If the average of the hearing levels at 500, 1000, 2000, and 3000 Hz is 25 dB or less, according to 1996 American National Standards Institute (ANSI) audiometric standards,<sup>4</sup> no impairment rating is assigned since there is no change in the ability to hear everyday sounds under everyday listening con-

**Evaluation of Monaural Hearing Impairment** 

hear everyday sounds under everyday listening conditions (Table 11-1). At the other extreme, if the average of the hearing levels at 500, 1000, 2000, and 3000 Hz is more than 91.7 dB, the binaural hearing impairment rating is 100% since the individual has lost the ability to perform an activity of daily living—the ability to hear everyday speech.<sup>1</sup>

The data from which this formula¹ was developed indicate that the ability to hear everyday sounds under everyday listening conditions is not impaired when the average of the hearing levels at 500, 1000, 2000, and 3000 Hz is 25 dB or less. The 25-dB "fence" represents this finding; it is not a compensatory adjustment for presbycusis, the hearing loss that occurs with age.

This method of evaluating hearing impairment should be applied only to adults who have acquired language skills. Evidence suggests that language acquisition by children who do not have language skills may be delayed when the average hearing level is in the range of 15 to 25 dB.

According to the above standards for monaural hearing impairment, for every decibel that the average hearing level or loss for speech exceeds 25 dB, 1.5% of monaural impairment is assigned. Thus, with an average hearing level loss of 67 dB above 25 dB, monaural impairment is 100% (Table 11-1).

Evaluation of Binaural Hearing Impairment Hearing impairment of both ears, referred to as binaural impairment, indicates a loss of hearing of greater than 25 dB in both ears at frequencies of 500, 1000, 2000, and/or 3000 Hz.

Binaural impairment is determined by the following formula:

binaural hearing impairment (%) =

[5 x (% hearing impairment better ear)

+ (% hearing impairment poorer ear)]

6

To calculate binaural impairment when only one ear exhibits hearing impairment, use the above formula, allowing 0% impairment for the unimpaired ear (the ear with the better hearing).

**Table 11-3** Relationship of Binaural Hearing Impairment to Impairment of the Whole Person

% Binaural Hearing Impairment	% Impairment of the Whole Person	% Binaural Hearing Impairment	% Impairment of the Whole Person
0.0 - 1.7	0	50.0 - 53.1	18
1.8 - 4.2	1	53.2 - 55.7	19
4.3 - 7.4	2	55.8 - 58.8	20
7.5 - 9.9	3	58.9 - 61.4	21
10.0 - 13.1	4	61.5 - 64.5	22
13.2 - 15.9	5	64.6 - 67.1	23
16.0 - 18.8	6	67.2 - 70.0	24
18.9 - 21.4	7	70.1 - 72.8	25
21.5 - 24.5	8	72.9 - 75.9	26
24.6 - 27.1	9	76.0 - 78.5	27
27.2 - 30.0	10	78.6 - 81.7	28
30.1 - 32.8	11	81.8 - 84.2	29
32.9 - 35.9	12	84.3 -87.4	30
36.0 - 38.5	13	87.5 - 89.9	31
38.6 - 41.7	14	90.0-93.1	32
41.8-44.2	15	93.2 - 95.7	33
44.3 - 47.4	16	95.8 - 98.8	34
47.5 - 49.9	17	98.9 -100.0	35

Alternatively, use Table 11-2, which is derived from the formula given above, to calculate the value for binaural hearing impairment. Then apply the value for binaural hearing impairment to Table 11-3, which converts binaural hearing impairment to impairment of the whole person.

## Example 11-1 5% Impairment Due to Hearing Loss

**Subject:** 70-year-old woman.

**History:** Chronic recurrent ear infections since teens. Occasional drainage from right ear. Right ear now dry but feels "like stuffed with cotton." Has occasional tinnitus in right ear; not bothersome. No dizziness.

**Current Symptoms:** Difficulty hearing, especially in right ear, with no impact on activities of daily living. No recent drainage.

**Physical Exam:** Scarred, retracted right tympanic membrane. Left tympanic membrane is thickened and retracted. Pneumo-otoscopy shows motion of left tympanic membrane, but no motion on right.

