

## HEARING LOSS AND LANGUAGE DELAY IN LITTLE CHILDREN

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This is being written to provide information to concerned parents, caregivers, teachers, and others about hearing loss and how it affects a child's speech and language development. More importantly it incorporates what can be done to help the child if a *mild or moderate hearing loss* is the basic problem. This information is from 41 years of experience as a certified, licensed audiologist, working with thousands of children. Children with a mild or moderate hearing loss causing speech and language delay exhibit certain behaviors which are:

1. Often says "Huh?" or "What?"
2. Inattentive.
3. May ignore sound.
4. Inconsistent response to sound.
5. Hears when he/she "wants to".
6. Acts "stubborn".
7. Disruptive—may be called "bad".
8. May be overactive.
9. May be withdrawn.
10. Acts "stupid" or "dumb" sometimes.
11. Unusually visually oriented.
12. Many misarticulations (mispronunciations).
13. Voice quality sounds "different" or "odd".
14. Speech may sound "mushy".
15. Language delay.

### **If your child exhibits one or more of these behaviors what should you do?**

The child should be referred to a certified, licensed audiologist for **complete audiometric testing**. The child will be given what is called a pure tone (PT) test where he/she responds to tones that change in frequency (pitch) and intensity (loudness). These tones will be tested by air conduction (AC) and if abnormal will be tested by bone conduction (BC). A speech reception threshold (SRT) and a word recognition score will be obtained. These two tests are explained more fully on page 11 in this paper. All results will be recorded on an audiogram.

Important Note: Other tests, including otoacoustic emission (OAE) testing, may be done but the above tests are important ones giving information about the hearing status of the child. If there is a medical condition, the audiologist will refer you to an otolaryngologist (ear, nose and throat doctor). If the child is not seen by an audiologist, the only test he/she may have will probably be an OAE test which is not sufficient. The OAE test yields important information, but it does not "test

hearing.” It simply says the child “passes” or “fails” certain criteria. Also 5% of those who “fail” will have normal hearing when tested and 5% who “pass” will actually have a hearing loss. To know the true hearing status, the child should have the speech and pure tone tests.

Before going any further, **the following will explain why it is so important to know the status of your child's hearing.**

Seventy-five percent (75%) of our knowledge in early childhood is gained through hearing. Although you have often heard that a picture is worth a thousand words, the truth is, that for **adequate normal learning, hearing is more important than the ability to see.**

**The later ability to read is more closely related to hearing than to vision.**

That seems incredible to most people. Reading is a skill learned after learning to talk or speak. Children understand speech long before they can speak. All children speak long before they can use the written symbols that portray speech; and speech is learned by having normal hearing.

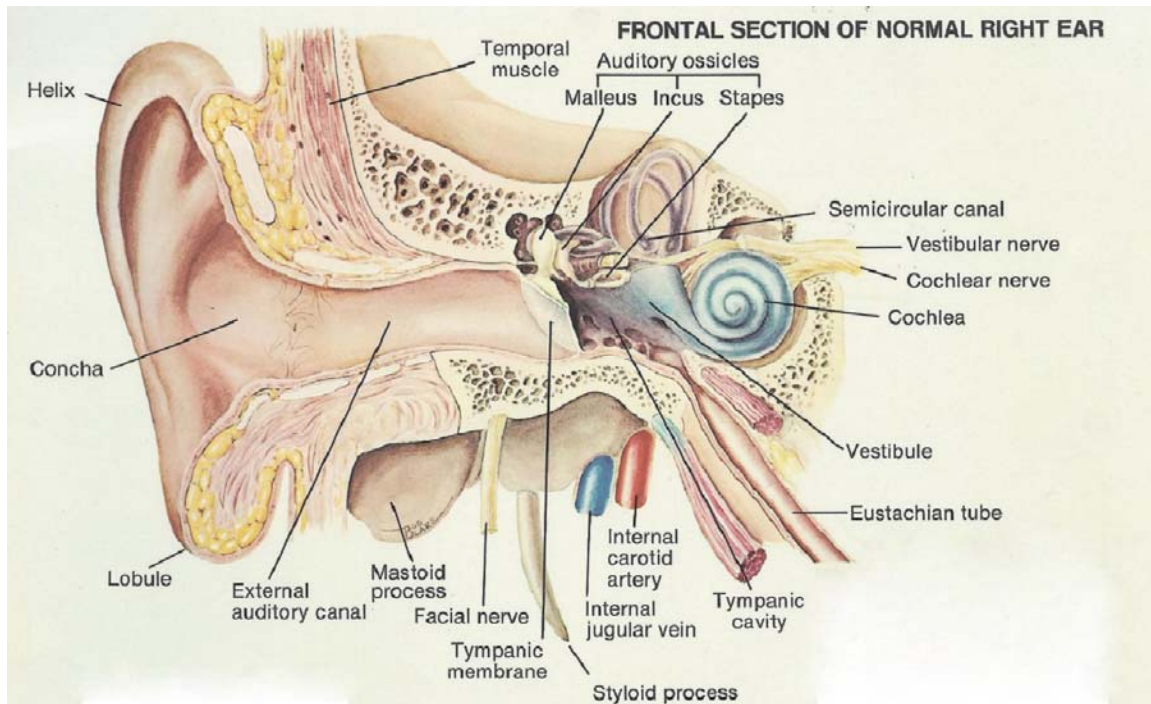
There is an important difference between "hearing" and "listening." Listening is an active process--you have to "pay attention" to interpret the sounds that you have heard. If a child has a hearing loss that fluctuates (comes and goes), he/she may become **a poor listener**. Or, if there is a loss of any degree, he/she may be unable to hear the sounds of speech correctly, so may "mispronounce" words, which is called an "**articulation disorder**." A certified speech language pathologist can determine this and provide treatment as needed.

The most devastating problem for children with a hearing loss of any degree, whether permanent or fluctuating, may be a **language deficit** because language learning appears to rely on hearing. Language depends upon our ability to use symbolism to express ideas, thoughts, and feelings. To understand language you have to understand the meaning of the words. Speech is an important component of language, but language also includes thinking, gesturing, reading, and writing. Often the problem for children with a hearing loss is not an inability to speak, but their language concepts are limited. This can be determined and treated by a certified speech language pathologist.

If a child does have a hearing loss, **background noise** is very distracting and interferes severely with his/her ability to acquire speech and language. Our modern world is very noisy. Background noise in the home may be the music or speech from a radio and/or television, the pots and pans in the kitchen, the dishes or silverware being moved around on the table, family members laughing or talking, a dog barking, etc. Later in this paper you will find under Treatment that controlling the background noise is recommended.

After your child has had the complete audiometric test, the results should be explained to you. To help you understand this information, let's review how we hear.

## ANATOMY OF THE EAR AND HOW WE HEAR



Used by permission from GlaxoSmithKline

A brief explanation: sound enters the ear canal (outer ear) and makes the tympanic membrane (eardrum) move. Behind the eardrum is the middle ear which is a small space filled with air holding three tiny bones called the malleus (hammer), incus (anvil), and stapes (stirrup). They are attached in such a way that, when the eardrum moves, they move. The movement of the stirrup causes fluid in the cochlea (inner ear) to move. There are several thousand hair cells that are activated causing the nerve fibers of the inner ear to send the signal to the auditory receiving area of the brain where you actually "hear."

