### SPEECH-LANGUAGE SCREENING CHECKLIST

**Name:** ___________________________  
**Date:** _______________

**Age:** ___________  
**Examiner:** _______________________

Speech-language skills should be observed by the student and the audiologist during the audiologic evaluation. Using the following checklist, the client would be referred for further evaluation if any of the items are checked as **No**. The checklist is appropriate for children 3 years of age and older. For younger children use the "Speech and Language Checklist for Infants and Toddlers."

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Says speech sounds appropriate for his or her age.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Language (4-5 Year Old Child):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Recognizes pictures, understands directions</td>
<td></td>
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<tr>
<td></td>
<td>B. Speaks in sentences</td>
<td></td>
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<tr>
<td></td>
<td>C. Remembers directions or what is said</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Language (6 Years to Adult):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Uses appropriate grammatical forms &amp; structures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Demonstrates appropriate semantic use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Demonstrates appropriate pragmatic &amp; discourse skills</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Uses appropriate rate/rhythm</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Uses appropriate voice quality</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>History reflects unremarkable background regarding speech/language development.</td>
<td></td>
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</tbody>
</table>

**COMMENTS:** ____________________________________________________________

_________________________________________________________________________

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___ Pass    ___ Refer for further evaluation
HEARING HANDICAP INVENTORY

PURPOSE: The Hearing Handicap Inventory (HHI) was designed to assist in quantifying the person's perceived emotional status and social situation due to a hearing loss. The self-assessment scale consists of 25 items (13 emotional items and 12 social situation items). The form accompanies the case history form when it is sent to the client. Both are returned at the time of the initial evaluation. In addition at any retest evaluation, the client may be asked to complete the HHI for comparison with previous self-assessment forms.

The HHI as an addition to the audiologic battery can: 1) help substantiate a client's hearing complaints; 2) facilitate decisions regarding the client's candidacy for amplification; 3) assist in the counseling process; and 4) serve as a guide in implementing an aural rehabilitation program. The HHI is appropriate for adult clients.

SCORING: On the HHI each YES is scored as 4 points, SOMETIMES is scored as 2 points, and NO is scored as 0 points. The inventory has a total of 100 points.

INTERPRETATION: The results are interpreted as follows:

<table>
<thead>
<tr>
<th>Raw Score</th>
<th>Handicap Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20 points</td>
<td>No handicap; no hearing aid indicated</td>
</tr>
<tr>
<td>22 to 60 points</td>
<td>Mild-moderate Handicap; hearing aid may be needed</td>
</tr>
<tr>
<td>62 to 100 points</td>
<td>Severe handicap; hearing aid needed</td>
</tr>
</tbody>
</table>
OTOSCOPIC INSPECTION

Since accurate assessment of the ear requires a clear external auditory canal, the audiologic evaluation should begin with an otoscopic inspection. The ear examination is used to rule out active pathological conditions and the potential for ear canal collapse. The otoscope is a flashlight type device with a funnel-shaped speculum on the end, which allows visualization of the ear canal and tympanic membrane. The otoscope directs light into the external auditory canal. Since the tympanic membrane is semitransparent, the light allows some of the structures of the middle ear to become visible.

PROCEDURE:

1. Before introducing the otoscope into the auditory canal, carefully observe the condition of the pinna and mastoid process. The pinna should be gently palpated for tenderness. The entrance of the ear canal should be inspected for the presence of debris or pus. Also check for signs of previous ear surgery, preauricular tags, and other malformations.

2. Select a speculum for the otoscope. The largest speculum tip, which can be comfortably inserted into the ear canal, should be used. The following sizes of specula are most often used:
   - Babies  - 2 mm
   - Children - 3 to 4 mm
   - Adults  - 4 to 6 mm

3. Hold the otoscope as you would hold a pencil between the thumb and forefinger so that your hand can brace against the side of the client's cheek or neck. If the client experiences discomfort during otoscopy, he or she may jump. By bracing the hand holding the otoscope, the clinician can assure that the otoscope will not be forced further into the ear canal or damage the ear canal wall.

