Binaural Hearing aids:

The Fitting of Choice for Bilateral Loss Subjects

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Introduction

Few issues have received as much attention in the field of audiology as binaural hearing aid fitting - that is, the fitting of two hearing aids in the presence of bilateral hearing loss. Indeed, as one reviews the literature of the 80's, one can easily find references to articles that cautioned care in binaural amplification (Berger, 1984; Berger & Hagberg, 1989; Gatehouse & Haggard, 1986). After decades of research on the impact of binaural hearing this cautionary view is no longer warranted.

There are good reasons for the increased acceptance of binaural fitting in people with bilateral hearing loss. Consumer surveys and questionnaires (Briskey & Cole, 1983; Brooks & Bulmer, 1981; Chung & Stephens, 1986; Dirks & Carhart, 1962; Markides, 1982; Kochkin & Kuk, 1997; and Kochkin, 2000), clinical studies (Byrne, 1980; Erdman & Sedge, 1981, 1986; Feuerstein, 1992; and Markides, 1980) and laboratory studies (Balfour & Hawkins, 1992; Belzile & Markle, 1959; Byrne, Noble, & Lepage, 1992; Durlach & Colburn, 1978; Durlach, Thompson, & Colburn, 1981; Grossman, 1980; Naidoo & Hawkins, 1994; and Zurek, 1993) all point to the same conclusion, that binaural amplification results in higher consumer satisfaction, benefit and wearer performance over monaural amplification. Furthermore, landmark publications summarizing the benefits of binaural amplification (e.g., Libby, 1980), and the report of potential adult-onset auditory deprivation effect from monaural hearing aid use (e.g., Silman, Gelfand, & Silverman, 1984; Silman, Silverman, Emmer, & Gelfand, 1992; Silverman, 1989; Silverman & Silman, 1990; Stubblefield & Nye, 1989) re-invigorated the interest in binaural amplification. What follows is a brief summary of the factors and reported advantages supporting the use of binaural hearing aids, and some considerations when making such decisions.

I. Neurophysiological Support For Binaural Interaction

The coded acoustic stimuli from the two cochleae ascend via the cochlear nerve to the cochlear nucleus. Ascending fibers decussate at the trapezoid body and travel to the superior olive on the opposite side. Thereafter, the majority of the fibers ascend ipsilaterally to the inferior colliculus, medial geniculate, and ultimately to the auditory cortex. Information from both ears interact at various subcortical structures, first at the superior olive to higher centers on the auditory cortex. Furthermore, discrete neuronal structures, which respond to differences in time and intensity of the incoming signals from the two ears (i.e., interaural differences), are present at various levels. The interested readers are referred to Gulick, Gescheider & Frisina (1989) for a detailed description of the ascending and descending auditory pathways.

From a structural point of view, the auditory system is not only binaural in nature, but also is wired with many safety (and perhaps redundant) features that help preserve the binaural advantages even in case of damage. Notwithstanding, it suggests the possibility that any damage to the peripheral auditory system may also lead to a disruption of the multi-level processing that is critical for analysis by the central auditory system. Compensation (i.e., use of hearing aids) at the level of the cochleae is deemed critical.

II. Psychoacoustic and Acoustic Factors that Account for Binaural Advantages

a. Binaural loudness summation

The loudness of a sound is greater when it is presented to both ears simultaneously than when it is presented to one ear alone. This observation is termed binaural loudness summation (Reynolds & Stevens, 1951) and is perhaps the most robust advantage of binaural processing. The magnitude of this effect varies across individuals, but is present in both normal and hearing-impaired people. When the sound is presented at an intensity level that is near the person's hearing threshold, the increase in loudness is approximately 3 dB. At suprathreshold level, this increase in loudness is approximately 6 dB on the average (Haggard & Hall, 1982). Levitt and Voroba (1980) also reported that the binaural system has better intensity and frequency discrimination ability than the monaural system.