If all the various parts of these structures are working as they should, the person will have "normal" hearing. If not, there will be a hearing loss which may be **CONDUCTIVE, SENSORI-NEURAL, OR MIXED.**

## TYPES OF HEARING LOSSES

### CONDUCTIVE

A conductive loss means there is a problem in the outer and/or the middle ear. Usually the problem is in the middle ear due to some problem restricting proper movement of the three tiny bones in that area. In children, the loss is most likely to be caused by fluid in the middle ear. That cavity should have air in it that is provided to the middle ear through the Eustachian tube.

In general, conductive losses can be alleviated by medical treatment, so are temporary. Usually word recognition scores are good as the person hears and understands if sound is loud enough.

### SENSORI-NEURAL

A sensori-neural loss means that the sensory hair cells of the inner ear or the nerve fibers of the hearing nerve are damaged. This cannot be alleviated medically, so will be permanent. Word recognition scores can be quite variable. Hearing aids are usually recommended.

### MIXED LOSS

A mixed loss is a combination of middle ear and inner ear problems. The conductive component is usually amenable to medical treatment. The sensori-neural component will remain. Thus, amplification may be needed. Word recognition scores can be quite variable.

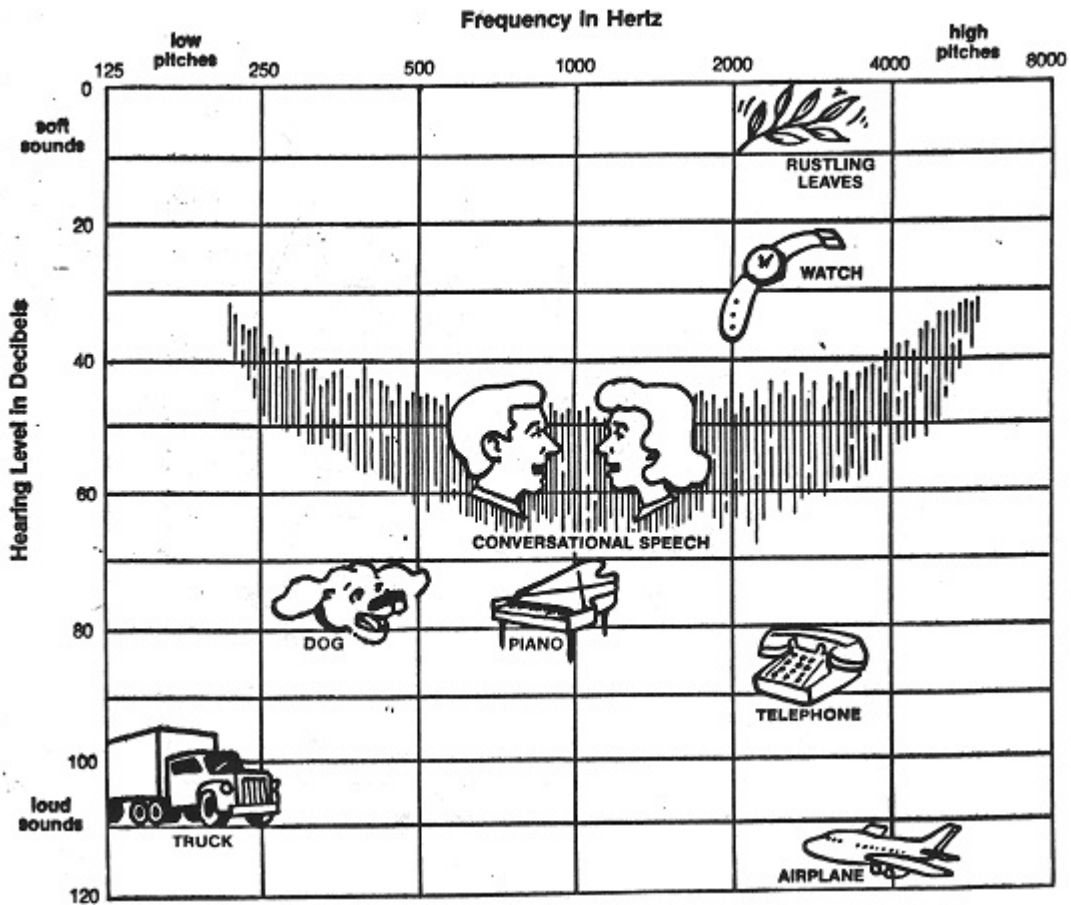
### SPECIAL NOTE

There may be a problem with the auditory receiving area of the brain so that the person does not "understand" even though the other parts of the hearing system are "normal." If the auditory receiving area is affected, the person could be diagnosed with a "Central Hearing Loss," an "Auditory Neuropathy Spectrum Disorder (ANSO)" or an "Auditory Processing Disorder" (APD). All of these are beyond the scope of this paper, so will not be discussed.

When your child has had the complete audiometric testing, the results will be shown on an audiogram.

## THE AUDIOGRAM

An audiogram is a graph of hearing. The very soft sounds (like rustling leaves) are at the top of the audiogram and the very loud sounds (like a jet plane) are at the bottom. The loudness (intensity) of sounds is measured in decibels (dB). The low pitches (frequencies) such as a truck engine are on the left of the audiogram and the high pitches such as a telephone ring are on the right side. These pitches (frequencies) are measured in Hertz (Hz).

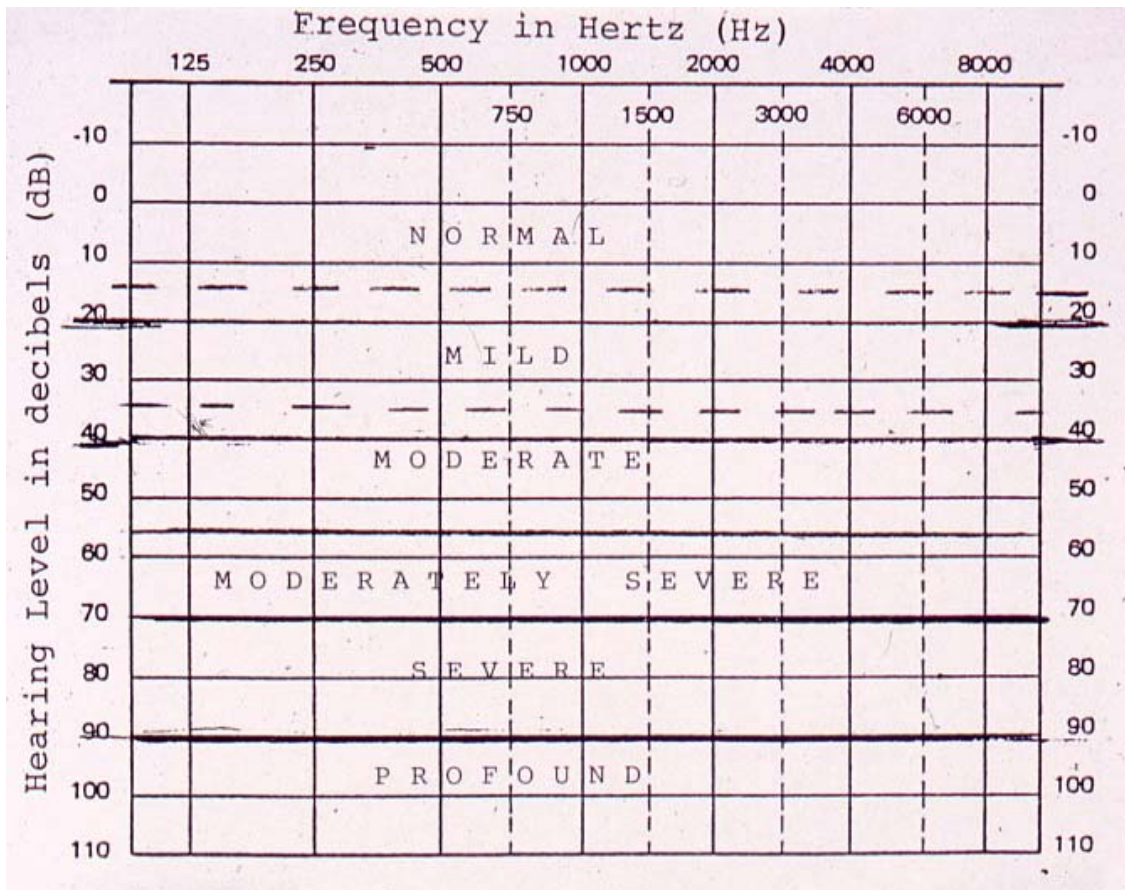


This diagram shows where different sounds are located on the audiogram. The shaded area is where many of our speech sounds occur. Normal conversational speech is represented in the center of the audiogram (40-60 dB). This will be explained more fully by the audiologist.

