

AUDIOLOGY IN A PRIVATE SCHOOL FOR THE DEAF*

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INTRODUCTION

It has been adequately demonstrated that the auditory capacity of the hearing impaired covers a continuum. At one extreme are those with minimal impairments, at the other those who receive only tactile sensations from sound. Moreover, it has been shown that a significant percentage of children who might at one time have been considered totally deaf can benefit significantly from the development and use of their limited hearing. Organizers of educational programs for such children therefore have a responsibility to provide facilities and services for the realization of hearing potential in their students. The discipline of audiology has reached a point where it can serve an educational program in this way. While I question the adequacy of preparation of the typical audiology student for work in an educational setting, there can be no doubt that persons whose primary training is in audiology can play a significant role in educational programs for the hearing impaired.

In the following, I shall discuss the hearing-related services which I feel should be available in a school for the deaf and describe the ways in which these services are provided at the Clarke School. I shall conclude with a discussion of the current weaknesses and needs in this area.

HEARING-RELATED SERVICES

The services which should be available for the optimum realization of hearing potential can conveniently be listed under four E'S--Evaluation, Equipment, Education, and Enquiry.

Evaluation

Evaluation should play an important role in any educational undertaking. There should be a means of assessing an individual's potential so that realistic goals may be established, means of determining the extent to which these goals have been reached and procedures for identifying weaknesses so that appropriate remedial steps may be taken. At

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times the evaluation may be formal using standardized tests, but there is also room for subjective evaluation. In fact, the ability to evaluate students in this way is one of the marks of a good teacher.

In the present context, we are discussing audiological evaluation. This means assessing an individual's potential for the development and use of sound perception, and determining his auditory achievement. It may also be necessary to identify complicating middle ear conditions and to determine the effectiveness of amplification equipment. Research on audiological diagnosis has centered primarily on identifying "site of lesion." However, in an educational setting, this is of much less importance than measuring auditory function. More will be said of this later.

Equipment

Development and use of hearing by hearing impaired children will normally require amplification equipment. This includes both personal and group aids. A school must not only supply some of this equipment, but must have the means of selecting, testing, and maintaining it. Additional equipment will include generators of audio signals (tape recorders, TV sets, etc.) and there should be provision for interfacing these with amplification systems. Further instrumentation will be used for certain aspects of audiological evaluation. If it is to be used solely with a population of severely and profoundly deaf children, the requirements for a pure tone audiometer may be different from those found in a typical clinical installation. Conversely, much of the sound proofing required in a regular clinic can be dispensed with for routine pure tone audiometry with profoundly deaf children.

Education

There are three aspects to education in this context: education of students, education of teachers, and education of parents. While there may be room for special remedial work by audilogically trained personnel, the primary responsibility for auditory training rests with the teacher. She is the one who must structure the child's environment so as to make sound meaningful and necessary. However, her own training will generally be inadequate to prepare her for this role, and it is important that she receive in-service training either formally or informally. The aim of this should be to teach her how to interpret the results of hearing tests, how to use auditory equipment and to provide an understanding of auditory perception and its development in the hearing impaired. It is

true that these topics are normally covered in a teacher training program, but it is impossible for the subject to be covered in sufficient depth or with sufficient practical experience in such a program.

The third aspect of education--parent education--has received some attention in preschool programs. It remains important for older children, however. The aim of making sound meaningful and necessary to a child cannot be adequately met unless he finds himself in a consistent acoustic environment. Parents should be aware of his auditory potential and capabilities and should be shown how they can capitalize on this. The responsibility for this should be shared by administrators, audiologists, and classroom teachers.

Enquiry

It is only proper that research into the use of sound by hearing impaired children should take place within an educational program. The problems involved are too numerous, too subtle, and too complex to be handled by research personnel who have no more contact with an educational program than to borrow students as experimental subjects. A close interaction between teaching and research personnel is essential if the results are to offer realistic solutions to realistic problems. For this reason, the organizers of educational programs should either provide facilities for research within their own program or should seek to develop close ties with institutions of higher learning.

SERVICES AT CLARKE SCHOOL

At the Clarke School an attempt is made to provide all of the services described above. Auditory training per se is the responsibility of the classroom teacher. The remaining services are provided by four members of the research department staff. As director of research, the writer has overall responsibility for these services and is directly involved in clinical assessment of potential students, evaluation and selection of amplification equipment, and teacher and parent education. A research teacher, with qualification in education of the deaf and audiology, carries out the audiological evaluation of students and advises teachers on classroom procedures. An engineer maintains and repairs the classroom amplification equipment, while routine maintenance of personal aids is the responsibility of the audiology division secretary.