There are many advantages that result from binaural loudness summation. Because sound is louder when heard in both ears, low intensity sounds that are not perceived in a monaural mode may become audible when the person is aided binaurally. Because less gain is required from each hearing aid to reach a comfortable listening level when the patient is aided binaurally than monaurally, the chance of feedback is decreased and larger vents may be used (as appropriate) in a binaural fit than in a monaural fit. Less gain from the hearing aid also reduces the chance for saturation distortion to occur. These advantages, together with better frequency and intensity discrimination in the binaural mode (than monaural mode), led to reports of better sound quality and speech understanding (Balfour and Hawkins, 1992; Erdman & Sedge, 1981, 1986) when the wearer was aided binaurally than monaurally. The lower volume may also lead to lower current drain from each hearing aid.

The loudness summation effect from binaural hearing aid use may solve some difficult-to-fit cases. One is fitting a severe-to-profound degree of hearing loss. People with this degree of hearing loss may not get adequate amplification from one single hearing aid without risking feedback. Binaural hearing aids would allow the wearer to enjoy comfortable loudness with lower risk of feedback.

b. Masking Level Difference (MLD)

When a desired signal (speech or a sinusoid) and an undesired signal (e.g., broadband or narrow band noise) are presented to both ears and the phase relationship of these signals is altered, the ease of detection and/or identification of the desired signal may be enhanced. This phenomenon is termed Masking Level Difference (MLD, Licklider 1948; Hirsch, 1948). Durlach and Colburn (1978) attributed MLD to the ability of the binaural system to utilize interaural time and intensity differences between ears to extract a signal from the noise background. The magnitude of MLD varies depending on the stimuli and comparison conditions. With sinusoids, it can vary by as much as 15 dB at 250 Hz and up to 3 dB above 2000 Hz (Green and Henning, 1969). Levitt and Rabiner (1967) reported that the MLD for monosyllabic words can be as high as 13 dB.

The occurrence of MLD suggests that speech intelligibility in noisy situations may be enhanced with binaural hearing aids than monaural hearing aid. This effect has been demonstrated in the laboratory with both normal hearing (Kock, 1950; Levitt and Rabiner, 1967; Pollack & Pickett, 1958) and hearing-impaired individuals (Harris, 1965, 1980; Zelnick, 1970), for both symmetrical and asymmetrical hearing losses (Markides, 1977).

Real World Surveys

The results from real-world surveys are not as straight-forward. While some surveys reported improved performance in noise as an advantage of binaural hearing aids (Erdman & Sedge, 1981, 1986), others reported less enthusiastic results (e.g., Briskey & Cole, 1983). There may be several reasons for such variation. First, the sensitivity of the measure may be partially responsible. Some consumer surveys sampled satisfaction with binaural hearing aids and not directly compared satisfaction between monaural and binaural fittings (e.g., Briskey & Cole, 1983). Because speech understanding in noise is the most frequently reported complaint of hearing-impaired people, it is plausible that even with the use of binaural hearing aids, wearers may still be dissatisfied with the performance of the hearing aid in noise. Studies which directly compared binaural and monaural amplification, showed a significant binaural advantage (Erdman & Sedge, 1981, 1986).

Technology may have contributed to the discrepancy in observed binaural benefit in noise. Naidoo and Hawkins (1994) compared the preference of 15 hearing-impaired subjects for binaural/monaural amplification while they listened to discourse passages presented in quiet and in noise backgrounds of 70 and 80 dB SPL. A variety of circuits were compared, including the K-Amp, Class D, linear output compression, Manhattan II, and a linear peak-clipping circuit. The results showed that subjects preferred binaural amplification for all but the linear peak-clipping circuit. The authors speculated that such preference may have to do with distortion products generated at high input levels. All but the linear peak-clipping circuits generate minimal distortion at high input levels. Subjects preferred the linear peak-clipping circuit in the monaural mode over the binaural mode because only one ear has to tolerate the distortion products. The other circuits were preferred in the binaural mode because the reduced distortions allowed subjects to enjoy the full binaural advantages.

