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Management of Deafness in the light of Unani System of Medicine

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Abstract:

People with hearing loss tend to use assistive and accessible technology differently from most other groups of people with disabilities, primarily due to the factthat their hearing loss influences their communication. As a result, their degree of hearing loss is but one of many aspects of their disability, which influences their preferred assistive or accessible technology. For example, for television programs, some deaf viewers may prefer to turn up the volume, while others may prefer to read verbatim captions, and others prefer to follow the program with a sign language interpreter overlay. Because of these differences, developers should strive to provide accessibility for people with hearing loss across multiple dimensions hearing loss, communication and cultural preferences and legal requirements. In this article Author write the Anatomy physiology of Hearing loss and Deafness, Sign Symptoms, Cause, Types, of Deafness and common Herbal Drugs or Household remedies used in Treatment of Deafness.

Keywords: Deafness, Sign Symptoms. Prevention of Deafness, Herbal drugs

I. Introduction:

Hearing loss affects social, language and communication fluency. These skills develop most rapidly in childhood. The term “hearing impaired” was originally used to describe people with any degree of hearing loss, from mild to profound, including those who are deaf and those who are hard of hearing. Many individuals who are deaf or hard of hearing prefer the terms “deaf” or “hard of hearing,” as it has a more positive connotation than the term “hearing impaired,” which implies a deficit or that something is wrong that makes a person less than whole. Hearing impairment, deafness, or hearing loss refers to the total or partial inability to hear sounds. When hearing loss goes undetected, the individual’s development

of these skills is likely to be delayed. The World Health Organization estimates that there were 360 million people with disabling hearing loss. In the United States, there are about 30 million people with hearing loss and about 500,000 people who use American Sign Language. Most people with hearing loss are elderly people who have lost some or all of their hearing.

Deafness is low incidence and random among children but is more prevalent among senior citizens who form a large percentage of the population. The percentage of people who are deaf or hard of hearing varies from 0.2 percent for those under 18 to 50 percent for senior citizens over age 75. This is attributable to the fact that most senior citizens progressively lose functionality in hearing as they age. It is a predictable and widespread phenomenon. Many senior citizens also relocate to retirement communities creating population concentrations. As a result, the needs of and solutions for social interaction and learning challenges differ for each group. The fact that deafness is low incidence and thinly dispersed has several subtle implications. For example, more than half of all deaf students have no classmates with similar challenges. Without appropriate support accommodations to facilitate inclusion by peers or to encourage interaction or group communication, they face participation barriers in informal social and formal learning communities. Older people, on the other hand, often live close to and interact frequently with each other but face difficulties in communicating with loved ones or in adapting to digital information that is gradually becoming less accessible to them. Symptoms may be mild, moderate, severe, or profound. A patient with a mild hearing impairment may have problems understanding speech, especially if there is a lot of noise around, while those with moderate deafness may need a hearing aid. Some people are severely deaf and rely on lip-reading to communicate with others. People who are profoundly deaf can hear nothing at all and can find themselves totally reliant on lip-reading or sign language.

Mechanism of Hearing

The hearing processes sound waves into perceived sounds translated from nerve impulse (electric activity). This process is known as auditory transduction. In order to transform sound to the neural nervous system, the energy of sound waves is transduced into three transformations: vibration, hydraulic motion (uid vibration), and nerve impulse. The mechanism of hearing will be divided into those three parts.

A. From sound into vibration

Sound is a mechanical wave. It needs a medium to propagate. The sound itself is created by something that vibrates, for example, a fork. Then, the vibration creates Mechanism of Hearing the hearing processes sound waves into perceived sounds translated from nerve impulse (electric activity). This process is known as auditory transduction. In order to transform sound to the neural nervous system, the energy of sound waves is transduced into three transformations: vibration, hydraulic motion (uid vibration), and nerve impulse. The mechanism of hearing will be divided into those three parts**.**

B. From sound into vibration

Sound is a mechanical wave. It needs a medium to propagate. The sound itself is created by something that vibrates, for example, a fork. Then, the vibration creates air particles' movement due to a change of air pressure. The sound wave through air reaches the human ear via pinna. As shown in Figure 4, the longitudinal wave of sound reaches pinna and concha.

The minimum detectable level of sound to reach pinna corresponds to an energy ow (or intensity) of 10□12 W=m2 in a sound pressure wave (threshold of hearing). Then due to its shape, the most sensitive frequencies are ranging from 1000 to 4000 Hz. In the outer ear, sound frequencies from 1500 to 7000 Hz are amplied about 10-15 dB. The last step in this stage is the sound wave hit the eardrum, causing mechanical vibration through ossicles.

