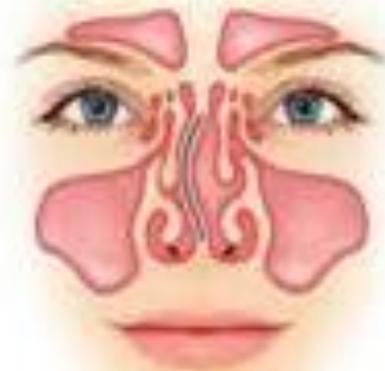


# Diseases of the Ear, Nose and Throat



1<sup>st</sup> Lecture:

## DEAFNESS

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The slides were provided by: Dr. Abdulrahman Hagr

Important Notes in red

Copied slides in black

Doctors notes in green

Our extra notes in blue

Possible MCQs mentioned or pointed by the doctor

## HEARING

- Introduction
  - CHL otosclerosis
  - SNHL
  - congenital, trauma, infection, noise, ototoxic, presbycusis, acoustic neuroma
- 



H<sub>2</sub>O



O<sub>2</sub>

-Vision is like water (H<sub>2</sub>O), hearing is like O<sub>2</sub>. So hearing is more important as O<sub>2</sub> is more important.  
- (بن باز- ال الشيخ) are blind and it didn't stop them from being scholars and famous people; however no one deaf could do it.

-القران معجزه سمعيه. السمع ذكر في القران ويقدم السمع على العمى لاهمية السمع

-Down syndrome, cleft lip, spina bifida, sickle cell anemia, phenylketonuria (which we have screening program for it in KSA) **all are common congenital problems but the COMMONEST congenital problem is hearing loss.**

-The first sense in our body start to develop is hearing. At the age of 3 months the fetus starts to hear, full development of hearing is in the 5th month. Vision is weeks and weeks after.

-Hearing is the strongest sense in our body. It is the first sense developed and the last one lost in sleeping, sedation and after death.

It has the widest range of 360 degrees, it is not limited by the room you are in or corners, of course it has a range of space but vision for example is only 180 degrees horizontally and 145 degrees vertically.

**-The best protected organ in the body is the ear: it is inside the Petrous Bone (العظم الصخري) which is the strongest bone in the body, it protects the cochlea.**

-Hearing loss has a major impact on life especially communication and learning.

## How common is hearing loss?

- Overall about 1 in 10 (people usually don't recognize it but it increasing)
- 1 in 3 adults 65 - 75
- 1 in 2 older than 75
- 1-2% school age children
- 4% children under 5 (high incidence in KSA parent complain that their child can't understand غبي ومايفهم!)

### **Common and Important**

## Signs of Hearing Loss

- Talking louder than necessary (people misunderstand them as arrogant because they talk loudly)
- Turning up volume on the TV or radio (like grandfathers turning up the radio volume)
- Complaints that other people "mumble" (they think other people talk badly about them)
- Confusion of similar sounding words نخلة / نخلة (people will make jokes about them)
- Inappropriate responses in conversation (as they try to communicate but they can't)
- Ringing or buzzing in the ears (can't hear normal talking but continuously hear annoying noises)
- Lip Reading (they develop it in order to communicate and understand what people are saying; however here in KSA it is considered inappropriate to stare at peoples' lips) اكثر شي في الاطفال عشان كذا الاهل ماينتبهون انه طفلهم مايسمع
- Watching a speaker's face intently
- Difficulty "hearing" someone behind (so they think he is ignoring them on purpose)
- Having difficulty on the telephone

## Effects

- Don't enjoy conversations – too much work (which is important to build relationships that's why they have their own language where they can build strong relationships with each other (deaf people among each other) sometimes its stronger than their relationship with their own mothers).
- People think you are an idiot
- Scared to try new contacts (don't want to meet new people)
- Scared to take new jobs
- Limits your world (جدي حبيب من المسجد للبيت) it's not true but he's trying to protect himself from jokes)