In a large-scale study, Kochkin and Kuk (1997) compared consumer satisfaction between binaural and monaural hearing aid wearers in the USA. Unlike previous surveys, which utilized restricted subject population and/or hearing aid models, this study included hearing aids of all types and models (conventional and programmable). Nearly 4000 hearing aid wearers, whose hearing aids were dispensed by audiologists, hearing aid specialists, and physicians in the USA were sampled. Respondents reported their degrees of hearing loss and their satisfaction for their hearing aids in various listening situations. In addition they completed the Abbreviated Profile of Hearing Aid Benefit (APHAB) under aided and unaided conditions. The data was segmented into five groups of hearing aid wearers. One group wore conventional hearing aids (N=1,124), while the other four groups wore advanced hearing aids such as digitally programmable hearing aids with multiple memories and multiple channels (total N for four groups = 2,827). In general, one can assume that approximately half of the conventional hearing aids used linear peak-clipping circuit (Hawkins, 1996), whereas the majority of the advanced hearing aids used classes B, D or some types of nonlinear circuits, which yielded low distortion at high input levels. All five samples studied (conventional and 4 advanced) showed a strong directionality effect in favor of binaural fittings, enhanced enjoyment in outdoor environments and improved benefit as measured by the APHAB. However, advanced technologies in general demonstrated a stronger binaural advantage on sound quality and in multiple listening situations especially outdoors. This suggests that the choice of circuit may affect the noted binaural preference. In addition they confirm the theoretical advantages of binaural amplification discussed previously.

In a more recent study (Kochkin, 2000) of a National sample (n=1,493) of bilateral loss subjects in the United States, binaural wearers reported significantly higher satisfaction scores on their quality of life, subjective benefit, sound of their voice, ability to hear soft sounds, value (performance versus price paid), ability to localize the direction of sounds, as well as enhanced hearing in ten of thirteen listening situations measured.

c. Localization

Localization refers to the ability of the individual to locate the source of sound in a sound-field. Such ability is based on a difference in the intensity and phase of the same sound arriving at two ears, which originated from a difference in distance between the sound source and the two ears (Kock, 1950; Levitt & Voroba, 1980). Using such interaural phase and intensity cues, normal hearing listeners can judge the distance of sound sources, as well as the angle of elevation of the source. In the median plane, it is estimated that normal hearing individuals can detect a difference in azimuth by as little as one degree (Zelnick, 1980).

The ability to localize sound source is important in daily communication situations. For example, it alerts the listener of the location or source of potential danger in the environment, e.g., traffic. Often, the ability to communicate in noisy situations require the listener to first identify the source of sound. Hearing-impaired people vary in their ability to localize sounds, possibly due to an elevation in threshold in each ear, difference in threshold between ears, and potentially retrograde degeneration of neurons involved in binaural tasks (Dermody & Byrne, 1975; Koehnke & Besing, 1995). Despite such potential limitations, it has been shown that binaural hearing aids, especially those with the microphone inlets recessed into the concha-canal opening area (i.e., in-the-ear, in-the-canal, completely-in-the-canal), provided the hearing-impaired person better localization ability (Westermann & Topholm, 1985). Kochkin and Kuk (1997) and Kochkin (2000) also showed that binaural hearing aid wearers were about 15% more satisfied with their ability to tell the direction of sounds than those wearing monaural hearing aids.

Other associated binaural advantages include stereophonic hearing, better sound clarity and quality (Balfour and Hawkins, 1992), and better speech understanding and sound quality perception in reverberate environments (Nabelek and Robinson, 1982).

d. Head Shadow

Head shadow refers to the attenuation of sounds as they travel from one side of the head to the other. High frequency sounds are more affected because of their shorter wavelength. The effect can be as much as 15 dB at 4000 Hz (Sivian & White, 1933). Because vowels are primarily low frequency sounds and consonants high frequency sounds, the head shadow effect can significantly impact the recognition and identification of consonant sounds.

Head shadow effect is minimal in normal hearing people regardless of which side of the head is the speech signal presented. For a hearing-impaired person, the effect may be substantial. Consider the case when the desired speech signal is presented to the unaided ear of a person with a bilaterally symmetrical hearing loss. Because of the elevated threshold, the desired speech signal is not perceived at the unaided ear. Rather, it has to "cross over" the head to the aided ear for perception. In the process, the intensity of the high frequency speech sounds is diminished. This may affect intelligibility. Furthermore, because only one ear (i.e., the aided ear) perceive the speech signal, information on the direction of the sound is lost. In cases where noise is present on the aided side and speech on the unaided side, the speech signal originating from the unaided side will not be perceived in either ear because of threshold elevation on the unaided side and masking on the aided side.