[The above adapted from Hearing in Children (Fifth Edition, pg. 18, 2002) and used with author's permission.]

Hearing losses are classified by degree of loss as **mild, moderate, moderately severe, severe, and profound**. The **degree of loss** is an important consideration.

### DEGREE OF HEARING LOSS



Shown above is a general description as there is no universal agreement about what constitutes "normal" hearing or a "mild" loss. For adults 25 dB or better is considered within normal limits. For a child a hearing level at 15-20 dB puts the child at a disadvantage, especially in the classroom, and particularly if there is any background noise.

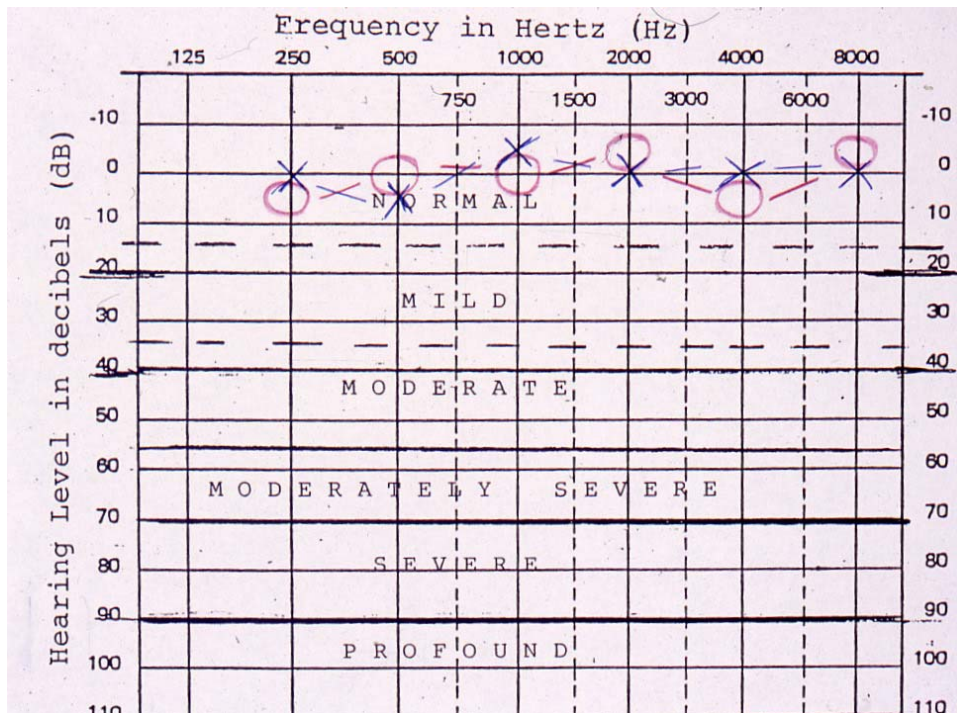
Note: Please remember that audiograms will vary from individual to individual but the ones that follow are "typical."

## SYMBOLS

Audiograms will be shown with the symbols used to indicate the air conduction and bone conduction responses. The international symbols are:

- a red (O) for the right ear pure tone (PT) air conduction (AC) response;
- a blue (X) for the left ear pure tone (PT) air conduction (AC) response;
- a red [ for the right masked bone conduction (BC) response;
- a blue ] for the left masked bone conduction (BC) response.

The following is an audiogram of “normal” hearing:



## MILD

A “mild” loss means the person will misunderstand 50% of what is being said when the speaker is only five feet (5’) away. If the speaker turns away, the listener may not understand anything being said. Background noise is very distracting to the one with a “mild” loss.

## MODERATE

A “moderate” loss means the speaker needs to be within one foot (1’) of the listener’s ear and must speak loudly to be understood.

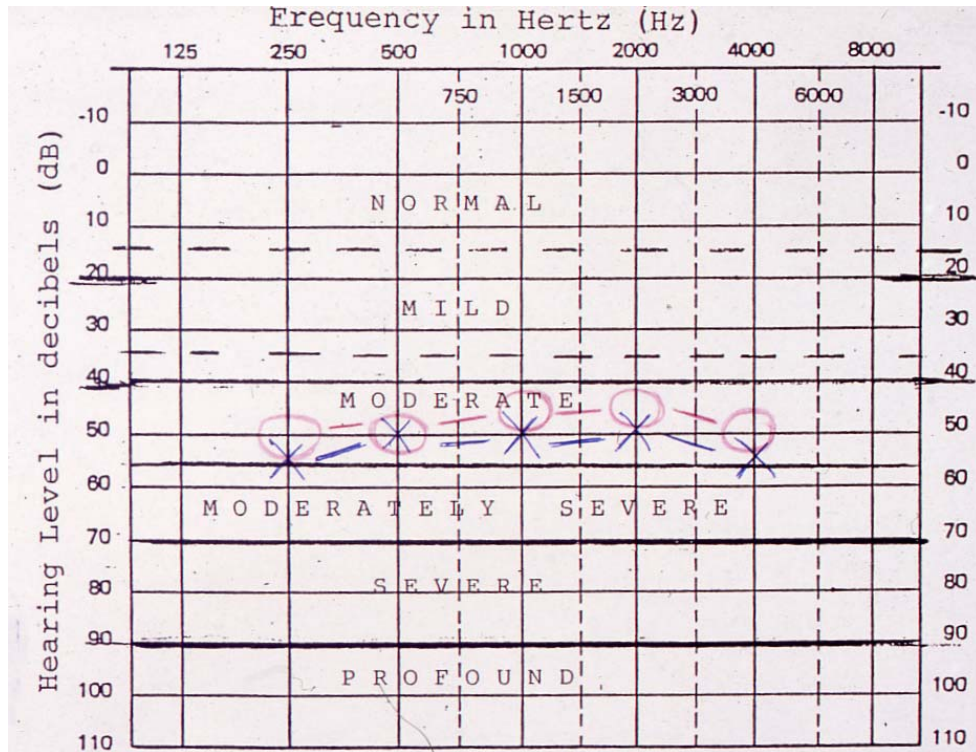
## SEVERE OR PROFOUND

This paper is limited to those with mild or moderate losses and will not discuss those with greater losses.

Another important factor to consider is the **shape** of the audiogram: **flat, rising or sloping**.

