CLINICAL RESEARCH IN SPEECH AND HEARING

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A review of the history of research in speech pathology and audiology as it has been conducted in the United States is both interesting and perplexing; interesting, because it shows a great deal of sophistication and scientific rigor for a field so young, and perplexing because as it has shown strength through growth, the growth has been away from clinical research in favour of more basic research. To the extent that funds for research, through the Government, eventually determine the course of research the direction back to clinical problems has already begun.

The foremost fund granting agency for medical and medically-related research in the United States is the National Institutes of Health of the Public Health Service. This organization provides funds for research into the causes of disease and, as a result, the tendency has been to develop more fundamental knowledge rather than that which has immediate clinical application. Funds provided for research in speech and hearing have generally followed the same pattern, being concerned primarily with how the various parts of the communication system function rather than how to improve the speech and hearing of the person with a communication disorder.

Unfortunately, the concern with more basic study has been at least partly responsible for the division between the researcher and the clinician. The very basic researcher has progressively moved further and further away from the 'disorder' aspect of speech and in recent years increasingly more research personnel have been entering the field who have had no prior clinical training or experience. The clinician, on the other hand, has tended to isolate himself from research in the belief that it is not relevant to the problems of the patient. The resultant isolation of researcher from clinician has been doubly unfortunate—the researcher needs to know why what he does needs to be done and the clinician needs to experiment with and evaluate his clinical work if he is to devote his best efforts to helping his patient.,

At the present time, government-supported researcher has started to. look, more to the goals of a given research problem in terms of more immediate application to patient care. This 'clinical research' is, in itself, undergoing many modifications in its own definition. It is no longer practical or realistic to look at-speech and hearing problems as though they existed in a vacuum, apart from the person handicapped by them, and his total environment as well.

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As an illustrative example, let us consider the problem of the older person with a loss of hearing. Let us first look at what we know about hearing loss in the older population and what we can probably say about our specific individual in need of help: first, people in his age range have the highest prevalence of hearing loss; second, although his loss is more likely to have been incurred later in life, it is likely to be of the type that is less remediable by medical treatment or hearing aid use and consequently is more difficult to adjust to; third, he has progressively greater difficulty in communicating with others at the time in his life when such communication often has greater value for him; fourth,while he is more likely to benefit from professional assistance prior to purchasing a hearing aid, he is also least likely to have sought out such assistance; five, even though he is a member of the income group least able to afford a hearing aid, he is most likely to be pressured into buying one and, six, if he does purchase it he is more likely to be dissatisfied with it and abandon its use entirely. Clinical research, then, into even such a 'simple' problem as the one outlined must encompass, before it can be considered anywhere near being 'complete', such diverse factors as the cause and progress of the hearing loss; the effects of ageing on hearing; the contribution of noise exposure; what services are needed and how they might best be delivered; what might be expected from medical treatment, hearing aid use, speech-reading; the economics involved; the 'acceptance' of services; etc.

The term 'service' continually appears in any discussion of clinical research, as well it should, but of equal concern is the delivery of such service. It has only been recently that the awareness has come in the United States that we will probably never have the number of otolaryngologists, speech pathologists, audiologists, and teachers of the deaf to provide the services needed by our population. Once this premise is accepted, it is then necessary to determine ways in which the available manpower can be best used to the greatest benefit. This, too, is clinical research—the development of new ways to provide the service, whether with lesser-trained personnel, new instrumentation, prevention of the disease responsible, or a combination of all these factors.

Because of its combined complexity of many characteristics, most of which mitigate against efficient delivery of health services, the State of Alaska provides an ideal testing ground for clinical research in speech and hearing. The largest of the 50 States, Alaska is also the most inaccessible and remote. Much of ks **land** mass is **mountainous and,** because of its northern location, weather is often bad. With only one-quarter of a million people, the State population density *is* very low for any given area. Of this total population, approximately 50,000 are Alaska Natives (American Indian, Eskimo, and Aleut) whose health services are provided by the government, through the Indian Health Service. These people live throughout the State, in small villages which are accessible only by air much of the time. For several years, the leading reported disease condition for these people has been otitis media. The prevalence of the disease is extremely high,

with villages reported where two-thirds of the children are found to have chronically-draining ears before the age of three. In addition to being a health problem, otitis media is also an educational and learning problem as well. These children very often come from bilingual families, have hearing loss during the time when they would ordinarily be learning language, and have very limited contact with the world outside their own area. The shortage of professional personnel is such that the Indian Health Service has only one otolaryngologist to serve this entire area and has only recently been able to hire an audiologist as well. The clinical research problems in this situation are obviously overwhelming, but a few initial phases of research are beginning at the present time: studies on the prevention of otitis media, while limited, have already begun; native Eskimo girls are being trained, on an experimental basis in six villages, in audiometry and hearing aid maintenance to identify the children earlier and provide the follow-up to hearing aid use once the child has had his medical treatment and any corrective surgery; the State Department of Health has begun the production and distribution of informational materials to acquaint parents better on how to recognize the symptoms of the disease. One major problem, in addition to those specified, as yet has not been even attempted—to determine why the children feel so negatively about hearing aids that they have, in the past, generally refused to wear them once they have returned to the village. If these various projects have the desired-for results, the preventive aspects, first, of keeping the child from contracting the condition and, second, of preventing resultant disability in those children for whom disease prevention was not possible, should provide an entire new approach to not only problems of this kind, but to the field of speech and hearing itself, which has traditionally been more oriented toward 'rehabilitation' than 'prevention'. A second kind of clinical research, and the kind which one day will be practiced daily, is that which the clinician conducts as part of his remedial procedures. As certainly as a dichotomy exists between so-called 'basic' and so-called 'clinical' research, another also exists between 'research' and 'therapy'. Many very successful clinicians would never agree to the term, but their very success is due to their practice of trying new clinical approaches, evaluating them in terms of results seen, and modifying appropriately thereafter. The ideal training course for therapists will, I should hope, include the necessary coursework in research that will make the clinician a better researcher, and the researcher a better clinician.

