

Hearing Technology For a Noisy World



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SOUND MANAGEMENT: A variety of hearing aid features help you use your remaining hearing efficiently and improve comprehension.

Noise may be defined as sounds that interfere with listening to speech. To enhance the importance of speech sounds, a variety of technologies are available in hearing aids. When facing sounds, they typically seem louder than when facing away from them. **Directional microphones** help in these situations, as each one is sensitive in only one direction. **Computer-controlled microphone selection** enables the hearing aid to decide which microphone setting is optimal in a given environment.

Listeners who have normal hearing hear both very soft and very loud sounds, but listeners with hearing impairment hear a limited range of sounds. Wide dynamic range compression (WDRC) helps people with hearing loss make better use of their narrow range of hearing. WDRC comes in two forms: slow-acting automatic volume control amplifies soft sounds and reduces loud sounds automatically, while fast-acting volume control makes adjustments to soft and loud sounds more quickly.¹⁻³

People with hearing loss typically have more loss in the high-frequency range than in the low-frequency range, meaning WDRC may help with some frequencies but not others. **Multi-channel compression** techniques are used with WDRC in the most beneficial area of a person's hearing loss to provide optimal hearing.

Ambient noise, a composition of sounds from many sources and directions (like street noise), seriously interferes with speech sounds. Adaptive noise suppression (ANS) uses ambient noise entering the microphone to automatically adjust the tone control of the hearing aid and reduce the noise.

Hearing aids using **multiple memory control** manage sounds that are amplified, adjusted and delivered to the ear. One program may enhance listening in quiet, while another may enhance listening in noise. The listener selects the best program for the listening situation (sometimes by using a wireless remote control), or **automatic program switching** permits changing between two or more programmed settings automatically.

Frequency transposition moves unusable sounds (i.e., high frequency noises) entering the hearing aid to a usable part of the patient's hearing range (i.e., low frequency). **Spectral en-**

hancement emphasizes speech sounds and limits the amplification of non-speech sounds to improve speech intelligibility.

Another feature that improves speech intelligibility is **transient enhancement**. Speech sounds (e.g., p, b, t) consist of slow-acting and fast-acting acoustical information; transient enhancement keeps information conveyed by a fast transition in sounds from being lost.

When the amplified output to the eardrum is blocked and the blocked sound is detected by the hearing aid's microphone, the hearing aid emits a whistling sound called feedback. **Feedback management control, or feedback cancellation**, reduces hearing aid whistling.

In addition to technology features discussed here, listening strategies (or aural rehabilitation) help improve speech understanding in noisy conditions. Consult an audiologist about aural rehabilitation options.

REFERENCES

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