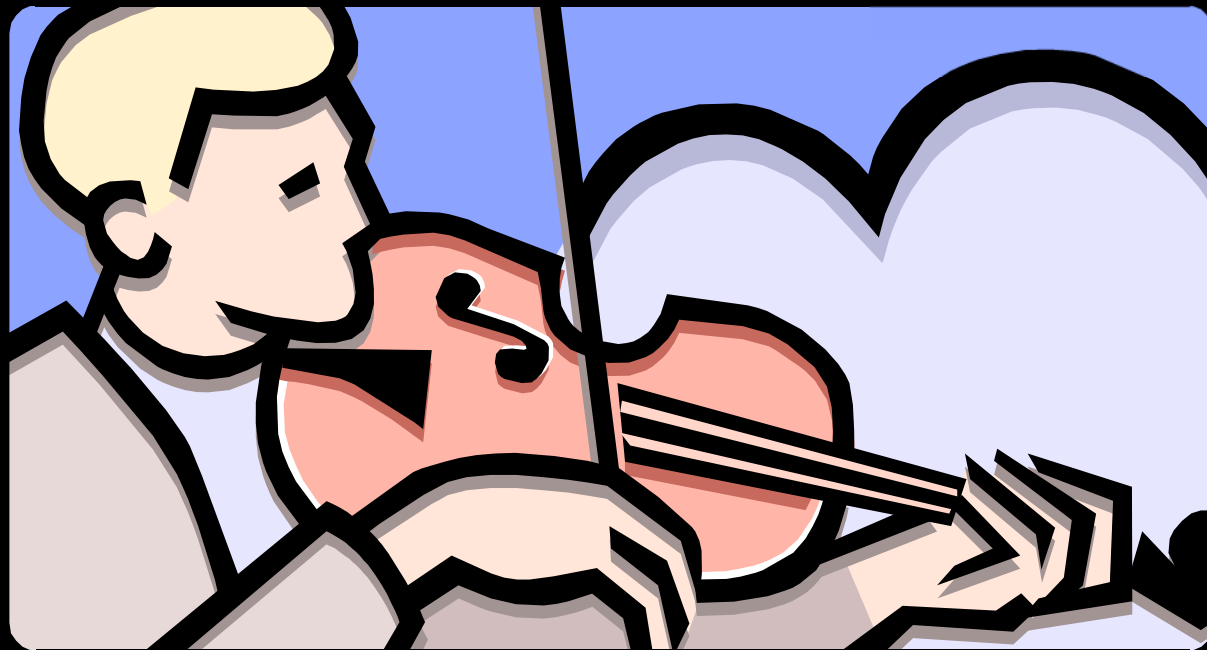
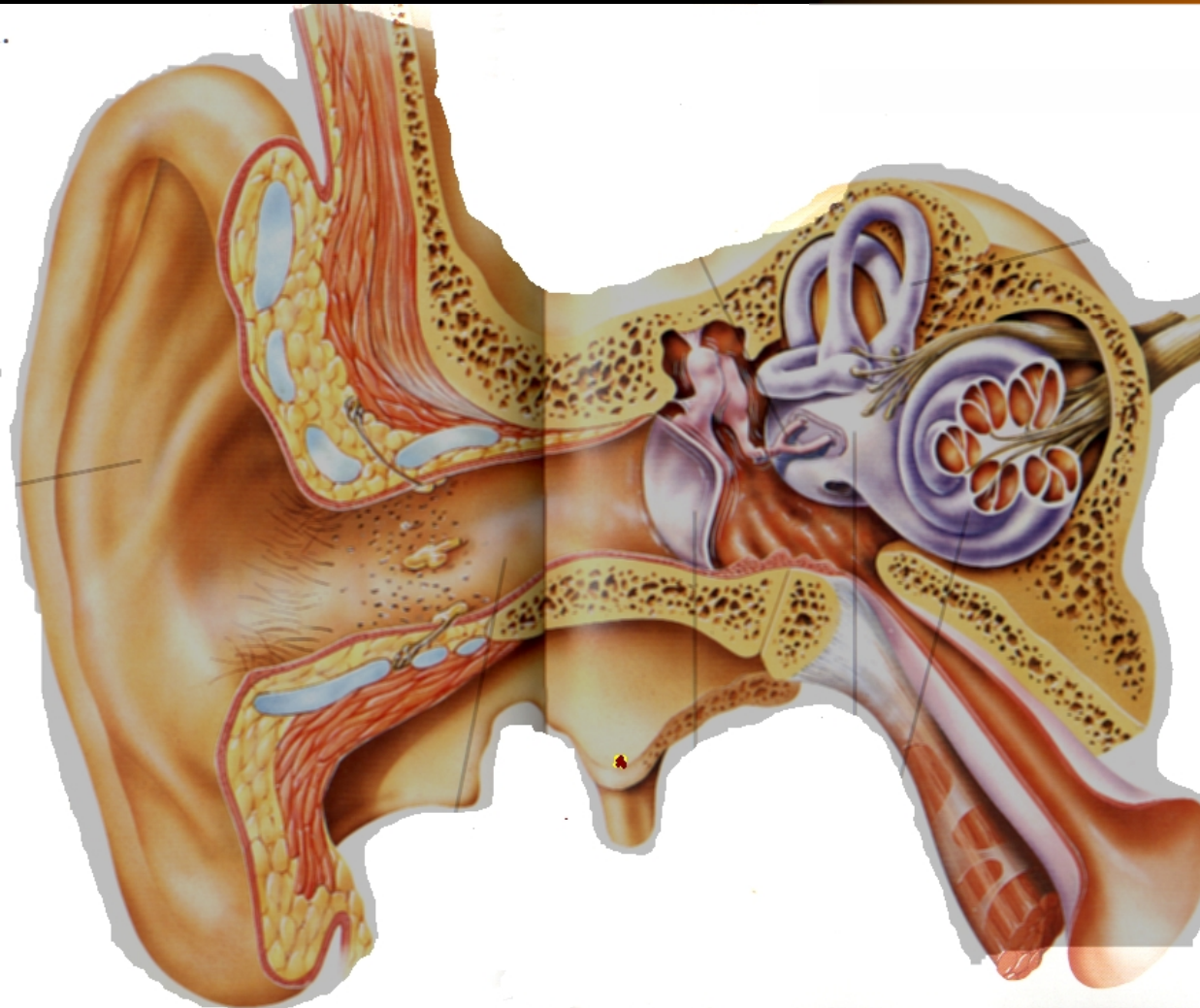