4. The speculum will enter the ear more easily if the outer cartilaginous part of the ear is straightened. Grasp the pinna in the helix area. In adults gently pull posteriorly and superiorly until the canal appears to straighten. In children ease the pinna horizontally backwards. You can also brace a portion of your hand against the side of the head as you pull the pinna. This allows for extra bracing.

5. With the light illuminated, gently insert the otoscope into the canal.

6. Note the landmarks in the ear canal. Look for signs of excessive cerumen, scratches, wetness, blood, and redness. Rotate the otoscope, if necessary, to view the tympanic membrane.
PURE TONE THRESHOLD TEST PROCEDURES

PURPOSE: Pure tone threshold audiometry is the measurement of an individual’s hearing sensitivity for calibrated pure tones. Although humans can hear from 20 to 20,000 Hz, we are more concerned about how an individual hears speech sounds, which range from 90 to 6000 Hz. The pure tone test results allow the clinician to estimate the amount of loss of hearing that affects the understanding of speech.

PROCEDURE: Find a quiet room or sound proof booth to give the test. The use of sound-isolated rooms or booths is viewed as a standard practice. Background noise must be avoided in threshold testing. The test environment shall meet at all times the specifications detailed in Maximum Permissible Ambient Noise Levels for Audiometric Test Rooms (ANSI, 2003).

The client should be seated in a manner to promote safety and comfort as well as valid testing. Such seating considerations may include:

- Avoid giving inadvertent visual cues to the client
- Enable easy observation of client responses
- Allow for monitoring and reinforcement of responses
- Permit observation of client comfort, safety, and health

The test instructions should be presented in a language or manner appropriate for the client. Test instructions shall accomplish the following:

- Indicate the purpose of the test
- Emphasize that it is necessary to sit quietly, without talking, during the test
- Indicate that the client is to respond whenever the tone is heard, no matter how faint it might be
- Describe the need to respond overtly as soon as the tone comes on and to stop responding when the tone goes off
- Indicate that each ear is to be tested separately with tones of different pitches
- Describe inappropriate behaviors such as drinking, eating, smoking, chewing, or any additional behavior that might interfere with the test
- Provide an opportunity for questions the client might have

Instruct the client to respond verbally, by raising a hand, by pushing the client response button, by dropping a block, or by the method of your choice when the tone is heard.

Example - We are going to determine how you hear different tones. You will hear a soft tone through the earphones. Raise your hand when you hear the tone and put your hand down when you no longer hear the tone. The tones will become very soft, so listen as carefully as you can. You can raise either hand you choose, but remember to put your hand up when the tone comes on and put your hand down when the tone goes away. We will start with the ____ ear, then test the other ear.

Directions should be given before the earphones are placed on the ears and before a hearing aid is removed.
If an otoscopic inspection is not performed, before placing the earphones on the client, check the ear canal for blockage by cerumen or for drainage. Check for the possibility of a collapsing canal which should be considered in cases of large "lop" ears and small ear canals. Interferences such as long hair, earrings, hats, eyeglasses, and chewing gum should be removed.

**The proper way to put on earphones:**

- Extend the headband apparatus to the end, allowing for the largest possible fit.
- Hold the earphones firmly at the juncture of the earphone and the headband apparatus.
- The earphone grid should be directly over the entrance to the ear canal.
- The right earphone should go on the right ear and the left, on the left ear.
- Using your thumbs adjust the headband to fit the client's head.
- If the earphones are loose then the threshold for low frequency sounds will be decreased.

Insert earphones also may be used. They should be placed comfortably deep in the ear canal in accordance with the manufacturer's specifications. The audiologist will assist with the proper insertion of these earphones.

**The basic test procedure for obtaining pure tone threshold has two parts:**

- **Familiarization** - the listener should be familiarized with the task prior to threshold determination. The purpose is to assure the audiologist that the client understands and can perform the response task.