### SHAPE OF THE AUDIOGRAM

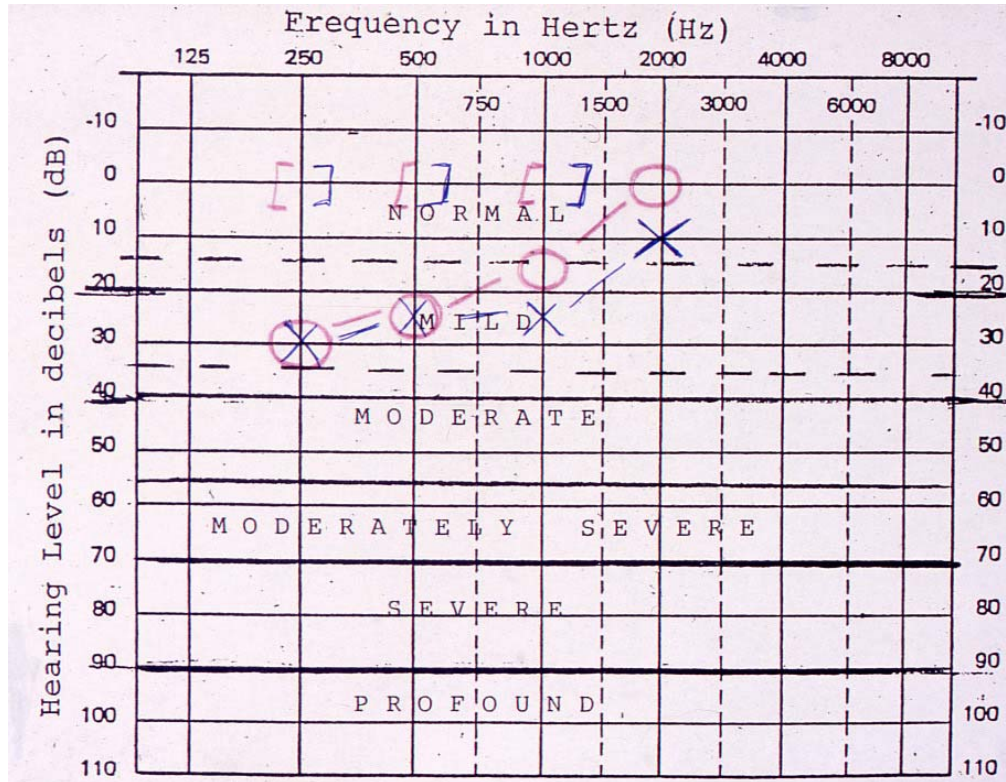
#### FLAT LOSS



Flat losses are often conductive, but may be sensori-neural. In the audiogram above, if the bone conduction (BC) is normal, the loss would be conductive. If BC is in the mild range the loss would be mixed. If BC is the same as the air conduction (AC), the loss would be sensori-neural.



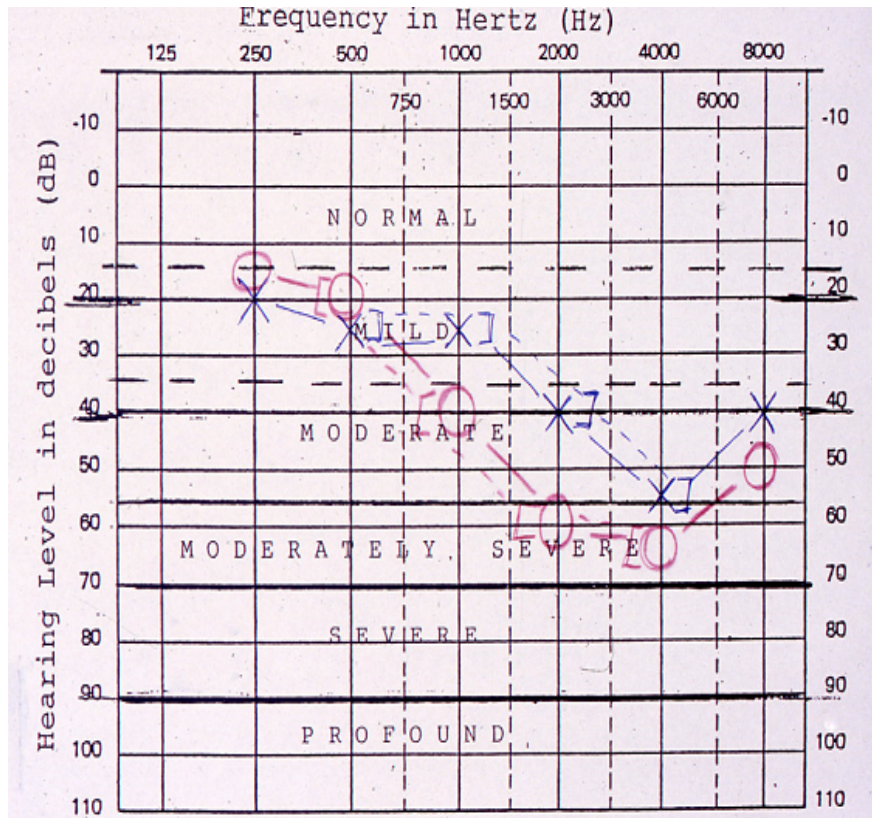
## RISING LOSS



Rising losses are usually conductive and in the mild range. They are usually seen in children with middle ear fluid.

A rising loss is rarely sensori-neural but it is possible--if present, the loss is usually hereditary. Also hereditary rising losses are more likely to be moderate or severe for low frequencies rising to normal for high frequencies.

## SLOPING LOSS



The majority of sensori-neural losses are sloping. Sloping losses can be more devastating, especially to little children, than a flat loss.

NOTE: 40% of early childhood hearing losses are caused by environmental influences while 60% of early childhood hearing losses are genetic according to information given at an ASHA Pediatric Conference in 2004. Environmental influences may combine with hereditary factors.

### IMPORTANT NOTE:

The number of children with multiple disabilities is growing. There are now many more children with hearing losses and another disability than 30-35 years ago. A study published by the Centers for Disease Control stated that among children with a hearing loss, it is estimated that anywhere between 25% to 33% have one or more developmental disabilities.

This discussion will concentrate on children who have a mild or moderate hearing loss but no other disorder.

## HEARING LOSSES—WHAT TO EXPECT

Hearing losses and what to expect are always in general terms. Individual differences are always an important consideration.

A complete hearing test always includes obtaining the Speech Reception Threshold (SRT) and a Word Recognition Score.

The speech reception threshold (SRT) is the softest level of intensity (loudness) where the person is able to repeat spondee (two-syllable) words 50% of the time. The pure tone average (PTA) is the average of AC results for 500, 1000 and 2000 Hz.

The SRT and PTA should agree within 5-10 dB.

If the audiogram is flat, these should agree closely.

If the audiogram is sloping, the SRT may be close to 500 Hz, or even 250 Hz.

If the audiogram is rising, the SRT will probably be close to 2000 Hz, or even 4000 Hz.

Audiometric word recognition scores tell you how well the person can differentiate among the various vowels and consonants of the English language. These scores are not absolutes.

Word recognition scores are obtained by having the person repeat single syllable words presented at the most comfortable level of intensity (loudness). If there are many articulation errors, the tester has to use her judgment in determining between an articulation error and a true word recognition error.

### WORD RECOGNITION SCORES

90%-100%	is normal
80%-90%	indicates very little difficulty understanding provided sound is sufficiently loud
70%-80%	indicates some difficulty understanding even when sound is loud enough
70% or less	indicates difficulty understanding even when sound is sufficiently loud

**Often word recognition scores for young children cannot be obtained.**

Flat Losses	Scores can be good or poor.
Rising Losses	Usually good scores.
Sloping Losses	The greater the slope, the poorer the score.

If the score is poor, frequently it will improve with properly fitted hearing aids. This applies to adults and may not apply to children.

