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Introduction to Audiology
Audiolab Assignment: Introduction to Pure-Tone Audiometry

Student Assignment: Auditory Wellness Clinic
Background

Minimal audible pressure (MAP) curves depict the softest sound pressure level needed for an average young adult human listener (ages 18 to 30 years old) to hear different frequency pure-tones 50% of the time (Sivian & White, 1933; Killion, 1978). MAP curves are measured using decibel sound pressure level (dB SPL), and we use these values to determine reference equivalent threshold sound pressure levels (RETSPL) to calibrate audiometric equipment to 0 dB Hearing Level (HL). When we measure a person's audiometric threshold at various frequencies using an audiometer, we report their threshold in units of dB HL on an audiogram. Hearing thresholds are reported in dB HL vs. dB SPL because humans have differential hearing sensitivity across the range of frequencies—that is, humans need greater amounts of sound pressure level to hear certain frequencies than they do others. With dB HL, we can use a flat line to depict hearing "within normal limits" for typically tested audiometric frequencies between 250 and 8000 Hz, despite the difference in hearing sensitivity among the same frequencies. Think of dB HL as a way to "flatten out" the MAP curve.

Pure-tone audiometry via air- and bone-conduction provides valuable information on whether a person has peripheral hearing within normal limits or peripheral hearing impairment. ASHA guidelines for pure-tone audiometry suggest including as a standard practice 3000 and 6000 Hz in addition to the traditional frequencies tested for both ears (octave frequencies at and between 250 and 8000 Hz). Obtain thresholds at 125 Hz if the person has a low-frequency hearing impairment. (Note that some clinical supervisors may not include 3000 and 6000 Hz in their standard protocol as the inclusion of these frequencies used to be optional prior to the 2005 revision of ASHA best practice guidelines.) To obtain a threshold, follow the ASHA guidelines and use the common "down-10/up-5" method based on a modified version of the Hughson-Westlake technique (Carhart & Jerger, 1959).

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Assignment: Auditory Wellness Clinic

For this assignment, log into Audiolab, navigate to the Pure-Tone Audiometry - Basic module, and select the Auditory Wellness Clinic. Once you enter the clinic, if needed, tour Audiolab to familiarize yourself with the program.

As a clinician, you should always try to treat the whole person. As an audiologist, you are diagnosing and treating auditory function and trying to improve a person's ability to communicate, connect with others, and fully engage in all aspects of their life. Invest in building rapport with your patient to better understand their communication challenges and what they want and need from your services. Simple conversations and case histories allow you to begin this process, but you should also listen carefully and use valid and reliable questionnaires.

Read all case histories closely. Think critically about other questions you might want to ask your client. Be prepared to discuss your case with the class.

This assignment should help you:

- Practice the techniques used to conduct pure-tone audiometry.
- Manipulate different symbols on an audiogram.
- Determine whether the patient has normal hearing sensitivity or hearing impairment.
- Assemble information to present to your patient about their test results.

Instructions: Click in the field to manually enter information. To preserve your input, save the document locally.

Part One: Knowledge Check

1. What is typically displayed on an audiogram?

2. What is measured on the *x*-axis of an audiogram? On the *y*-axis?

3. What are the different symbols typically used when plotting data on an audiogram and what do the different symbols represent?

4. Which dB HL levels typically represent hearing within normal limits?

5. What is the difference between an ascending and a descending response? How many ascending responses are required to establish a person's audiometric threshold?

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Part Two: Active Learning - Introduction To Pure-Tone Audiometry

Log into Audiolab, navigate to the Pure-Tone Audiometry - Basic module, and select Start to enter the Auditory Wellness Clinic. Read the instructions to help you better understand the clinic in which you are working. You will be introduced to one of five potential patients. Read the patient's case history, then write notes about your patient. What information about your patient might be important? Are there additional questions you would like to ask the patient? Also consider these questions: Which frequencies will you include in your test? Which ear will you start testing first? How many ascending responses will you require to determine the threshold for each frequency? Will you obtain both air- and bone-conduction thresholds? How long will you present each tone? How long will you wait between presentations of each successive tone?

Next, practice instructing your patient out loud that they will be listening for many different tones (e.g., "The tones will have different pitches and some of the tones will sound very quiet"). Explain they should try to sit still, listen attentively, and press the response button when they hear the tone. If they are unsure whether they heard the tone, tell them it is okay to guess.

After conducting the test, use the audiogram in Audiolab to report the thresholds for the right and left ear. Once you enter data for both ears, select "Continue to Review." Review the patient's audiogram and interpret the results. You will be prompted to answer the question: **Which of the following best characterizes the patient's hearing?** Select your response and enter a summary of your findings.

If you are completing this assignment in class, stop after you complete testing for your first patient. If you are completing this assignment at home, test all five patients. In a separate document, write a brief report describing your test results and recommendations for each patient (one page limit in total). Provide the report to your instructor.

Submitting Your Work

After completion, submit this completed assignment and a copy of your Audiolab transcript(s) to your instructor. If you completed the assignment at home, you will also submit your reports to your instructor.

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