- **Threshold determination** - defined as the level at which responses occur in at least one-half of a series of ascending trials with a minimum of 2 of 3 responses required at a single presentation level

Start the test in either the better ear or the right ear. Present 1000 Hz at a comfortable loudness level, usually 30 dB HL for a person with normal hearing. Be sure to get a clear and definite response. The tone should be presented for a period of 1 to 2 seconds. The interval between the tone presentations should be varied and should not be shorter than the test tone.

If the client does not respond at 30 dB HL, then increase the tone to 50 dB HL and try for a response. If there is still no response, then present the tone in successive additional increments of 10 dB (60 dB HL, 70 dB HL, 80 dB HL, etc.) until a response is obtained.

If a clear response is made, then threshold measurement begins. Reduce the intensity in 10 dB steps until the client does not respond to the tone. Increase the intensity in 5 dB steps until the client responds again. Once a response is obtained, decrease the tone by 10 dB and increase in 5 dB steps until a response is obtained. Continue this procedure until the client has responded at a certain level three (3) times.

Record this hearing level as the threshold of the 1000 Hz tone.
Proceed to test 2000 Hz in the same manner, followed by 3000 Hz, 4000 Hz, 6000 Hz, and 8000 Hz. Retest the 1000 Hz tone to determine reliability. If the result has not changed by plus or minus 5 dB, proceed to test 500 Hz, then 250 Hz. If the result has changed by more than plus or minus 5 dB, then the lower of the two responses may be accepted and at least one of the higher frequencies must be retested.

Test the other ear by air conduction, using the same process. A retest of 1000 Hz is not necessary for the second ear.

**PURE TONE AVERAGE (PTA):** Calculate the pure tone average (the average of the decibel levels at 500, 1000, and 2000 Hz) and record this on the audiogram. The PTA estimates the hearing loss for speech since the critical speech range is reported to be from 300 to 3000 Hz. Enter the number in the appropriate box on the audiogram.

Sometimes with a marked slope a 2-tone average is appropriate. Use the best two frequency thresholds for this pure tone average calculation. Make a note on the audiogram that a 2-tone average was used.

**SPECIAL REMINDERS:**

1. If there is no response at 30 dB HL, move the intensity to 50 dB HL, then in 10 dB steps (60 dB HL, 70 dB HL, 80 dB HL, etc.) until a response is made.

2. If when retesting 1000 Hz for validity, the response is more than plus or minus 5 dB of the initial threshold, then the lower of the two responses may be accepted and at least one of the higher frequencies must be retested.

3. Do not push the tone button harder as the intensity is increased, make YOUR motions discreet.

4. Do not hold the tone button down when increasing or decreasing the intensity level.

5. Watch eye contact and overt movements.

6. Bone conduction testing is accomplished by placing the bone oscillator on the most prominent part of the mastoid process with rounded circle portion against the client’s head and the cord is at the bottom of the oscillator. The headband is placed across the client’s head at approximately a 45 degree angle to secure the oscillator. The test ear should not be covered. The contralateral ear is covered when masking is used.

Using the test procedures described for air conduction test the following frequencies: 250, 500, 1000, 2000, and 4000 Hz.

7. Do a biological check of the equipment before beginning testing.
CLASSIFICATION SYSTEM FOR HEARING LOSS

The following system of classification is based on Clark's Modification of the Goodman Severity Scale:

- Normal hearing - 0 to 15 dB HL
- Slight hearing loss - 16 to 25 dB HL
- Mild hearing loss - 26 to 40 dB HL
- Moderate hearing loss - 41 to 55 dB HL
- Moderately severe hearing loss - 56 to 70 dB HL
- Severe hearing loss - 71 to 90 dB HL
- Profound hearing loss - 91 + dB HL

INTERPRETATION OF THE RESULTS

No difficulty either air conduction or bone conduction - **normal** hearing

Difficulty with both air conduction and bone conduction in equal amounts - **sensorineural** hearing loss