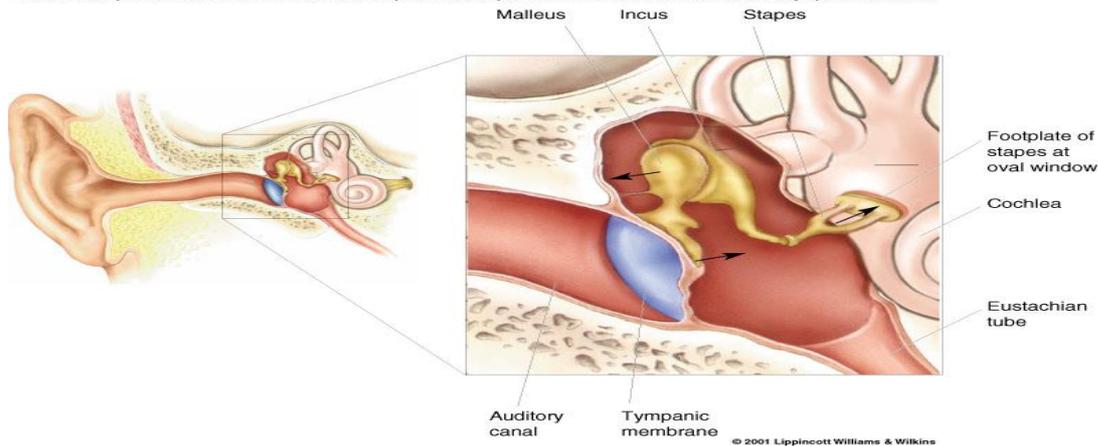
## Hearing Loss

- limit activities
- Isolation
- Depression
- Anxiety
- Insecurity (they think that people around them are talking about him/her) " إذا كانوا ثلاثة فلا يتناجى اثنان دون الثالث "
- strain relationships (insecurity may progress to more serious problem where the patient may think people around him are plotting against him due to the constant whispering which he thinks is about him it may lead him to thinking that his mother wants to kill him).
- Increases psychosocial difficulties (a lot of psychiatric impact)

## Deafness & Recruitment

**Recruitment:** The cochlea normally acts as a filter; it decreases loud voices and amplifies the low sounds. However here the cochlea filter sounds and therefore they can't protect themselves from loud sounds or hear low sounds. (That's why even though they can't hear well, loud sounds like that of a crying baby can bother them because they hear it louder than we do).

**Figure 11.5**  
The middle ear. As the arrows indicate, when air pressure pushes the tympanic membrane, the bottom of the malleus is pushed inward, and the lever action of the ossicles makes the footplate of the stapes push inward at the oval window. The pressure pushing at the oval window is greater than that at the tympanic membrane, in part because the surface area of the footplate of the stapes is smaller than the surface area of the tympanic membrane.

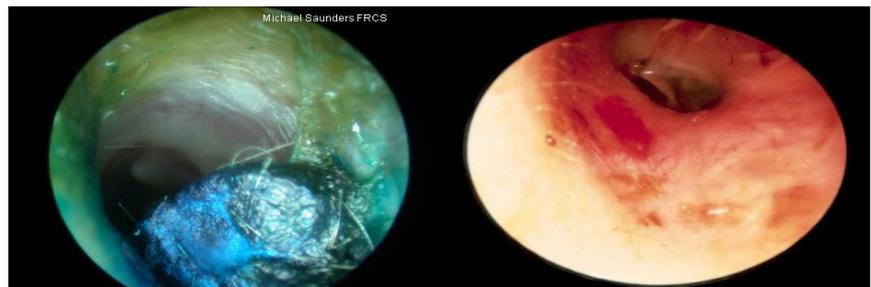


- Anything from the stapes footplate to the outside gives conductive hearing loss.
- Anything from the cochlea gives sensory hearing loss.
- Anything from the nerve give neural hearing loss; however the hearing test combines both of them together that is why we call them sensorineural hearing loss.
- All of them together called mixed.

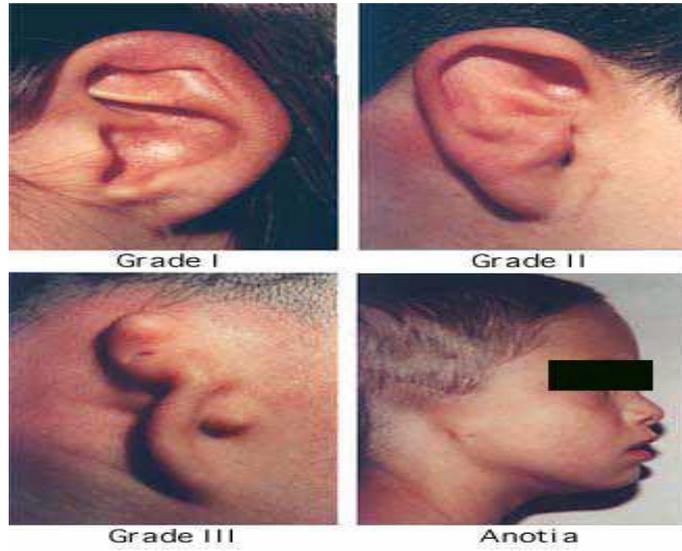
## ❖ CONDUCTIVE DEFECTS

- Wax & foreign bodies (most common cause because of Q-tips we should not clean our ears. the ear cleans itself! (Unless there is a problem))
- Otitis externa
- Ear drum Scarring; perforation
- Otitis media (ASOM)
  - Acute suppurative
  - Otitis media with effusion (OME)
  - Chronic otitis media (CSOM)
- Otosclerosis
- Ossicular chain disruption

