Special Problems of the Hard of Hearing

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SPECIAL PROBLEMS OF THE HARD OF HEARING

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Consideration of the title of this organization, the American Deafness and Rehabilitation Association, brings the question to mind as to whether or not this group is discriminating against the vast population of hard of hearing individuals who are also in need of rehabilitation services. The hard of hearing population is obviously different from the deaf population in terms of communication ability. Unfortunately, services are more readily available for the person with the more severe problem, and the hard of hearing individual is left to solve his own problems.

In 1937 the Conference of Executives of American Schools for the Deaf offered the following operational definitions of deaf and hard of hearing (Silverman and Lane, 1970):

The deaf — those in whom the sense of hearing is nonfunctional for the ordinary purposes of life.

The hard of hearing — those in whom the sense of hearing, although defective, is functional with or without a hearing aid.

Notice the key term in these definitions is "functional". If the person is able to use his residual hearing to function in an auditory communication situation, he is classified as hard of hearing. Also notice that this classification is to be based on aided results. If the hearing aid creates a functional auditory system, then that person is hard of hearing, even if he is not able to hear speech when he is not aided. The person’s auditory skills should be classified according to aided performance just as visual skills should be classified in terms of corrected scores.

Without this type of definition, these two populations were defined by a magical line on the audiogram. Any individual with hearing poorer than say 80 dB HL was "deaf", and any individual with hearing better than 80 dB HL was "hard of hearing". Unfortunately this method did not explain how two people with identical audiograms could have extremely different auditory-oral communication skills. The audiogram is a frequency-by-intensity plotting of the softest pure tone signal that the person responds to 50% of the time. It provides information concerning the amount of potential distortion that the ear imposes on the incoming speech signal. The problem is that people with the same audiogram handle this distortion differently. In view of this, the concept of functionality proved to be a very useful one.

Various factors that interact to determine functional hearing can be listed as follows:

1) Degree of loss
   We cannot escape the fact that one of the main determiners of functional hearing is the audiogram. If the person does not have enough hearing, even when aided, to let him detect conversational speech and understand certain key features of speech, then all of the following factors may be in his favor, but he will still be deaf. The audiogram is still the prime determiner of functional hearing.

2) Age at onset
   The general rule that applies to age at onset is that the more years of normal
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hearing the person has had, the better will be his functional hearing and oral communication skills. If the person learned speech and language through a normal auditory system, then when the loss occurs, he is faced with the problem of relearning what the now distorted sounds mean. He already knows that sound exists, and he knows how to use this auditory information. If, on the other hand, the child is born with the hearing loss, he is learning language through a distorted system from the beginning, and depending on the degree of the loss, may have to be led through each stage of auditory development.

3) Age at detection
   This factor is related to the age at onset of the hearing loss. If the loss goes undetected, valuable time may be lost. Our goal with young children is early detection so that early intervention and training may be started. Our goal with adults is also one of early intervention. Hopefully this will occur shortly after the loss begins so the frustrations and problems of acquired hearing loss can be avoided or at least minimized.

4) History of hearing aid use
   This factor is related to the previous two. The key in the aural rehabilitation program is the selection of an amplification system that will enable the hearing-impaired individual to make maximum use of his residual hearing. Notice this does not say "restore hearing to normal". In some cases of mild or moderate hearing impairment, this may be possible. The hearing aid may restore the client's hearing to normal or near normal, and he can return to his job or home with functional hearing. In cases of severe-to-profound hearing impairment, however, this goal of functional hearing will not be achieved even when the client is making maximum use of his residual hearing. The strongest hearing aid may only let a deaf individual detect conversational speech. He may be able to tell that someone is speaking and be able to hear stress and intonation patterns but not hear enough of the features of speech to understand exactly what was said. The age that amplification was first introduced and the consistency with which it was worn will determine, in part, how functional the client's hearing will be.

5) Parental cooperation
   The attitude of parents and their willingness to carry out suggested home programs is a critical factor in the development of auditory skills. Parents are with the child whenever he is not in school. If they are also effective clinicians, the child will benefit.

6) Educational background and training
   Early identification is geared toward early intervention. The quality and type of educational program in which the child is enrolled and the amount of auditory training he receives will determine how well he learns to use his residual hearing.

7) Associated problems
   If the child is a multiply-handicapped, hearing-impaired child, he may not develop auditory skills as well as if the associated problems did not exist. Factors such as mental retardation, learning disabilities, cerebral palsy, etc. may complicate the overall problem.