THE ASSESSMENT OF HEARING - Revision



M. DIN

ANATOMY



HEARING PATHWAY



AIR CONDUCTION (WHOLE PATH)


EAC \rightarrow **TM** \rightarrow **ME** \rightarrow **COCH** **CN** **Br**



SKULL BONES

BONE CONDUCTION

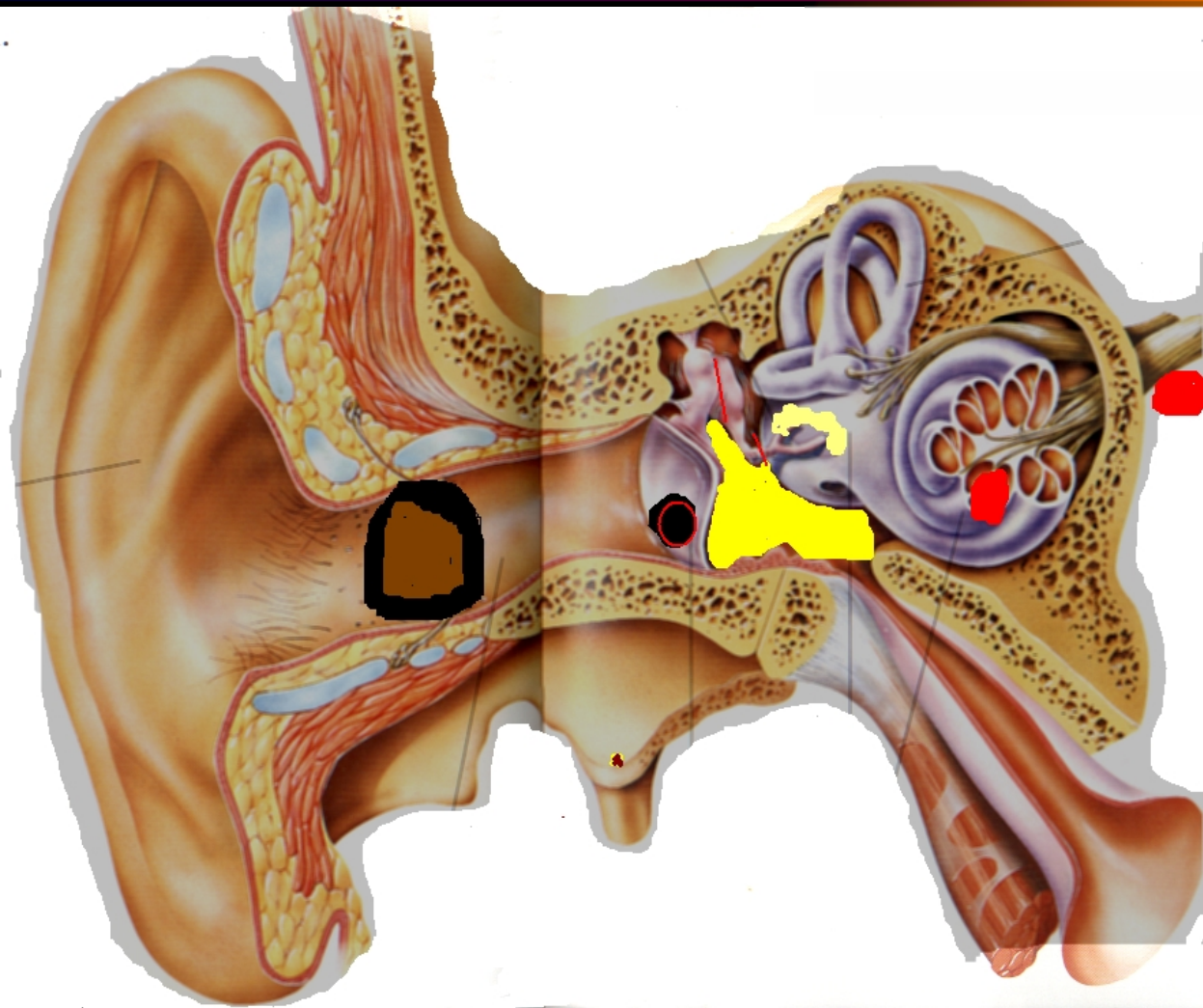
NB AC > BC

- 
- External Ear- Conduction & some amplification
 - Middle Ear – Conduction and amplification
 - Inner ear (Cochlea)- Transduction
 - Cochlear nerve- Transmission