**Wax**



**Microtia** = صمحاء  
الاذن الصغيره



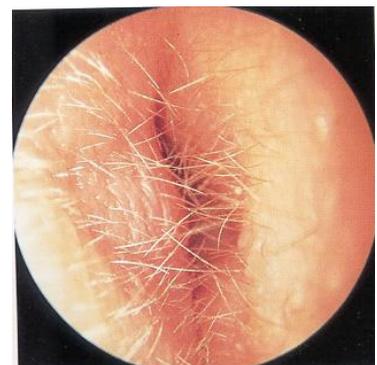
**Atresia** = رثق (atresia of the canal)



**AOE (Otitis Media Externa)**



Swimmer's Ear (AOE)



**Raccoon eyes sign** (skull base fracture blood goes to the external auditory canal, tympanic membrane perforation and blood in the middle ear)



**Battle's sign**



**Tympanic membrane perforation** (this is a new trauma because there is bleeding so acute situation)



## Drum Retraction (Adhesive OM)



Normal

Ear drum sucked inside. It's called Atresia, Atelectatic ear  
Adhesive OM

- The tympanic membrane gets sucked in because of Eustachian Tube Dysfunction and negative pressure which will suck the ear drum inside. We treat it by ventilation tube which prevents the ear from getting sucked inside by preventing the negative pressure.

So perforation and retraction both of them are causes conductive hearing loss

## MEE



**Tympanosclerosis** (white tissue patches on ear drum) tymp=طبلي scleriosis=التحجر

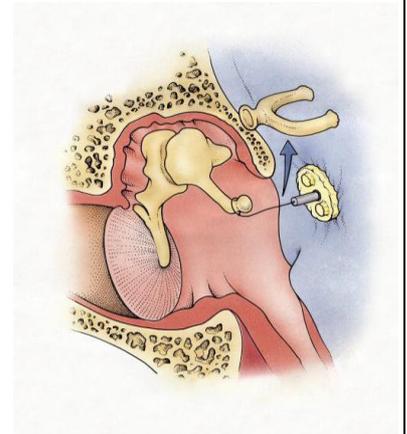
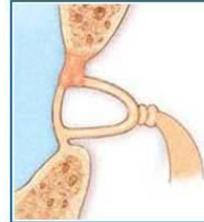
It's very common. Come from recurrent infection and usually asymptomatic but it can cause conductive hearing loss.



## Otosclerosis:

(Not common in KSA but common in west, oto= ear, sclerosis=stiffness)

- 10% otosclerotic lesions (10% symptomatic) (10% of Caucasian)
- Females: Male 2: 1 (because of hormonal changes)
- Middle-age
- Worse during pregnancy
- Stapedectomy (remove the stapes footplate and put prosthetic one = the patient starts to hear in the recovery room, however it may cause vertigo)



### ❖ SENSORINEURAL HEARING LOSS (SNHL)

- Congenital
- Trauma
- **Infection**
- Noise
- Ototoxic
- Presbycusis
- Acoustic neuroma

#### Congenital hearing loss

- Deafness affects 0.2% (the commonest congenital anomaly in humans)
- SNHL attributed to
  - 50% genetic factors
  - 20-25% environmental
  - 25-30% sporadic
- Genetic (we have the biggest center for cochlear implant)
  - 75% AR (autosomal recessive common in KSA زواج الاقارب)
  - 20% to AD (autosomal dominant)
  - 5 % X-linked
- Over 400 syndromes

#### Noise induce SNHL

- Boilermaker's deafness (because people who work at boilermaker's usually develop deafness with time)
- One of the most common occupationally induced disabilities (example: Soldiers)
- Tinnitus (can drive people crazy it's most common in quiet areas such as before sleep so they will develop insomnia, and depression! Some suicide)
  - Commonly accompanied NISNHL
  - Warning sign (wearing hearing aid increases the normal sounds and decrease the tinnitus)

**98** *(No need to learn this)*

- 90 db for 8 hours (normal speaking 60-65 db)
- 95 db for 4 hours (should not stay in the place more than 4h)
- 100 db for 2 hours
- 105 db for 1 hour (when increase can cause death because it is a form of torture)

## Ototoxicity Medications

- Antibiotics
- Diuretics
- Antineoplastics
- Antiinflammatories
- Antimalarial agents
- Ototoxic agents
- Others