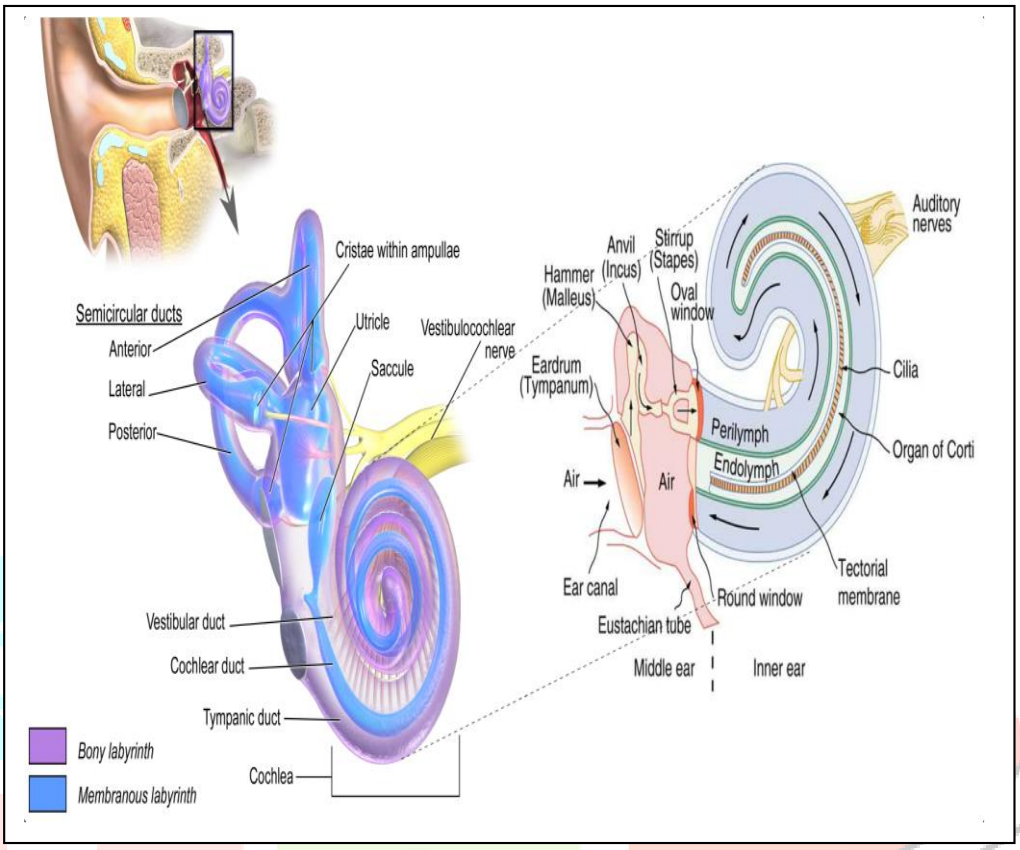

Figure 1: Detail anatomy of inner ear.

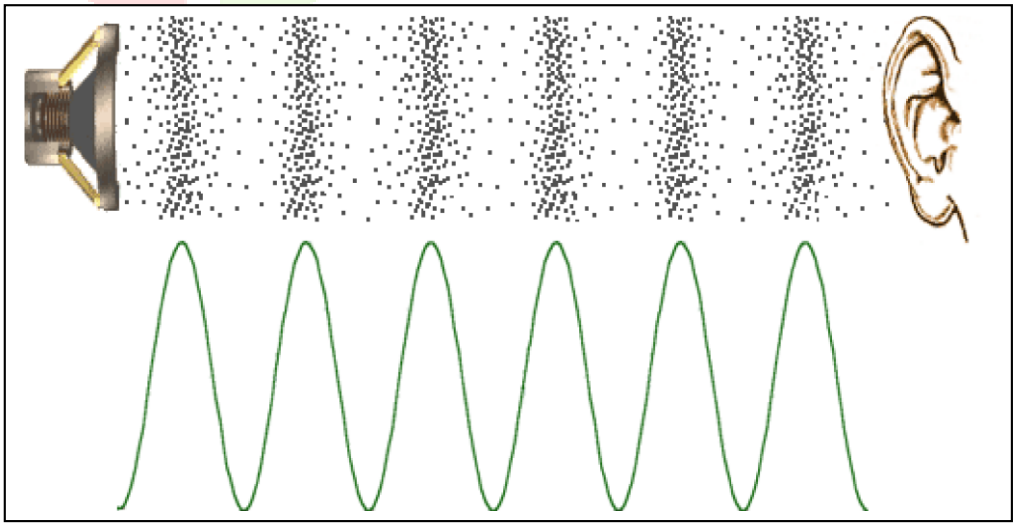

Figure 2: Propagation of sound wave from sound source to ear.

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C. From mechanical vibration into uid vibration

Vibrations of the eardrum are transmitted to malleus, incus, and stapes (stirrup). The stapes contact the oval window as a pneumatic lever. Figure 5 shows the mechanism of converting mechanical vibration into the uid (hydraulic) vibration in the cochlea. The two mechanics in the ossicles can be calculated to amplication of energy: (1) thearea ratio between the tympanic membrane and stapes footplate; (2) the length ratio of malleus and incus. The rst mechanic determines pressure amplication, while the second one determines force amplication. From the illustration in Figure, it is shown that the area of the stapes footplate is very small compared to the area of the tympanic membrane. The actual ratio is 17.