It is somewhat unfortunate, in many respects, that the changes discussed, in orienting the focus of present-day research on the clinical aspects, have been brought about largely in response to economic pressures. The means by which these pressures are brought to bear has been outlined by a distinguished American physician, Dr Joseph Cooper:

> 'The clamor for practical application of discoveries of biomedical knowledge grows louder. Medical researchers are being told they must release the secrets of their laboratories for the public benefit. . . .

The situation is not an unexpected one. Sooner or later, an impatient public was bound to ask for delivery on promises made recurringly that the conquest of innumerable diseases would be achieved quickly if only enough were spent in a hurry'. *(Saturday Review,* 6-3-67, p. 56).

Theultimate test of the reality of such a clamor, of course, is a change in government planning to answer the cry. A good indicator of the imminence of such change is the Congressional Hearing. One such set of Hearings, under the chairmanship of Senator Fred Harris, was held early in 1967 on the topic 'Research in the Service of Man'. These Hearings, in turn, were an outgrowth of an earlier conference, in part supported by the Senate Sub-committee on Government Research. In testimony before that conference, Surgeon-General William Stewart outlined what would ultimately be the basis for new research activity within the Public Health Service:

'People now recognize that the advances in living they desire must be based on a continuing flow of new knowledge (which) is attainable only through free fundamental research. Moreover, they recognize that science is expensive and that society has a continuing responsibility for its support.

'Therefore, I am convinced that we have reached a time of maturity in scientific endeavour. A climate of stability and confidence can well permeate the Nation's research institutions. . .

'Beyond question, part of the public acceptance of science to which I have just referred is based on a definition of science which leans heavily toward development and application. ..

'I am confident that the public has accepted the importance of basic biomedical research. But public expectations of research are framed largely in terms of specific medical benefit—the cancer cure, the wonder drug.

'Research is expensive and getting more so ... Only continued public confidence can keep the wheels turning.

'What is needed is a balance that encourages the growth of the creative core of biomedical research and still is responsive to the pressures for hot pursuit of the most promising leads.' (p. 69, *Research in the Service of Man;* Government Printing Office, 1967).

While it is relatively easy to say that 'basic results must be translated into improved patient care', one reason why such application has not been more widespread is that very often such application of research involved further research. It is no simple task to acquaint yourself with the broad areas of basic research which might be pertinent to speech and hearing problems, for even a partial listing of the disciplines which are concerned with these problems is somewhat overwhelming: otolaryngology, pediatrics, physical medicine, experimental, clinical, and developmental psychology, anthropology, linguistics, physics, physiology, and many others in addition to electronics and electrical engineering. Again, the point might better be illustrated by example: Evidence has existed for several years that a slight variation in mass between each vocal cord will create slight, inaudible, disturbances in the air flow as it is phonated. It is possible, through

use of computers, to analyse this signal rapidly and calculate the variation between the two cords. Such a technique may have promise if we realize that a lesion on one cord should cause such a variation to appear; if the lesion is early carcinoma, the speaker's life may be in danger. The Public Health Service has, at the present time, a study to determine the clinical usefulness of such a 'basic' research measure which will, if successful, be used as a 'screening' device to detect early laryngeal disease.

A second example might also prove useful to illustrate how a basic result might influence the course of hearing therapy for a child; we know, from a rather substantial body of literature, that certain changes take place at various levels of the visual system if a newborn kitten or monkey is deprived of patterned light from birth to given age ranges. If deprived sufficiently long, the system loses its capacity to develop functionally and leaves the animal with impaired vision. No similar studies exist for the auditory system, for a variety of reasons, but it may be surmised that similar effects might result for that sense modality as well. If so, the importance of early detection of hearing loss gains even further importance—if the hearing impaired child is not given amplification at the time his already defective system needs it to reach full development, we have, in effect, added a second loss of hearing to the first. Clinical evidence now available supports this notion, by the way, and another series of Public Health research studies have begun to test the theoretical concept itself, and to evaluate early detection-remediation procedures on the basis of their effectiveness in the child's development of speech and language.

Summary

Research in speech and hearing, in common with other activities aimed at improved health and well being, takes its direction from the needs of the populace it is organized to serve. On the basis of health needs in the United States at the present time, research in this country is moving in these directions.

1. More emphasis in present and future research will be on seeking answers to clinical questions rather than furthering basic research.
2. More emphasis in present and future research will be directed toward broader problems—not necessarily disease entities—which will enable care to be provided for total problems, rather than specific problems. At the same time, the usual 'boundary lines' as to what constitutes a health problem will be restructured to allow for more consideration of environmental conditions.
3. More emphasis will be placed upon delivery of services, on a much broader scale than previously.
4. More emphasis will be placed on disease prevention and conditions effecting health. Mounting concern over such problems as those

which will be posed by the 'sonic boom' of supersonic air transport planes is one case in point for our field.

Regarding the inevitability of such change, Dr James Shannon, former Director of the National Institutes of Health, had this to say.

'I would hope that we can accomplish the necessary organizational and bureaucratic changes through rational processes within the scientific community and the branches of government rather than at the hands of a disenchanted public'. (*Science,* Feb. 21,1969, p. 773).