the junction of the middle ear with the inner ear. The middle ear is an air containing compartment.



The inner ear consists of balance organ structures and hearing organ structures. They are in a uni-compartment fluid system. That is to say, it is a self contained unit in which cells change motion activity into neural activity. That occurs on both the vestibular or balance side as well as on the cochlear or hearing side. These structures are known as the labyrinth.



The individual nerves of the inner ear then form into the larger nerves that go through the internal auditory canal (see diagram) and lead directly to the brain. The vast majority of these nerve structures carry the impulses to the brain, a few carry the impulses from the brain out to modulate the inner ear, in particular the vestibular system of the inner ear. There is one more important nerve in this area, which goes through the temporal bone, that is the nerve which moves your face, the facial nerve. This nerve does not give sensation to the face, but gives motion activity to the face. It has a tortuous course that is almost uniformly predictable within the temporal bone. It comes from the brain through the internal auditory canal, goes through the middle ear just above the stapes, just under part of the inner ear, the labyrinthine portion called the horizontal semi-circular canal and exits inferiorly out of the temporal bone to gain access to the face. An accessory portion of the aerated middle ear is the mastoid process, which is a honeycomb process of bone that resides basically under the pinna behind the ear canal but is pointed

to by most people by pointing behind the ear where the bony prominence is notable. This is variably aerated, it is an area that can become infected and inflamed just as any of these anatomic areas can. Inflammation of this structure is called mastoiditis. There is a nerve for taste which goes through the middle ear without a bony covering which makes it somewhat susceptible to disease processes and to surgical manipulation. Any one of these structures noted above will be referred to during various discussions of the disease processes that can affect the ear. It would be a good idea to refer to this either directly or by downloading a print out of this discussion when you are looking up particular areas of significance in regard to your particular search and your particular disease while perusing the remainder of our web site.