Technology Applications in Occupational Therapy

Since the infancy of their profession, occupational therapists have been closely linked with the provision of technology. Traditionally, technological devices have been referred to as aids to the activities of daily living (ADL aids) and have been purchased through catalogs or fabricated within the occupational therapy department. The technology available in today’s marketplace is changing rapidly. This is true for devices for the able-bodied population as well as for persons with physical disabilities. Not only is there more to choose from, but the available technical aids are more complicated, more sophisticated, and often expensive.

Occupational therapists have always been creative in using technology to help their clients achieve more independent lives. Unfortunately, as the number and sophistication of aids increase, we can no longer rely on one or two catalogs to provide us with the information required to make appropriate choices. There are now occupational therapists in this country whose sole job responsibility is to evaluate clients for technology. Even for them it is becoming increasingly difficult to stay up-to-date on what is available, where to get it, and how to train the client in its use. How can a practicing clinician hope to acquire a working level of expertise in this rapidly expanding field of technology application?

This special issue of the American Journal of Occupational Therapy responds to this challenge. The articles presented provide clinicians with an overview of relevant information in specific areas of technology application. What became obvious rather quickly in the planning was that we cannot in one issue of a journal provide all the answers. Therefore, we selected the areas of practice and issues of concern that have been influenced most strongly by technological advances, stressed the concepts behind the decision making process, and described some of the technical options currently available. Gregg Vanderheiden, in a revised version of his keynote address presented at the 1986 AOTA conference, challenges occupational therapists to continue to participate as active team members in the application of technology. Articles on positioning clients for function (Susan Johnson Taylor), the selection and use of environmental control units (Ruth Dickey and Susanne Shealey), using information technology in rehabilitation (Marian Hall), computer applications for the severely disabled (Marti McGrath Spicer and Susan McMillian as well as Jutta Trevirianus and Rosemary Tannock), the use of microswitches (Jane Everson and Roberta Goodwyn), and robotics (Karen Glass and Karyl Hall) provide an overview of principles and applications of technology in clinical settings today. The inclusion of a description of a master’s level program with a technology focus (Grace Gilkeson and Thomas Krouskop) is presented at a time when educational needs are great and quality assurance issues related to the providers of technology are a concern. We have also attempted to provide guidance as to where to seek further information that would be helpful in making decisions on technology applications for the physically disabled.

Occupational Therapists as Evaluators and Trainers

Occupational therapists have unique and essential skills to contribute to the technology team. A rehabilitation engineering program is one of the environments in which the interdisciplinary technology team can operate. We are experts in evaluation. We provide a holistic approach to a client’s needs that is often neglected if the primary focus is on technology. The most effective evaluations are performed by a team consisting of various professionals and the client. The designation of a team leader should be based on the individual expertise of the members; however, an experienced occupational therapist is often well qualified to lead the tech-
The role of occupational therapists as evaluators has been stressed. What is not so obvious is their role as trainers. For some time it was thought that the provision of an appropriate aid would solve the client's problem. That philosophy has resulted in many expensive aids gathering dust in closets. Most therapists now recognize that the provision of an aid is only a preliminary step in attaining a solution. Clients must receive training to become functional in the use of their new technical aid. Clients, like therapists, are sometimes intimidated by the cost of the aid, and, as a result, are afraid of breaking it. Through appropriate training they can become more familiar with the limitations of the aid, learn how to perform basic maintenance, and even do simple trouble shooting when malfunctions occur. For example, simple maintenance such as charging of batteries, can save many hours of frustration when dealing with many of the electrical aids.

Financial Considerations

The dollar issues are somewhat controversial in technical aid provision. First, we should not prescribe a sophisticated and/or expensive aid if a simple and/or less expensive one will do. Second, we should resist the urge to fabricate an aid that is already commercially available. Aids fabricated by therapists are often perceived to be less expensive, but if therapists truly accounted for the cost of fabrication, including materials, labor, overhead, and liability insurance, they would soon find that the hand-made item is not so inexpensive after all. Third, we must consider such questions as where the client can get servicing for the device, what happens if the device is defective and injury results, and where the client should go for duplicating the "free" device if the fabricating therapist moves or a department's philosophy changes. This is not to say that the therapists should stop making simple ADL devices or stop modifying commercially purchased devices; it is only to say that we need to use our expertise in the most effective ways possible. Finally, we must recommend to the client the most appropriate aid, explain the options, and then help him or her to make informed decisions.

Legal Issues

The legal issues related to the provision of technical aids by occupational therapists are of concern to us all. One important concept is negligence. Negligence is the act of omission or commission that results in injury or damage to a person to whom a duty of care is owed. Therapists can be considered to be negligent if a client is injured by equipment even if there is no strict liability. To be negligent, an occupational therapist must fail to provide the standard of care of the average, reasonable, prudent occupational therapist in similar circumstances. Generally, this means the therapist is not required to provide treatment or technology "at the cutting edge" of the profession. For example, it would be appropriate for a therapist to recommend a commercially available environmental control unit even if a research robotic device could be made available to the client.

