

The Auditory System and Human Sound-Localization Behavior

Exercises Chapter 14

Problem 14-1

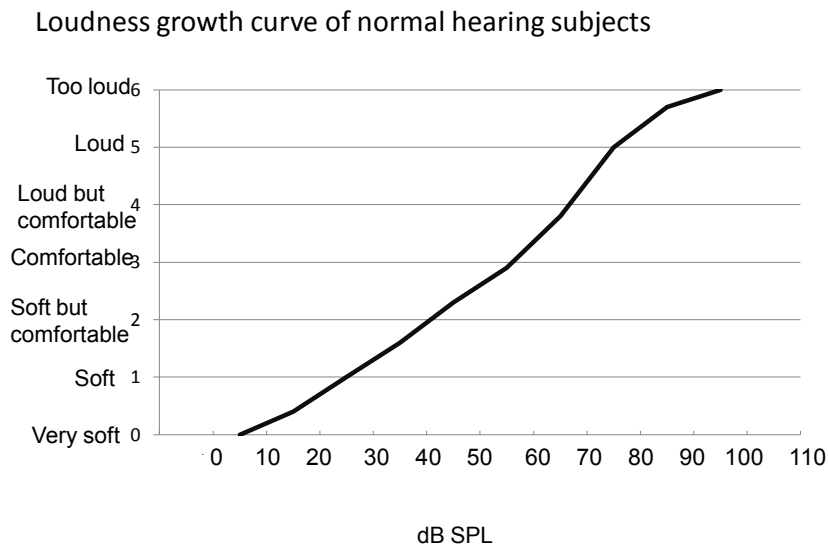


Figure 14-13 Loudness growth curve for normal-hearing listeners.

The figure presents the mean loudness growth curve of a group of normal-hearing subjects (referred to as “norm curve”). The (mean) subjective rating is presented as a function of presentation level of a narrow-band noise, with $f=1000$ Hz as its central frequency.

- Given this curve, draw the expected loudness growth curve for a patient with a 30 dB conductive hearing loss. Label the line with ‘a’ and describe the difference with the norm curve.
- In the same figure, draw the expected curve for a patient with non-functional Outer Hair Cells. Label the line with ‘b’ and describe the difference with the norm curve and the conductive hearing loss patient.
- Do the same for a patient with non-functional inner hair cells. Label with ‘c’.
- Discuss shortly for each of these 3 patients whether or not non-linear amplification with hearing aids (slow compression) should be considered.
- Draw the expected loudness growth curve of a patient with sensorineural hearing loss of 50 dB using his hearing aids, which have a gain of 30 dB, compression ratio of 2 to 1 with onset at 45 dB HL. Label the line with a ‘d’ and explain how it was obtained.