Telephone Services for the Handicapped

by

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As a result of a two-year study carried out by the Institute of Rehabilitation Medicine of the New York University Medical Center, a relatively under-emphasized aspect of the total rehabilitation need of the disabled patient was developed. This was an evaluation and training program to assist patients in acquiring the most efficient telephone equipment or combination of equipment which best meets their physical needs.

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BACKGROUND OF THE STUDY

In 1965, representatives of the American Telephone and Telegraph Company and the Institute of Rehabilitation Medicine discussed the problem of providing adequate and efficient telephone service for customers who had upper-extremity disabilities. These discussions led to the sponsorship by the American Telephone and Telegraph Company of a two-year cooperative investigation into the telephone service and equipment needs of the motion handicapped.

PURPOSE OF THE STUDY

The purpose of the study was to investigate the use of standard telephone equipment in meeting the needs of the disabled for telephone service. All of the pres-



FIGURE 1-THE ABOVE-ELBOW AMPUTEE: A) Although the APRL hand may be used by this amputee to hold a regular telephone receiver, the weight of this hand, together with the abducted position of the arm and the necessary slight turn of the head, makes this an uncomfortable position to hold for a lengthy period of time.

ently available equipment was tested to determine:

1. Which readily available items of equipment could be used by persons with a specific disability without the need for modifications.

2. Which equipment required only simple modifications to become usable.

3. How many disability categories would require the development of entirely new equipment to achieve independent use of the telephone.

4. Would such new equipment, if indicated, be feasible to develop on a standard basis, when compared to the number of disabled and disability categories which required such specialization of equipment, or should these requirements be met on a special basis.

It was hoped that specific equipment and specific disabilities could be matched, thus allowing easier accommodation of patients by the telephone companies. The types of disabilities were classified into broad categories, and the special needs for telephone service of the individuals so handicapped were outlined.

The results are to be published in two information manuals; the first, for the Bell Telephone System, to assist the Bell System representative in evaluating and equipping the handicapped customer; and the second, a Rehabilitation Monograph published by the Institute of Rehabilitation Medicine, to provide information for rehabilitation center personnel to assist them in evaluating the needs of the disabled for telephone service and making them aware of the types of equipment and modifications that are available to the individual patient.

METHOD AND SCOPE OF THE STUDY

Three hundred and five patients representing the full range of diagnostic categories which result in upper-extremity disabilities were extensively evaluated and studied. They were first tested using the regular available telephone equipment following the normal pattern of use. The patients were tested at the hospital, at home and at their places of employment.

Each patient was evaluated in detail for his residual functional motion, his performance using the different types of equipment, and his vocational and social need for independent use of the telephone. In addition, the individual techniques which the patients had developed to give them independent use of the telephone were evalu-



FIGURE 1—B) The Wear-it-or-Hold-it Handset is lighter in weight than the standard receiver. But its use is also precluded by the abducted position of the arm and the excessive rotation of the head necessary for placing the ear and mouth to the set.

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ated and, if feasible, were used as an evaluation technique and instruction method for similarly disabled patients.

Each item of equipment was evaluated for its physical requirements for normal operation. This information was correlated with the data received from the evaluation of the functional motion and the ability to perform of the patients with a variety of upperextremity weaknesses and deformities. From this data. some criteria was established whereby items of equipment could be matched to the disability of the individual patient.

RESULTS OF THE STUDY

Upon completion of the study, the following general conclusions could be reached:

1. It is technically possible to provide a usable telephone installation for almost any person with upper-extremity disability hv combining appropriate telephone equipment with the patient's devices (prosthetic self-help hooks. activities-of-daily-living splints, tenodesis splints, etc.). The available Bell equipment was found to have the potential. unmodified or with only slight modifications, for meeting the needs of all but a very few.

The study disclosed that stand-



FIGURE 1—C) A shoulder rest attached to a regular receiver provides appropriate assistance to the user of an APRL hand. The shoulder rest will not displace when it can lodge against the proximal edge of the socket.



FIGURE 1—D) Holding a standard receiver in a prosthetic hook to the ear on the same side necessitates an abducted position of the arm. Holding the handset in the distal curve of the hook and placing it at the opposite ear allows a more comfortable position for a prolonged conversation. The handset must be placed into the hook by the other hand.

ard equipment could be used in four distinct ways:

—in the normal manner, without the need for special devices or instrument positioning.

—in an unconventional way, by the repositioning of the apparatus. For example: The quadriplegic who finds rotary dialing less difficult to use by turning the telephone set around.

-with minor equipment modifications. For example: A lever placed over a pinch-operated turnbutton switch thus allowing operation of the switch by lever pressure rather than the more sophisticated and often physically lost pinch mechanism. —using the equipment for a purpose other than which it was originally designed and used. For example: Using a line button as an "off-on" switch allows call connections and disconnections merely by pushing the button. This allows the patient to leave the relatively heavy receiver permanently off the cradle.

2. Though the ability to use a telephone independently depended to a large extent on the choice of equipment appropriate to the patient's physical function, the technique employed to operate the equipment was found to be of equal importance.

3. The study gathered impor-

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tant information about the equipment per se, such as the amount of pressure needed to operate the individual levers and buttons, the shapes and sizes of these levers and buttons, and the weight and shape of the telephone equipment which needs to be lifted and grasped by the patient. Such information should be helpful when future equipment is designed for use either by normal or disabled persons.