## CHILDREN LEARN TO TALK BY “OVERHEARING”

A child is born already programmed to learn speech and language but normal hearing is essential for that to happen. A baby recognizes his/her mother's voice immediately after birth because of hearing the mother's voice while in the womb. The baby with normal hearing learns to talk because he/she is “overhearing” all the people around as they are speaking. The child with a hearing loss does not have this advantage. **It is very important to talk, talk, talk to all babies.**

It is also very important to listen to your child and answer all questions, no matter how annoying they may seem at the time.

How does a hearing loss affect a child's ability to learn to talk? Let's look at vowels and consonants.

In general, Vowels

- Give speech quality and carrying power.
- Have more intensity (loudness) than consonants.
- Have their fundamental frequencies (itches) in the low frequency range.
- Have their overtones in higher frequency range.

In general, Consonants

- Give speech intelligibility.
- Have less intensity (loudness) than vowels.
- Are higher frequency (pitched) sounds.

The intensity (loudness) of speech sounds lessens as the frequency (pitch) of the speech sounds become higher.

If the VOWEL SOUNDS in a child's speech are affected, ALWAYS think of a hearing loss and have the child tested as soon as possible.

Always think of a hearing loss if a child has frequent colds or sore throats or seems to have “allergies” because many times these go hand in hand.

NOTE: It was reported in the December 2004 issue of *The Hearing Journal* that **whether children have normal hearing or a hearing loss in order to understand speech they need it to be louder than adults with the same hearing acuity.** For that reason grossly normal hearing, borderline hearing, or a mild loss will likely adversely affect the child's ability to learn speech and language. Also he/she is more likely to become a poor listener.

Picture (original source unknown) showing how a sensori-neural loss affects understanding:



**Temporal integration and the dimension of duration** are factors affecting the understanding of speech.

#### TEMPORAL INTEGRATION AND THE DIMENSION OF DURATON

The factor of temporal integration is a complex dimension involving more than the organ of hearing. For correct judgment of temporal order, a temporal separation of 20 msec. is needed. The dimension of duration enables the hard of hearing to discriminate between consonants if intensity (loudness) and frequency variations are sufficient.

The average duration of Vowels is 0.29 sec.

The average duration of Consonants is 0.15 sec.

If you articulate (pronounce) the following you will see that the duration of those in the first column is "longer" than those in the second column.

sh	vs	ch
as	vs	axe
oh	vs	uh
s and z		
m, n, ng		

A speech language pathologist can explain this more fully.

The frequencies affected by the hearing loss are an important consideration. The original source is unknown, but the following chart shows consonants with their fundamental frequency range and overtones so you can see how a hearing loss will affect the person's ability to hear certain consonant sounds:

Consonant	FREQUENCY		BANDS		POWER IN DB
	1	2	3	4	
	r (err)	600-800	1000-1500	1800-2400	
l (let)	250-400		2000-3000		63
sh (shot)			1500-2000	4500-5500	61
ng (ring)	250-400	1000-1500	2000-3000		61
ch (chat)			1500-2000	4000-5000	58
n (no)	250-350	1000-1500	2000-3000		57
m (me)	250-350	1000-1500	2500-3500		55
th (that)	250-350			4500-6000	54
t (tap)			2500-3500		54
h (hat)			1500-2000		52
k (kit)			2000-2500		54
j (jot)	200-300		2000-3000		56
f (for)				4000-5000	54
g (get)	200-300		1500-2500		53
s (sit)				5000-6000	52
z (zip)	200-300			4000-5000	51
v (vat)	300-400			3500-4500	51
p (pat)			1500-2000		50
d (dot)	300-400		2500-3000		49
b (bat)	300-400		2000-2500		49
th (thin)				about 6000	48

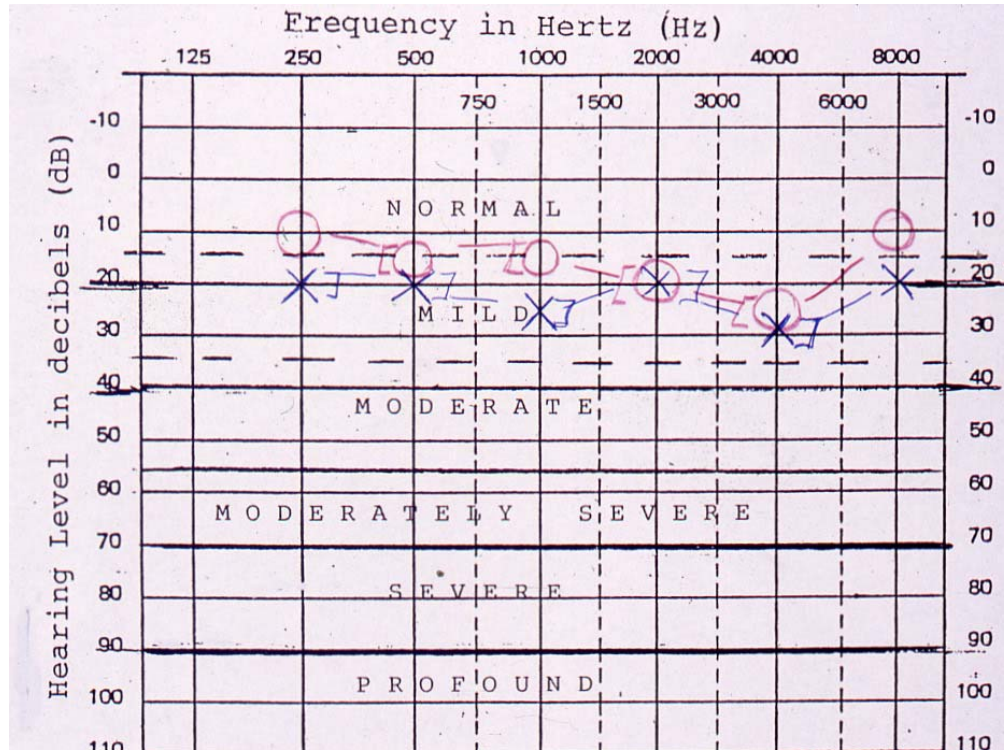
## WHAT TO DO IF YOUR CHILD DOES HAVE A HEARING LOSS

### SOME SUGGESTIONS TO HELP ALL CHILDREN WITH HEARING LOSSES

1. Allow child to use vision, with or without hearing aids.
2. Control background noise as much as possible. For example, turn off the radio/television when talking with the child.
3. Be sure the child is near you--do not talk across the room. He/she will not understand you at all if you are in different rooms.
4. Structure environment but don't stifle the child. Remember, **first of all, he/she is a child and play is a child's work**. Child needs to experiment—to succeed AND fail. Needs to use his/her imagination.
5. Phrase questions so child will have to give a response other than “yes” or “no.” Phrase so he/she really understands you.  
Do not ask “Do you see this?” Ask “What is this?”  
Do not ask “Do you want to \_\_\_?” Ask “Would you rather \_\_\_\_\_ or \_\_\_\_\_?”
6. Think about which vowels and consonants the child can probably hear. Think about which he/she cannot hear and how temporal integration (duration) might help him/her to learn.
7. DO TALK TO THE CHILD. **Talk! Talk! Talk!** Give him/her the words, the language—very important!
8. Give the child time enough to answer questions. Give the child the opportunity to talk. Very Important: He/she may be slow in making statements, so allow time for him/her to reply or make statements.
9. If the child is in school, his/her teacher(s) may need to provide written notes.
10. ASK FOR HELP! You don't have to know everything or have all the answers. Ask an Audiologist. Ask a speech language pathologist.