Clinical Studies: Tympanograms: B pattern for right ear and C pattern for left ear. Speech discrimination score: 95% for right ear; 80% for left ear. Acoustic immitance: reveals normal external auditory canal volumes for both ears. Pure tone audiometry reveals the following threshold levels in decibels (dB):

	Right Ear (thousands)								Left Ear (thousands)							
Frequency, Hz	0.5	1	2	3	4	6	8	0.5	1	2	3	4	6	8		
Air Conduction	40	55	60	70	80	95	NR	25	30	30	40	40	60	70		
Bone Conduction	20	30	15	_	35	_		Not	tes	ted	in le	ft e	ar			

**Diagnosis:** Mixed (sensorineural + conductive) hearing impairment, right ear. Mild sensorineural hearing impairment, left ear.

**Impairment Rating:** 5% impairment of the whole person.

Comment: The decimal sum of hearing threshold levels (DSHL) for the right ear is 225 (40 + 55 + 60 + 70), and the DSHL for the left ear is 125 (25 + 30 + 30 + 40). Combine 225 (worse ear) and 125 (better ear) using Table 11-2 for a binaural hearing impairment rating (BI) of 15.6%. Use Table 11-3 to obtain the 5% whole person impairment rating.

## Example 11-2 8% Impairment Due to Hearing Loss

Subject: 65-year-old woman.

**History:** Repeated ear infections for many years. Hearing loss in both ears and roaring, pulsing, rushing-water tinnitus in both ears. No history of dizziness. Tympanoplasty, left ear, 4 months ago.

**Current Symptoms:** Difficulty hearing in both ears, but hearing much improved in left ear since tympanoplasty. Still has tinnitus in both ears, which impacts some activities of daily living.

**Physical Exam:** Retracted right tympanic membrane.

Clinical Studies: Left tympanic membrane shows well-healed graft. Tympanograms: B pattern for right ear. Tympanometry was not performed for left ear due to recent otologic surgery. Speech discrimination scores: 80% for right ear; 85% for left ear. Pure tone audiometry reveals the following threshold levels in decibels (dB):

	J							Left Ear (thousands)							
Frequency, Hz	0.5	1	2	3	4	6	8	0.5	1	2	3	4	6	8	
Air Conduction	50	50	55	55	60	85	NR	25	30	40	40	40	60	85	
Bone Conduction	15	35	35	-	20	_	-	0	5	25	_	15	_	_	

**Diagnosis:** Mixed (sensorineural + conductive) hearing impairment, bilaterally.

**Impairment Rating:** 8% impairment of the whole person.

Comment: The DSHL for the right ear is 210 (50 + 50 + 55 + 55), and the DSHL for the left ear is 135 (25 + 30 + 40 + 40). Combine 210 (worse ear) and 135 (better ear) using Table 11-2 for a BI of 17.8%. Add 5% for the presence of tinnitus, giving a BI of 22.8%. Use Table 11-3 to obtain the 8% whole person impairment.

## Example 11-3 8% Impairment Due to Hearing Loss

Subject: 64-year-old man.

**History:** Progressive hearing loss for 13 years. Worked in several noisy environments; used hearing protectors fairly regularly. Exposure to gunfire during 4 years of service in the Marines. General health good. No history of tinnitus or vertigo.

**Current Symptoms:** Difficulty with communication at home, in restaurants, driving a car, and in noisy environments.

Physical Exam: No abnormalities.

**Clinical Studies:** Audiologic tests: speech reception threshold of 20 dB. Pure tone audiometry reveals the following threshold levels in decibels (dB):

	3								Left Ear (thousands)							
Frequency, Hz	0.5	1	2	3	4	6	8	0.5	1	2	3	4	6	8		
	20	15	60	80	85	85	70	25	15	60	60	65	65	60		

**Diagnosis:** Sensorineural hearing impairment, bilateral.

**Impairment Rating:** 8% impairment of the whole person.

Comment: The impairment calculated from this audiogram is based on the DSHL. The DSHL for the right ear is 175 (20 + 15 + 60 + 80), and the DSHL for the left ear is 160 (25 + 15 + 60 + 60). Combine 175 (worse ear) and 160 (better ear) using Table 11-2 for a binaural hearing impairment of 23.4%. Use Table 11-3 to obtain the 8% whole person impairment.