8) Need to use hearing
   This may be one of the more critical factors in determining functional hearing. If the hearing-impaired individual relies on the auditory channel for communication, then he is likely to develop auditory skills far more than if he uses his hearing only twice a week during therapy. In this case, practice may not make "perfect", but practice at least contributes to "functional".

The hard of hearing individual, therefore, is one for whom the above factors have interacted to result in functional hearing. With only auditory information, he is able to understand the gist of conversational speech, but communication problems still exist. In looking at the special problems of the hard of hearing, it is convenient to look at them with respect to age of onset since this will be a strong determiner of behavior.

The first problem that is faced in dealing with the congenitally hard of hearing is early identification. Potentially all newborn infants could be seen for a hearing screening test, but this involves a great deal of time and money. Even then, identification of all hearing-impaired infants is not assured. In fact, according to Northern and Downs' (1974) discussion of the problem, only 27% of hearing-impaired newborns are identified through screening alone, and 3% are identified
as hearing-impaired who turn out to have normal hearing. Because of these problems involved in early identification, a Committee was organized to study the issue. In a statement, published in 1970, it was concluded that they could not support the use of routine screening of newborn infants but suggested that additional research be carried out. (Northern and Downs, 1974).

In the years to come, the concept of a high risk register for hearing impairment was developed. The idea is that through extensive case history information, a list is made of those neonates who have a higher than normal probability of having a hearing loss. These high risk infants are then followed closely for at least two years until a complete pure tone audiogram can be obtained. This follow-up is continued even if initial test results indicate no hearing loss.

In April of 1973 the Joint Committee on Infant Hearing Screening issued another statement which advocated the use of a high risk register coupled with screening in the early identification of hearing impairment. The Committee also outlined five criteria that they recommended for placing a child on the high risk register. These criteria are listed by Downs, using a mnemonic, as the ABCD's for early identification (Downs and Silver, 1972):

A — Affected family: History of hereditary childhood hearing impairment.
B — Bilirubin level: 20 mg/100 ml or serum or over. Due to blood group incompatibility.
C — Congenital rubella: Or other nonbacterial intrauterine infection during pregnancy.
D — Defects of ear, nose, or throat: Any abnormality of the otorhino-laryngeal system.
S — Small at birth: Birthweight less than 1500 grams.

Even with the use of the high risk register and follow-up audiometric testing, there are still problems identifying neonates who are hard of hearing. A child cannot be tested using adult-like procedures until he is about two or three years old. Only then will the child wear earphones and respond in a structured way to frequency-specific stimuli. Until that time audiometric testing consists primarily of behavioral observation audiometry (BOA) in which complex sounds, such as speech or noisemakers, are presented to the child through speakers in the sound-field. The audiologist watches the child’s behavior before and after the sound is presented to see if any changes occur. These changes might include localization of the sound, eye-blinks, eye widening, arm or leg movements, cessation of activity, etc.

The problem with this type of testing is two fold. First, testing in a sound-field environment means both ears are listening at the same time. It must be assumed that the better ear is doing most of the work. This means that a unilateral loss or a large difference between ears may not be identified. The other problem has to do with the nature of the complex stimuli. The speech materials and noisemakers that are used in testing all contain a wide range of frequencies, some low and some high. If the child is hard of hearing and has good low frequency hearing, he may respond to these sounds. He may not understand the speech if he does not have high frequency hearing, but he will detect it and respond to it with a change in behavior if he hears the low frequency components. Later the audiologist will discover the high frequency loss when a pure tone audiogram is obtained. Speech and language may have already failed to develop properly.

An example of this type of loss is seen in Figure 1. Notice that detection responses were obtained at 10 dB HL. The child was able to do this because, as was later discovered, his hearing in the low frequencies was within normal limits. Based on these early detection results, one might assume that the child had normal hearing, and yet at age 2½ years, speech and language were not developing properly. This was because of the severity of the high frequency loss which was distorting the incoming auditory signal. This child is not an unusual case. As an example, it points out the importance of close follow-up of suspected hearing-impaired children until complete audiological data can be obtained.
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Figure 1. Audiogram obtained from a 2½ year old child. Earlier speech detection responses had been obtained at 10 dB HL.

In Table 1 Marion Downs describes the handicapped effect of hearing loss on a child if it is not treated in the first year of life (Downs, 1976). That is, this table describes the problems that might be expected later in life if the loss is not detected early.

