Assistive Listening Systems and Devices

Hearing is not an all or nothing phenomenon.  People show varying degrees of hearing at varying frequencies in both ears.  The implications of this fact are often overlooked for a variety of reasons that include a lack of understanding about modern technology that improves access to sound.

This article is written from the perspective that Assistive Listening Systems (ALSs) can benefit many hearing aid and cochlear implant users.

**What are ALSs?**

Assistive Listening Systems (ALSs) are sometimes called Assistive Listening Devices (ALDs).  Essentially they are amplifiers that bring sound directly into the ear.  They separate the sounds, particularly speech, that a person wants to hear from background noise.  They improve what is known as the “speech to noise ratio.”

**Why Are ALSs Necessary?**

Research indicates that people who are hard of hearing require a volume (signal to noise ratio) increase of about 15 to 25 dB in order to achieve the same level of understanding as people with normal hearing.  An ALS allows them to achieve this gain for themselves without making it too loud for everyone else.

**Can ALSs Be Used By Some People Who Are Deaf?**

Yes.  ALSs are used by people with all degrees of hearing loss, from mild to profound.  This includes hearing aid users and cochlear implant users, as well as consumers who do not use either hearing aids or cochlear implants.  Hearing aids or cochlear implants have performance limitations and do not work well in all situations.  ALDs are sometimes described as “binoculars for the ears” because they “stretch” hearing aids and cochlear implants, thus extending their reach and increasing their effectiveness.

**Where Do People Use ALSs?**

ALSs help address listening challenges in three ways:  minimizing background noise; reducing the effect of distance between the sound source and the deaf or hard of hearing person; and overriding poor acoustics such as echo.  People use ALSs in places of entertainment, employment, and education, as well as for home/personal use.

**What Are The Types of ALS?**

ALSs utilize FM, infrared, or inductive loop technologies.  All three technologies are considered good.  Each one has advantages and disadvantages.

**What Are FM Systems?**

FM systems are ALSs that use radio broadcast technology.  They are often used in educational settings and offer mobility and flexibility when used with portable body-worn transmitters.  Some newer FM systems utilize miniaturized receivers that fit onto a hearing aid via a “boot.”

This smaller type of receiver is not available through a catalogue.  It must be dispensed by a hearing aid professional and is more expensive than traditional FM systems.  It also uses a high frequency making it incompatible with other FM systems.

**What Are Infrared Systems?**

Infrared systems are ALSs that utilize light-based technology.  They guarantee privacy because light does not pass through walls.  They are the appropriate choice for situations such as court proceedings that require confidentiality.  They are frequently installed in places of entertainment.  They are also frequently designed and marketed for use in television listening.

**What Are Inductive Loop Systems?**

Wide area loop systems utilize an electromagnetic field to deliver sound.  They offer convenience to groups of t-coil hearing aid users because those users do not require body worn receivers.  Loop systems can be used by non-hearing aid users through use of a headphone and inductive loop receiver.

**What Are The Basic Parts of an ALS?**

Each ALS has at least three components:  a microphone, a transmission technology, and a device for receiving the signal and bringing the sound to the ear.  This is important to understand in order to troubleshoot problems systematically and to improve a system’s effectiveness.

**When Do I Need to Obtain Assistance from a Sound Contractor?**

Sometimes users stretch a limited system too far by using products ordered from consumer catalogues.  Group set-ups are frequently complex enough to justify hiring a professional sound contractor to sell and install a system.  This is especially true when multiple microphones are needed, for example in large meetings of 10 or more people.  In this case, a microphone mixer is indicated.  An automatic microphone mixer turns microphones up and down when an individual speaks so that the “closed” microphones do not detract from the “open” microphone’s signal quality.

**What Are the Differences in Listening Couplers?**

It is important to learn about the variety of hearing aid listening attachments.  Your decision to use a headset, earphone, neckloop, silhouette inductor or other connector will depend upon whether you have a telecoil, as well as other factors.  For example, you cannot put an earplug into an ear that already has a hearing aid!  Some couplings are more effective than others.  You should discuss these issues with your hearing aid dispenser.

Cochlear implant users may use a patch cord to connect an ALS receiver directly to their speech processor.  (See explanation of patch cord below.)  Some speech processors are “body pack” sized.  Others are “ear level” and miniaturized to the size of a behind-the-ear hearing aid.  Consumers with ear level speech processors can utilize neckloops for listening in the same way as hearing aid users.

**What Are Patch Cords?**

Familiarity with patch cords is necessary to ensure optimal connections.  Patch cords are short wires with a plug at each end, enabling a connection between a cochlear implant speech processor and the jack of the equipment the cochlear implant user is listening to.  One patch cord manufacturer advises connecting the short end to the speech processor.  Some cords have a mini plug (2.5 mm instead of 3.5 mm) for connecting to devices requiring the smaller plug.  Consumers report varied experience with the quality and effectiveness of patch cords.

Electrical requirements of devices vary, as do patch cord features.  Therefore, consumers need to be aware that one cord may not work with everything.  It is frustrating, for example, to want to patch into a cell phone without knowing whether the cord will work and to be unable to receive advice on this specialized issue from the local retail sales person.  However, some vendors sell patch cords that work with the phones they sell.

Patch cord manufacturers may be able to provide information on compatibility, as may ALS manufacturers and cochlear implant manufacturers.  There is no central list at this time to guide consumers through the confusion of compatibility between all brands and models.

**What About 1-on-1 Personal Amplifiers?**

ALDs (assistive listening devices) are personal amplifiers that are used to increase volume in face-to-face and small group conversations.  They are boxes about the size of a deck of cards with both a microphone and listening cord connected to them.  Both talker and listener share the same device.  This type of ALD is less effective when you hold it far from the sound source, however it is relatively inexpensive.  It will cost approximately $200, whereas a personal FM system, for example, could cost between $700 and $1,000.

**What Is a Sound Field System?**

Sound field is a speaker system that brings the sound closer to listeners and is often used in schools.  It may be helpful to people with a mild hearing loss as well as people who want to use inconspicuous (hidden) speakers.  Some speakers are wireless and designed to look like lunch boxes or books.  Hearing aid users as well as cochlear implant users who want to hear through their microphones may appreciate use of a sound field system.

One interesting feature of using a sound field system is the concept of “electronic curbcut.”  That is a metaphor for the secondary benefit of cuts on sidewalks, which are designed to help wheelchair users but also benefit people who push shopping carts and baby carriages.  Similarly, a sound field system heard by many people is proven to result in a general rise in class test scores, even by people who do not have a hearing loss.  It also saves the teacher from having to “speak up” all day.

**Are ALSs Required?**

Wide area ALSs are covered under Title III of the Americans with Disabilities Act (ADA).  This title stipulates that ALSs be provided in public places unless a provider can prove that it is an undue burden. Examples of such venues include movie theaters, live performance theaters, and public classes.  The ADA specifies that ALS receivers be provided at no cost and specifies the number of receivers that must be provided depending on the number of seats (4% rule).  Revised ADA Guidelines to be released in the future are expected to increase standards for performance of ALS and address related issues.

ALSs may also be indicated under ADA Title I (employment accommodations) as well as Title II (accommodations provided by state and local governments).  Other public policies that may require use of ALSs include Section 504 of the Rehabilitation Act (affecting federally funded agencies and the Individuals with Disabilities Education Act.