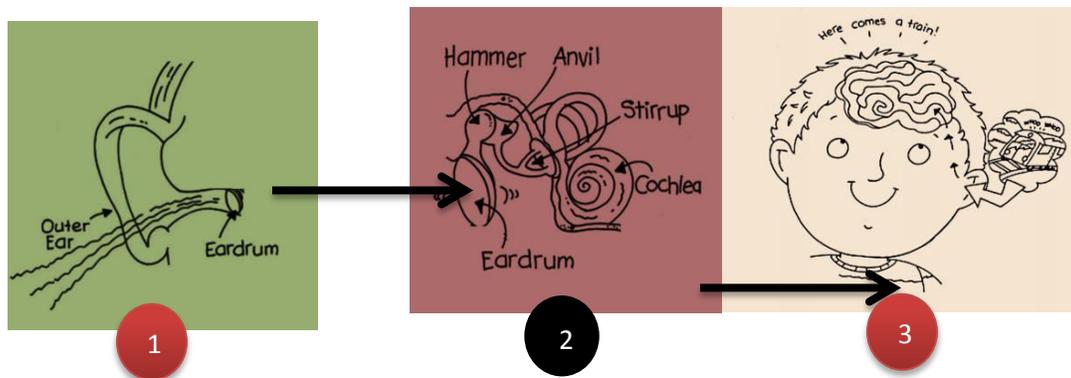


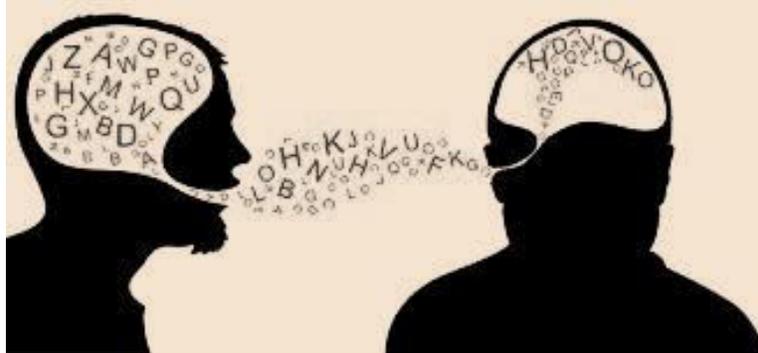
How do we hear?

1. Sound waves travel in air and enter the outer ear, called the auricle. It funnels the sound waves inside your ears to your eardrum through an opening called the auditory canal and sends it to the eardrum which vibrates when the sound waves push against it.
2. Then the tiny bones in the middle ear begin to vibrate. These tiny bones amplify, or increase, the vibrations, which then travel into the inner ear. In the inner ear, the vibrations reach the cochlea, the liquid inside is set into motion, A wave moves through the liquid, and sensitive hair cells are moved by the wave.
3. The hair cells change the vibrations into electrical signals, which are sent through the auditory nerve to the brain and the brain sorts out the signals as a certain sound.



How do we talk?

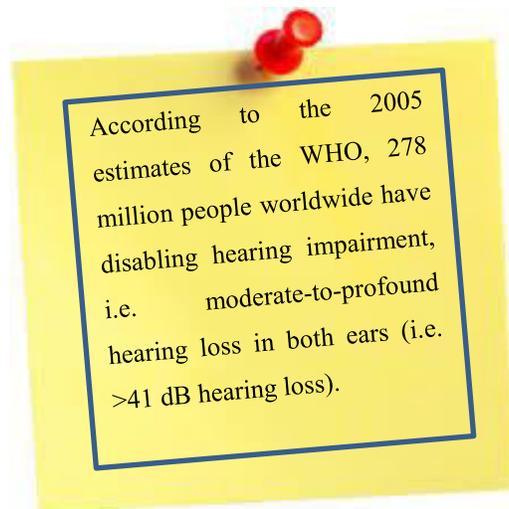
- Talking is a form of communication most people use to express their thoughts and feelings. which begins with a person's thought and results in the formation of words and sentences to express that thought.



- Speech act involves pushing air from the lungs into the voice box. The voice box or larynx has vocal cords that vibrate to produce your voice. The act of speaking occurs by air coming from the lungs, through the vocal folds. Then, the lips, tongue, and teeth form the sounds to make speech.

What is Hearing Impairment?

Hearing is the ability to perceive sound. A person suffering from hearing impairment has difficulty in perceiving or identifying sound clearly due to auditory problems.



Degree of Hearing Loss	Ability to perceive sound
Mild	★Difficult to identify soft sound such as whispering
Moderate	★Unable to hear clearly what others are saying during conversation. ★ Hearing aids are necessary from this degree of hearing loss
Moderately-severe	★Can hear people talk only within a short distance and rely quite heavily on lip reading for communication ★ Have difficulty in listening watching TV programmes ★ Misarticulations
Severe	★Can hear sounds within a short distance, e.g. drumbeats ★Rely on lip reading for communication even with hearing aids. Misarticulations
Profound	★ Usually it very difficult to hear sounds and can sense

	the vibrations only. Rely on hearing aids with which a limited amount of sounds can be heard ★Rely on lip reading & gestures even with hearing aids.
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What are the symptoms of children with hearing impairment?