Table 1. Handicapping Effects of Hearing Loss Taken from Downs (1976) p. 200

<table>
<thead>
<tr>
<th>AVERAGE HEARING 500-2000 Hz (ANSI)</th>
<th>DESCRIPTION</th>
<th>SOUNDS HEARD WITHOUT AMPLIFICATION</th>
<th>DEGREE OF HANDICAP (IF NOT TREATED IN FIRST YEAR OF LIFE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15 dB</td>
<td>Normal range</td>
<td>All speech sounds</td>
<td>None</td>
</tr>
<tr>
<td>15-25 dB</td>
<td>Slight hearing loss</td>
<td>Vowel sounds heard clearly; may miss unvoiced consonant sounds</td>
<td>Mild auditory dysfunction in language learning</td>
</tr>
<tr>
<td>25-40 dB</td>
<td>Mild hearing loss</td>
<td>Hears only some louder-voiced speech sounds</td>
<td>Auditory learning dysfunction, mild language retardation, mild speech problems, inattention</td>
</tr>
<tr>
<td>40-65 dB</td>
<td>Moderate hearing loss</td>
<td>Misses most speech sounds at normal conversational level</td>
<td>Speech problems, language retardation, learning dysfunction, inattention</td>
</tr>
<tr>
<td>65-95 dB</td>
<td>Severe hearing loss</td>
<td>Hears no speech sounds of normal conversation</td>
<td>Severe speech problems, language retardation, learning dysfunction</td>
</tr>
<tr>
<td>95 dB or more</td>
<td>Profound hearing loss</td>
<td>Hears no speech or other sounds</td>
<td>Severe speech problems, language retardation, learning dysfunction, inattention</td>
</tr>
</tbody>
</table>

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Notice that Downs labels the 0-15 dB range as the normal hearing range. This is somewhat lower than other handicap scales which define normal hearing as 0-25 dB. The point that Downs is making is that even a slight hearing loss of 15-25 dB can have an effect on the emerging speech and language behaviors of a young child. Notice that for this level of impairment, she says vowel sounds are clearly heard but many unvoiced consonants are missed. These consonants may include p, t, k, f, th, s, and sh. This means that the child might have trouble hearing the markers at the end of words that signal possessives, plurals, and past tense as well as portions of words in general. If the hearing loss is worse, more and more speech and language information will be lost. The child will be listening through a distorted system. Again, be sure to keep in mind that the degree of handicap described for various losses are an indication of what to expect if the loss is not treated in the first year of life. With early amplification and early training, the handicapping effects can be minimized. Remember that functional hearing should be based on aided performance even in a congenitally hearing-impaired population.

The handicapping effects of hearing impairment are different for a person who acquires the loss later in life. First of all, with an adult population, identification is relatively simple. The problem comes in getting the person to admit he has a loss. Over and over, we see a wife practically drag her husband up the front walk and tell us that he has a hearing loss. Her husband claims that his hearing is fine! For some reason, everyone seems to be mumbling lately!

Another problem occurs with the hard of hearing if the loss is progressive in nature. The client must adjust to a gradual loss of sensory input. At first he may deny the problem and people around him help with the masquerade by talking louder or even shouting at him to help him communicate. Finally, the client must also be prepared for possible amplification as the loss gets worse. He has to realize the advantages and limitations of a hearing aid and learn to adjust to its use.

Once the person seeks an audiometric evaluation, information concerning the nature of his problem can be quickly obtained. The initial testing yields a pure tone audiogram that indicates how much the ear is distorting the incoming speech signal. Figure 2 is a representation of the type of audiogram presented by Boothroyd (1971) in his *Auditory Training Manual* to use as an aid in audiogram interpretation. The grey shaded area represents the range of frequencies and intensities where speech information occurs.
Figure 3. An example of a high frequency hearing loss for the left ear. Probable etiology is noise trauma.

Figure 4. An example of a high frequency hearing loss for the left ear. Probable etiology is presbycusis.
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With the hard of hearing adult, we are concerned about what frequency information is missing. For example, if the hearing loss is worse in the higher frequencies, the voiceless consonants listed earlier may not be heard. Vowel sounds and voiced consonants may be heard because they possess low frequency information, but they may be confused with other sounds if some of the higher frequency identifying information is missing. This might be the case in Figures 3 and 4. We would expect these clients to hear speech because they hear the low frequencies, but they will complain that they do not understand because the words sound distorted.