HEARING LOSS



- CONDUCTIVE- if conduction is affected- EE & ME
- SENSORI-NEURAL- If the transduction or transmission is affected- Cochlea & Cochlear Nerve
- MIXED- Both



Hearing assessment

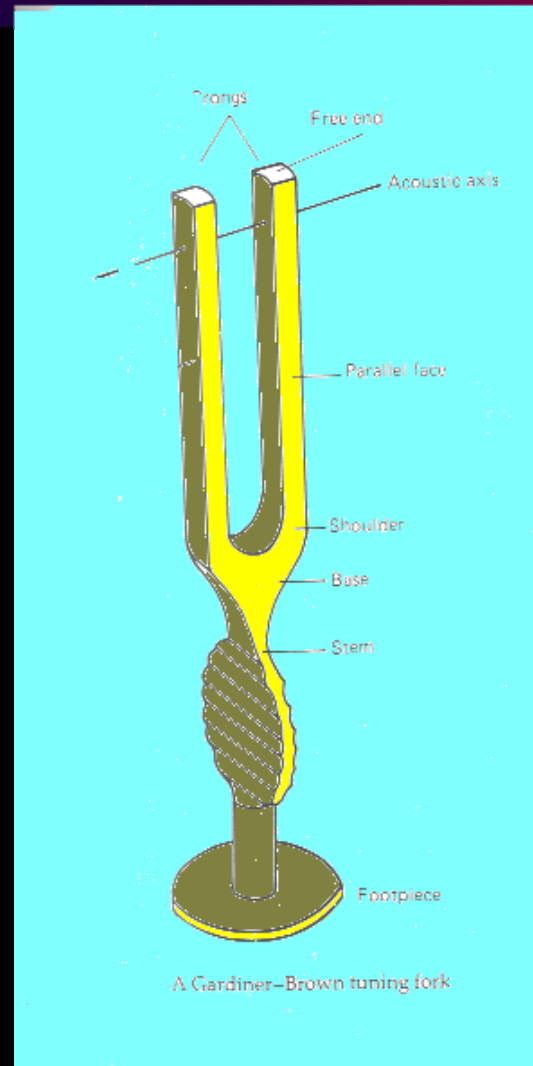


- **Presence of hearing loss**
- **Type of hearing loss**
- **Amount of hearing loss**
- **Cause of hearing loss**

*Basic clinical tests:
Finger friction/watch ticking test*

- Measure distance at which a normal person hears watch ticking or finger friction
- This distance can be compared with the distance which a patient hears the same sound

TUNING FORK TESTS



PRINCIPLE'S OF TUNING FORK TESTING

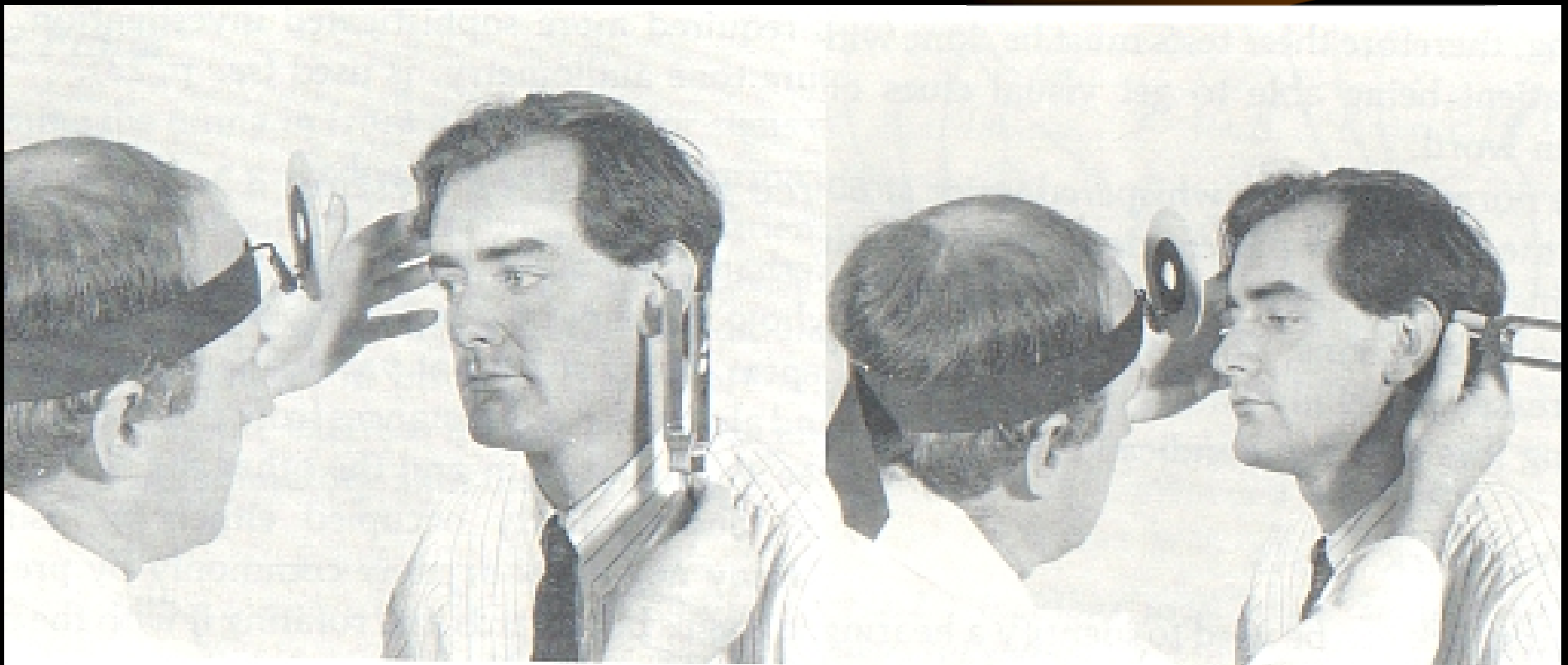
- **IN NORMAL HEARING**
 - $AC > BC$
 - BOTH EARS BC ESSENTIALLY EQUAL
- **IN CHL**
 - $BC > AC$ ($> 25-30$ dB)
 - BC better than normal persons BC because ENVIRONMENTAL NOISE NOT HEARD
- **IN SNHL**
 - $AC > BC$ (BOTH PATHWAYS AFFECTED)

