Binaural Hearing and Bilateral Hearing Aid Care

The advantage of hearing with two ears

Nature equipped humans with two ears for good reason. The symmetrical arrangement and coordination between them makes our perception and communication not only possible but also facilitates them. If the function of one or both ears is reduced, then hearing and communicating become markedly more difficult. In most cases, hearing devices are able to keep the adverse effects of hearing losses in check. In more than 80 percent of the hearing impaired, both ears are affected by a reduction in hearing ability. They should also be supplied with hearing instruments for both ears.

Why binaural hearing is so important

Binaural sound perception enables the brain to receive the information necessary to filter out unwanted noise, to concentrate on one voice in a jumble of voices or to identify the direction signals are coming from, to name some examples. The benefits and advantages of binaural hearing become clear when based on the following effects or facts:

**Binaural loudness summation**
Loudness summation probably represents the biggest benefit of binaural hearing. It causes the volume of a sound to be higher when both ears hear it at the same time. As a result, sounds that one ear alone doesn’t recognize become audible when both ears are involved. For example, a sound that is heard only with difficulty by one ear at a distance of three meters can still be heard well by both ears even from a distance of 12 meters.

**Binaural background noise**
The improvement in hearing ability in situations where background and/or interfering noise is present benefits from the so-called masking level difference effect. This is based on the ability of the brain to use time and intensity differences between both ears to filter a desired signal from an unwanted one.
Localization
The ability to localize the source of a sound has great significance in daily life. That is the only way the hearing person can concentrate on a discussion partner in a noisy environment, follow a discussion between several people or recognize potential danger signals in time. This ability is extremely important in traffic in particular. For example, someone who can’t judge whether a honking car is coming from the left or the right can’t react appropriately or remove him/herself from the danger area in time.

Head shadowing effect
A sound becomes weaker the farther away it gets from its source. High tones are reduced more than low ones because of their shorter wavelength. If a signal first reaches the left ear, its spread to the right ear is weakened by the head shadowing effect. That means the right ear perceives the signal less strongly than the left one. If this effect is impaired, it has an especially negative influence on the hearing ability.

The advantages of bilateral care
Approximately 80 percent of all patients come into consideration for bilateral care. If only one ear is equipped with a hearing device, then its benefit is limited and hearing ability is frequently unsatisfactory. That can lead to the hearing impaired person not using the hearing instrument regularly or at all and becoming increasingly isolated. Bilateral hearing aid care, on the other hand, provides improved hearing comfort and thus leads to higher customer satisfaction and increased performance.

Better sound quality
Two hearing aids expand the audible field from 180 to 360 degrees, which provides for balanced, even signal recognition (stereo effect). In addition, the individual hearing aids equipped bilaterally don’t have to be amplified as much to achieve a comfortable hearing level. That not only reduces the hearing devices’ power consumption, but in particular reduces the risk of feedback and overload through loud input sounds, which increases the sound quality.

Retaining hearing ability
The functionality of a sense organ is also dependent on whether or not it is stimulated regularly. If the ears are not sufficiently supplied with sound - especially in the first years of life - the hearing sense doesn’t develop optimally. That in turn has a negative effect on
the linguistic and cognitive abilities. Children with binaural hearing loss are therefore always given bilateral care. But it can also come to a worsening of hearing ability in adults if the hearing loss is insufficiently compensated due to unilateral treatment.

**Bilateral tinnitus reduction**

Tinnitus patients with accompanying hearing impairment can also benefit from bilateral hearing device care because the devices can help to distract from negative tinnitus sounds through new, more pleasant ones.

**Less fatigue**

Binaural hearing is particularly advantageous in loud interfering noise situations. The wearer can concentrate better on a speech signal with two hearing aids. Hearing is then perceived to be less strenuous. Participating in conversations is therefore easier and is less tiring in the long run than with only one device.

**Who should receive bilateral care?**

In current opinion, all hearing impaired people in whom both ears show intact connections to the brain should receive bilateral care. Only then can the sound be processed centrally.