The use of binaural hearing aids eliminates any potential head shadow. In cases where noise originates from one side of the head, the wearer can turn the hearing aid off that side to minimize any masking effect.

III. Other Advantages of Binaural Amplification

a. Preservation of integrity

The integrity of a sensory system depends on external stimulation. Deprivation studies, those in which the effect of withholding stimulus on the development of sensory neurons in a newborn animal, conclusively showed that sensory stimulus is needed for the structural development of sensory neurons as well as their functional connectivity (Webster & Webster, 1977). Studies on children's development showed that appropriate sensory stimulation, especially between the ages of 0 to 2 years are critical for the proper development in later years (Northern & Downs, 1991). These studies illustrate the importance of hearing on the proper speech, language, and cognitive skills of the children, as well as providing the rationale for the early identification, intervention, and binaural hearing fit for hearing loss in children (Northern and Downs, 1991; Ross, 1980; Ross, Brackett, & Maxon, 1991).

Until recently little was known concerning adult sensory deprivation effect if their hearing losses are not properly managed (e.g. binaurally treated). In a landmark report by Silman, Gelfand, and Silverman (1984), the authors demonstrated that hearing-impaired people with bilaterally symmetrical hearing loss who were fitted monaurally suffered a loss of speech recognition ability in the unaided ear (average loss of 18.5%). Subsequent reports by the same group of researchers (Gelfand, Silman, and Ross, 1987; Silverman, 1989; Silverman and Silman, 1990) and others (Burkey and Arkis, 1993; Gatehouse, 1989; Hood, 1990; Stubblefield and Nye, 1989) also showed that such deprivation only occurred in the unaided ear of a monaurally fitted subject, but not in the unaided ears of a non-wearer. Additionally, they also showed that this deprivation may be partially reversible (Silverman and Silman,1990), but the duration of monaural aid use and the age of the subjects did not have any effect on the recovery from the deprivation effect (Burkey & Arkis, 1993).

Results from the deprivation studies have fitting and legal implications. In order to avoid potential deterioration of performance in the unaided ear, binaural hearing aid fitting is necessary in bilateral hearing loss. Legally, these results form a physiological basis that requires binaural amplification as the standard of fitting in cases with aidable hearing loss in both ears. Violation from such practice may constitute malpractice and could be subjected to legal actions. Indeed, Lowe (1988) reported a case where an audiologist and an otologist were sued by a hearing impaired patient for failing to inform her of binaural amplification.

b. Bilateral tinnitus reduction

One effective approach to treat bilateral tinnitus in patients with associated hearing loss is the use of hearing aids (Brooks and Bulmer, 1981). Over 50% of hearing-impaired people reported they were less affected by their tinnitus when a hearing aid was worn on the affected ear. Masking of the tinnitus, and enhancement of hearing ability with hearing aid use are often quoted as the reasons for the noted tinnitus relief. In cases of bilateral tinnitus but monaural hearing aid use, the hearing-impaired person may report suppression of tinnitus on the aided ear, but noticeable tinnitus on the unaided ear. Binaural hearing aids may be extremely beneficial for bilateral tinnitus.

c. Consumer Report

Ease of listening comfort

Consumer surveys of binaural hearing aid wearers also revealed that a major advantage is the improved ease of listening with binaural hearing aids (Brooks and Bulmer, 1981; Briskey and Cole, 1983; Erdman and Sedge, 1986; Chung and Stephens, 1986). Bergman (1957) reported that deaf-blind individuals reported enhanced ease of listening with binaural hearing aids. Zelnick (1985) also reported that binaurally aided hearing-impaired people were more relaxed and experienced less tension in listening situations then subjects fit only monaurally. Feuerstein (1992) also showed that normal hearing people reported higher ease of listening ratings and word recognition scores when tested binaurally than monaurally. Furthermore, this investigator also reported a moderate correlation between ease of listening ratings and word recognition.

Preference over monaural fitting

Most surveys comparing monaural/binaural amplification favor binaural amplification. For example, Jordan et al (1967) surveyed 1147 patients and showed that 78% continued to wear binaural hearing aids after their initial fittings. Erdman and Sedge (1981, 1986) determined that 90% of their patients preferred binaural amplification. Chung and Stephens (1986) showed that a significant number of their 200 subjects preferred binaural amplification. As many as 97% of 450 respondents preferred binaural hearing aids over monaural aids in Briskey and Cole's (1983) survey. Such preference was found regardless of the experience of the hearing aid wearers, their gender, the symmetry of their hearing loss, and whether they paid for the hearing aids.