SCHWABACH'S TEST

- COMPARE BONE CONDUCTION OF SUBJECT WITH EXAMINER
 - NORMAL- SAME
 - CHL- SUBJECT PROLONGED
 - SNHL- SUBJECT SHORTENED

RINNE'S TEST

Compare AC and BC of each ear

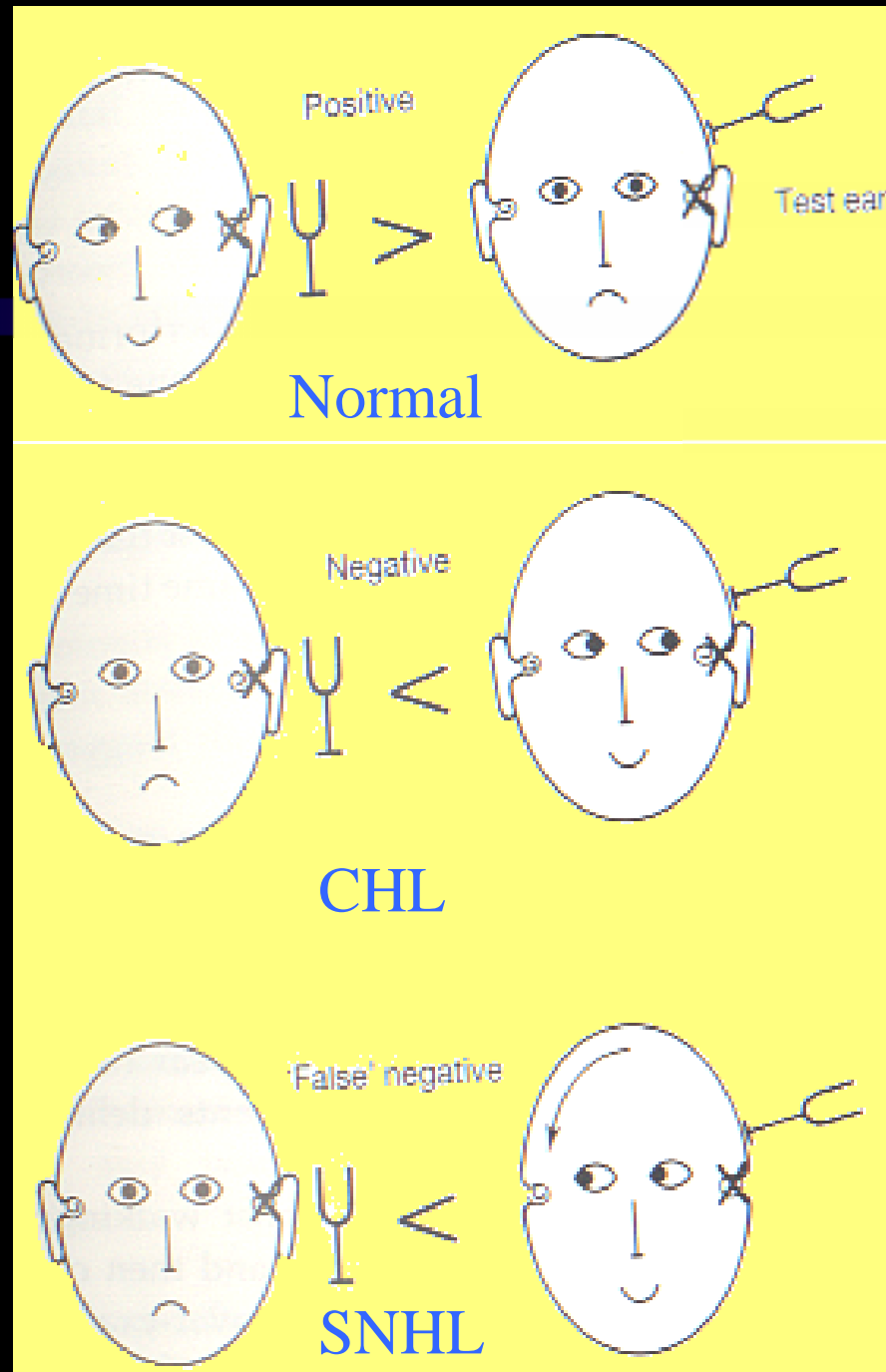


RINNE'S TEST

- **NORMAL- AC >BC: RINNE'S POSITIVE**
- **CONDUCTIVE HEARING LOSS(>25 dB)**
BC>AC: RINNE'S NEGATIVE
- **SENSORI-NEURAL HEARING LOSS**
AC>BC: RINNE'S POSITIVE
- **!!! RINNE'S FALSE NEGATIVE**
IN UNILATERAL SNHL