Hence, the power application is 17.

$$\frac{P_{cochlea}}{P_{eardrum}} = \frac{\text{Area of tympanum}}{\text{Area of stapes footplate}} = 17$$

Hence, the total ampli_cation of sound pressure in cochlea (Pc) compared to sound pressure in eardrum (Pe) can be calculated as in ideal transformer,

Pc / Pe = 17 _ 1:2 = 20

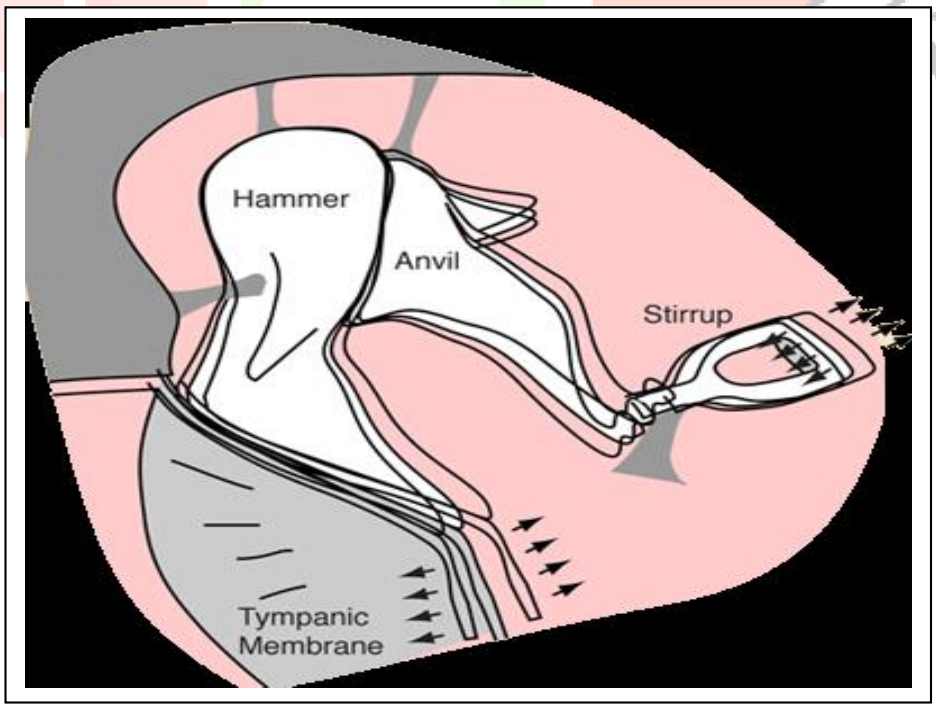

Figure 3: Vibrations in the middle ear

D. From uid vibration into nerve impulse

The uid vibration on the cochlear duct from scala vestibuli to scala tympani causes movement on the basilar membrane and hair cells. Displacement of the basilar membrane toward the scala vestibuli produces a shearing force between the basilar membrane and the tectorial membrane, causing the stereocilia on the hair cells to be bent to the right. Displacement of the BM toward the scala tympani produces the opposite e_ect, causing the stereocilia to be bent to the left. When the stereocilia are bent to the right, the tip links are stretched, and ion channels are opened. Positively charged potassium ions (K+) enter the cell, causing the interior of the cell to become more positive (depolarization). It stimulates them to send nerve impulse to the cochlear nerve and on the brain. When the stereocilia are bent in the opposite direction, the tip links slacken, and the channels close. Here, the sounds we perceived are processed in different loudness and pitches by the cochlea. The loudness corresponds to the high of the uid wave, and the frequencies we perceived correspond to the frequency selectivity of the basilar membrane. Figure shows coiled cochlea and its uncoiled section where sound transduction was performed to convert uid vibration into a nerve impulse.

II. Definition of Deafness in Unani System of medicine:

If a child born with loss of power of hearing (*Quwwatesamiah*) then he cannot talk because when the child listens, then he talks, so the power of hearing is important. The term deafness may imply total or severe hearing loss to a patient. The patient may complain of hearing loss or reduction in hearing which may be in one or both ears. Hard of hearing; a human being is said to be hard of hearing if he/she has a hearing loss which can be helped by medical/surgical methods. Hearing loss can be classified as conductive deafness, sensorineural deafness and mixed deafness. In Unani literature, the causes of hearing impairment are *Auram*, *Buthur* (pustules), *Ghaleezakhlat* (morbid viscid humours), congenital, *Waram* (swelling), *Sudda* (obstruction), *Sue Mizaj* (altered temperament), *Tafarruq-i-Ittisal* (discontinuity), tumours, foreign bodies etc., and hearing impairment is classified as *Waqr*, *Samam or Tarash*.

A. Waqr (Deafness)

It is defined as complete loss of hearing.

B. Samam (Congenital Deafness)

An anomaly where patient has no external auditory meatus.

