Hearing Assistance Technologies

- Individual and environment considerations must be analyzed before determining the best style for any individual.
- All styles improve speech reception of speaker by minimizing background noise, high reverberation levels, distance from speaker and other interfering factors.
- Generally the closer the signal is delivered to the ear the greater the enhancement.
- All systems minimally contain a remote wireless transmitter/microphone and a receiver and/or speaker.

Transmission Modes:

Roger:

Digital standard remote microphone technology from Phonak that uses 2.4GHz transmission from wireless microphones to small ear-level, telecoil or universal receivers.

Advantages: Several receivers can be connected to the same microphone, no frequency interference, multiple microphones are available and will work together in multi-talker network. Uses an adaptive algorithm to provide benefit at louder noise levels.

Limitations: Requires a Roger microphone and a Roger receiver.

FM:

Remote microphone technology that uses radio frequency transmission from wireless microphone(s) to FM receivers.

Advantages: Several receivers can be connected to the same microphone

Limitations: Prone to transmission interference, requires frequency management

Type of Microphones

Omni Microphones

Advantages: Sensitive to sound in all directions

Limitations: May transmit more noise, especially in large crowds

Directional Microphones

Advantages: Fixed or adaptive microphone focuses on one signal minimizing amplification of surrounding noise. Some units allow user to switch between omni and directional microphone positions

Limitations: If positioned incorrectly, the speaker's voice may be weak. For user selected option, multiple settings may be confusing to user. Automatic functionality is sometimes available.

Styles of Remote Microphones

Lavalier: Microphone and transmitter in one unit

Advantages: Easy to hang around the neck

Limitations: May pick up clothing noise. Signal may be reduced when head turned from microphone (especially if using directional microphone). Some models are cumbersome.

Lapel Microphone: Connects to body-worn transmitter

Advantages: Microphone clips easily onto clothes

Limitations: May pick up clothing noise. Signal may be reduced when head turned from microphone (especially if using directional microphone)

Conference: Microphone and transmitter in one unit; sits on tabletop

Advantages: Omni-directional microphone picks up multiple speakers around the table

Limitations: Speaker may be difficult to hear due to distance from microphone

Boom Microphone: Connects to body-worn transmitter

Advantages: Microphone stays close to speaker's mouth providing the most consistent signal.

Limitations: May be uncomfortable or distracting to user.

Ear Level Receivers

Design Integrated: Design integrated system containing a Roger or FM receiver for signal from a compatible wireless remote microphone.

Advantages: Small, discreet and always attached.
Limitations: Receivers are often not compatible with multiple hearing aids.

Universal Receiver : (with Audio Shoe) Adapter that interfaces Roger to HA/CI/BAHA to receive signal from wireless remote microphone.

Advantages: Universal receiver with audio shoe interfaces to a variety of personal HAs/CIs & BAHA. Small in size.

Limitations: Additional adapter/audio shoe connection increases susceptibility of signal to intermittency or malfunction

Stand-alone: Wireless Roger receiver, may include signal processing strategies to enhance speech reception.

Advantages: Provides Roger advantage to individuals with normal to near normal hearing sensitivity who require additional speech enhancement due to problems such as hearing, listening, processing and/or attention, Small, inconspicuous, Non-occluding style permits access to sounds in addition to those from remote microphone

Limitations: Cannot be used without a microphone/transmitter, Not a replacement for a hearing aid

Telecoil Receivers

Personal Neck Loop:

Induction loop is worn around the neck

Advantages: Operates through hearing aid t-coil, Inexpensive, Easy to operate,

Limitations: Signal interruptions can occur if not properly oriented

Wide Area Loop:

Large room or area is looped with a special wire.

Advantages: Easily installed in a room, classroom, or car. Operates through hearing aid t-coil. Inexpensive, Easy to operate,

Limitations: Requires strong hearing aid t-coil, Signal interruptions can occur if not properly oriented

3D Mat:

Series of loops are contained in floor that could be installed under large rugs or carpeting.

Advantages: Consistent signal transmission, Operates through hearing aid t-coil, Durable (less maintenance)

Limitations: May be too costly for home use, Permanent site if installed under carpet, Requires good hearing aid t-coil

Classroom Audio Distribution Systems

Desktop speaker:

Speaker's voice is delivered via wireless transmitter to speaker placed strategically near student or on student's desk.

Advantages: Provides slightly enhanced speech when ear level option is not possible, Portable

Limitations: Signal enhancement less than ear level options,

SoundField:

Speaker's voice is delivered from remote microphone/transmitter to a loud speaker strategically located in classroom or listening space (e.g. church, community room, outdoor theater). Soundfields can use a variety of transmission signal including the Roger Dynamic Soundfield, Radio Frequency Soundfields and Infrared Soundfield systems.

Advantages: Easy to operate, Benefits all listeners with normal hearing, No equipment to wear

Limitations: Not a replacement for hearing aid/CI/Baha for a user with hearing loss