One problem that must be faced in dealing with the hard of hearing adult is estimating how handicapping a particular hearing loss might be. The pure tone audiogram only indicates how much distortion the ear imposes on the incoming speech signal. It does not reveal how well the person uses what hearing is left. In 1965 the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology devised a system of estimating the potential handicap from a given hearing loss. This system has become known as the Hearing Handicap Scale and is presented in modified form in Table 2.

This scale attempts to classify hearing handicap using the average of pure tone thresholds at 500 Hz, 1000 Hz, and 2000 Hz for the better ear. The scale assumes that if there is a difference between ears, the better ear will take the majority of the responsibility in the listening situation. Notice that in this scale, the range of normal hearing is 0-25 dB. Because of this, this scale is more applicable for use with adults who have already developed speech and language in a natural way before the onset of the hearing loss. The rules of the language have already been well established so that a loss of 15-25 dB has little effect. The client learns to fill in information that is missing because of the loss. Please bear in mind that this scale is to be used only as a rough estimate of hearing handicap. If the loss has a severe slope or if the client has a severe discrimination problem because of the etiology of the loss, then the handicap may be worse than the scale implies. This information is to be used only as a general guide and not as an absolute rule. Apply it with discretion.

One of the main differences between the congenitally hard of hearing individual and the individual who has acquired the loss later in life lies in knowledge of the rules of the language. Our language is rule governed. It does not occur randomly. For example, if the following sentence is presented, and if you are asked what it is, you have nowhere to start.

If a question mark were placed at the end of the sentence instead of the period, certain words would automatically pop into your head to fill the first blank. These might include "how, where, when, who, what, why..." and were chosen because of your knowledge of the rules of question formation. If you were told that the first two words are It is, you again make reasonable guesses about the rest of the sentence. If all but the last word were filled in with It is still raining in _________, and if you recall the recent weather reports from the west coast, you could probably fill in the word California even if you were unable to hear any of the final word. You are able to do this because of the linguistic constraints that are regulating our use of language.

The linguistic constraints presented by Sanders (1971) are outlined below:

I. Structural constraints
   A. Phoneme constraints = how speech sounds can be combined
   B. Morpheme constraints = how groups of speech sounds can be combined
   C. Syntax constraints = how words can be combined

II. Contextual constraints
III. Situational constraints

Structural constraints include our knowledge of how sounds can be combined, how groups of sounds form words, and how words are combined into meaningful sentences. These rules tell us, for example, that pzk is not an acceptable sound combination in English. They also tell us that the groups of sounds pre- and anti- always occur at the beginning of words, but -ing and -ly are always at the end. Finally, they tell us that sentences occur in subject-verb-object word order. In
Table 2. Classification of Hearing Handicap  
(Average of 500, 1k, 2k Hz re ANSI)

<table>
<thead>
<tr>
<th>ANSI (in dB)</th>
<th>HANDICAP</th>
<th>SPEECH UNDERSTANDING</th>
<th>PSYCHOLOGICAL IMPLICATIONS</th>
<th>NEED FOR A HEARING AID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>Range of Normal</td>
<td>No difficulty</td>
<td>None</td>
<td>None for bilaterally normal; unilaterals may use CROS</td>
</tr>
<tr>
<td>25-40</td>
<td>Slight</td>
<td>Difficulty only with faint speech</td>
<td>Children may show verbal deficit</td>
<td>Occasional use</td>
</tr>
<tr>
<td>40-55</td>
<td>Mild</td>
<td>Frequent difficulty with normal speech</td>
<td>Psychological problems in children measurable; social inadequacy begins in adults</td>
<td>Frequent need for an aid</td>
</tr>
<tr>
<td>55-70</td>
<td>Marked</td>
<td>Frequent difficulty with loud speech</td>
<td>Children: educationally retarded; emotional and social problems; Adults: measurable psychological problems</td>
<td>Generally, the area of greatest satisfaction from an aid</td>
</tr>
<tr>
<td>70-90</td>
<td>Severe</td>
<td>May hear shouted or amplified speech, but this ability may depend on other factors</td>
<td>Children: pronounced educational problems; social and emotional problems in both children and adults</td>
<td>Generally, good results with aid, but help is dependent upon other factors</td>
</tr>
<tr>
<td>90+</td>
<td>Profound</td>
<td>No understanding of speech, even when amplified</td>
<td>Children: severe educational retardation and emotional under-development</td>
<td>Help from aids depends upon objectives - may help lipreading and voice quality</td>
</tr>
</tbody>
</table>

From: AAOO Guide (modified)
addition to structural constraints our language is governed by contextual constraints in which knowledge of the topic of conversation limits vocabulary choices and by situational constraints in which our language is altered by the circumstances surrounding the communication.

