Modern Trends in Audiology

Expansion and development in the field of audiology during the last decade have been vast. The availability of improved diagnostic and remedial procedures has broadened the range of benefits and resources now employed for the auditorily impaired. Many of the advances in audiology are spinoffs from allied fields. From medicine, otologic surgeons developed middle ear reconstruction techniques that often restore hearing to normal acuity. Medical treatment using improved antibiotics and preventative otologic procedures have also resulted in notable contributions. Innovations in engineering and electronics are responsible for smaller, more efficient, and more flexible amplification devices worn as individual or group hearing aids. Computer technology has become the basis for several audiological procedures. The audiologist’s hearing test battery contains new diagnostic tests, many based on modern technological advances. Hence, in the past decade, significant improvements have occurred in hearing assessment, prevention, aural rehabilitation, and medical and surgical restoration. Furthermore, there have been noteworthy advances in educational management and federal legislation mandating rehabilitative services. This chapter will attempt to inform the reader of the current status of audiometry.

Diagnostic audiometry has evolved to a relatively sophisticated component of
audiology over the years. While many of the techniques are an outgrowth of the basic pure tone and speech tests, modern procedures employing electronic measurements have opened up new dimensions in diagnosis, treatment, and research. The foremost goal in diagnostic audiometry is to locate the site of lesion and to assist the otologist in determining the nature and etiology of the lesion. Most new tests still employ pure tones, speech, and noise as the basic stimuli but with improved methods for delivery. A good deal of effort has been expended to refine tests that differentiate between peripheral and central disorders. This differentiation is crucial for rehabilitation since the two systems functionally behave quite differently.

**Terminology**

*Peripheral Auditory Disorders.* Lesions located within the outer and middle ear conductive mechanism, the cochlea and the eighth nerve, are considered peripheral disorders. In other words, all lesions that are distal to the synapse between the auditory nerve and the dorsal and ventral cochlea nuclei are considered peripheral (J. Jerger, 1973).

The most common terms used today to describe the types of peripheral auditory pathology are *conductive* and *sensorineural.* A hearing loss associated with a *conductive impairment* of the outer or middle ear mechanism results from a blockage or reduction of sound transmission into the inner ear. Any pathogenic or structural aberration to the external auditory meatus, the ossicular chain, the oval and round windows, the tympanic membrane (eardrum), and other structures may result in a conductive hearing loss or a reduction in auditory sensitivity.

*Sensorineural Impairment* is a broadly defined term which designates disorders of the cochlea (sensory), the eighth cranial-auditory nerve (neural) or both. Sensorineural impairments include a wide range of physiological structures and functions that are quite complex. Still another term associated with peripheral pathology is *mixed loss,* which refers to the presence of both a conductive and a sensorineural impairment in the same ear.

*Central Auditory Impairment* occurs when the lesion is proximal to the boundary at the first synapse between the first and second order neurons of the afferent auditory pathway in the dorsal and ventral cochlear nuclei (J. Jerger, 1973). Hearing sensitivity to pure tones is usually not affected but speech discrimination and language perception are affected. Thus, central auditory impairment does not necessarily imply hearing "loss" to pure tone stimuli.

*Hearing Loss* is a reduction in auditory sensitivity to pure tones and speech that exceeds the upper limit of the normal hearing range. The normal range extends