Table 10-8 Neurodevelopmental-Behavioral Complications of Hearing Loss

SEVERITY OF HEARING LOSS	POSSIBLE ETIOLOGIC ORIGINS	COMPLICATIONS			TYPES OF THERAPY
		SPEECH-LANGUAGE	EDUCATIONAL	BEHAVIORAL	
Slight 15–25 dB (ASA)	Chronic otitis media/ middle ear effusions	Difficulty with hearing distant or faint speech	Possible auditory learning dysfunction	Usually none	May require favorable class setting, speech therapy, or auditory training
	Perforation of tympanic membrane		May reveal a slight verbal deficit		Possible value in hearing aid, surgery
	Sensorineural loss				Favorable class setting
	Tympanosclerosis				
Mild 25–40 dB (ASA)	Chronic otitis media/ middle ear effusions	Difficulty with conversational speech over 3–5 ft	May miss 50% of class discussions	Psychological problems	Special education resource help, surgery
	Perforation of tympanic membrane	May have limited vocabulary and speech disorders	Auditory learning dysfunction	May act inappropriately if directions are not heard well	Hearing aid, surgery
	Sensorineural loss			Acting out behavior	Favorable class setting
	Tympanosclerosis			Poor self-concept	Lip reading instruction Speech therapy
Moderate 40–65 dB (ASA)	Chronic otitis media/ middle ear effusions	Conversation must be loud to be understood.	Learning disability	Emotional and social problems	Special education resource or special class, surgery
	Middle ear anomaly	Defective speech	Difficulty with group learning or discussion	Behavioral reactions of childhood	Special help in speech-language development
	Sensorineural loss	Deficient language use and comprehension	Auditory processing dysfunction	Acting out	Hearing aid and lip reading
			Limited vocabulary	Poor self-concept	Speech therapy
Severe 65–95 dB (ASA)	Sensorineural loss	Loud voices may be heard 2 ft from ear.	Marked educational retardation	Emotional and social problems that are associated with handicap	Full-time special education for deaf children, cochlear implant
	Severe middle ear disease	Defective speech and language No spontaneous speech development if loss present before 1 yr	Marked learning disability, limited vocabulary	Poor self-concept	Full-time special education for deaf children, hearing aid, lip reading, speech therapy, surgery, cochlear implant
Profound ≥95 dB (ASA)	Sensorineural or mixed loss	Relies on vision rather than hearing Defective speech and language Speech and language will not develop spontaneously if loss present before 1 yr.	Marked learning disability because of lack of understanding of speech	Congenital and prelingually deaf may show severe emotional problems.	Full-time special education for deaf children, hearing aid, lip reading, speech therapy, surgery, cochlear implant

Adapted and updated from Gottlieb MI: Otitis media. In Levine MD, Carey WB, Crocker AC, et al, editors: Developmental-Behavioral Pediatrics, *Philadelphia, 1983, WB Saunders.*
ASA, Acoustical Society of America.

and sensorineural loss caused by cochlear disease. Any hearing loss may have a significant effect on the child's developing communication skills. These skills then affect all areas of the child's cognitive and skills development (Table 10-8).

It is sometimes quite difficult to accurately determine the presence of hearing in infants and young children. Inquiring about a newborn's or infant's response to sounds or even observing the response to sounds in the office is unreliable for identifying hearing-impaired children. Universal screening of newborns is required prior to nursery discharge and includes the following:

- **Auditory brainstem response (ABR)** measures how the brain responds to sound. Clicks or tones are played through soft earphones into the infant's ears. Three electrodes placed on the infant's head measure the brain's response.