Difficulty with air conduction but normal bone conduction - **conductive** hearing loss

Difficulty with air conduction and some difficulty with bone conduction but not as much as with air conduction - **mixed** hearing loss
SPEECH RECOGNITION THRESHOLD TEST

PURPOSE: Speech recognition threshold (SRT) testing is a procedure used in the assessment of an individual's threshold of hearing for speech. The basic purpose is to quantify an individual's hearing thresholds for speech. It is primarily used as a validity check for the pure tone audiogram. The SRT should be within plus or minus 5 dB of the pure tone average or agree with the configuration of the audiogram (in the case of a sloping configuration).

The SRT is the minimum hearing level at which an individual can recognize 50% or more of the time the speech material. It is a recognition task in which the client selects the test item from a closed set of choices. Spondaic words are the usual and recommended material. They are two-syllable words with equal stress on both syllables. The usual response is repetition of the stimulus word, and in the Communication Disorders Clinic the task is accomplished via monitored live voice. Other test materials may be used, but should be indicated when recording and reporting the results.

PROCEDURE: The test requires a 2-room test suite; the client is in a room that is reasonably sound isolated and the examiner is in a separate control room.

The client should be told the purpose of the test. The instructions should: 1) orient the client to the nature of the task; 2) specify the client's response mode; 3) indicate that the test material is speech; 4) indicate that the client should respond with only words from the test list; 5) stress the need for the client to respond at faint listening levels; and 6) encourage the client to guess.

Example - Starting with the ___ ear, I am going to say some two-syllable words to you through the earphones. I want you to repeat each word I say. (Go through the list of spondaic words to familiarize the client, eliminating a word from the list if the client has difficulty understanding or responding to the word.)

Now these same words will become very soft, but you should continue to repeat the words even if you are not quite sure what I said. It is okay to guess.

The basic test procedure for obtaining the SRT has two parts:

Familiarization - the listener should be familiarized with the spondaic words prior to threshold determination. Visual cues should be eliminated. This step ensures that:

The test vocabulary is familiar to the client
The client can auditorily recognize each test word.
The client's responses can be accurately interpreted by the clinician.

Threshold determination – finding the point at which the client can respond consistently to spondaic words from the familiarized list.

For the GSI 61 Audiometer the stimulus selected should be MIC and the Interrupt button should be in the ON mode. Start the test in the better ear at about 30 or 40 dB above the estimated SRT. Present the test list through the microphone, eliminating a word from the list if the client has difficulty understanding or responding to the word, or if the clinician cannot understand the word from the client. Visual clues should be eliminated.

Be sure that each syllable in a word is "zeroed" on the VU meter.
Once all the words have been presented successfully to the client, present one spondaic word at 30 or 40 dB above the estimated SRT. If the client responds correctly, decrease in 10 dB steps, presenting one word at each level until the client responds incorrectly.

When one word is missed, raise the level by 5 dB and present a spondee. If a correct response is given, then lower the intensity level by 10 dB. If an incorrect response is given, then continue raising the level in 5 dB steps until a correct response is obtained. Use a different spondaic word at each decibel level.

From this point on the intensity level is increased in 5 dB steps and lowered in 10 dB steps with one spondee presented at each level, until three correct responses have been obtained at a given level.

The point at which the 3 correct responses are obtained is the client's threshold.

Test the other ear in the same manner.

The SRT results should be recorded on the audiogram form in the column marked "SRT." When a modification in testing is used, it should be noted on the audiogram and in the report.

**SPECIAL REMINDERS:**

1. If there is no response during the preliminary portion of the test, then increase the intensity level by 20 dB until a response is obtained. As the intensity reaches 70 dB HL, then increase in only 10 dB steps to obtain a correct response.

2. Modifications may be made for variables such as age, language facility, and the physical condition of the client.

3. When material other than the spondaic word is used, it may alter the test and should be noted on the audiogram and in the report.