IV. Candidates for Binaural Amplification

Many clinicians and researchers (e.g., Hawkins, 1986; Skinner, 1988) suggested that hearing-impaired people with aidable hearing loss in both ears should be considered candidates for binaural amplification. However, there still may be issues that need clarification.

a. Symmetry of hearing loss

Some authors (Markides, 1977; Davis and Haggard, 1982; Gatehouse and Haggard, 1986) have suggested that binaural amplification should be recommended only to people with symmetrical hearing loss who has less than 15 dB difference in threshold and less than 8% difference in speech recognition score between ears. Substantial difference in the values of suprathreshold indices (like MCL and LDL), and hearing loss configuration (flat in one ear and precipitous in other ear) were also cited as contraindications for binaural amplification.

On the other hand, some reports suggest that symmetry of hearing loss should not be a factor in considering binaural candidacy (Hawkins, 1986; Moncur & Dirks, 1967). Chung and Stephens (1986) surveyed over 200 patients' use of their hearing aids and reported that patients with asymmetrical hearing loss used binaural hearing aids more than subjects with symmetrical hearing loss. Kuk (1992) reported that the incidence of hearing aid return for patients fit with binaural hearing aids was the same for patients with symmetrical and asymmetrical hearing loss (less than 5%) after a free, 30-day trial period.

Both ears must be aidable in order for effective binaural hearing aid use.
However, the definition of an "aidable" ear is not easy. Obviously, an ear with no measurable threshold is "unaidable." Beyond that, the definition of an "aidable" ear varies from "one with good speech recognition when aided alone" to "one with measurable threshold". However, if one considers the issue, one will find that the practice of individual ear evaluation paradoxical, because it undermines the ability of the auditory system to integrate and process information received from both ears. Clinically, it is frequently observed that a majority of people with asymmetric hearing loss enjoy good (or even better) speech recognition and sound quality judgments when they are aided binaurally than monaurally, even though one ear has significantly poorer sound quality and speech intelligibility score when it is aided alone. In addition, the patient is able to report some of the advantages of binaural amplification like "louder and clearer speech", "more comfortable and relaxed listening", "hearing on both sides" , "can tell directions better." These comments are possible because of the integration of binaural information from both ears.

Consequently, the criterion for binaural amplification cannot be determined simply based on threshold and/or suprathreshold information on each ear alone (exception: dead ear). Rather, such decision must be based on the results of aiding both ears together. From an audiological perspective, the decision for binaural amplification is contingent upon the presence of binaural fusion in the impaired auditory system, a process that is dependent on the central auditory processing capability of the hearing-impaired individual.

There is not yet a standard protocol to determine fusion for the purpose of binaural amplification. However, one relatively simple clinical procedure may have some merits (Mercola and Wenke-Mercola (1985). In this procedure, speech is presented to both ears of the hearing impaired listener until it is at a comfortable listening level (levels may be different between ears). Those who can maintain a midline image are considered potential candidates for binaural amplification. Those who report separate images at each ear, despite careful adjustment of presentation levels would not be good candidates for binaural amplification. Monaural amplification will be indicated instead. In such case, the ear with better speech recognition score and/or better sound quality will be aided. In the case of a "dead" ear, CROS (Contralateral Routing of Signal), BiCROS (Bilateral Contralateral Routing of Signal), or Power-CROS are suitable alternatives to monaural hearing aids (see Skinner, 1988 for a description of their proper use).

b. Age: Central Processing Ability & Dexterity

There is ample evidence to suggest that elderly people are more likely to suffer from some degrees of central auditory processing deficit (Arnst, 1986; Gilad and Glorig, 1979; Grose, 1996; Jerger & Hayes, 1977; Martin and Cranford, 1989; Stach, Spretnjak & Jerger, 1990). One may argue that functional deterioration of the central auditory system may also reduce its ability to handle the existing acoustic information. Several reports have indeed cautioned the use of binaural amplification for elderly hearing-impaired person (Berger, 1984; Gatehouse and Haggard, 1986). On the other hand, one may argue that because of the reduced processing ability, the elderly hearing-impaired person has even more reasons to need all the available binaural cues in order to supplement the deficient central auditory processor.