Knowledge of these rules influences the redundancy and hence the predictability of the message. It lets us fill in the missing parts when we only hear part of the message due to the hearing loss. Knowing the rules lets us make an educated guess when only part of the message is heard.

The problem with the congenitally hard of hearing is that the auditory mechanism is distorting the signal from the beginning of the child’s auditory experience. Depending on the degree of loss, he may not be able to learn all of the rules or constraints of language in a normal way. He must be taught in a more structured way and as a result he may not be an accurate guesser. He does not have a linguistic framework on which to place the partial information that he receives auditorily. As a result, language errors are made.

The advantage that exists for a person with an acquired hearing loss lies in his knowledge of the rules of language. They were established prior to the loss. Therefore, this individual may have the same loss as a congenitally hearing-impaired individual, and yet he is able to hear only part of the auditory signal and fill in the rest. He knows what to expect in terms of word and sentence structure, and his communication problem is less severe. Our job in training programs is to develop or establish a knowledge of these linguistic constraints.

The differences in receptive skills that exist in congenital versus acquired hard of hearing populations are reflected in differences in speech production. The congenitally hard of hearing individual learned speech through a distorted system, and the result may likely be distorted speech. With an acquired hearing loss, speech skills were learned through an undistorted system. If the loss that eventually occurs is severe enough that the person is considered deaf, his ability to monitor his speech is greatly reduced or even absent. It is common in cases such as this to see changes in voice quality, rhythm and articulation patterns. The hard of hearing individual, on the other hand, has enough residual hearing that he is able to monitor at least some of his speech output. As a result, little if any change is seen. Part of the reason for this is the fact that this person generally is an excellent candidate for amplification. With the hearing aid, his self-monitoring ability is greatly improved. Couple this with the fact that he has already learned the linguistic rules that state that -s occurs at the end of plurals and possessives and -ed occurs at the end of past tense verbs, and we can see why his speech output is not disturbed even though auditorily he may not be hearing the sounds he is producing. If a change does occur in his speech, it is usually in the articulation of the lower intensity, higher frequency consonants such as s, f, th, and sh and it is usually in the final position of words.

The last age group that needs to be considered in terms of special problems is the geriatric hard of hearing. An early survey states that 20% of all hearing-impaired individuals in the United States are over 65 years of age (Metropolitan Life Insurance Company, 1966). About 50% of people in this country who are over age 65 have some degree of hearing loss (Hull, 1977).

Presbycusis is the term given to the auditory disorder that affects the aging person. In dealing with this type of client it is important to remember that a loss of auditory sensitivity is probably not the only component that contributes to the behavior pattern of the presbycusic. Most authorities agree that it also involves the central auditory system that normally lets a person interpret what he hears. This means that the problems an elderly person with presbycusis has understanding speech are often much greater than might be expected from the audiogram. The sorting and processing of auditory information is somehow at fault. A person several years younger with the same audiogram but resulting from another cause may have very little difficulty functioning. The more severe comprehension problems experienced by the elderly do not exist. There may be some difficulty in noisy environments, but even that problem will not be very severe. The
result is that the young are better able to cope with the acquired hearing loss.

The pathology of presbycusis has been summarized by Hinchcliffe (1962) as follows:

1. Impairment of:
   a. auditory threshold sensitivity
   b. frequency discrimination
   c. auditory temporal discrimination
   d. sound discrimination
   e. auditory perceptual judgment
   f. sound directionality
   g. speech discrimination
2. A lowering of the higher frequency limit
3. A decrease in:
   a. the intelligibility of distorted speech
   b. the ability to recall long sentences

Notice the range of involvement in several areas of auditory functioning. The problem is a complex one, and unfortunately, the solution is not an easy one.

The typical audiogram seen in cases of presbycusis is shown in Figure 4. Notice that the loss is a gently sloping, sensorineural (nerve-type) loss that is more severe in the higher frequencies. It must be remembered that in cases of hearing impairment due to aging, it is almost impossible to separate out the effects of years of noise exposure. The typical noise induced audiogram is shown in Figure 3. Again notice that the loss is sensorineural in nature and is more severe in the higher frequencies. The characteristic mark of a noise induced problem lies in the notch that occurs at 4000 Hz with the thresholds at 8000 Hz being somewhat better.