The following will give you the **expected behaviors** for specific losses as well as **treatment** which will be the things you can do or the services that you can have provided for your child. The audiologist will give you more information about a personal FM system or sound field system if they are recommended.

## BORDERLINE NORMAL



Adults seldom have a problem if hearing is borderline or grossly normal.

### CHILD—BEHAVIORS

May respond inconsistently to sound.

May be inattentive.

Often disruptive or withdrawn.

Is "bad"—hears when he/she "wants to."

Articulation, language, voice and word recognition score probably normal  
(2000 Hz and 4000 Hz are the key).

### TREATMENT

Consider personal FM system.

Consider sound field system.

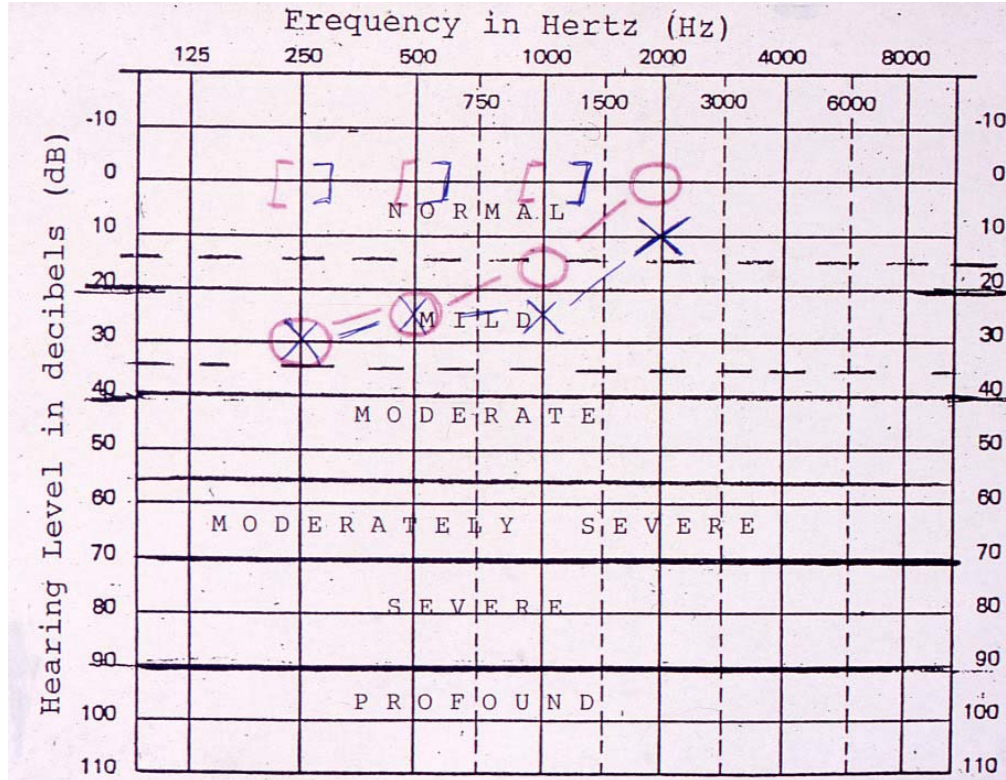
Control background noise as that is very distracting.

Seat child so he/she can see and hear.

Be sure child understands.



## MILD CONDUCTIVE LOSS



Most mild conductive losses are rising as shown, but can be flat.  
Child probably has fluid—middle ear problem.  
Articulation and voice quality are normal (2000 Hz is the key).

### BEHAVIORS

Seems to "hear if he/she wants to."  
Response to various sounds may be inconsistent.  
Appears to be inattentive.  
Seems to be "stubborn" at times.  
May be disruptive, especially in the classroom.

### TREATMENT

#### **Medical treatment without delay.**

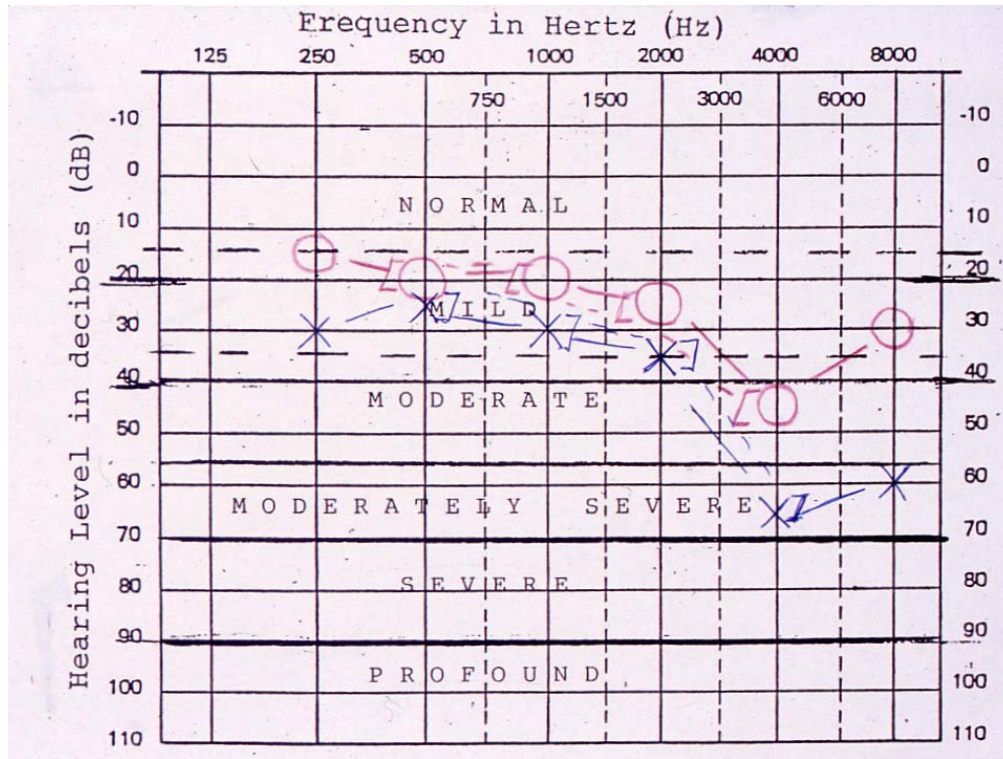
Behavior should improve if middle ear is treated and hearing returns to normal.

May need listening training—learn how to listen.

May have a language delay. This depends on age and length of time has had the hearing loss. Consult a speech language pathologist.

If the loss does not go away with medical treatment, and medical clearance is given by the otolaryngologist, hearing aids should be considered. This may be a bone anchored type of aid.

## MILD SENSORI-NEURAL LOSS



### BEHAVIORS

Usually learns to talk.

"Hears if he/she wants to."

Misarticulations—Vowels will be OK but consonants may be affected—Look at 1000 and 2000 Hz.

Word recognition score might be fair.

Visually oriented.

May be disruptive; often called "bad."

Some children become withdrawn.

Possible language delay.

### TREATMENT

Keep background noise to a minimum if at all possible.

Seating is important—must see as well as hear.

Personal FM system.