Manufacturer's warranties, carried by most commercially available devices, is another area that therapists should be knowledgeable in. The warranty becomes invalid at a certain point in a modification or customization process. It would be wise to determine before modifications are done at what point the manufacturer will deny liability. Therapists could seek the advice of an attorney on how to limit their liability toward the client for equipment modifications. One way of doing this is to have the client sign a release to that effect. This helps document the client's agreement to the modification plan. Therapists might be able to reduce the malpractice risk by keeping thorough professional records, which might include the reason for the modification, details of the information search that was completed to determine if a more appropriate device could have been purchased, training...
that was performed, and follow-up plans. Therapists could consider obtaining malpractice insurance from a company that covers the modification or fabrication of equipment as part of its policy. Courts are tending to impose strict liability on manufacturers who produce defective products when injury to the client is a result of the product's use. This means that the client can collect from the company without having to prove that the company was negligent. Therefore, if an occupational therapist fabricates a custom technical aid or modifies a commercially purchased aid, he or she should at least carefully consider the risk involved. This area of law is known as tort law, and it can vary from state to state. It is important to investigate the law in one's state.

Legislative Issues
Within the last year several legislative issues related to technology have been introduced and/or incorporated into law that should be of interest to occupational therapists. The latest amendment to the Rehabilitation Act (1986) states that all vocational rehabilitation clients who could benefit from rehabilitation engineering must be offered that service as part of their rehabilitation program within the department of vocational rehabilitation. This means that if technology is recommended as part of the client's vocational rehabilitation plan, the department of vocational rehabilitation must provide that technology. Occupational therapists certainly could become involved in the interdisciplinary team that will be providing this technology.

United Cerebral Palsy's Office of Governmental Affairs has drafted a bill for the Senate that would mandate a statewide system of evaluation for technology for children, with an emphasis on special education environments. The bill was introduced by Senator Kerry from Massachusetts, together with Senator Stafford from Vermont and Senator Weicker from Connecticut. If the bill is passed, funds will be provided to establish in each state resource centers with expertise in evaluation for technology. These centers would also provide a nucleus for disseminating information on a state level and providing assistance in all issues related to the provision of technology.

Multidisciplinary Collaboration
The Association for the Advancement of Rehabilitation Technology (formerly called the Rehabilitation Engineering Society of North America) (RESNA) is concerned with applying advances in science, engineering, and technology to the needs of persons with disabilities. Its membership consists of rehabilitation professionals from many disciplines, including occupational therapists, physicians, engineers, speech pathologists, and consumers. Its goal is to promote interaction between these groups so that the needs of those who can benefit from rehabilitation technology are better understood and served. RESNA brings together individuals whose credentials, activities, and interests vary widely, but all of whom are committed to designing, developing, evaluating, and delivering the appropriate technological intervention. The occupational therapists who are members of RESNA serve as board members, committee members, and committee chairs. These same professionals are active members of AOTA and therefore have dual professional loyalties as do many of the other RESNA members. RESNA provides the practicing therapists access to information, professional expertise, educational opportunities, and publications related to research and technology application. As an association that welcomes professionals of all disciplines RESNA provides a forum for interdisciplinary interchange and collaboration.

One of the professionals well represented in RESNA is the rehabilitation engineer. This professional has chosen to apply her or his knowledge of engineering to the design and application of technology useful for persons with physical and/or sensory deficits. Because of their involvement in research or service delivery-oriented programs (hopefully a combination of both) rehabilitation engineers are welcome members of the professional team. They bring an expertise in design that, along with our evaluation expertise as therapists, lays the groundwork for the enhanced application of technology for the disabled.

AOTA has demonstrated a commitment to issues relating to the application of technology in the practice of occupational therapy. An official liaison to RESNA has been designated. In addition, members of the staff have been active in supporting technology legislation and serve on numerous technology-related committees and coalitions. The special interest sections (SISs) have played a key role by featuring articles on technology in their newsletters, and in January 1987, the Physical Disability SIS sponsored a Technology Task Force meeting to evaluate continuing education needs within the profession. Presentations at the task force meeting were made by RESNA and AOTA experts. Recently, AOTA funded a Professional Enhancement Project (PEP) entitled "Occupational Therapy, Applications of Technology" to be carried out by the Occupational Therapy Department at the State University of New York at Buffalo. Its purpose is to develop a videotape and manual of computer applications through the Developmental Disabilities SIS Research Symposium. AOTA has indicated a willingness to support technology-related research in the future.

Summary
The products of today's research will be available to clinicians in the future. Many occupational therapists are involved in technology research in rehabilitation engineering and other technical programs. As part of the research teams they are designing new positioning systems and monitoring the effects of these new systems on the posture and skin of people with disabilities. They are designing new interfacing strategies for equipment. They are developing training strategies for accessing computer-based augmentative communication aids. They are providing functional design criteria for the modification of personal vehicles for use by disabled people. They are involved in the development and clinical application of
robotics. In summary, the field of rehabilitation technology provides a fertile area for therapists wishing to pursue research careers.

RESNA provides continuing education courses with a focus on technology application in conjunction with its annual meeting and encourages regional meetings with educational program components. RESNA is also very concerned with the issues of quality assurance. Only one formal training program for training rehabilitation engineers exists in this country, yet many engineers and others are providing technology in clinical settings. Current legislation is alerting many professionals to the value of technology, and yet there is no mechanism in place to monitor the quality of technical programs or the qualifications of many of the professionals providing the technical services. A major challenge is to address the formal training and quality assurance issues in a sensible way.

The application of technology as a component of our clients' rehabilitation is an exciting development. Specialists, programs, and resources are available to ensure that our clients have access to high-quality technical services. We should again move forward to exploit the advantages that new technologies can bring to the lives of the clients we serve.

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