During infancy:

1-3 months old	No response to sudden sound such as banging of door or door bell ring.
4-6 months old	Unable to locate the sound source.
7-9 months old	Do not look at the person being mentioned, e.g. “Where is /dada/?”
10-12 months old	No response to name call

During childhood:

Delayed response to sound

Cannot hear clearly what others are saying

Show difficulty in locating the sound source

Pay more than usual attention to speakers' facial expression and lip movement while listening

Give irrelevant answers or misinterpret commands

Request for repetition during conversation

Show poorer ability to understand speech in a noisy environment

Tend to turn up the sound volume of television

Incorrect pronunciation

Delayed language development

Poor attention in class

Frequent use of gestures to express themselves, e.g. pointing to what they want

*Parents should be alert if their child shows the above signs, and consult an audiologist at the earliest.

What causes hearing impairment?

DID YOU KNOW?

Poking objects too deeply into the ear canal (Q-tips, pencils, food, buttons, pins, etc) can cause hearing loss. It is the most common ear injury in toddlers.

Congenital factors

Acquired factors

Heredity	Excessive earwax , Eardrum perforation Sequelae of childhood diseases such as measles and meningitis
Congenital defects such as anomalies of the ear, nose or throat	Middle ear effusion or infection Prolonged exposure to loud noise
Viral infection during pregnancy, e.g. rubella infection	Medication that may lead to hearing damage
Premature birth, birth asphyxia, excessive bilirubin, etc.	Otosclerosis or ear ossicles dislocation

Signs of Hearing loss

- Speech delay,
- frequent or recurrent ear infections,
- a family history of hearing loss (hearing loss can be inherited),
- syndromes known to be associated with hearing loss (for example, Down syndrome, the Alport syndrome, and Crouzon syndrome),
- infectious diseases that cause hearing loss (for example, meningitis, measles, and cytomegalovirus [CMV] infection),
- poor school performance,
- diagnosis of a learning disability or other disorder, such as autism or pervasive developmental disorder (PDD).

In addition, the circumstances surrounding the pregnancy and birth may be associated with subsequent hearing loss. If there is a history that includes any of the following, a child should have a hearing assessment.

- low birth weight (less than 2 pounds) and/or prematurity
- assisted ventilation (to help with breathing for more than 10 days after birth)
- low Apgar scores (numbers assigned at birth that reflect the newborn's health status)
- severe jaundice after birth
- maternal illness during pregnancy (for example, German measles[rubella])
- hydrocephalus

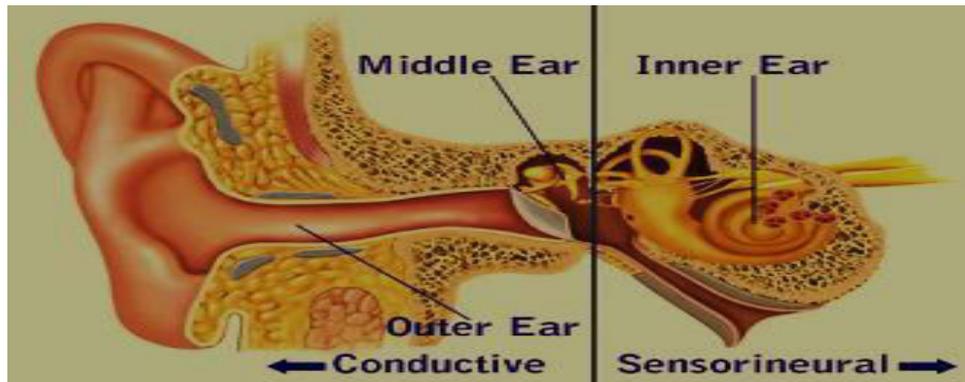
How does hearing impairment affect children's development?

Children learn to talk by listening to speech. The first few years of life are a critical time for speech and language development. Children must be able to hear speech clearly in order to learn language. A fluctuating hearing loss due to repeated ear infections might mean the child doesn't hear consistently and may be missing out on critical speech information. Permanent hearing loss will also

affect speech and language development, especially if it is not detected early. The earlier a hearing loss is identified and treated, the more likely the child will develop speech and language skills on par with normally hearing children

Types of Hearing Loss

There are four types of hearing loss: Conductive, Sensorineural, Mixed and Central.



Conductive hearing loss

A conductive hearing loss can be the result of a blockage in the external ear canal or can be caused by any disorder that unfavorably effects the middle ear's ability to transmit the mechanical energy to the stapes footplate.

Sensorineural Hearing Loss

Sensorineural hearing loss results from inner ear or auditory nerve dysfunction. The sensory component may be from damage to the organ of Corti, an inability of the hair cells to stimulate the nerves of hearing or a metabolic problem in the fluids of the inner ear

Mixed Hearing Loss

A mixed hearing loss is caused by problems in both the conductive pathway (in the outer or middle ear) and in the nerve pathway (the inner ear).