Rousch (1985) reviewed several reports on the performance of the binaural system in different age groups and reported that the binaural system was resistant to distortion and that there was no difference in performance between elderly and younger subjects on binaural tasks. Antonelli (1978) also indicated better binaural speech discrimination than monaural speech recognition. Grose (1996) also reported that although elderly persons showed reduced binaural advantages, there remained significant benefits for the elderly hearing-impaired person to listen with both ears instead of one. These reports showed that age, and the potential central deficit, should not be a limiting factor in binaural fitting.

However, the physical and cognitive abilities of the elderly individuals to handle their hearing aids may limit their successful use. Fortunately, technologies are available today that simplify the use of hearing aids. Some digital and digitally programmable hearing aids can automatically adjust their volume and frequency responses to adapt to the changing listening environments. Some programmable hearing aids also come with a tiny remote control device that obviates the need for external volume adjustment. A detailed evaluation of the needs of the hearing-impaired person, and the application of proper technology could ensure that these individuals enjoy all the benefits provided by binaural amplification.

c. Attitude of the service provider

Despite the abundant evidence supporting the use of binaural amplification (Markides, 1977;

Libby, 1980), only 75% of bilateral loss subjects are fit binaurally in the United States (Kochkin, 1999). Anecdotally we hear the binaural fit rate is significantly lower in Europe (estimated at 35%) and Asia (estimated at 10%). Previously, Mueller (1986) attributed this lack of acceptance to attitudinal factors that are held by the dispensers, the referral sources, and the preconceived notions that the patients held prior to the hearing aid fitting. Unfortunately, this observation is still true today of the referral sources and hearing-impaired individuals. From the clinical perspective, it is important that hearing health care professionals communicate the binaural advantages to their referral sources, and patients so that more binaural hearing aid fittings will be accepted.

d. Other factors

There are other factors that are important to consider in the recommendation of binaural amplification. Clearly, those with a severe loss must wear binaural hearing aids to ensure adequate output (Day, Browning, Gatehouse, 1988). Some wearers are just easier to accept binaural amplification than others (Danhauser, Mitsunaga & Danhauser, 1991). Children with bilateral hearing loss, especially the very young ones, should be amplified binaurally as early as possible in order to maximize their learning potential. It is gratifying to note that such practice is widely adopted in many countries (Byrne & Upfold, 1986; Duffy, 1980; Ross, 1980).

Cost is often cited as a factor in binaural recommendation (Schreurs & Olsen, 1985). Erdman and Sedge (1986) showed that cost was not a factor in the preference for binaural over monaural hearing aids. Indeed, Kochkin (1992) showed that cost is one of the least important factors in a consumer's perception of their satisfaction towards hearing aids. Improved hearing, especially in multiple listening environments, is the key factor governing satisfaction. If our goal in hearing aid fitting is to improve the patient's communicative ability and their satisfaction towards hearing aids, we should not let our perception of the cost of the hearing aid be the primary factor that determines our recommendation for the patient. Rather, inform the patients of binaural benefits and let them make the decision.

Summary

Binaural amplification receives both theoretical, clinical and consumer support. Progress in hearing aid technology has also helped realize some of the theoretical advantages of binaural amplification. Such benefits include better hearing in quiet and noise, better sound quality, better localization of sounds, and higher listening comfort in various situations. Binaural hearing aids are also effective in the management of bilateral tinnitus in some patients.

In order that hearing-impaired people can benefit from binaural amplification, it is important that hearing healthcare professionals select the appropriate technology and counsel their patients on binaural benefits properly. The hearing-impaired person should know why binaural fitting is appropriate for all degrees of hearing loss. The advantages of eliminating head shadow, potential improvement in speech understanding in noise, and improved sound quality and listening comfort are some of the validated benefits. A list of reasons, which should be shared with qualified patients is attached in the appendix.