In addition there is a curriculum development committee on auditory training which includes research department personnel, supervising teachers, and classroom teachers. One of the products of this committee is a handbook on auditory training (Boothroyd and Others 1971), which gives a much more detailed account of the School's philosophy and procedures with respect to auditory training than is possible in the present paper. It contains a history of auditory training, information on hearing tests and hearing aids, and an account of auditory perception and its development in hearing impaired children. There also is an activity guide for teachers and a question and answer section for parents. This last has been reprinted separately and distributed to parents.

Formal evaluation of students is carried out annually and involves aided and unaided pure tone audiometry, acoustic impedance measurement, tests of speech sound discrimination and recognition, and electroacoustic evaluation of personal aids.

Teacher education takes place informally in professional staff meetings and in classroom discussions. The meetings of the auditory training curriculum development committee also provide an opportunity for the discussion and dissemination of information related to auditory training. There is little parent education, but steps are being taken to remedy this situation. One such step is the distribution of the question and answer chapter referred to earlier.

Basically two types of group hearing aids are used in the School. Lower school classes operate with completely mobile FM systems. Since all but a few students are residential, their use of this equipment can extend into out-of-school hours. Older classes use wired group hearing aids. These have some undesirable features--in particular the absence of individual microphones for students. This is another area in which steps are being taken to effect improvements.

Clarke School has been involved in research for many years. In fact, the audiological services described above are a byproduct of research department activities. While this produces a close relationship between research, teaching, and support activities, it does cause difficulties in terms of the budgeting of time by research department personnel and a dilution of research effort.

WEAKNESSES AND NEEDS

There is room for improvement in every area discussed above, but some topics warrant more immediate attention than others.

Audiological evaluation of severely and profoundly deaf children is a crude procedure at best. Virtually our only prognostic tool is the pure tone audiogram, and while this does provide considerable information if properly interpreted, its limitations have been amply demonstrated. Moreover, standard procedures don't permit us to differentiate tactile from auditory responses in profoundly deaf children, or to assess pure tone sensitivity up to intensities currently available from personal and group hearing aids.

Such tests of auditory perception as are available are generally too difficult for profoundly deaf children and therefore cannot serve to differentiate between subjects or to measure progress. Even if measures equivalent to "SRT and PB Max" could be obtained, they would provide very limited information. Auditory perception is a complex process and cannot be adequately assessed solely by measures of sensitivity and differential sensitivity. There is an urgent need for increased research effort in the area of defective auditory perception together with the development of appropriate measuring tools. What form these tools will ultimately take is not clear at this stage, but as an interim measure, we are experimenting at Clarke with teacher evaluations using suitably designed questionnaires.

The electroacoustic design of amplification equipment for hearing impaired children has reached a high level of sophistication. It is now possible to provide such children with equipment having powers up to the maximum tolerable to the ear and covering a wide frequency range. Various forms of volume compression, wireless reception and even frequency transposition are also available. Unfortunately, insufficient attention has been paid to human engineering. Our engineer spends most of his time attending to defects in cords, switches, plugs, sockets, cases, transducers and other components which were originally designed for use by persons other than hearing impaired children.

There has been great interest in recent years in the design of carrier wave group amplification systems. The mobility offered by such systems has great advantages for

young deaf children, but in the opinion of this writer, such mobility is less necessary for older children. At the same time, the provision of individual microphones in a fixed system, permitting students to hear each other's voices with the same signal to noise ratio as the teacher is an important addition. Hopefully there will shortly be a swing of the pendulum with more attention being paid to wired, or at least fixed, classroom systems.

The last need to which I wish to draw attention is for better teacher education. Auditory training must remain the province of the teacher of the deaf since its success depends on how the student needs to use hearing to function effectively in his environment. It cannot be relegated to a specialist teacher or to a short period in the daily schedule. Consequently, the teacher needs guidance and training which extend well beyond any formal full time teacher training program. Hopefully the new requirements for certification will increase the possibilities of such extended training. In the meantime, no one can afford to be complacent. Audiologists and teachers of the deaf must acknowledge their common concern and common inadequacies in the area of educational audiology and should put aside any professional sensitivities which might interfere with progress towards more effective utilization of hearing by hearing impaired children.

In the above I have briefly described those hearing-related services which are involved in the development and use of hearing by hearing impaired children. I have also described the extent to which these services are provided at Clarke School. In discussing current weaknesses and needs, I have emphasized the inadequacies of evaluative procedures, equipment design and teacher education.

The present day teacher of the deaf is not to be envied. She deals at a very practical level with the development of language in children with a serious sensory impairment. The problems she tackles have challenged some of the best thinking minds the human race has produced and will doubtless continue to do so. Moreover, she is in frequent contact with "experts" who will tell her that the methods she uses are theoretically unsound without providing a workable practical alternative. Sometimes such an expert is an audiologist. I often have the feeling that educational audiology is a no-man's land, jealously guarded by audiologist and teacher

but cultivated by neither. The integration of sound perception into the total development of the child is something which requires not one skill, but many. The continuation of professional sensitivities in this area can only serve as a barrier to progress.

REFERENCE

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