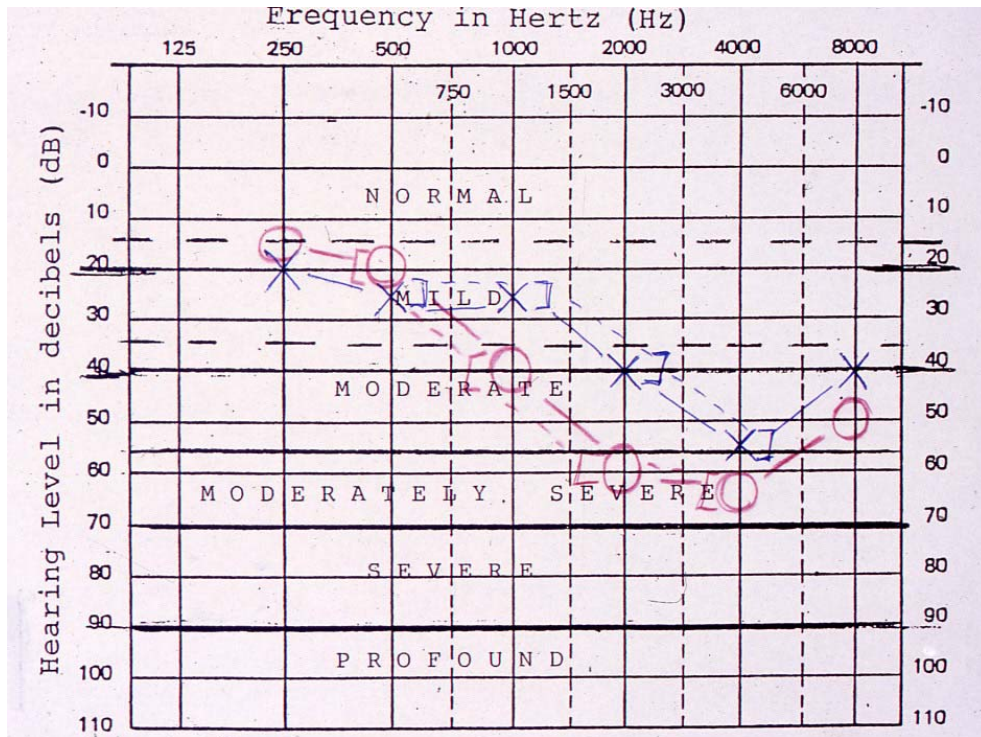
Sound field system.

May need hearing aids with careful auditory training.

Be *sure* child understands. Phrase questions carefully so child must respond rather than answering "yes" or "no".

Will need speech language pathologist to test for language delay

**SLOPING SENSORI-NEURAL HEARING LOSS  
BORDERLINE MILD TO MODERATE**



Note: The two ears may be essentially alike or slightly different as shown above.

**This child is in real trouble, especially in the classroom.**

**BEHAVIORS**

Acts “dumb” or “stupid” and may be called “MR”.

Very inconsistent response to sound.

Inattentive.

Hears but doesn’t understand.

Called “stubborn.”

Visually oriented.

Gentle slope not as devastating as a precipitous drop at 1000 Hz or 2000 Hz.

Ski slope has serious effects.

Background noise is devastating, especially through hearing aids. This may cause the child to reject amplification.

SRTs may be close to normal, or in mild range, BUT word recognition score will be very poor—Note: 1000 Hz.

Will have many articulation errors.

Language delay is noticeable.

Voice quality may be poor. Vowels affected—cannot hear the overtones.

## TREATMENT

Hearing aids with careful auditory training. (Unfortunately this training is seldom met.)

Important note: Even with hearing aids child will hear but not necessarily understand.

Personal FM system.

Sound field system.

Will need services of a speech language pathologist.

Articulation Therapy

Vowels: Child hears the fundamental frequency, but not the overtones.

Teaching the vowels will help voice quality.

Consonants: will need help with consonants, esp. sh, ch, s, z, th.

Language Delay—will need much help with vocabulary and language.

The language delay will cause child to fail, especially in reading. Probably cannot learn to read using the phonic method.

Control background noise as noise is devastating to child, especially with amplification.

Structure environment carefully for listening and learning activities.

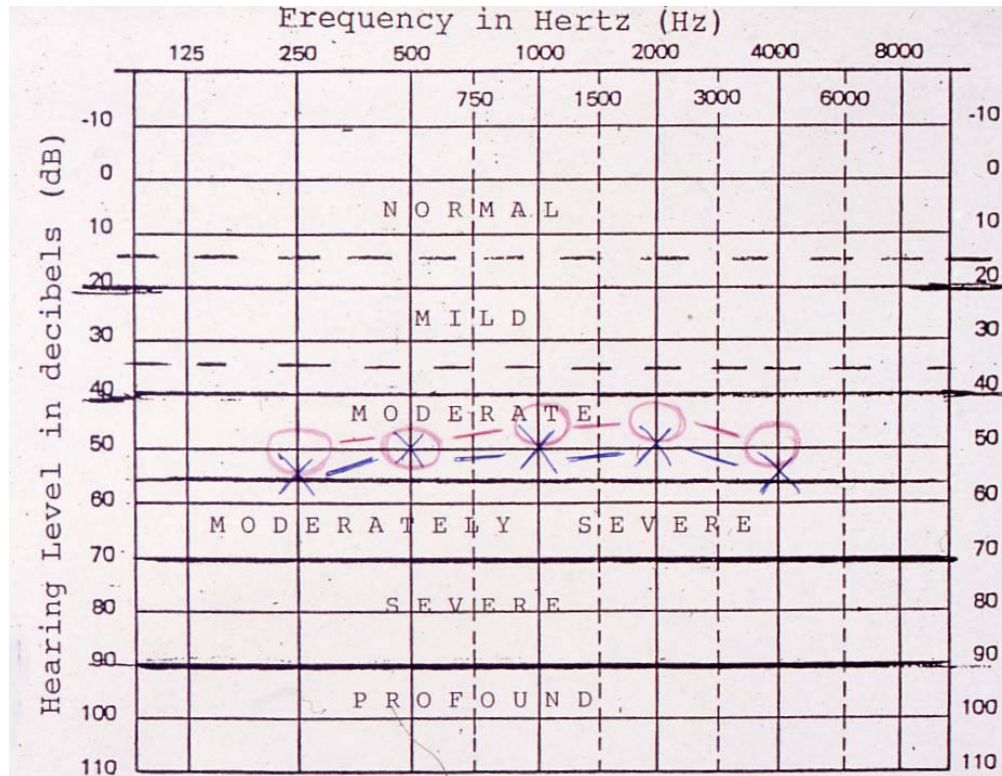
Phrase questions carefully to be sure child really understands.

Give plenty of time for child to respond to questions or make statements (due to language delay).

Probably will need the teacher(s) to provide written notes.

See page 15 for general suggestions.

## MODERATE FLAT LOSS



If BC is close to normal this would be conductive. If BC is in the mild range this would be mixed. If BC is the same as AC this would be sensori-neural.

## MODERATE FLAT LOSS

Speaker must be within one foot (1') of ear and talk quite loudly to be heard.

## BEHAVIORS

Ignores sound.

May be disruptive, especially in the classroom; said to be "bad."

May be very withdrawn or may be overactive.

Usually very visually oriented in every respect so is easily distracted by movement in the environment.

## TREATMENT IF CONDUCTIVE OR MIXED

**Medical treatment without delay.**

If mixed, amplification needed after medical clearance given.

Sound field system.

Probably will need listening training (learn how to listen).

Voice may sound mushy. If so, work with vowels.

May need speech therapy if there are consonant errors.

May have language delay. This will depend on age of onset, present age, and length of time has had the loss. A speech pathologist can test for this.

#### TREATMENT IF SENSORI-NEURAL

Always needs to see and hear.

Hearing aids. Will need careful auditory training to accept them.

Personal FM system.

Sound field system.

Will need services of speech language pathologist as language delay will be noticeable, so will need help with vocabulary and language.