C. Tarash (Impaired Hearing)

It is defined as diminished power of hearing. It can be acquired, congenital, after acute diseases, traumatic, senile, hot and cold impaired temperament of ear, infiltration of viscous humours in auditory nerve, obstruction in the ear passage by ear polyp, foreign body or tumours, *akhlateghaleez* (morbid viscid humours), and wax etc.

III. Causes of Deafness.

Some diseases or circumstances that can cause deafness include:

- chicken pox
- cytomegalovirus
- mumps
- meningitis
- sickle cell disease
- syphilis
- lyme disease
- Diabetes, as studies have shown that people with diabetes are more likely to have some kind of hearing loss.
- a treatment for tuberculosis (TB), streptomycin,
- hypothyroidism
- arthritis
- some cancers
- teenagers exposed to second-hand smoke

The inner ear is home to some of the most delicate bones in the body, and damage to the eardrum or middle ear can cause hearing loss and deafness in a range of ways.

IV. Hearing loss vs. Deafness

It is important to distinguish between the different levels of hearing loss.

Hearing loss: This is a reduced ability to hear sounds in the same way as other people.

Deafness: This occurs when a person cannot understand speech through hearing, even when sound is amplified.

Profound deafness: This refers to a total lack of hearing. An individual with profound deafness is unable to detect sound at all. The severity of hearing impairment is categorized by how much louder volumes need to be set at before they can detect a sound. Some people define profoundly deaf and totally deaf in the same way, while others say that a diagnosis of profound deafness is the end of the hearing spectrum.

V. Physiology of Hearing.

Sound waves enter the ear, move down the ear or auditory canal, and hit the eardrum, which vibrates. The vibrations from the eardrum pass to three bones known as the ossicles in the middle ear. These ossicles amplify the vibrations, which are then picked up by small hair-like cells in the cochlea. These move as the vibrations hit them, and the movement data is sent through the auditory nerve to the brain. The brain processes the data, which a person with functional hearing will interpret as sound.

There are three different types of hearing loss:

1) Conductive hearing loss

This means that the vibrations are not passing through from the outer ear to the inner ear, specifically the cochlea. This type can occur for many reasons, including:

- **A.** An excessive build-up of earwax
- **B.** Glue ear
- **C.** An ear infection with inflammation and fluid buildup
- **D.** A perforated eardrum
- **E.** Malfunction of the ossicles
- **F.** A defective eardrum

Ear infections can leave scar tissue, which might reduce eardrum function. The ossicles may become impaired as a result of infection, trauma, or fusing together in a condition known as ankylosis.

2) Sensorineural hearing loss

Hearing loss is caused by dysfunction of the inner ear, the cochlea, auditory nerve, or brain damage. This kind of hearing loss is normally due to damaged hair cells in the cochlea. As humans grow older, hair cells lose some of their function, and hearing deteriorates. Long-term exposure to loud noises, especially high-frequency sounds, is another common reason for hair cell damage. Damaged hair cells cannot be replaced. Currently, research is looking into using stem cells to grow new hair cells. Sensorineural total deafness may occur as a result of congenital deformities, inner ear infections, or head trauma.

Fig. 4 Types of Hearing Loss

Fig. 5 Types of Hearing Loss

3) Mixed hearing loss

This is a combination of conductive and sensorineural hearing loss. Long-term ear infections can damage both the eardrum and the ossicles. Sometimes, surgical intervention may restore hearing, but it is not always effective.

4) Deafness and speech

Hearing loss can affect speech ability depending on when it occurs.

A. Prelingual deafness

This is an inability to fully or partially hear before learning how to utter or understand speech. An individual with prelingual deafness was born with a congenital deformity or will have lost hearing during infancy. In the majority of cases, people with prelingual deafness have hearing parents and siblings. Many are also born into families who did not already know sign language. They consequently also tend to have slow language development. The few who were born into signing families tend not to face delays in language development. If children with prelingual deafness are given cochlear implants before the age of 4 years, they can acquire oral language successfully. Oral language and the ability to use social cues are very closely interrelated. That is why children with hearing loss, especially those with severe symptoms, may not only experience delayed language development, but also slower social development. As a result, children with prelingual deafness risk becoming socially isolated, unless they attend a school that has a well-run special needs department with other children who have the same condition. Children who identify with a "deaf subculture," or those who have learned how to use sign language, might feel less isolated. However, some young people might experience isolation if their parents have not yet learned sign language. There are cases of children with profound deafness who find themselves on the outer fringes of their hearing peers' social circles while not being fully accepted by peers with total deafness, due to a lack of fluency in sign language.