The appropriate candidates for binaural amplification should include all hearing impaired people with measurable hearing loss in both ears. The overriding criterion is that the central auditory system can integrate auditory images from both ears to form an undistorted, midline image. Even so, the ultimate decision maker of binaurality is the hearing-impaired person. To that end, it is important that the hearing impaired person be given the chance to experience monaural and binaural amplification outside the clinic before a decision on the mode of fitting is made (Hawkins, 1986; Jablin, 1982; Skinner, 1988). Free trial periods (typically 30 days, during which they can return one or both hearing aids at no or minimal fee) should be given to potential candidates to encourage binaural hearing aid use.

Refractory problems in both eyes are treated with a pair of glasses. It is time that we treat bilateral hearing loss with binaural hearing aids.

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Sidebar

15 Reasons Why You Should Wear Two Hearing Aids

1. Better understanding of speech

By wearing two hearing instruments rather than one selective listening is more easily achieved. This means your brain can focus on the conversation you want to hear. Research shows that people wearing two hearing aids routinely understand speech and conversation significantly better than people wearing one hearing aid.

2. Better understanding in group & even noisy situations

Speech intelligibility is improved in difficult listening situations when wearing two hearing aids. However, advanced binaural technology tends to perform better in noise than the older (linear) technology.

3. Better ability to tell the direction of sound

This is called localization. In a social gathering, for example, localization allows you to hear from which direction someone is speaking to you. Also, localization helps you determine from which direction traffic is coming or where your children or grandchildren are playing. Simply put, with binaural hearing, you will better detect where sounds are coming from in every situation.

4. Better sound quality

When you listen to a stereo system, you use both speakers to get the smoothest, sharpest, most natural sound quality. The same can be said of hearing instruments. By wearing two hearing instruments, you increase your hearing range from 180 degrees reception, with just one instrument, to 360 degrees. This greater range provides a better sense of balance and sound quality.

5. Smoother tone quality

Wearing two hearing instruments generally requires less volume than one. This results in less distortion and better reproduction of amplified sounds.

6. Wider hearing range

It's true. A person can hear sounds from a further distance with two ears, rather than just one. A voice that's barely heard at 10 feet with one ear can be heard up to 40 feet with two ears.

7. Better sound identification

Often, with just one hearing instrument, many noises and words sound alike. But with two hearing instruments, as with two ears, sounds are more easily distinguishable.

8. Keeps both ears active resulting in less hearing loss deterioration

Research has shown that when only one hearing instrument is worn, the unaided ear tends to lose its ability to hear and understand. This is clinically called the auditory deprivation effect. Those wearing two hearing instruments keep both ears active. In fact, wearing one hearing aid when two are required might result in greater deterioration of hearing loss in the unaided ear than when wearing no hearing aid at all.

9. **Hearing is less tiring and listening more pleasant**

More binaural hearing aid wearers report that listening and participating in conversation is more enjoyable with two instruments, instead of just one. This is because they do not have to strain to hear with the better ear. Thus, binaural hearing can help make life more relaxing.

10. **Feeling of balanced hearing**

Two-eared hearing results in a feeling of balanced reception of sound, also known as the stereo effect. Whereas monaural hearing creates an unusual feeling of sounds being heard in one ear.

11. Greater comfort when loud noises occur

A lower volume control setting is required with each of two hearing instruments than with just one hearing instrument, resulting in better tolerance of loud sounds.

12. Reduced feedback and whistling

With a lower volume control setting the chances of hearing aid feedback is reduced.

13. Tinnitus Masking

About 50% of people with ringing in their ears report improvement when wearing hearing aids. If the subject has a hearing aid in only one ear, there will still be ringing in the ear, which does not have a hearing aid.

14. Consumer preference

When given the choice and allowed to hear binaurally, the overwhelming majority of consumers choose two hearing aids over one, when they have a hearing loss in both ears.

15. Customer satisfaction

Research with more than 5,000 consumers with hearing loss in both ears demonstrated that binaurally fit subjects are more satisfied than people fit with one hearing aid.

Nature gave us two ears for a reason just like it gave us two eyes and limbs. So logically, just as you use both eyes to see clearly, you need two healthy ears to hear clearly. Before you decide on one hearing aid try two. Your hearing health provider can demonstrate to you the binaural advantage experience either through headphones (during testing), probe microphones, master hearing aids, or during your trial fitting. Decide for yourself.