4. When circumstances or individual capabilities prevent determination of the SRT, then the speech awareness threshold (SAT) may be tested instead. The SAT is the minimum level for speech at which an individual can just discern the presence of speech material 50% of the time. The listener does not have to identify the material as speech, but must indicate awareness of the presence of sound. The SAT in dB should be consistent with the best pure tone threshold between 250 and 4000 Hz.
**WORD RECOGNITION TEST**

**PURPOSE:** Word recognition testing is a procedure used to assess an individual's ability to identify speech material at some level above the individual's threshold for speech. It is used to: 1) evaluate the functional state of the auditory system at suprathreshold levels; 2) contribute to the localization of specific lesions of the auditory tract; 3) predict the outcome of otologic surgery; 4) assess the value of therapeutic procedures, i.e. auditory training; and 5) help in the determining candidacy for hearing aids.

Word recognition is measured using phonetically balanced (PB) word lists presented at some level above the SRT. It is recorded as a percentage correct score.

**PROCEDURE:** The test requires a 2-room test suite; the client is in a room that is reasonably sound isolated and the examiner is in a separate control room.

The client should be told the purpose of the test. The instructions should: 1) give information about the nature of the task; 2) specify the client's response mode; 3) indicate that the test material is speech; 4) indicate that a carrier phrase will be used, i.e. "Say the word ..."; and 5) indicate that the client should respond to only the final word in the phrase.

Example - Starting with the ___ ear, you are going to hear some words spoken to you through the earphones. I want you to repeat each word said. All words will be preceded by the phrase "Say the word..." You do not have to say the phrase, just the final word. It is okay to guess if you are not sure of a word.

Set the audiometer at 80 dB HL or as instructed by the audiologist in charge of the case. Masking should be used in the contralateral ear, when testing at high intensity levels.

The words may be presented via compact disc using the NU-6 Word Lists or other word list designated by the audiologist in charge of a client. For the GSI 61 audiometer the stimulus should be set on EXT B. Be sure the routing box on top of the compact disc player is set on "CD." The Interrupt button is pushed to the ON mode.

The client should respond orally to the words presented and the clinician should mark the words missed on a PB word list.

Determine the words correct by subtracting the words missed from the total number of words presented, or by counting the words said correctly. Calculate the percentage correct - 50 words = 2 points each; 25 words = 4 points each. Note the percentage correct on the audiogram form under "Recognition (percent at dB HL)."

For the majority of cases, if the client scores better than 80%, then the testing ends. There is no chance of significant rollover. If the client scores poorer than 80%, then decrease the level by 10 dB and test again. This procedure continues until a maximum score is achieved.

Word recognition testing can also be obtained at 45 to 55 dB HL to determine the client’s response to normal conversational speech.
SCORES:

90 to 100% - normal limits

75 to 89% - slight difficulty

60 to 75% - moderate difficulty

50 to 60% - poor recognition

Below 50% - very poor recognition

SPECIAL REMINDERS:

1. Modifications may have to be made because of the age, language facility, or physical condition of the client.

2. The material used should be identified either on the audiogram form or in the report.

3. When the client cannot respond either verbally or in written form, the Word Intelligibility by Picture Identification (WIPI) Test can be used. The WIPI is designed for children six to twelve years of age, who have a hearing loss. It is also occasionally used with adults or children who have unintelligible speech. The procedure for administering the WIPI is the same as the procedure above for administering word recognition testing. If using the recorded version, it is based on the first edition of the test. Some of the words are different from the 2nd edition list, but the pictures are essentially the same.

4. For children six (6) years of age or younger or with a language age six (6) years or younger, the PBK-50 lists may be used. The procedure for administering the PBK-50 is the same as the procedure above for administering word recognition testing.