B. Post-lingual deafness

Most people with hearing loss have post-lingual deafness. They acquired spoken language before their hearing was diminished. A medication side effect, trauma, infection, or disease may have caused losing their sense of hearing. In most people with post-lingual deafness, hearing loss onsets gradually. Household members, friends, and teachers may have noticed a problem before they acknowledged the disability. Depending on the severity of hearing loss, the individual may have had to use hearing aids, receive a cochlear implant, or learn how to lip-read. People who experience hearing loss face different challenges, depending on when it occurs and how long it takes to develop. They might have to become familiar with new equipment, undergo surgery, learn sign language and lip reading, and use various communication devices. A feeling of isolation is a common problem, which can sometimes lead to depression and loneliness. A person with post-lingual hearing loss also has to face the often-distressing process of coming to terms with a disability. The condition may also pose challenges for household members, loved ones, and close friends, who have to adapt to the hearing loss. Miscommunication can place a strain on relationships, not only for the person with the hearing impairment, but also the people

around them. If the hearing loss is gradual and has not yet been diagnosed, family members may mistakenly believe that the individual with the condition is becoming more distant.

VI. Causes of Hearing Loss

Congenital causes of hearing loss include a family history of hearing loss, infections during pregnancy (such as rubella), complications during pregnancy (such as the Rh factor, maternal diabetes, or toxicity). The most common causes of acquired hearing loss is exposure to noise, fluid in the middle ear, infections, childhood diseases, such as mumps, measles, or chicken pox and head trauma. Syndromes can leads to hearing loss include Down syndrome, Usher syndrome, Treacher Collins syndrome, Crouzon syndrome and Alport syndrome. In 85% to 90% cases of sudden sensori neural hearing loss (SSNHL), in spite of thorough evaluation, the underlying cause is unknown or uncertain at the time of presentation and treatment decisions are generally made without knowledge of the etiology.

C. Bilateral Hearing Loss

Presbycusis is a symmetric, progressive deterioration of hearing in elderly patients. The etiology is a combination of inherited and environmental factors, including lifetime noise exposure and tobacco use. Noise trauma is the most common preventable cause of sensorineural hearing loss. Gunfire, explosions and loud music can cause irreversible hearing impairment. High frequencies are affected first, typically at 4,000 Hz, followed by middle and lower frequencies. A less common cause of hearing loss is ototoxin exposure, typically from diuretics, salicylates, aminoglycosides and many chemotheraupetic agents. Autoimmune hearing loss present with rapidly progressive bilateral sensorineural hearing loss and poor speech discrimination scores and they also may have vertigo or disequilibrium.

D. Unilateral Hearing Loss

Temporal bone fractures can cause unilateral sensorineural and conductive hearing loss. When the fracture line involves the bony labyrinth, sensorineural hearing loss occurs. Meniere's disease patients report unilateral fluctuating hearing loss with aural fullness, tinnitus and episodic vertigo.[10]

There are four types of hearing loss, as follows. Conductive hearing losses are caused by abnormality in the conductive apparatus (external or middle ear). Conductive hearing losses usually affect all frequencies of hearing evenly and do not result in severe losses. Sensori neural hearing losses result from damage to the delicate sensory hair cells of the inner ear or the nerves that supply it. These hearing losses can range from mild to profound. A mixed hearing loss refers to a combination of conductive and sensorineural loss and means that a problem occurs in both the outer or middle and the inner ear. A central hearing loss results from damage or impairment to the nerves or nuclei of the central nervous system, either in the pathways to the brain or in the brain itself. Diagnosis can be done with otoscope (used to examine the external auditory canal, tympanic membrane), Paper test, Watch test, tuning fork test (Rinne's test and Weber's test). Hearing acuity can be measured with either objective or subjective tests in childrens. Objective examonation include brainstem auditory evoked response, otoacoustic emissions (OAE), auditory steady state response (ABR) and impedance testing (Tympanometry). Subjective tests include behavioural and pure-tone testing etc. Management includes aural toilet, cerumenolytics, antibiotics, myringotomy, stapedectomy, hearing aids, cochlear implantation, counseling to subjects and parents etc.

The symptoms of hearing impairment depend on its cause. Some people are born without being able to hear, while others suddenly become deaf due to an accident or illness. For most people, symptoms of deafness progress gradually over time.

Some conditions may have hearing loss as a symptom, such as tinnitus or stroke.

Hearing impairment in infants

The following signs may indicate a hearing problem:

- **A.** Before the age of 4 months, the baby does not turn their head toward a noise.
- **B.** By the age of 12 months, the baby still has not uttered a single word.
- **C.** The infant does not appear to be startled by a loud noise.
- **D.** The infant responds to you when they can see you, but respond far less or do not respond at all when you are out of sight and call out their name.
- **E.** The infant only seems to be aware of certain sounds.

Hearing impairment in toddlers and children

These signs might become more evident in slightly older children:

- **A.** The child is behind others the same age in oral communication.
- **B.** The child keeps saying "What?" or "Pardon?"
- **C.** The child talks in a very loud voice, and tends to produce louder-than-normal noises.
- **D.** When the child speaks, their utterances are not clear.