Since both losses are higher frequency, it is the unique 4000 Hz notch that signifies the noise induced problem. The problem is that any person who has lived 65 or more years in today's world has experienced 65 or more years of noise exposure. The noise induced portion of the loss might account for some discrimination problem, but if the ability to understand what is said is really severe the aging effect is being felt.

The effect of age on auditory sensitivity is shown in Figure 5 (Glorig, et al., 1957). The graph depicts the median pure tone thresholds for males from age 10 to 79 years. The progressive nature of the problem is evident, and it is this gradual decline in sensitivity that presents adjustment problems.

Notice that in all cases the loss is worse in the higher frequencies and better in the lower frequencies. As the person gets older the problem becomes even worse in the high frequencies and more and more speech information is lost. The point to remember is that if the same loss occurred in a younger individual, the speech processing problems would not be as severe. Both people would have the same capacity to hear speech since the audiograms would be essentially the same. The difference is in the processing ability of the two central auditory systems.

Phonemic regression is the term that is given to this decline in speech perception which is greater than what seems appropriate for a particular audiogram. Willeford (1971) outlines Gaeth's description of the characteristics of phonemic regression as follows:

1. Otological and audiological findings indicate a mild or moderate sensorineural hearing loss.
2. The loss of hearing for speech agrees with pure tone results.
3. There is greater difficulty understanding speech than the type and severity of the hearing loss would predict.
4. The patient does not appear to demonstrate a general decay in mental capabilities as severe as his deterioration in speech perception.
5. The patient lacks insight into the problem and tends to blame it all on auditory acuity.
6. These signs appear more often in adults over 50 years of age.

This discrimination problem that the geriatric client faces creates a problem with the use of amplification. The hearing aid will amplify everything. This includes speech, but it also includes all of the environmental noises that might interfere with speech understanding. The problem is that in many cases of presbycusis, louder speech does not improve understanding ability because of the central processing problems that exist. This population is faced with both a loss of hearing sensitivity and understanding. As a result they often appear to be confused and senile, and even with amplification they continue to report, "I can
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hear, but I can't understand". For further discussion of the problem of hearing loss in a geriatric population, let me refer you to the two referenced books by Ray Hull (1977, in press) which appear in the bibliography.

The hard of hearing population is faced with a wide range of communication problems and are in need of just as wide a range of services. From the aural rehabilitation point of view, services start with a complete hearing evaluation, which serves two purposes. First, it should serve as an aid to the physician in medical diagnosis and monitoring of the effects of treatment of the otologic problem, and second, it should serve as an aid in the assessment of hearing handicap.

Once medical clearance has been obtained and the effect of the loss on the client has been established, a complete aural rehabilitation program can be developed to meet the individual needs of the hard of hearing client. This program might include one or more of the following:

I. Amplification
   A. Hearing aid evaluation
   B. Dispensing
   C. Hearing aid orientation

II. Development, remediation, or conservation or receptive and expressive language skills.
   A. Receptive skills
      1. Auditory training
      2. Speechreading
      3. Auditory-visual training
      4. Sign language training
      5. Communication aids
   B. Expressive skills
      1. Speech training
      2. Language training
      3. Sign language training

III. Counseling of the client and/or his family concerning communication.

The first step in the aural rehabilitation process involves the amplification system and should be considered to be the most important factor in the program. The goal of amplification is to help the hearing-impaired client make the maximum use of his residual hearing. Notice again this does not say the goal is to return his hearing to normal or to solve all of the auditory problems. The goal is to increase auditory sensitivity and speech understanding to its maximum potential. Depending on the degree of loss, the expectations for amplification have to be adjusted. In some cases "normal" hearing can be restored. In others, sound detection ability may be all that can be hoped for. The aural rehabilitationist's role in the amplification process includes selection and evaluation, dispensing, and orientation and training.

The success that is experienced with amplification will determine what additional steps need to be taken in the rehabilitation of the hearing-impaired individual. The areas for consideration include first of all the development, remediation, or conservation of both receptive and expressive language skills. If the hearing aid is not returning the client's hearing to within normal limits, then it is likely that he is in need of auditory training. With a congenital loss, this would involve the initial training in sound awareness and perception and would lead through various stages of auditory language learning. If the loss is acquired, auditory training involves structured relearning of the acoustic code. If the client has not heard the high frequency components of speech for several years, the new experience of amplification exposes him to strange, unfamiliar auditory information which he has to relearn.

