

Task Force 4: Proper Utilization of Auditory Training Units

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SELECTION OF APPROPRIATE SYSTEM

The first step in ensuring that auditory training units are being properly utilized is the determination of the most appropriate system for the educational environment under consideration. The requirements of a self-contained class in a school for the deaf are vastly different from those needed by the hearing impaired child who is fully integrated in his local public school system. The auditory needs of the children in each of these situations can be met only after the complete educational environment has been analyzed. This paper will cover some of the more basic generalizations and principles pertinent to this analysis.

SELF CONTAINED CALSSROOM IN A SCHOOL FOR THE DEAF

Any wired or wireless system is appropriate which permits (1) the teacher to broadcast to the calss as a whole, (2) natural child-to-child communication, and (3) effective auditory self-monitoring. The signal transmitted from the teacher's lavelier microphone—the type which ensures the best s / n ratio at the child's ear--should result in a relatively equal field strength throughout the room but yet not interfere with the reception in other rooms in the building. When the teacher is not broadcasting to the group as a whole, the unit must permit de-activation at either the teacher microphone or the child's receiver pack. The monitoring microphones on the pack should permit the unit to be utilized as a body-worn binaural hearing aid; this is particularly important when a large portion of each day is not group instruction by the classroom teacher. Individual gain controls for the signals arriving at the teacher and student microphones are necessary.

Currently, children with ear-level hearing aids are misfits in this type of classroom. In order to utilize the group auditory trainer, of whatever type, they must first relinquish their ear-level aids. During group instruction, they should receive a superior signal with the group system; during an individualized instruction period, the signal they receive with the auditory trainer used as a body hearing aid is probably inferior to that they obtain with properly fitted ear-level binaural instruments. The time ratio of group vs. individualized instruction, the inconvenience of changing systems, the relative effect of room acoustics upon the speech signals received with the ear-level aids or the auditory trainer used as a body hearing aid, the curricular significance of the material at different times, these are but a few of the considerations the educational audiologist must weigh in evaluating this particular situation. In making the decision in this and other cases, the deciding principle is to ensure that the child receives the best possible auditory signal for his most important academic and social experiences for most of the time.

SELF CONTAINED CLASSROOM IN A NORMAL PUBLIC SCHOOL

The considerations are similar to those obtained in self contained classes in schools for the deaf, with a few significant differences. Overspill of the signal from one room to another is no problem. More of the children will probably be using ear-level aids than would be found in schools for the deaf. If the class functions as a group for most of the day, then the group unit can be substituted for the child's aid(s) for the entire day. If there is a great deal of individual instruction, and some non-academic social integration with the hearing children, then the relative effectiveness of the auditory trainer used as a hearing aid, and the child's own aids, have to be weighed. An important consideration here is the fact that more care is usually devoted to adjusting the electroacoustics of the child's personal hearing aids to his residual hearing than is the case with auditory training units. For example, an aid may be adjusted to emphasize the low frequencies for a child with just low frequency hearing, while the auditory trainer may either not permit such adjustment or the teacher may not be aware of its necessity. In this case, the child would not be receiving an optimal auditory signal for the period of time the auditory trainer is being used as a hearing aid.

RESOURCE ROOM IN THE PUBLIC SCHOOLS

Looping a room is less appropriate in this type of situation. The children are in the resource room for individual or small group instruction; the rest of the time they are and should be in the regular classes. Wireless systems are the most appropriate auditory training units in this situation; provision has to be made for a number of microphone / transmitters on different broadcast frequencies. The unit must permit individual or small group instruction in the resource room while not transmitting to other children in the resource or other rooms in the school. The children attending regular classes carry the appropriate microphone / transmitter to their teachers and return with it to the resource room. The unit must permit easy modification of the FM carrier frequency signal to that used by the teacher of the hearing impaired in the resource room, and then back to another frequency when required.

In this type of situation, it is necessary to have enough microphone / transmitters with different carrier frequencies to cover the possible full integration of all the children at any one time. Some of the children may be attending the same integrated class, and this will reduce the number of transmitters required. In some of the integrated classes, it may be inappropriate to utilize a wireless FM auditory trainer system and this will further reduce the number of required microphones (it is assumed that a separate receiver pack, properly adjusted electro-acoustically, is required for each child). Possible examples of such classes are art, laboratory sciences, physical education, etc. As stated earlier, at this time the educational audiologist must weigh the relative advantages and disadvantages of the child changing back to his hearing aid for these classes, rather than continuing the use of auditory trainer as a personal body worn hearing aid.