VII. Different levels of deafness

There are four levels of deafness or hearing impairment. These are:

- **A. Mild deafness or mild hearing impairment:** The person can only detect sounds between 25 and 29 decibels (dB). They may find it hard to understand the words other people are saying, especially if there is a lot of background noise.
- **B. Moderate deafness or moderate hearing impairment:** The person can only detect sounds between 40 and 69 dB. Following a conversation using hearing alone is very difficult without using a hearing aid.
- **C. Severe deafness:** The person only hears sounds above 70 to 89 dB. A severely deaf person must either lip-read or use sign language in order to communicate, even if they have a hearing aid.
- **D. Profound deafness:** Anybody who cannot hear a sound below 90dB has profound deafness. Some people with profound deafness cannot hear anything at all, at any decibel level. Communication is carried out using sign language, lip-reading, or reading and writing.

Diagnosis of Deafness.

Patients who suspect something is wrong with their hearing will initially go and see their doctor. The doctor will talk to the patient and ask several questions regarding the symptoms, including when they started, whether or not they have gotten worse, and whether the individual is feeling pain alongside the hearing loss.

A. Physical examination

An otoscope is an instrument that allows a physician to examine the inside of the ear.

The doctor will look into the ear using an otoscope. This is an instrument with a light at the end. The following may be detected during the examination:

1. A blockage caused by a foreign object
2. A collapsed eardrum
3. An accumulation of earwax
4. An infection in the ear canal
5. An infection in the middle ear if a bulge is present in the eardrum.
6. Cholesteatoma, a skin growth behind the eardrum in the middle ear.
7. Fluid in the ear canal
8. A hole in the eardrum

The doctor will ask questions about the person's experiences with hearing, including:

1. Do you often find yourself asking people to repeat what they said?
2. Do you find it hard to understand people on the telephone?
3. Do you miss the doorbell when it rings? If so, does this happen frequently?
4. When you chat with people face-to-face, do you have to focus carefully?
5. Has anybody ever mentioned to you that you might have a problem with your hearing?
6. Do you find more people mumble today than they used to?
7. internal you hear a sound, do you often find it hard to determine where it is coming from?
8. When several people are talking, do you find it hard to understand what one of them is telling you?
9. Are you often told that the television, radio, or any sound-producing device is too loud?
10. Do you find male voices easier to understand than female voices?
11. Do you spend most of each day in a noisy environment?
12. Have you often found yourself misunderstanding what other people say to you?
13. Do you hear rushing, hissing, or ringing sounds?
14. Do you avoid group conversations?

If you answered "yes" to most of the above questions, see a doctor and have your hearing checked.

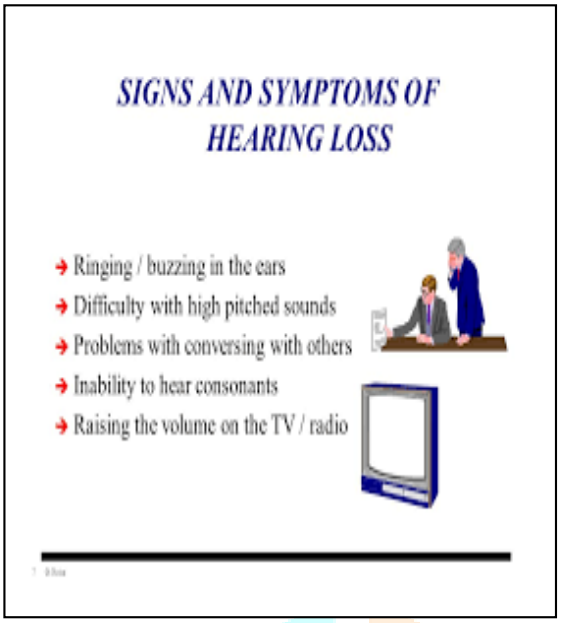

Fig. 7 Sign of Hearing Loss

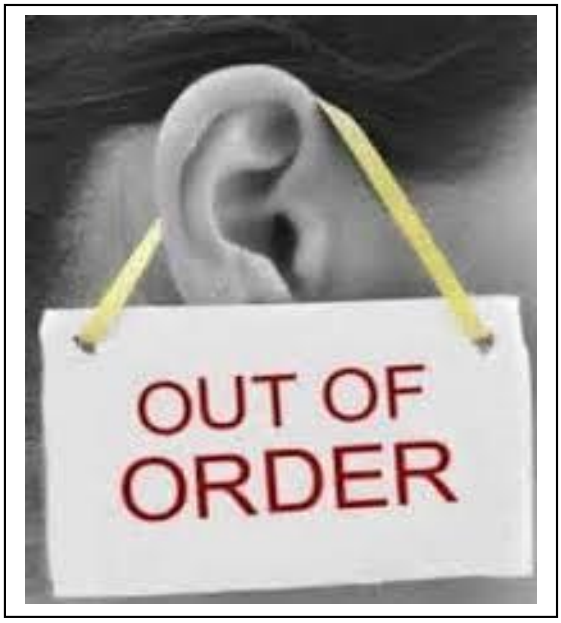

Fig. 8 Hearing Loss

B. General screening test

A doctor may ask the patient to cover one ear and describe how well they hear words spoken at different volumes, as well as checking sensitivity to other sounds. If the doctor suspects a hearing problem, they will probably be referred to either an ear, nose, and throat (ENT) specialist or an audiologist. Further tests will be carried out, including:

A tuning fork test: This is also known as the Rinne test. A tuning fork is a metal instrument with two prongs that produces a sound when it is struck. Simple tuning fork tests may help the doctor detect whether there is any hearing loss, and where the problem is. A tuning fork is vibrated and placed against the mastoid bone behind the ear. The patient is asked to indicate when they no longer hear any sound. The fork, which is still vibrating, is then placed 1 to 2 centimeters (cm) from the auditory canal. The patient is asked again whether they can hear the fork. As air conduction is greater than bone conduction, the patient should be able to hear the vibration. If they cannot hear it at this point, it means that their bone conduction is superior to their air conduction. This suggests a problem with sound waves getting to the cochlea through the ear canal.

Audiometer test: The patient wears earphones, and sounds are directed into one ear at a time. A range of sounds is presented to the patient at various tones. The patient has to signal each time a sound is heard. Each tone is presented at various volumes, so that the audiologist can determine at which point the sound at that tone is no longer detected. The same test is carried out with words. The audiologist presents words at various tones and decibel levels to determine where the ability to hear stops.

Bone oscillator test: This is used to find out how well vibrations pass through the ossicles. A bone oscillator is placed against the mastoid. The aim is to gauge the function of the nerve that carries these signals to the brain.

Routine screening of children

The American Academy of Pediatrics (AAP) recommends that children have their hearing tests at the following times:

- when they start school
- at 6, 8, and 10 years of age
- at least once when they are in middle school
- once during high school

Testing newborns

The otoacoustic emissions (OAE) test involves inserting a small probe into the outer ear; it is usually done while the baby is asleep. The probe emits sounds and checks for "echo" sounds bouncing back from the ear. If there is no echo, the baby might not necessarily have a hearing problem, but doctors will need to carry out further tests to make sure and to find out why

IX. Treatment of Deafness.

Help is available for people with all types of hearing loss. Treatment depends on both the cause and severity of the deafness. Sensorineural hearing loss is incurable. When the hair cells in the cochlea are damaged, they cannot be repaired. However, various treatments and strategies can help improve quality of life.

X. Herbal Drugs used in treatment of Deafness:

Unfortunately, it is natural for us to lose our hearing as we age. The deterioration of your ability to hear occurs gradually throughout the years, and it happens at such a pace it makes it difficult for anyone to notice. Typically a person does not see this progression until it affects their lives, and even then, not everyone will admit that they have a hearing problem. While we can't avoid the aging process, your lifestyle and dietary choices do play a part in this progression and can affect your hearing. Fueling your body properly and watching what you intake plays a huge role when you are trying to maintain your hearing. While there are no natural remedies to cure your impaired hearing, there are plants found in nature that are known to help you preserve your ability to hear. Knowing which herbs that are good for hearing loss may help you maintain what you already have. What you intake plays a significant role in how well your body functions, ears included. While there are no cures for hearing loss, maintaining a proper diet, and knowing which herbs that are good for hearing loss can go a long way in preserving your ability to hear.

A. **Hawthorn Berry**– For centuries, hawthorn berries have been used for high blood pressure and as a remedy for digestive issues. However, hawthorn berry might also help prevent hearing loss, as it improves blood flow and circulation.

B. **Ginkgo Biloba**– A popular herb in Chinese medicine has been grown for thousands of years and has a variety of uses. In certain countries, this herb is used to treat inner ear disorders and is thought to increase blood circulation, which may help stabilize hearing loss. *Ginkgo biloba* extract is a favorite of natural healers. Advocates of this type of treatment suggest that taking 60 to 240 milligrams of ginkgo biloba per day can help with tinnitus and other noise associated with hearing loss.

C. **Spearmint**– A popular flavor in toothpaste and chewing gum, spearmint contains folic acid, which studies have shown that low levels of folic acid are linked with age-related hearing loss. This pleasant-smelling species of mint contains other antioxidants, vitamins, and nutrients as well, so go enjoy some tea!

D. **Garlic**– While defining garlic as a spice may be more suitable, it doesn't change the fact that garlic is excellent for the body, as it contains a plethora of health benefits. Adding garlic to your diet may help combat hearing loss because it helps increase blood flow. Increased blood flow equals a healthy cochlea, which transmits sound impulses to the brain for conversion, so this is an organ you want to keep healthy!

E. **Turmeric**– Turmeric has been used since ancient times, and for a good reason, as it has many healing and health properties. Turmeric is excellent at relieving pain and inflammation and is also high in potassium. Getting enough potassium in your diet is vital if you want to have healthy ears. Potassium levels drop naturally as we age, and this can cause problems since potassium plays a crucial role in cell interaction in the inner ear. Another supposed "superfood," turmeric is also commonly used in the Eastern hemisphere for its medicinal values. Turmeric is loaded with potassium, which is great for your ears. Alongside this, turmeric is extremely bioactive, meaning the positive changes it makes take hold quickly and effectively.