4. Many patients required devices to hold the receiver to the ear. Two types of holding arms were found to be of value during the study. This type of equipment is not ordinarily furnished by the telephone companies but



FIGURE 2—SPEAKERPHONE TELEPHONE: A) G. H. is a spinal cord quadriplegic. The high level of his injury left him with the ability to move his arms only by shoulder elevation. With the aid of balanced forearm orthoses and ADL long opponens orthoses with attachments, he is able to use the control stick of his motorized wheelchair (1), to type, to operate a tape recorder (2), an electric page turner (3), and to use a Speakerphone telephone. A Speakerphone consists of a transmitter unit and a loudspeaker unit (the dial is provided by its associated regular telephone). The phone is switched "on" and "off" by pressing buttons on the transmitter. The workplace is arranged for maximum efficiency and accessibility from a wheelchair.



FIGURE 2—B) G. H. can exert a downward force of $1\frac{1}{2}$ lbs. by the pencil secured to his right hand and 1 lb. by the pencil in his left, so the push button Touch-Tone dial (1) was located under his right hand. Although the Speakerphone "on-off" buttons on the transmitter can be depressed by a pencil after they have been fitted with enlarged tops, a paddle-lever device (2) into which the transmitter fits is more appropriate for G. H. The device reduces the operating force required and, by providing a wide surface to contact, allows G. H. to approach and operate the telephone most easily. The volume-control knob has been replaced by a wheel (3) to allow its adjustment by pencil. The microswitch for the tape recorder (4) may be seen in front of the Speakerphone transmitter. The loudspeaker (5) of the Speakerphone incorporates no controls and could be placed out of the immediate work area.

is available through commercial sources.

5. While it was possible to classify the types of disabilities into broad diagnostic categories, there was little correlation between these diagnostic categories and the types of equipment which the patients found to be the most useful and serviceable. The variations in physical function, even among patients with the same diagnosis, clearly showed that each patient must be evaluated individually as to his needs for telephone equipment.

DISCUSSION

In general, it can be said that all persons who are able to communicate orally should be able to initiate and terminate a telephone call when properly evaluated for the types of equipment that best compensates for their physical deficit. All patients who can grasp or hold a receiver have the potential to use a rotary dial, with the exception of those who have a visual perceptual problem or those who cannot sufficiently control their involuntary tremors and athetoid movements.

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The great majority of patients will be able to dial without assistance as pushbutton (Touch-Tone[®]) service becomes more universally available.

Successful use of a rotary dial requires muscle strength in the arm (or neck and trunk), equipment which offers a minimum of resistance, the employment of an appropriate technique which best corresponds with the patient's disability, and the training in the development of this skill. Fewer severely disabled are able to use a rotary dial as opposed to the more easily managed Touch-Tone system. Where no form of dial is usable because of the severe loss of function, an arrangement often may be made whereby the telephone operator can be reached through one simple motion and the calls then made verbally with the assistance of the operator.

A basic problem which the study hoped to overcome through the publication of the manuals was that when a disabled person or those concerned with his rehabilitation called the local telephone company for assistance. there was no guide or information available to the companies to help them assist these people with their individual problems. Frequently, the only recourse was to call in the engineers of the Bell System to devise a special installation for the one disabled person. This was a time consuming and inefficient process, and one that resulted in extra expense both for the patient and to the Bell System. This study has shown that there is far less need for elaborate

special installations than had been assumed. Simple modifications of standard equipment and a better understanding by the telephone company representative of the disability of the patient should suffice in most instances.

It was found that standard Bell System equipment was available to answer many of the problems about which rehabilitation workers have long been aware. For example, holding arms to hold the receiver to a patient's ear have been commercially available for some years, but the methods used to connect and disconnect calls have been crude. Often metal bars or "kiddyheavy proof" guards were used to keep down line buttons. This study showed that the line transfer switch on a two-line telephone or the line buttons on a six-button telephone can be used for this purpose and solve this problem.

A receiver which weighed only $8\frac{1}{2}$ ounces was found to be more suitable for some patients. It was used in many instances where the regular $11\frac{1}{2}$ ounce receiver proved to be too heavy.

Some of the newer items of equipment, such as the lightweight headset and the Card Dialer were found to provide the answer to cases that could not previously be helped.

Because the full range of Bell System equipment was evaluated, information is now available to enable the disabled person to choose telephone equipment suitable to his needs. As mentioned above, this information is to be distributed throughout the Bell

System in the form of a manual. It is designed to assist the Bell representative to fully evaluate and provide for the needs of the disabled customer. For use in local rehabilitation centers, a monograph will be published by the Institute of Rehabilitation Medicine in September of 1968 and this will outline an evaluation technique and full equipment survey which should prove invaluable the occupational to therapist and vocational counselor.

The Bell System telephone equipment used in the study is similar in function to the telephone equipment employed by the many independent telephone companies. Thus the findings of the study are broadly applicable throughout the United States and not just in the territories served by Bell System operating telephone companies. And there are well established routines whereby copies of Bell System printed material-such as the information manual on service for the handicapped-can be purchased by independent telephone companies.

SUMMARY

A two-year cooperative study was conducted at the Institute of Rehabilitation Medicine of New York University Medical Center under the sponsorship of the American Telephone and Telegraph Company to evaluate the telephone equipment available and its ability to be successfully used by the handicapped. It was found that it is technically possible to provide telephone service to all disabled persons with neuromuscular involvement or absence of all or part of the upper extremities. The study resulted in the publication of two manuals which provide information that allows the needs of the disabled person for telephone service to be evaluated and met, both in the community and in the rehabilitation centers of the country. It also resulted in the perfection of an evaluation technique for rehabilitation centers under the direction of the Occupational Therapy department to functionally evaluate the needs of the patient and prescribe the most efficient telephone equipment for his use.