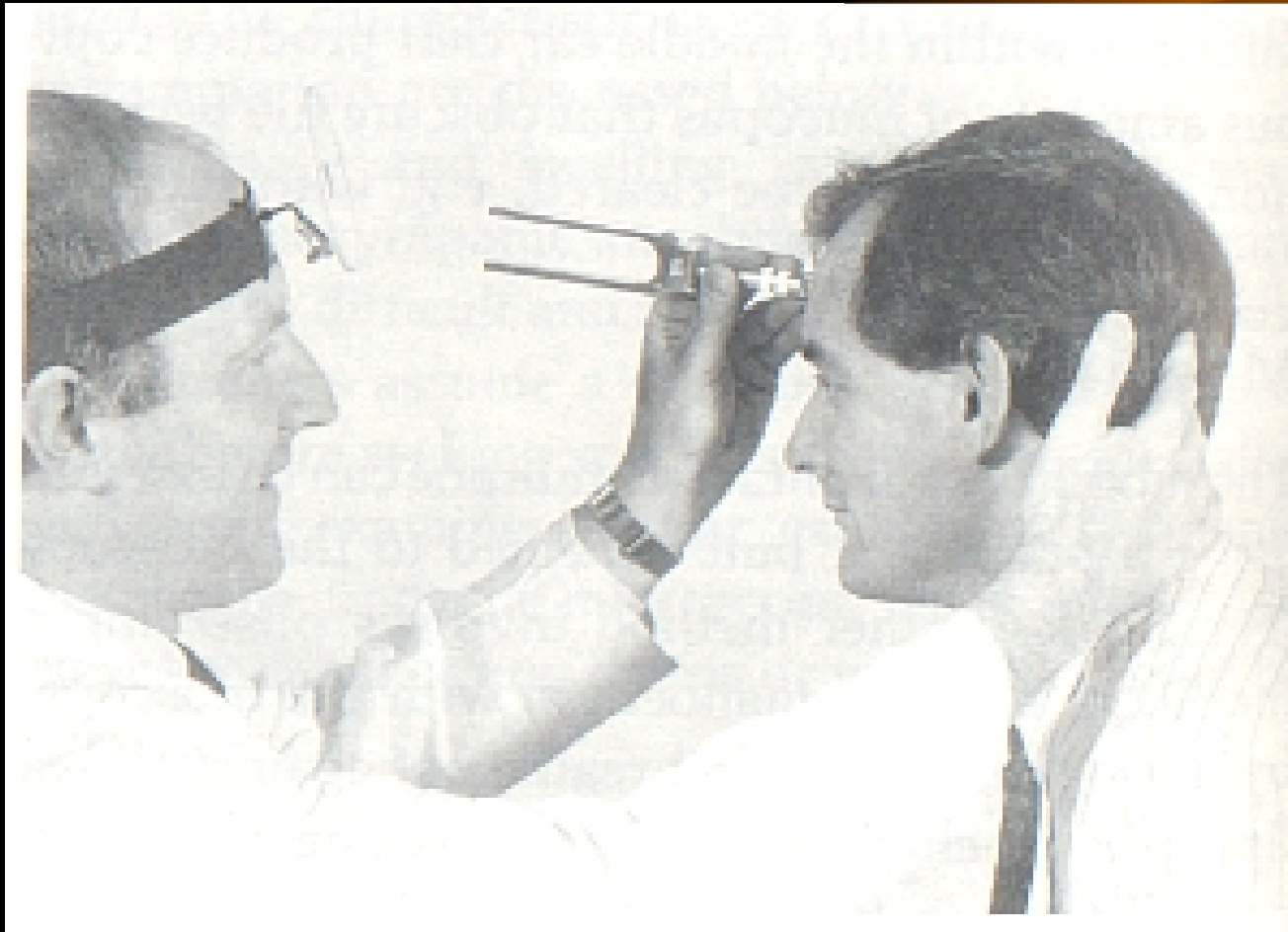
Subject answers from the non- tested ear

Rinne's test



WEBER'S TEST

Compare the BC of both ears (with each other)



WEBER'S TEST

- NORMAL- CENTRAL
- CONDUCTIVE HEARING LOSS
LATERALISES TO AFFECTED EAR
- SENSORI-NEURAL HEARING LOSS
LATERALISES TO BETTER EAR