5. For gaining information about the client's ability to interpret sentences the **Sentence Pairs** may be utilized along with or in lieu of the PB words. These are presented via compact disc.
| 0 - 100% | 0 - 100% | 26 - 48% |
| 1 - 96%  | 1 - 98%  | 27 - 46% |
| 2 - 92%  | 2 - 96%  | 28 - 44% |
| 3 - 88%  | 3 - 94%  | 29 - 42% |
| 4 - 84%  | 4 - 92%  | 30 - 40% |
| 5 - 80%  | 5 - 90%  | 31 - 38% |
| 6 - 76%  | 6 - 88%  | 32 - 36% |
| 7 - 72%  | 7 - 86%  | 33 - 34% |
| 8 - 68%  | 8 - 84%  | 34 - 32% |
| 9 - 64%  | 9 - 82%  | 35 - 30% |
| 10 - 60% | 10 - 80% | 36 - 28% |
| 11 - 56% | 11 - 78% | 37 - 26% |
| 12 - 52% | 12 - 76% | 38 - 24% |
| 13 - 48% | 13 - 74% | 39 - 22% |
| 14 - 44% | 14 - 72% | 40 - 20% |
| 15 - 40% | 15 - 70% | 41 - 18% |
| 16 - 35% | 16 - 68% | 42 - 16% |
| 17 - 32% | 17 - 66% | 43 - 14% |
| 18 - 28% | 18 - 64% | 44 - 12% |
| 19 - 24% | 19 - 62% | 45 - 10% |
| 20 - 20% | 20 - 60% | 46 -  8% |
| 21 - 16% | 21 - 58% | 47 -  6% |
| 22 - 12% | 22 - 56% | 48 -  4% |
| 23 -  8% | 23 - 54% | 49 -  2% |
| 24 -  4% | 24 - 52% | 50 -  0% |
| 25 -  0% | 25 - 50% | 50 -  0% |
IMMITTANCE MEASUREMENTS

The following description is for use with the GSI Auto Tymp (GSI 38). Tympanometry is performed automatically once a seal is obtained. Acoustic reflexes are obtained following tympanometry.

PROCEDURE:

1. Place an ear tip on the end of the probe apparatus. Generally speaking when selecting an ear tip, the following criteria apply:
   - Baby - 6 to 8 mm
   - Child - 10 to 13 mm
   - Adult - 13 to 15 + mm

2. Visually inspect the ear canal to be sure it is free of any obstruction or drainage. If there is a problem, tympanometry should not be done.

Contraindications include:
   a. Drainage, blood, or lesions in the external canal
   b. History of head injury within the past 3 months
   c. Ear surgery within the past 6 weeks

3. Position the probe against the entrance to the ear canal.

   Move hair away from the ear.

   For an adult pull upward and backwards on the pinna to straighten the ear canal and ensure better results.

   In children ease the pinna horizontally backwards.

   Be sure the green light of the probe is blinking and watch the probe light throughout the testing.

4. As soon as a good seal is obtained, the blinking green light will change to a continuous green light. The machine will automatically run the test.

5. The green light will remain steady throughout the test. When the lights go off, the test is complete.

6. The report must be printed out by the examiner.

TYMPANOGRAM PRINTOUT

1. **Ear canal volume** (Physical volume)

   As a rule ear canal volume should be between 0.2 and 2.0 (cm cubed). Ear canal volume of the two ears should be compared for any inconsistencies.
A canal volume of less than 0.2 (cm cubed) indicates a pathological condition or probe problem, such as wax build-up.

A canal volume of greater than 2.0 (cm cubed) may indicate a pathological condition such as a perforation or the presence of a pressure-equalization tube.

2. **Compliance peak**

The range for normal compliance is 0.2 to approximately 1.8 (cm cubed). If the ear falls within this range then it is indicative of normal mobility within the middle ear system.

A value of less than 0.2 (cm cubed) indicates that the system is stiffer than expected.

Normal pressure along with a lower compliance peak could indicate: glue ear, otosclerosis, or severe scarring of the eardrum (TM).

Abnormal pressure (negative) along with reduced mobility could indicate poor eustachian tube function with possible effusion.