F. **Echinacea.** Also known as "coneflowers," echinacea is a flower commonly found growing in North America. There have been a few studies that have found echinacea to be somewhat effective as an antibiotic – it has previously been tested against the common cold, as well as some other infections. As you can tell from this description, echinacea is a nice supplement, but **won't solve your hearing loss on its own**. Keep this sentiment in mind, as it will be a common theme throughout the article – natural remedies for hearing loss are supplements, not fix-all cures.

Fig. 9 Turmeric used in treatment of Deafness

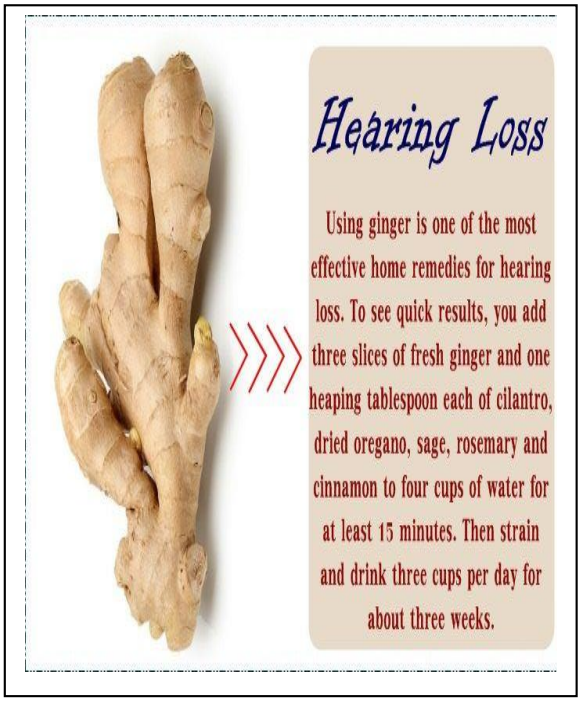

Fig. 10 Ginger used in treatment of Deafness

G. Ginger. This common ingredient in a lot of Eastern dishes has a hidden restorative property. Well, not exactly hidden – ginger has been used as a natural remedy for centuries. Ginger is often considered a "superfood." This term has zero scientific value, but if it was an accepted term, ginger would almost definitely fall beneath its umbrella. It has countless medicinal properties, acting as an antihistamine, painkiller, and – in this case – an antibiotic. Not only can it help with infections, but ginger contains anti-inflammatory properties that help quell any inflammation in the nervous system. As you might remember, the nervous system is responsible for taking sound from your ears to your brain, so any measures you can take to improve your nervous system could only serve to improve your hearing. Supporters of natural healing recommend drinking ginger tea. To make your own, boil the following in a covered pot for 15 minutes:

1. 4 cups water
2. 3 slices fresh ginger
3. 1 tablespoon cilantro
4. 1 tablespoon cinnamon
5. 1 tablespoon oregano
6. 1 tablespoon rosemary
7. 1 tablespoon sage

After boiling, strain and drink three cups a day for a minimum of three weeks.

H. **Tea Oil.** Tea tree oil is believed by many to positively treat hearing loss and deafness. You should use this remedy with caution and be sure to mention it to your doctor before attempting. You can mix and then heat:

1. 3 drops tea tree oil
2. 2 tablespoons olive oil
3. 1 teaspoon colloidal vinegar
4. 1 teaspoon apple cider vinegar

You can then place the mixture into your ears and sit still for five minutes. Proponents claim that if you do this four times per day, you'll see results after two days.

I. **Cajeput essential oil**

Some believers of natural treatment suggest cajeput essential oil can reverse hearing loss naturally. Massage a few drops of cajeput essential oil behind and in front of your ears to improve your ability to hear.

XI. Conclusions

It is important to engage deaf or hard of hearing people on their own terms, and letting them take the lead, and recognize that technology powerfully shapes human outcomes. Technology design is an ongoing process that remains sensitive to the evolution of technology and of consumers' changing needs and desires. It is fairly common for developers to focus on features that are relatively unimportant to deaf individuals even when explicitly designing accessibility into communications programs. Investigation of a specific issue in collaboration with a deaf or low vision individual offers a unique teaching opportunity for peers to consider complex, real world issues as a balancing act between the technology, interface and

cognitive and perceptual capabilities. Properly designed tools have the potential to create a new educational and social paradigm for deaf individuals. Integrating accessibility in core infrastructure can lower the difficulty of providing accessible applications, which can in turn be scaled to address the needs of deaf individuals and increase inclusiveness of communities. While much accessibility progress has been made, there are specific areas needing intensive attention. Deaf individuals should have access to services in centers that accumulate a pool of expertise. These centers can also offer an opportunity to meet others and receive multidisciplinary services from qualified personnel. Further, these services can facilitate the collection and measurement of qualitative and quantitative data. This could include demographics, language access and acquisition,

Literacy and academic benchmarks, cognitive ability, social/emotional development, post-school outcomes, and developmental indicators. Such data retention can assess the efficacy of programs at the local, state and national level.

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