THE FULLY INTEGRATED HEARING IMPAIRED CHILD

Again, the educational environment has to be carefully evaluated. The kind of auditory training system utilized in a conventional, highly structured type classroom will not be the same used in an "open" school. In the former, the use of a wireless system by the teacher can provide the child with an excellent signal from the teacher and permit the hearing impaired child to profit maximally from the group instruction. In the latter, the occasions for group instruction occurring are few and must be assessed first in terms of the time involved in changing and then re-changing systems and second, whether it is possible to receive an acceptable signal in the group situation with the hearing aids (perhaps helped by the judicious use of absorbent material in the classroom and by the child insinuating himself closer to the teacher). At the present state of the art, auditory training units have minimal value in any instructional system which emphasizes a truly individual approach. In these circumstances, the teacher rarely broadcasts to the class as a whole. Unless we want the hearing impaired child to hear everything the teacher says to all of the children, which is not very desirable, particularly when child-to-child communication is occurring, then no broadcast system is appropriate. The "open" classroom, particularly if it is noisy, seems to lend itself to the children's utilization of powerful, ear-level, binaural hearing aids with directional microphones. Some companies are now making moderately powered ear-level aids with directional microphones and in the near future, we should be able to anticipate further developments along this line.

PROPER UTILIZATION OF AUDITORY TRAINING UNITS

The proper utilization of auditory training units is viewed as just one component in the total educational structure. It is simply not possible to accomplish our goal regarding auditory training units in a diagnostic and educational vacuum. Some requirements:

1. There has to be an informed commitment on the part of all staff and administrators concerning the maximal exploitation of residual hearing. Initially, one can assume that this commitment would be rather superficial and an agreement in principle; as the program develops, as in-service training programs are held and as evidence accrues testifying to the good utilization of residual hearing by the children, then, hopefully, this commitment would be substantive rather than superficial.
2. There has to be an adequate and highly trained staff whose professional functions include selection of the auditory trainers, supervision of their utilization by the teachers and analysis of their performance by behavioral and electroacoustical means. These individuals, call them educational or rehabilitative audiologists, hearing clinicians or whatever, must have access to the classrooms and, indeed, be an integral part of the educational system under consideration. They should be the individuals who perform the diagnostic audiometric evaluations

- of the children, make recommendations regarding specific hearing aids and electroacoustic adjustments and then schedule frequent follow-ups to verify their recommendations and to continually monitor the child's auditory performance.
3. The physical plant has to be provided to enable the educational audiologists to perform these functions. In addition to purely testing facilities, there has to be equipment which permits the electroacoustic analysis of the auditory training equipment. These facilities would ideally be incorporated, physically and administratively, in the same (regional) educational grouping in which the children are enrolled.
 4. Continuing in-service training for all personnel dealing with the children must be provided. The best training of this type would include recordings through the children's units as they function in the actual classroom (a portable 2 cc coupler with an associated tape recorder can accomplish this), examples of poorly and optimally functioning units, and concrete suggestions concerning specific children and teachers. Good microphone technique has to be demonstrated and supervised in the classroom.
 5. The limitations which the acoustical environment places upon the performance of the auditory training units must be analyzed (noise, s/n at the microphone, reflection patterns in the room, lack of appropriate acoustical treatment, etc.) and specific suggestions made to the teachers and administrators of the program to reduce acoustical problems.
 6. Scheduled trouble-shooting of all auditory equipment, through behavioral and electroacoustic methods. Optimally, the system will include the services of an electronics repairman for rapid maintenance. In either event, back-up units and loaner hearing aids have to be supplied. Electroacoustic monitoring cannot be accomplished without the possibility of immediate access to Bruel and Kjaer equipment (or similar equipment which can do the same job).

One of the weakest links occurring in educating hearing impaired children, no matter what type of program they are enrolled in, is the full utilization of auditory training units and hearing aids. The individuals who are responsible for the children in the classroom typically know little about amplification, while those who presumably have this information have had little access to the classroom. Community Speech and Hearing Clinics cannot adequately serve this function. They see the children on an intermittent basis, their communication with the schools are either superficial, unrealistic or absent, and their authority in the classroom is nil. Programs in which hearing impaired children are enrolled must utilize educational audiologists as resource personnel, much as psychologists and guidance counselors are now viewed, and provide them with the mission and resources to accomplish their role in the school setting itself. Without this, the full utilization of auditory training units will not occur and in consequence, the full utilization of the hearing impaired child's residual hearing will remain a chimerical dream.