NB- lateralisation occurs $> 5\text{dB}$ difference -

-May have central Weber's if both sides
have equal hearing loss



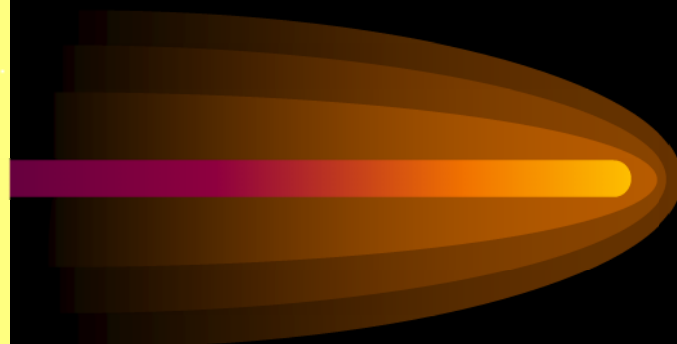
Normal



L SNHL



R CHL



SOUND LEVEL MEASUREMENT



DECIBEL SCALE

SOUND PRESSURE IN dB

$$= 20 \times \text{Log}_{10} \text{ measured SP/ reference SP}$$

**Reference SP is the least amount of sound that
can be heard by a normal hearing person at a
specific frequency**

$$= 20\text{mPa} (20 \times 10^{-6} \text{ N/m}^2)$$

PURE TONE AUDIOMETRY

- AC & BC TESTED FOR EACH EAR
 - At different frequencies
- CALLIBRATED SOUND IN DECIBELS
 - 0 dB - 20 dB **NORMAL**
 - 21dB - 40 dB **MILD HL**
 - 41dB - 60 dB **MODERATE HL**
 - 61dB - 80 dB **SEVERE HL**
 - >80 dB **PROFOUND HL**

Pure tone audiometry



- Masking
 - Delivery of wide band noise the non-tested ear
 - Always needed in BC measurements
 - Needed if $> 50-60$ dB AC measurements

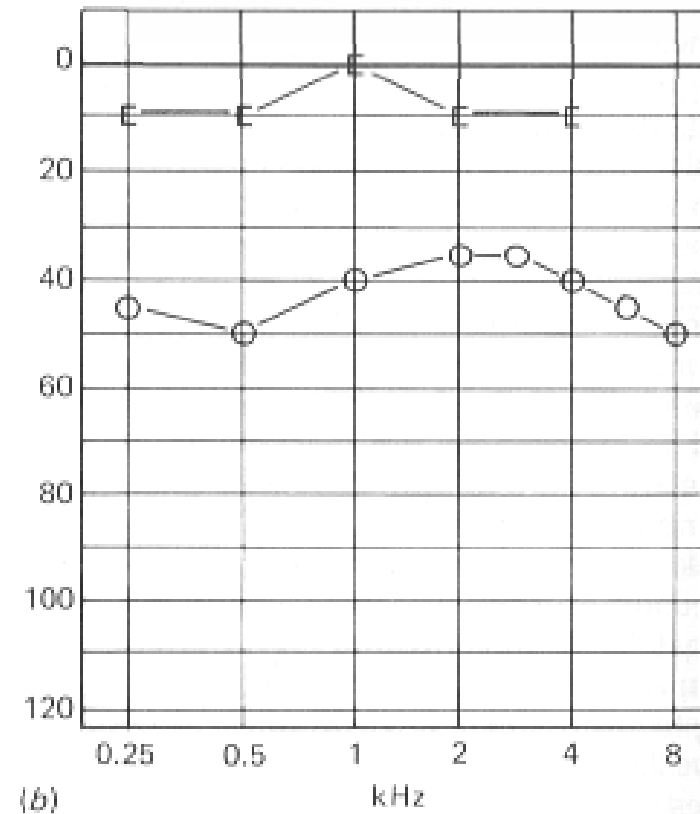
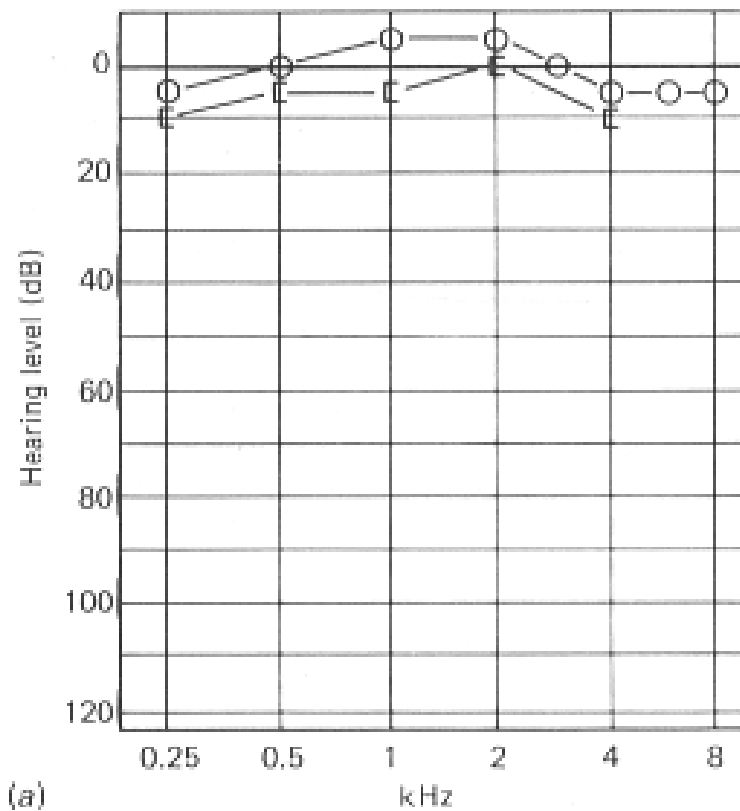
PTA- nomenclature

