

# Binaural Amplification

*Dr. Enid Smith, Audiologist*

After the audiometric evaluation is completed and the hearing loss is explained to the patient, the subject of hearing aids is typically the next item on the agenda. Many patients' first question is "Do I need one or two hearing aids?"

The quick response is "If you have hearing loss in both ears, and if it can be helped by hearing aids in both ears, then you need two hearing aids." This quick and easy response is well supported by logic, science, and experience.

Two points of logic easily understood are the wearing of eyeglasses and the mimicking of nature. How many people would walk into an optometrist's office and order eyeglasses with only one lens? When purchasing eyeglasses, patients acknowledge that it would be senseless to see clearly out of one eye, while allowing the vision in the other eye to remain blurry. However, these same people may consider putting a hearing aid in only one ear!

The other point of logic is nature. Simply, there are no "normal" animals born with one ear, one eye, one leg, one lung, or one kidney. Basically, you are issued two at birth, because two is what you need! Yes, you can survive with one eye, one ear, one arm, etc., but it is certainly not as pleasant and as desirable as having two. We can safely assume that if we were meant to hear using only one ear, we probably would have been born with one ear, probably on the end of our nose or on top of our head.

Science and experience have helped us understand how we hear, and why we are born with two ears and not one.

The ability to identify the source of a sound in three dimensional space is known as localization. Localization requires both ears functioning at about the same level. The way the brain is able to determine where a sound is coming from is by comparing timing and loudness information from the two ears. This process can be compared to asking someone if one ball is larger than another ball. If a beach ball is held up to a tennis ball, it is easy for a person to pick the beach ball as the larger ball. However, if a person is only handed one ball, and asked to say whether this ball is larger or smaller than another ball, an accurate response would be impossible. In other words, we need to compare one piece of information to another, in order to maximally understand the value of the information.

In fact, without two functioning ears, the hunting skills of our ancestors would have been so impaired, that they probably would have starved to death, and we would not be here today to discuss the issue!

Although we cannot consciously detect the subtle differences in timing and loudness of sounds entering each ear, the brain can. When the brain perceives a sound, it automatically registers the exact time of entry and the exact loudness of that sound and compares it to the information from the other ear.

Since our heads are obstacles to sound waves, the extra time needed for the sound to cross over to the other ear results in a delay in timing and a softening of that sound. The brain makes a quick calculation comparing the loudness perceived in each ear, as well as which ear heard the sound first, and without being conscious of the ongoing math, we accurately deduce the direction of the sound.

When one has hearing loss in both ears but wears a hearing aid in only one ear, the brain cannot accurately determine which ear is hearing the sound first, and which ear is hearing it louder. As a result, the ability to determine where the sound is originating from is lost.

A person with hearing loss in both ears, who chooses to wear a hearing aid in one ear, will also experience difficulty hearing and understanding sounds.

Sometimes patients have said to me, "I tried one hearing aid and it was terrible, if I try two it will be twice as bad!" Of course, this is incorrect. If one was bad (and it usually is), two will offer twice the benefit, more clarity, less problems in noise, and a much more pleasant and realistic sound quality. Listening with one ear is difficult, tiring and usually very frustrating. Again, listening with one ear can be compared to reading with one eye. It can be done, but it is not the method of choice. If reading with one eye is difficult (and it is), reading with two eyes is certainly much easier.

Many studies have been conducted to determine less obvious advantages to binaural hearing (both ears). One of these advantages is improved speech intelligibility in the presence of competing messages, such as in a group setting or a noisy background. When the sound comes through both ears, a slight reduction in the background noise occurs, allowing a speaker to be more easily heard and understood. The brain automatically "squashes" the non-desired sounds a little bit better, when both ears work together.

Importantly, hearing loss is an important and significant health problem and has been associated with depression, anxiety, irritability, and withdrawal from social interactions. As an audiologist, when a patient comes to me with a problem, it is rarely my goal to fix it halfway! Imagine telling your dentist that you just want the left teeth fixed, or the top teeth fixed! Again, we have two ears, because we need two ears. Getting by with one ear is not very good, and is not the goal.

Children with hearing loss in one ear have been reported on for many years. The results have been clear and alarming. Children with only one good hearing ear have a greatly increased likelihood of academic failure than do children able to hear well out of both ears. One study noted that children with only one normal hearing ear had a ten times greater likelihood of repeating a grade, than did children with two normally hearing ears!

Research also indicates that adults with hearing loss in both ears, who choose to wear only one hearing aid, have an increased risk of additional hearing problems in the unaided ear. That is, the ear that is not wearing the hearing aid, may deteriorate more rapidly than the ear with the hearing aid.

Although budgets have to be carefully considered when deciding how to improve hearing difficulties, aiding one ear instead of two ears in order to keep costs lower may not be a wise decision.

The inability to tell direction of sound, the inconvenience of having to move people to a "hearing side", the reduced ability to understand in noisier environments, and the emotional, social, and educational drawbacks could end up costing the patient more than was bargained for.

*Enid Smith is an audiologist in private practice at Summit Medical Center in Hermitage, TN. She has been in practice since 1988 and has patients from throughout the Southern United States. Additional information can be found at her web site [www.summitaudiology.com](http://www.summitaudiology.com) and she can be reached by phone at 615- 889-4105.*

Opinions, facts and thoughts expressed in this article are those of the author(s) only. These opinions, facts and thoughts may or may not relate to you as a consumer, and/or patient. Therefore, we strongly urge you to seek the advice and opinion of your licensed hearing healthcare provider to determine how this article may/may not relate to you and your specific needs. Only after obtaining your case history and performing a physical examination, can a licensed health care provider can make specific recommendations for you.