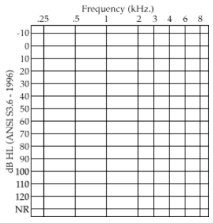
Basic Audiogram Interpretation

Basic Audiology Series

Audiogram Interpretation

- Audiogram - graph showing
  - **Frequency on Horizontal axis**
  - **dB Hearing Level on Vertical axis**
  - **dB level increases as we move down on graph**

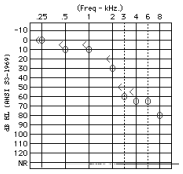


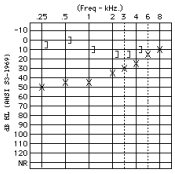
Audiogram Interpretation

- Audiogram displays the individuals pure tone thresholds (in dB HL) at each tested frequency
- Audiometry Symbols

Audiogram Interpretation

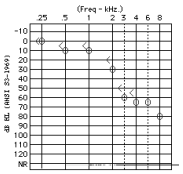
- Sample Audiograms

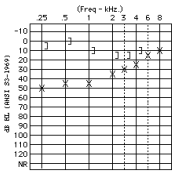




Audiogram Interpretation

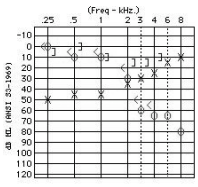
- Or it may display separate graphs for each ear.





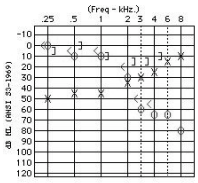
Audiogram Interpretation

- Audiogram may display both ears on one graph



Audiogram Interpretation

- Either way **interpret each ear individually!**

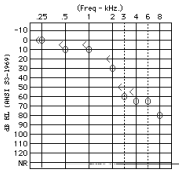


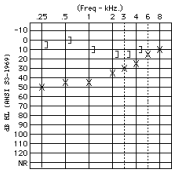
Audiogram Interpretation

- Determining Presence of Hearing Loss
  - **What does 0 dB HL mean?**
  - **When does a threshold become 'bad' enough to be considered a hearing loss**
  - **General Rules**
    - Adults - 25 dB HL
    - Children - 15 dB
  - **So, if a threshold is greater than 25 the individual has a hearing loss**

Audiogram Interpretation

- Sample Audiograms





Audiogram Interpretation

- Determining Degree of Hearing Loss
  - **How do we describe the degree of hearing loss?**
  - **First what numbers do we use**
  - **Pure Tone Average**
    - Traditional - average threshold at 500, 1000, and 2000 Hz
      - **Example: 500 Hz = 25 dB; 1000 Hz = 35 dB; 2000 Hz = 45 dB - PTA = 105 / 3 = 35 dB**
    - High Frequency - Add 4000 Hz
      - **Example: add 4000 Hz = 55; 160 / 4 = 40**

Audiogram Interpretation

- Once we have a pure tone average, find the matching descriptor category
  - **What we will use**

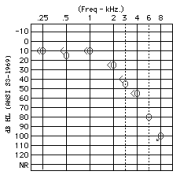
PTA (dB)	Descriptor
<= 15	No Loss
16 - 25	Slight
26 - 40	Mild
41 - 55	Moderate
56 - 70	Moderately-Severe
71 - 90	Severe
> 90	Profound

Audiogram Interpretation

- PTA Rules
  - **First - Always calculate PTA using air conduction thresholds**
  - **Second - If the two PTA calculations will lead to different degree descriptors, use the one that gives the greater amount of hearing loss**

Audiogram Interpretation

- PTA Samples



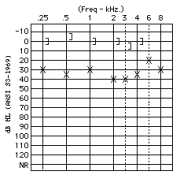
500 Hz = 15 dB
1000 Hz = 10 dB
2000 Hz = 25 dB
4000 Hz = 55 dB

PTA = (15 + 10 + 25)/3 = 16.7 dB
Category = Slight hearing loss

HFPTA = (15 + 10 + 25 + 55)/4 = 26.25 dB
Category = Mild hearing loss

Audiogram Interpretation

- PTA Sample



500 Hz = 35 dB
1000 Hz = 30 dB
2000 Hz = 40 dB
4000 Hz = 35 dB

PTA = (35 + 30 + 40)/3 = 35 dB
Category = Mild hearing loss

HFPTA = (35 + 30 + 40 + 35)/4 = 35 dB
Category = Mild hearing loss

Audiogram Interpretation

- Determining Type of Hearing Loss
  - **Our goal her is to determine if we are seeing results suggesting a**
    - conductive hearing loss due to a lesion in the outer and/or middle ear
    - sensorineural hearing loss due to a lesion in the inner ear or auditory nerve
    - mixed loss due to a lesion in the outer or middle ear AND a lesion in the inner ear or auditory nerve

Audiogram Interpretation

- Determining Type of Hearing Loss
  - **We will make this basic determination by comparing the patient's air conduction and bone conduction thresholds**
  - **Air conduction thresholds will be affected by lesions in the outer ear, middle ear, inner ear, and auditory nerve**
  - **Bone conduction thresholds, however, will only be affected by lesions in the inner ear or auditory nerve**

Audiogram Interpretation

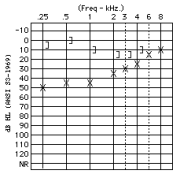
- Determining Type of Hearing Loss
  - **A lesion in the middle ear (such as otitis media) will effect the air conduction threshold as the pure tone must travel through the middle ear. The middle ear lesion will attenuate the pure tone causing hearing loss by air conduction.**
  - **This same lesion, however, will have no effect on the bone conduction threshold as the bone conducted signal travel through the temporal bone directly to the inner ear. It bypasses the outer and middle ears so a lesion in the middle ear will have no effect on the bone conducted signal.**

Audiogram Interpretation

- Determining Type of Hearing Loss
  - **Conversely, since both air conducted and bone conducted signals travel through the inner ear, a lesion here will affect both signal equally.**
  - **Therefore, we can compare the air and bone conduction thresholds to determine the basic types of hearing loss.**

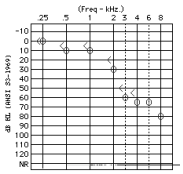
Audiogram Interpretation

- Determining Type of Loss
  - **Conductive Loss - If air conduction shows hearing loss and bone conduction is normal then we have air/bone gaps and a conductive loss**



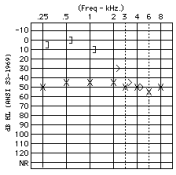
Audiogram Interpretation

- Determining Type of Loss
  - **Sensorineural Loss - If both air conduction and bone conduction thresholds show hearing loss we have a sensorineural loss**



Audiogram Interpretation

- Determining Type of Loss
  - **Mixed Loss - If both air conduction and bone conduction show hearing loss, ***and*** bone conduction is better than air conduction by more than 10 dB then we have evidence of both conductive and sensorineural hearing loss so we have a mixed loss.**



Audiogram Interpretation

- The Audiogram Interpretation Interactive Exercises tutorial will give you valuable practice in interpreting audiograms.