



doorbell may be connected to the telephone. So, whenever the phone rings, the light flashes. In such cases, the flashing of the light is coded in order to tell the difference between the telephone ring and the doorbell (ex: 5 flashes for the doorbell, 1 flash for every time the phone rings, etc). Some other alerting systems have a vibrator which can be worn around the wrist.

c. Smoke alarms:

Most of these alarms are extremely loud, and can be heard even by most individuals with hearing impairment. However, those with profound hearing loss may not be able to hear even this loud sound. Smoke alarms and fire alarms can be made specially for individuals with hearing impairment. These have extra-loud alarm signals, and a flashing light to alert the person in case of an emergency.

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Assistive Listening Devices

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Assistive Listening Devices

Hearing aids greatly improve a person's quality of life. But listening might still be difficult in certain situations. An assistive listening device (ALD) is an instrument that improves a person's ability to hear in such situations. Listening to the telephone, listening to the television, listening in noise, across a distance, etc. may be easier if an ALD is used. These devices are usually used in schools, conferences, auditoriums, homes, etc. Some ALDs work with a hearing aid, but most do not require a hearing aid.

ALDs are usually based on one of the following technologies:

Hard wire: Hard-wired ALDs are usually used for permanent installations like schools. A wire connects the sound source to a receiver unit, which is worn by the listener. Hard wire systems are also used in some TV listening devices.

Induction loop: A microphone converts sound signals to electric energy. This signal is then increased in strength (amplified). The amplified electrical signal is made to run through a loop of wire which may be enclosed in the walls of the room or worn as a neck-loop by the user. An electromagnetic field is created around the wire. This can be picked up by a hearing aid kept in 'T' (telecoil) position and changed back to sound, which the person with hearing impairment can hear.

FM technology: This system consists of 2 parts - a **transmitter unit** and a **receiver unit**. The transmitter unit is made up of a microphone and a transmitter. The microphone converts the sound signal to electric signals. The transmitter then transmits sound via Frequency Modulated (FM) radio waves to the receiver unit. The receiver unit converts the FM radio waves into audio frequencies, which in turn are converted to sound signals by the receiver. The receiver unit is worn by the person with hearing impairment. Most receiver units are box-like, similar to a small cassette player or radio. The receiver itself can be clipped onto a belt or put in the pocket.

Infrared technology: Infrared ALDs pick-up the speaker's voice through a microphone, which converts sound signals into electrical energy. These signals are then sent to a receiver using invisible light rays. The signal is then changed into sound energy. Infrared is most useful for settings like auditoriums, television and movie theaters.

Some common ALDs that can be extremely useful in daily life are:

1. Telephone amplifiers
2. TV Listening Systems
3. Personal Listening Devices
4. Alerting Devices
5. Group Hearing Aids

1. Telephone Amplifiers:

Talking over a telephone can be difficult, because there are no important visual cues. Most BTE and body-level hearing aids have telecoils, which can be used to talk and listen over the telephone. However, many ITE, ITC and CIC hearing

aids do not have a telecoil. Moreover, many telephone signals are not perfectly clear or strong enough.

Most telephones have an amplifier coil that can be used with the hearing aid's telecoil. Some users may require additional amplification, in which case the telephone amplifier would be useful. A telephone amplifier is designed to make the voice over the telephone louder (by up to 40 dB). The telephone amplifier may be an:

a. Integrated Amplified Telephone: A volume control wheel and an amplifier unit are built directly into the telephone. Since the amplifier is inbuilt, there are no issues regarding compatibility with the phone. The amplifier is powerful, and makes sounds louder by 30 to 50 decibels. However, this kind of telephone amplifier is more expensive than the add-on amplifier.



b. Add-on amplifier: This type of amplifier can be attached to the receiver end of the existing telephone. It can be removed from the telephone. The biggest advantage of this amplifier is that it can be used with different phones. The user may even carry the add-on amplifier around and use it when he/she uses public/other phones. These amplifiers are also cheaper and easy-to-use. However, they may not work with all phones. Also, batteries need to be changed regularly.

2. TV Listening Systems:

These are designed to make listening to the television more comfortable for individuals with hearing impairment, without disturbing those around them. TV listening systems may be:

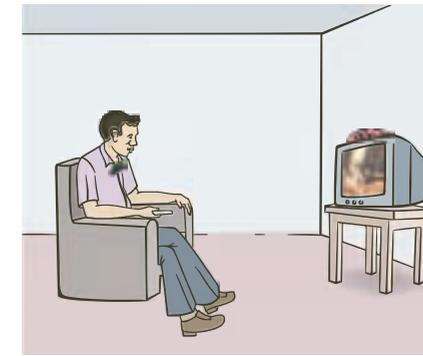
a. Hardwire System: A hard-wired system has an amplifier and a head set. The amplifier receives its signal directly from a wire that is plugged into the



TV. The amplifier sends the sound to a headset through the wire. The major disadvantage of this system is that the wire is not too long, and the listener has to stay close to the television. Moreover, others may accidentally trip over the wire.

b: Small Area Infrared System:

This is a wireless system. The transmitter unit is plugged into the television. The listener wears an individualized receiver (which is a headset with earphones). The transmitter unit sends the signals using Infrared, which



are picked up by the receiver and transmitted as sound. The listener can adjust the volume as he/she requires. While this cordless system comfortable to use and affordable, it works only within a small range. All so, it cannot be moved easily. Battery life is also limited. Moreover, this does not work if there is any obstruction between the transmitter unit and the receiver unit.

3. Personal Listening Devices:



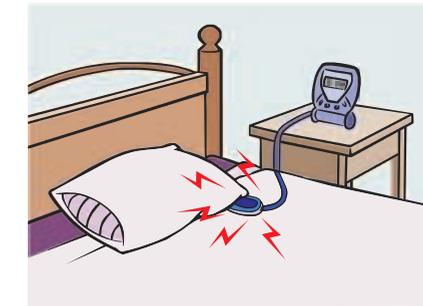
Personal Listening Devices are usually based on FM technology. These are typically used in schools, meetings, discussions, etc. The speaker wears a microphone that is either clipped on to their collar or as a headset. This is connected to a transmitter, which sends out FM signals to the receiver. The receiver wears ear buds, or earphones on a headset. Personal Listening Devices can also be carried around in the

pocket everywhere. It helps reduce the background noise and improves speech quality.

4. Alerting Systems:

Sometimes, sound signals alone might not be sufficient to alert a person with hearing impairment. He/she may require additional information, such as flashing lights, vibration, or both.

a. Vibroalarms: There are special alarm clocks available, which beep, flash



a light, and vibrate the bed at the same time. This is especially useful for students. Many people with hearing impairment have trouble hearing the alarm clock, as they would have taken their hearing aids off for the night. Hence, a vibroalarm will be useful. This vibroalarm, kept under the pillow at night-time, vibrates the pillow at the set time.

b. Doorbell alerts:

In this system, the doorbell is attached to a light, which flashes every time somebody presses the doorbell. The sound of the doorbell may also be made louder. Sometimes, the light that is used to signal the ringing of the