

Hearing & Amplification

Hearing Aid Choices

FM Systems

Hearing aids keep improving rapidly. Yet, hearing aids alone are still not enough to provide benefit in all listening situations. The interaction of background noises, distance from a sound, and reverberation or echo can make listening difficult. People with normal hearing can have trouble hearing at greater listening distances. Background noise and reverberation bother all listeners. People with hearing loss are even more affected by these situations.

Infants and young children are in difficult listening situations every day. Some examples are traveling in the car, family gatherings, day care, playing outside or at the park, and even watching television. The best ways to overcome these problems are by decreasing the distance between the talker and listener and by decreasing or eliminating background noise. However, most people do not carry on conversations at a distance of 3-6 inches from each other. This close listening distance would be impossible in a car. Background noise cannot be changed in many listening situations. There are devices that can reduce the effective distance between the speaker and the hearing aid user. The most commonly used device is a Frequency Modulated or FM system.

The Parts of an FM System: Microphones and Transmitters

FM systems work like a small radio transmitter and radio receiver. A parent or teacher wears the FM transmitter and microphone. The microphone is usually placed at chest level (about 6 inches away from the mouth), or at the level of the mouth (3 inches from the mouth). In some situations a microphone may be used on a table as a conference microphone. This allows the FM user to hear voices all around a table. Some microphones have a directional feature. This allows the FM microphone to “zoom in” on one specific talker within a background of high noise. These microphones are often held by the FM user, who points the microphone toward the person who is talking.

(continued on page 2)

Different Microphone Positions



“lapel” microphone - about six inches away from the mouth



“boom” microphone - three inches from the mouth

Different Types of Transmitters



Receivers

The FM transmitter sends a low-power FM radio signal to an FM radio receiver that is within approximately a 50 foot range. The transmission channels for these radio signals have been set aside for educational use in the United States. The receiver picks up the signal from the microphone and routes it to a personal hearing aid, cochlear implant processor or other device. A wide variety of FM receivers are available. They are either body-worn or worn at ear-level. Some FM systems work independently from a hearing aid. Others only work when they are connected directly to a person's hearing aid. Ear level receivers are the most convenient and smallest-sized choice for FM use at home.



Where should FM systems be used?

Traditionally, FM systems were only used in schools to overcome the difficulties of listening in noisy classrooms. Many audiologists now recommend FM systems for use outside of school as well. There are ear-level FM receivers and light-weight FM transmitters that are easy to use in many everyday listening situations.

FM systems provide other benefits for children. Research has shown that children learn a large amount of language by overhearing conversations. This overhearing is critical to vocabulary growth. Children with hearing loss may miss many overhearing opportunities if they are more than three feet (one meter) away from a talker. Because FM systems reduce the listening distance, a child using an FM system has more overhearing opportunities. This can increase vocabulary. Home use of FM systems can provide more consistent speech and language input to an infant or young child. For example: a mother and child are both in the kitchen, but the mothers' back is turned while working at the stove or sink. When using an FM system, the child can still easily hear what the mother is saying no matter where she moves. When infants begin to crawl and walk, listening distances between the child and parent can quickly change. Children usually do not follow adult rules such as facing or looking at the person who is speaking. A toddler may be busy exploring his/her environment while people are talking around them or to them.

(continued on page 3)

Many families report that the use of FMs increases the opportunities to interact with their children in activities outside the home. Some of these activities include traveling in the car or van, visiting the zoo, playing in the park and shopping at the grocery store. The car is a listening situation with high background noise and increased listening distance between the back and front seats. Other outdoor situations also have high background noises and increased or changing listening distances.

When at home, the FM sometimes is used for one-way messages at distances beyond where people with normal hearing would be able to hear. This usually happens when families use the FM system as a walkie-talkie or pager. The FM is not intended for this use. However, it can create situations where the child with hearing loss is responsible to contact others. It also may give the child a sense of security when they are at a distance from their parents. Parents may forget to turn off the FM microphone during private conversations. Proper use of the mute function should be reviewed.

FM modes of operation

When an FM receiver is connected to a hearing aid, parents will need to decide when the FM should be activated. The choices are getting the sound from: (1) the hearing aid microphone alone, (2) the FM microphone alone or (3) a combination of FM and hearing aid microphones together. The FM microphone should be turned on whenever the parent or family member will be talking to the child in a highly noisy area. It should also be turned on when the talker will be moving away from the child while still wanting the child to hear their voice. Most of the time, the FM system is used in the FM plus hearing aid combination. This allows a main talker to have a consistent signal to the child's ear. The hearing aid microphone also stays on so that environmental sounds can be heard. This allows children to hear and monitor their own voices. Other voices may be heard through the hearing aid microphone or through the FM microphone, depending on the distance of the talker from either microphone. FM operation is often controlled by a switch on the FM receiver or hearing aid. Sometimes it is activated by remote control.

Expected costs

Purchasing an FM system for home use is an additional expense on top of personal hearing aids. A complete FM package, including FM transmitter/microphone and ear-level FM receivers, may range from \$2,100 to \$2,500. If additional warranties or special microphones are requested, the cost may be higher. Parents often seek financial assistance for this purchase. Insurance coverage often does not apply to FM purchases. Families should consult with their audiologist and hearing aid dispenser for funding resources.

For further information on specific FM products, see the following websites:

Phonak: <http://www.phonak.com/professional/products/fm.htm>

Phonic Ear: <http://www.phonicear.com/lexis.asp>

AVR Sonovation (Click on Products, Logicom XP): <http://www.avrsono.com/> (Click on Products, Logicom XP)