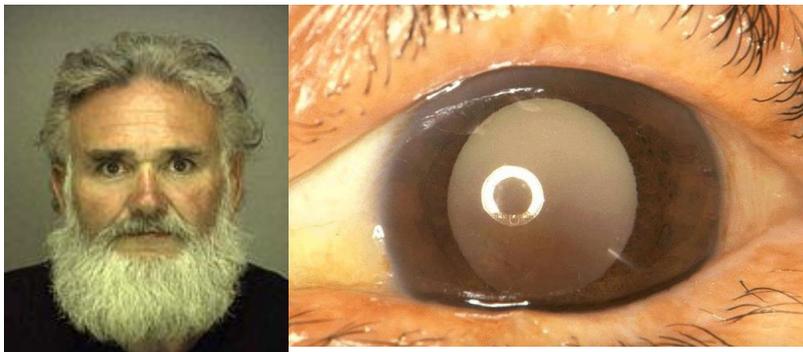
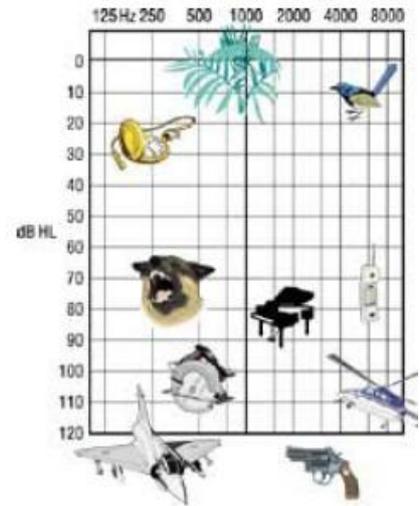
**Higher risk**

1. Renal failure (Elevated peak and trough levels)
2. Liver failure
3. Immunocompromise
4. Collagen-vascular disorders
5. Advanced age (> 65 years)
6. Prior ototoxicity
7. Concurrent use of known ototoxic agents
8. Preexisting HL or Vestibular
9. Bacteremia (fever)
10. Treatment course longer than 14 days
11. + ve FHx of AG ototoxicity

**Presbycusis**

It means hearing loss with aging. Most people at age of 40 start to have degenerations in body including hearing, usually they will accept having grey hair and decreased vision but not hearing loss. It's difficult for them to admit that there is a problem.

**Presbycusis = Deafness + Tinnitus + Recruitment**



# 1 DEAFNESS

## Overview of Hearing Loss

- #1 Handicapping disorder
- 60% of Americans > 65 HL
- 90% of > 75 Y have HL
- HL + degenerative processes of aging.
- 1/2 Vestibular symptoms

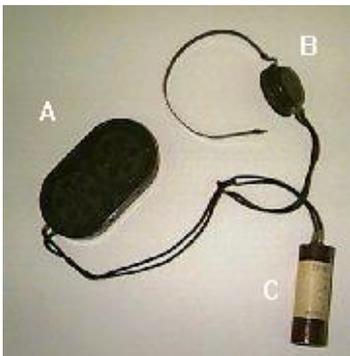
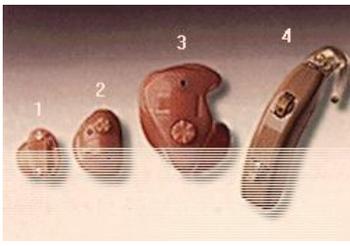
## Problems with Diagnosis

- Shame or embarrassment. (Especially from wearing hearing aids)
- HA social stigma
- Embarrassment prevents 15 million elderly people from getting help.

## ❖ Hearing Aids

### History

1550 by Girolamo Cardano when he saw that sound could be transmitted through the teeth.



## Hearing Aids

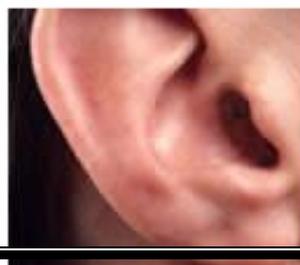
behind the ear



in the canal



completely in the canal



in the ear

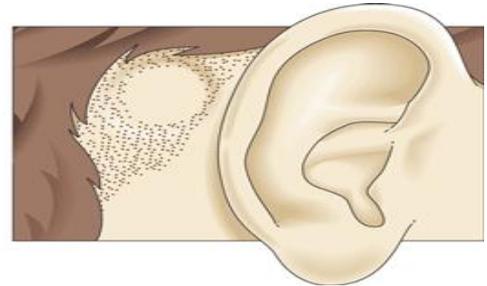


### ❖ Cochlear implant: (1827-1745) فولتا الكساندرو

It's started when Volta put a battery in his head and turned it on, he passed out. When he woke up he noted down that he notice that the battery produced electricity (voice).

### Bone Anchored Hearing Aids B.A.H.A

Fixing the implant on bone using titanium; it doesn't react with body. Used for conductive hearing loss.



### Direct bone Conduction



### Auditory brainstem implant

This is used in a patient who does not have a cochlea (congenitally or due to fracture) or a nerve. We go to the brain stem and the cochlea nucleus and stimulate the nerve. They may develop arrhythmia or respiratory arrest from the electrical stimulation.