It is not unusual for the loss to be severe enough that even with amplification and auditory training, information is still missed. In this case, the hard of hearing individual learns to rely on visual information obtained through speechreading to fill in what is missed auditorily. Speechreading training is then undertaken in conjunction with and not in place of amplification and auditory training. Speechreading is a difficult skill and the typical person only receives about 30% of speech at best if he relies only on visual cues. Part of the reason for this lies in the nature of speech itself. It is not meant to be conveyed visually. Each vowel should be unique visually, but in rapid conversational speech, many vowels begin to look alike. Consonants are even more of a problem because many of them are visually identical and cannot be differentiated using only visual cues. These consonants are termed...
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homophenous and can be categorized according to one system (Binnie, Jackson, Montgomery, 1976) as follows: /f,v/, /p,b,m/, /s,z/ /t,d,s,z/, /k,g/ (categories only partially illustrated). The speechreader must rely, in part, on context to identify the particular sound that occurred.

The advantage that the hard of hearing individual faces is that he has enough auditory perception to hear at least part of speech, and if visually he receives enough information to fill in missing parts, he functions quite well. This is why part of the aural rehabilitation program must focus on the interaction of both sensory modalities in auditory-visual training. What is missed through one channel may be perceived through the other, and the net result is improved communication.

If the client is more severely impaired, functional hearing may never be a reality and sign language training and the use of various communication aids become critical. Here we are beginning to cross the functional/nonfunctional line between deafness and hard of hearing. For the most part these are skills that we look toward as the loss progresses and as more communication problems occur.

Expressive skills are also part of the aural rehabilitation program. This might involve development of speech and language if the loss is acquired or remediation if errors already exist. Part of the responsibility in aural rehabilitation also lies in conservation of expressive skills. If the hearing loss has reached a point where self-monitoring of speech is becoming difficult, it is important to take measures to see that speech does not deteriorate over time. Finally if the loss is severe enough, expressive training also involves sign language training to give the client expressive skills for communication.

The last component of the aural rehabilitation program that really begins with the initial contact is counseling. This includes counseling of the client and his family regarding the communication problem and expectations for the future. Information is conveyed concerning how the normal auditory system works, what is going wrong in the present case, what the audiogram means, and what communication problems can be expected based on the results of testing. Future goals of aural rehabilitation and future expectations are also related and referrals to other supporting services are made when appropriate. It is important to include family members in these sessions because their support, assistance, and understanding are invaluable in the total communication training program of the hard of hearing client.

In your professional dealings with hard of hearing clients, communication problems will exist. In the majority of cases, the hard of hearing individual will not have sign skills to aid in communication. You will have to rely upon your skills in communication and upon your support and patience to succeed. The following is a list of suggestions or techniques offered by Hull (1977) that might help achieve better communication with the hard of hearing of any age:

1. Try to speak to the hard of hearing client from a distance of about six feet.
2. Arrange the light in the room or the seating arrangement so that the light is on the speaker’s face and not in the eyes of the hearing-impaired person who is trying to speechread.
3. Try to speak to the hard of hearing person at eye level so that he does not have to look up at you.
4. Do not speak directly into the person’s ear no matter how hearing impaired he is. Give him the advantage of speech reading cues.
5. Always face the person when speaking.
6. Speak at a natural rate. Do not slow down too much since this only tends to distort speech.
7. Do not overarticulate, because this will also only distort the visual signal.
8. Do not shout.
9. Speak in relatively short sentences and keep your language simple.
10. If the person seems confused by your statement and answers inappropriately, do not ignore the confusion by simply moving on to another topic. Reward your statement and try to correct the misinterpretation.

The hard of hearing individual is faced with the ultimate problem that his loss is not as handicapping as is the loss of a deaf individual. As a result, his needs may be overlooked, and
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once the loss is identified, rehabilitation services may not be readily available. There are many hearing-impaired who fall into this category. We must be careful not to ignore their needs by focusing all of our efforts and attention on the more severely impaired. It is time to develop and train a "professional rehabilitation worker for the adult hearing impaired". It is time to meet their needs as well as the needs of the deaf.

REFERENCES