A value of greater than 1.8 (cm cubed) indicates a system that is hyperflaccid.

If the compliance is greater than 1.5 (cm cubed) the tympanometer automatically change the tympanogram chart to a 3.0 (cm cubed) scale.

If no compliance peak is measured, then the printout will read NP.

3. **Pressure peak**

A normal range of pressure in a strict sense is plus or minus 50 daPa. For most applications normal may be considered from +100 daPa to -150 daPa.

Negative pressure is common and is indicative of a poorly functioning eustachian tube. The severity of this condition is determined by how negative the pressure is and its impact on the compliance peak.

If no pressure peak is measured, then the printout will read NP.

4. **Tympanogram**

The smoothness of the tympanogram chart is determined by the amount of movement during the testing.

Interpretation of the tympanogram can be based on the Jerger classification system although on the audiologic report a description of the tympanogram rather than a type is appropriate.
The Jerger classifications are as follows:
Type A - normal curve, normal middle ear mechanism
Type As - rather shallow curve, stiffening of the system
Type Ad - rather flaccid system
Type B - no point of maximum compliance
Type C - negative middle ear pressure

5. **Gradient**

The normal gradient for a child is between 60 and 150 daPa.

The normal gradient for an adult is between 50 and 110 daPa.

A higher gradient is indicative of middle ear effusion.

No gradient will be measured in the case of viscous effusion. The GSI 38 will display dashes for the gradient.

Very low gradient values are associated with a flaccid middle ear system.

6. **Reflex in dB HL**

On the GSI 38 the reflexes can be screened at 500, 1000, 2000, and 4000 Hz.

The reflex is obtained ipsilaterally and should occur at 70 to 90 dB above the pure tone threshold. The reflex may also be obtained contralaterally.

The machine will print the level in dB HL the screening level at which the reflex occurred.

NT - the reflex was not tested for some reason.

NR - no reflex was present.

6. **Diagnostic Reflex Threshold**

On the Tympstar Middle Ear Analyzer, after determining the tympanogram, select the test mode by pressing the **REFLEX** key.

Use the soft keys to set the test parameters.

Set the stimulus frequency and the intensity.

With probe in place press the **START** key and the ear will be pressurized to the peak pressure as recorded on the last run tympanogram or to 0 daPa if the previous tympanogram information is unavailable.
Press the **PRESENT** key to initiate the presentation of the stimulus.

Criteria for an acoustic reflex (AR) is a repeatable compliance change of .02 ml or greater.

Usual frequencies tested:  Contralateral - 500, 1000, and 2000 Hz  
Ipsilateral - 1000 Hz

Additional frequencies:  Contralateral - 250 and 4000 Hz  
Contralateral - Noise (Broad, low, high)  
Ipsilateral - 500, 2000 and 4000 Hz

Begin at 1000 Hz at an intensity of 70 dB HL. Present the tone. Increase in 10 dB steps until the compliance change of .02 ml or greater is observed. Decrease the intensity by 5 dB and retest. Once the reflex is obtained check a 5 dB lower intensity to ensure the accuracy of the results. The reflex must be obtained twice at that intensity.

Repeat the test sequence at the other audiometric frequencies.

**Interpretation**

- Normal - AR threshold for 500 to 4000 Hz is 70 to 90 dB SL; white noise is 65 dB SL
- Conductive - AR is absent when stimulating or monitoring the involved ear
- Cochlear involvement – AR is observed at a low sensation level (60 dB SL or less)
- VIII Nerve involvement (mild/moderate loss) - AR is absent or elevated when stimulating the involved ear
- VII Nerve involvement - AR is absent when monitoring the involved ear and no middle ear pathology is present
- In a severe/profound hearing loss from any etiology the AR will be absent

Further information for the Tympstar Middle Ear Analyzer is given in the equipment section of the Audiologic Procedures Manual. Further information concerning the ipsilateral versus the contralateral acoustic reflex threshold is given in the special tests section of the Audiologic Procedures Manual.