FM SYSTEMS WITH CHILDREN WHO ARE DEAF-BLIND

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Abstract: The effect of FM systems on communication skills of deaf-blind children was investigated using a Single-Subject Alternating Treatment Design. There was a marked improvement for a number of the subjects in the FM condition. The results will be discussed along with individual case studies. An overview of FM systems will also be presented.

OVERVIEW OF FM SYSTEMS

The use of an Assistive Listening Device can often reduce the distance, reverberation, and acoustic problems encountered by individuals who use a hearing aid by providing a constant sound pressure level of the speaker's voice. The two most typical types of Assistive Listening Devices are personal FM systems where the sound is sent through the hearing aid(s) and FM Auditory Trainers which are independent amplification systems. With a personal FM system, the speaker wears a microphone transmitter and his/her voice is sent to a receiver which is attached to the microphone of the listener's hearing aid(s) in one of two ways: 1) by direct audio input coupling using a boot attachment with the hearing aid(s), or 2) by inductive coupling using a Teleloop worn around the neck. With an FM Auditory Trainer, the speaker also wears a microphone transmitter and his/her voice is sent to a microphone in the receiver that is contained within the device. In this way, the Auditory Trainer itself functions as a body-worn hearing aid. However, in both of these situations, the listener must wear a rather cumbersome receiver on the body. The manufacturers of these types of FM systems include: Phonic Ear, Telex, Comtek, and Earmark.

A relatively new type of FM receiver is now available which combines the hearing aid and FM system in a single behind-the-ear unit (BTE/FM). This new BTE/FM system eliminates the body-worn case as well as all loops and cords for the listener. The unit can function as a hearing aid alone, an FM system alone, or a hearing aid and FM at the same time. These FM systems were produced first by Phonic Ear which is called the "FREE EAR" and by AVR Sonnovation in Israel which is called the "EXTEND EAR". The "EXTEND EAR" comes in a variety of power and frequency combinations to cover a wide range of hearing loss configurations, from mild to profound. Telex has just come out with its own FM/BTE unit called the "SELECT 2-40". All of these FM/BTE units have an antenna on the end. The devices are becoming more sophisticated in channel changeability -- Sonnovation attaches a boot to the unit and Telex has two channels built into their system.

FM technology is continually expanding. There are two new developments which have just been introduced. The first is a "boot" attachment called the "UNICOM" developed by Unitron which will change one of their over-the-ear hearing aids -- the US80 -- into a FM/BTE. This is designed for individuals with a severe to profound hearing loss who need to communicate in noisy environments. This product is the result of a joint effort by Unitron and Sonnovation.

The latest FM technological advance comes from Phonak and is called the "MICROLINK". The company has developed the world's smallest FM microchip ever
designed for spoken communication and they consider it to be a revolution in hearing instrument technology. The “Microlink” is about 1/3 of an inch and is attached to a plastic boot which slips over the end of the over-the-ear hearing aid. Another advantage of the “Microlink” is that the antenna is built into the unit and does not stick out. This FM product has been designed to be compatible with the entire line of Phonak hearing aids, including their most sophisticated high-power digital aid.

RESULTS

This Poster will discuss the results of the third year of a four-year research study to investigate the effect of FM systems on communication skills of children who are deaf-blind. The nine subjects who participated in Year 3 ranged in age from one to eighteen years, with a wide range of hearing and vision losses, as well as functioning levels. Their educational placements included residential schools, self-contained classrooms on regular school sites, and one fully inclusive classroom. Their communication skills ranged from pre-linguistic signal behavior to expressive and/or receptive language via signs and/or speech.

A Single-Subject Alternating Treatment Design was used. An appropriate communication target behavior was selected for each participant and a baseline of three observations over three separate sessions was established. This was followed by six observations of each subject’s performance with and without an FM system. These comparative observations were done over a period of six sessions. There was an improvement in the FM condition for five of the subjects. The FM systems used included: 1) behind-the-ear/FM (BTE/FM) systems, 2) standard FM systems without hearing aids used with earphones or earmolds, and 3) personal FM systems coupled to hearing aid(s) with loops or boots.

DISCUSSION

An ABAB Single-Subject Design was used for Year 2 of this study and no improvement was noted for the eleven subjects. The participants for Years 2 and 3 were different but had similar characteristics. There are many variables that are almost impossible to control when data is collected on different days in an ABAB design. It may be that the Alternating Treatment Design where data with and without an FM system is collected on the same day at relatively the same time has reduced some of these variables and is a more appropriate Single-Subject Experimental Design to use with this population.

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