Speech therapy for misarticulations.

Voice quality—will need work with vowels.

Teacher(s) may need to provide written notes.

### FLUCTUATING LOSSES IN LITTLE CHILDREN

Unfortunately, some children have a conductive loss that comes and goes (fluctuates). The loss is usually low frequency conductive and in the mild range, as shown on page 9. This can cause the child much difficulty, especially if he/she is in school.

#### BEHAVIORS

Poor listener—responds inconsistently.

Many, many variables:

Current age.

Age of onset—from infancy much more serious, especially language development can be seriously affected.

Has child had medical care? *Conductive losses can become sensori-neural.*

Frequency of attacks.

How long do attacks last?

How much loss is there during these attacks?

Has child become a behavior problem?

#### TREATMENT

**Consistent monitoring by physician to be sure middle ear stays clear of fluid.**

Will probably need much training to learn how to listen.

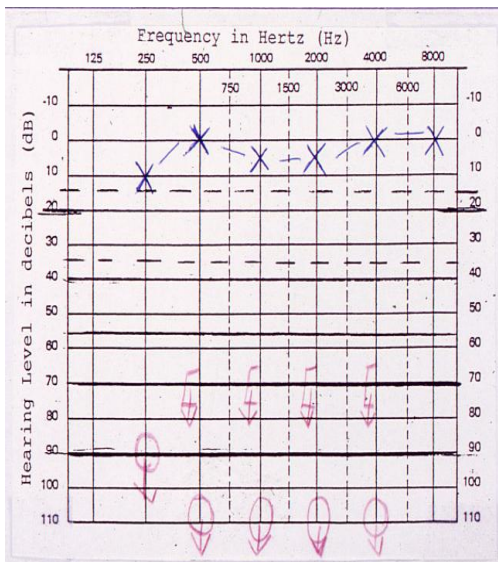
Many authorities think fluctuating losses in infancy cause language delay so that should be tested.

Articulation may need to be tested.

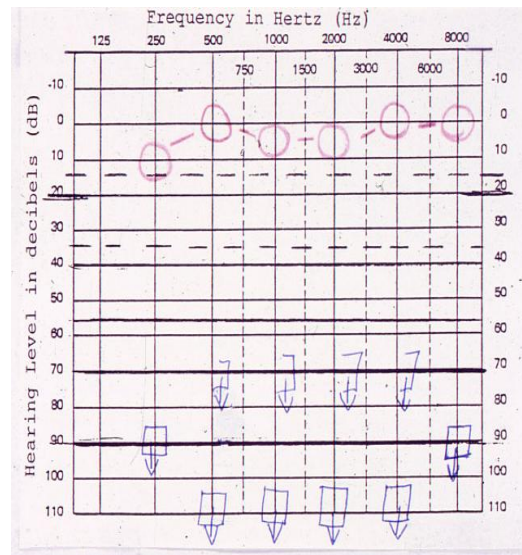
If voice sounds “different” or “odd” will need work with vowels.

Under certain circumstances hearing aids may be considered. This requires medical clearance by an otolaryngologist.

## UNILATERAL LOSSES



Left ear normal



Right ear normal

When a person has hearing that is normal in one ear, but has a loss in the other, the loss is known as unilateral or single sided deafness (SSD). The loss in the poor ear may be partial or is often complete as pictured above. There are a number of reasons for an adult to lose hearing in one ear, but for a child, it is usually present from birth or early age. **A child with a unilateral loss is in real trouble and more susceptible to failure in school.**

### PROBLEMS

The person cannot localize sound. That means he/she will have no idea which direction sound comes from. He/she will not be able to understand if you call from one room to another. In fact, he/she may not understand if you call from across the room when you are both in the same room. In the classroom, if the teacher turns away to write on the board and continues to talk, or walks around the room and talks, the child probably will understand nothing being said.

It takes two good ears to separate speech out from noise. Therefore, a very serious problem faces the person with only one good ear. As background noise increases, he/she will have more and more difficulty understanding speech. In fact speech may become unintelligible in noise. This makes it very difficult for a child in school. He/she should never sit close to an open door or window, a pencil sharpener, the fan of a furnace or air conditioner, or any other type of noise. The good ear should always be towards the teacher and other children.

## WARNING

Some studies have shown that a child with a unilateral loss is ten times more likely to fail in school for kindergarten through the 8<sup>th</sup> grade than the general population as a whole.

A child with a unilateral loss is five times more likely to require special services than the general school population.

There may be a language delay although speech will be normal.

Teachers do not usually differentiate or identify the child with a unilateral loss.

The child with a unilateral loss who does fail is more likely to have had the loss from an early age, the loss is severe to profound in the poor ear, and the poor ear is more likely to be the right ear.

(Some of the above is excerpted from LSHSS, April 1988.)

## TREATMENT

Preferential seating is essential:

- Always talk from the front or from the "good side."

- The speaker needs to be within five feet (5') of the listener.

- The child needs to see the person speaking.

Keep background noise to a minimum. This is very important.

In the classroom a sound field system would be helpful.

If the loss is mild conductive for the poor ear, and medical treatment does not alleviate the condition, a hearing aid might be considered.

Depending on certain conditions of the poor ear, a bone anchored aid could be considered. The other ear must be normal.

Be sure the child understands verbal statements, questions, assignments, or instructions. Do not ask yes or no questions but phrase questions so the child must respond more fully so you know he/she really understands you.

If the child is having difficulty understanding, have the speech language pathologist test him/her for a generalized language deficit as that may be the problem, especially if the right ear is affected.

Teacher(s) may need to provide written notes.



## PROGRESSIVE HEARING LOSSES

Earlier in this paper it was stated that 40% of childhood hearing losses are caused by environmental influences; 60% are genetic (hereditary); and environmental influences may combine with hereditary factors.

Some hereditary losses may be present at birth and those children will need special services. There are a group of hereditary losses that do not start until age 5. If the loss is acquired after age 5, language concepts and speech patterns are usually formed. Another group of hereditary losses start at puberty, but by that time the child has a basic education. Then some losses begin at age 30 and another group about age 50. Most of these are sensori-neural losses, but there is one that can be conductive and that is a disease process known as "otosclerosis." White adult females are more prone to otosclerosis than any other group, but it is possible to have "childhood otosclerosis."

On page 22 it was pointed out that unfortunately there are some children who are prone to have middle ear infections that fluctuate (come and go). It has been found that 1/3 of children through the third grade may have a fluctuating conductive loss at any given time. When the infection is present the child will have a conductive hearing loss which is very confusing to a child because sometimes he/she hears normally, then there will be a time he/she isn't hearing normally. This often causes the child to become a poor listener and exhibit the behaviors listed on page 19. Some believe fluctuating hearing causes learning disabilities. Warning: Conductive losses that are not treated medically can become sensori-neural, so the loss becomes permanent.

Usually sensori-neural losses in childhood are stable--they do not "get worse." However, there are certain sensori-neural losses that do progress--that is, the loss does "get worse."

One potential risk facing children is acquiring a noise-induced hearing loss from the misuse of personal audio technology and the misuse of entertainment media (television, music, Internet, etc.). Loss from excessive noise exposure is sensori-neural, thus is permanent. *THE ASHA LEADER*, April 2010, reported on a study of children ages 8 to 18 and stated "Even a mild hearing loss due to excessive noise can lead to delays in speech and language development, affecting a student's ability to pay attention in the classroom."

**Consistent monitoring of hearing is essential. It is strongly recommended that complete audiometric evaluations be done at least once a year, sometimes more often depending upon certain conditions.**

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