- **O** Right ear AC
- **X** Left ear AC
- **[** Right ear BC with masking
- **]** left ear BC with masking
- If no masking BC-
- Air conduction readings linked, BC left unattached

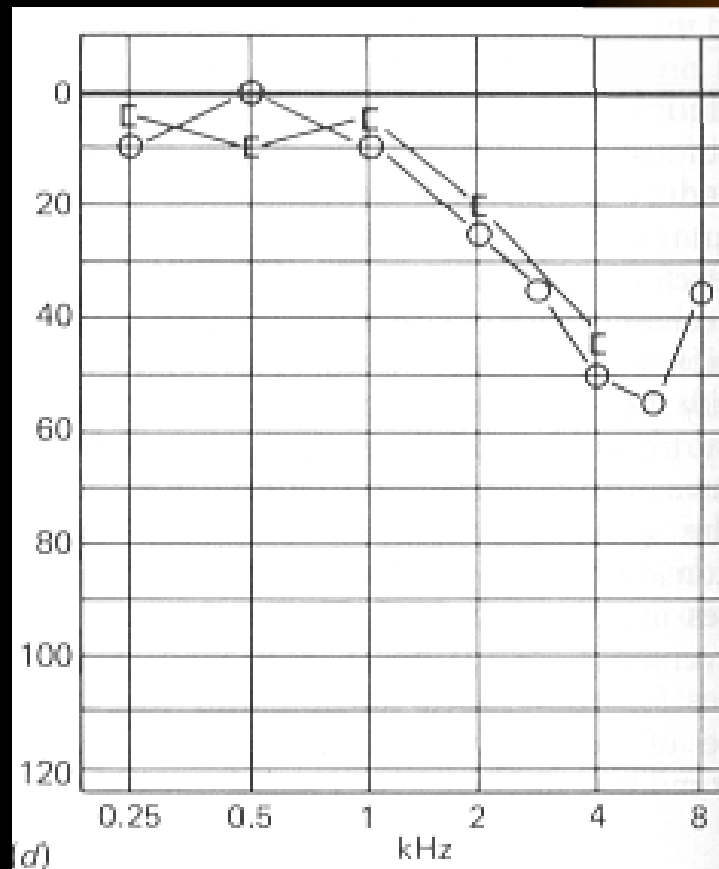
AUDIOGRAMS

Normal- AC=BC

CHL- BC < AC

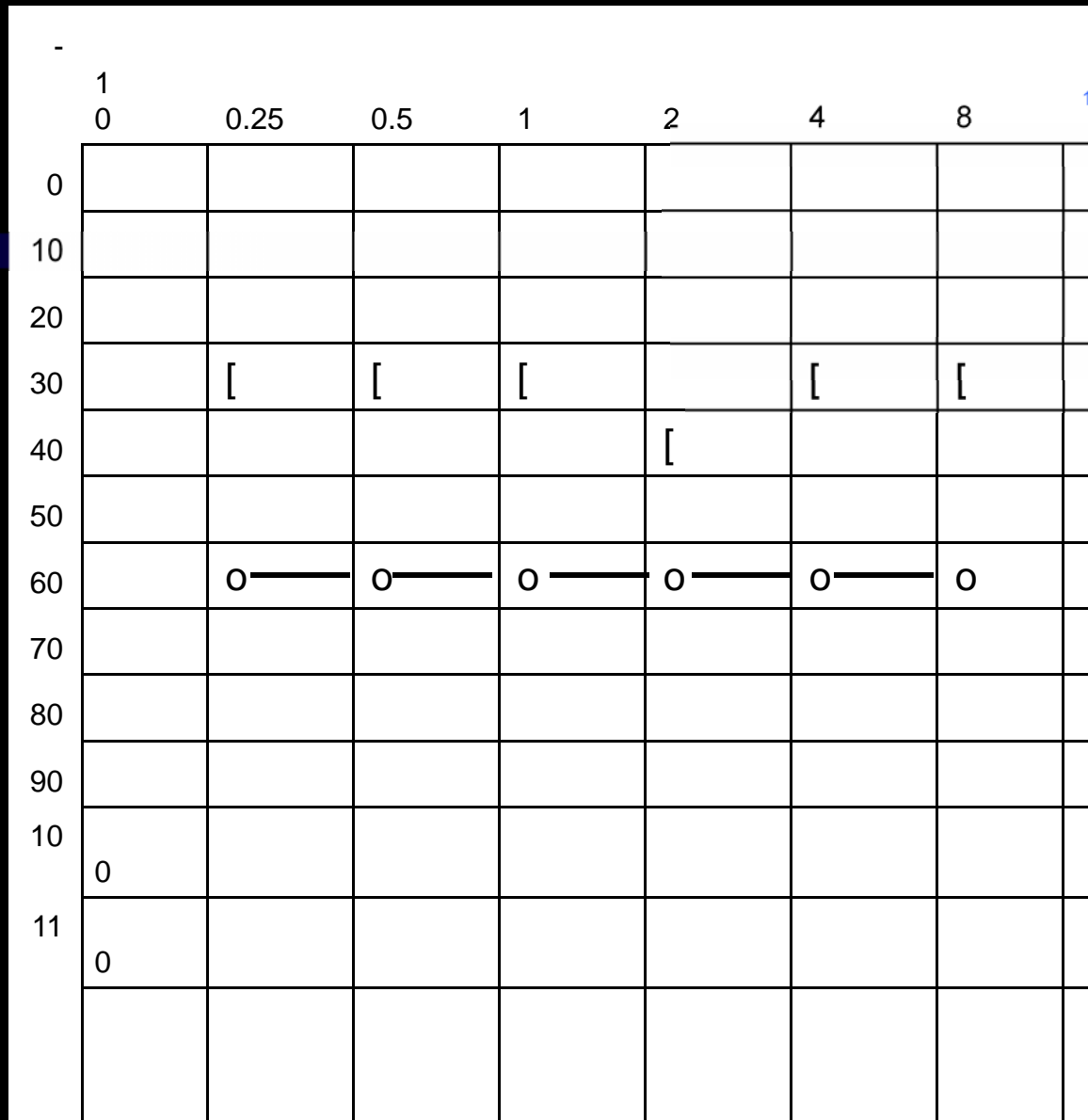


AUDIOGRAM



**SNHL- BC&AC
affected equally**

Mixed hearing
