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Anatomy and Physiology of the Auditory System

AFTER COMPLETING THIS CHAPTER, YOU SHOULD BE ABLE TO:

1. Describe the structure and understand the function of the outer, middle, and inner ears.
2. Describe the structure and understand the function of the acoustic reflex arc.
3. Compare and contrast characteristics of inner and outer hair cells.
4. Define fundamental neurological terms.
5. Describe the structure and function of the central auditory system.

This chapter presents the anatomy and physiology of the auditory system. In Chapter 2 we introduced two different pathways of sound that are used in audiology: air conduction and bone conduction. These are relevant to our discussion of anatomy and physiology because they introduce the basic structures of the auditory system as well as the two routes for getting sound to the inner ear. In addition, knowledge of air and bone conduction pathways is related to the discussion in Chapter 2 regarding how to read audiograms.

ANATOMY AND PHYSIOLOGY OF THE PERIPHERAL AUDITORY SYSTEM

Although the treatment of the auditory system that follows is more detailed than the very basic description in Chapter 2, it is nonetheless basic in that it does not provide in-depth information about any of the topics. This discussion of anatomy and physiology is intended to provide a

working knowledge of the auditory system as a foundation for further study in advanced courses, as well as to support understanding of subsequent chapters of this textbook.

One of the questions that emerges when deciding how best to present information about anatomy and physiology is whether to discuss anatomy (structure) and physiology (function) separately or to combine them. An advantage of combining them is that separating this information can seem artificial—how do we talk meaningfully about a structure without also talking about its function? A disadvantage of combining anatomy and physiology is that understanding how the auditory system operates can become lost in the details involved in learning the system's anatomy.

To address this dilemma, anatomy and physiology are combined and periodic summaries of the physiology of the auditory system are provided to give the student a clear sense of the process of hearing at different stages. We begin with the peripheral auditory system, which is made up of the outer, middle, and inner ears and the eighth cranial nerve.