Prevention of Hearing Impairment

- Avoid marriages amongst close relatives.
- Immunize adolescent girls and women in child bearing age against Rubella.



- Ensure good health of the expectant mother – seek health check-ups at regular intervals.
 - Expectant mother should avoid contact with persons suffering from infectious diseases.
 - Make sure that the delivery is performed under the supervision of a trained person.
 - Follow the child's immunization schedule properly.
 - Eat as well as possible before and during pregnancy, use iodized salt, and include foods rich in iron and other vitamins and minerals.
 - Take precautions to prevent brain damage and cerebral palsy
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- **Maintain good ear hygiene:**

- Keep the ears clean, free from dust, water, wax etc.
- Do not clean or scratch your ears with pointed objects like matchsticks, hairpins, pencils etc. It can rupture the eardrum or injure the ear canal.
- Avoid slap or blow to the ear as it can cause a hearing problem that may be irreversible.
- Keep a watch on young children playing with tiny objects like beads, seeds etc. If they put them in the ear, the eardrum may get ruptured or the ear canal may be injured.
- Do not put oil or any other liquid in the ear as they can result in pain, swelling and ear discharge. Keep your ears dry always.
- Do not swim in dirty water. Unclean water entering the ear can cause ear infection. While swimming always plug your ears with cotton, especially while diving. This prevents the water from directly entering your ear and rupturing the eardrum.
- Do not have your ears cleaned by roadside quacks. They use unclean instruments, which may cause infection. The eardrum too may get damaged. Clean your ears with cotton buds regularly or get them cleaned by a doctor.
- Avoid using unwashed pillow covers, towels, etc., used by a person with ear discharge. This may cause infection in your ear too.
- While feeding a baby keep its head raised otherwise milk may enter into the ear cavity (through the small passage connecting the throat and the ear). It can cause pain with swelling and ear discharge.
- Avoid exposure to loud sounds.
- Do not take medicines without the doctor's advice.
- Use ear protectors while working in noisy places

Methods of Communication

Success with any communication mode depends upon the above factors and the desire and willingness of all family members to support and actively participate in promoting functional communication.

- **Auditory-Verbal Approach:** Children can use their hearing potential to learn to talk and communicate through listening using hearing aids and cochlear implants .A child's listening skills are developed; visual cues are not used.
- **Sign Language:** Is a means for communicating with and educating deaf children that incorporates the use of Indian Sign Language (ISL) as the primary language of instruction. It is a distinct language that uses visual-gestural-spatial hand and body movements as components of the language to express its own grammar and sentence structure.
- **Using Lip reading:** Children use speech reading to aid listening skills and touch cues to aid in speech sound production. Children use their residual hearing and use speech as their primary means of communication. Appropriate amplification with hearing aids and/or cochlear implants is warranted to maximize the oral approach's effectiveness.



- **Total Communication Approach:** Use any and all ways of communicating that will enable the child with a hearing loss to learn language. Children use a combination of signs, gestures, speech, hearing aids, FM systems, speech reading and text .



Role of Parents



Different degrees of hearing loss will have different impacts on communication, which will affect a child's speech and language development, communication skills and learning ability.

- If you find that your child has a hearing problem, you should get advice from audiologists, medical specialists, education professionals and social workers to work out a learning and lesson plan for him/her.

- You should accept the fact of your child's hearing impairment, do your best to understand his/her needs and help him/her improve his/her language and communication skills so as to develop his/her potentials in full with the support of professionals and educational institutions.
- Adopt a positive attitude towards your child's hearing impairment and encourage him/her to make the most of his/her residual hearing by wearing a properly adjusted hearing aid for optimum amplification.
- Let your child receive appropriate and well-structured auditory training to improve his/her ability to perceive

Speech & Language Problems in Children

- Infants who have not started babbling by 6 months or children who do not use meaningful words by 1 ½ years or who do not talk in sentences by 2-3 years
- Does not speak clearly or Child repeats speech sounds in a word or does not speak fluently or
- Child does not attend to commands or cannot concentrate on a task for long time.
- Children with reading and writing problems.

Speech & Language Problems in Adults

Difficulty in speaking or understanding speech due to paralysis or head injury

Difficulty in swallowing and chewing

Hoarse voice due to excessive use

Stuttering

Speech and Language Therapy

Management of speech –language problems can be done by speech language therapy. It is a long term process, which requires consistent practice. The family also have an important role to play in the management process.

Need for Psychological Assessment

Disability like hearing impairment can affect different areas of development or may exist along with another disability

Psychological testing helps in finding out:

- Developmental status of the young child
- Level of general intellectual functioning
- Whether there is any motor or perceptual problem
- Level of personal social maturity of the child or person
- The presence and degree of behavioral or emotional problems and
- The kind of intervention or remedial measures that will be helpful