Loss- both
conductive and
sensorineural
components



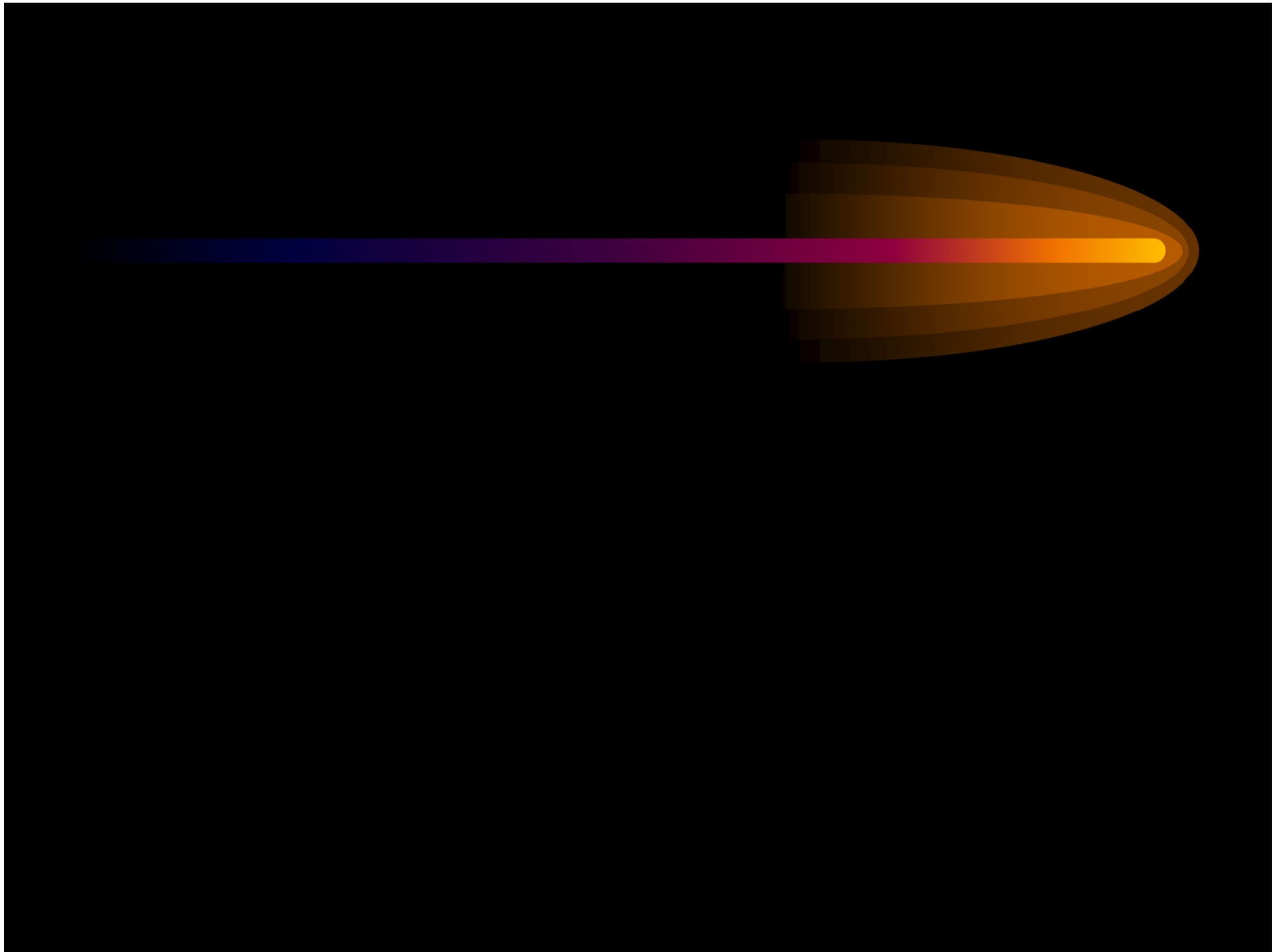
EXAMINATION

OTOSCOPY



Summary

- Know the technique and expected results of the clinical tests of hearing.
- Know the method of audiometry, masking, the nomenclature and the common types of audiograms
- Know the technique and expected findings in otoscopy





**THANK
YOU**