Technology for Adults With Multiple Impairments: A Trilogy of Case Reports

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Three persons with severe physical and cognitive impairments, residents of a facility for persons with mental retardation, learned to use switch-controlled assistive devices. Previous case reports have described the technology and techniques used to enable these women to explore their surroundings. Material was collected, organized, and analyzed in three sections: clients, powered devices, and treatment approaches. The purpose was to affirm tenets that often provide the basis for treatment when powered activities are used in occupational therapy with adults with severe impairments. Client enthusiasm, responsiveness, and stamina can be predictive of success in using technology. Powered devices can elicit a client's drive for competence, aid therapists in assessing the cognitive level of adults with extreme physical disability, and allow persons with multiple impairments to interact with objects in their environment. When clients learn to use powered devices, success will be self-perpetuating. Persons with multiple impairments using powered devices are well served by conditional clinical reasoning.

The purpose of this paper is to reaffirm occupational therapy tenets used with institutionalized adults who are mentally retarded and have severe physical impairments. Occupational therapists working at the Walter E. Fernald State School for adults with severe mental retardation in Waltham, Massachusetts, initiated this project by asking themselves why switch-controlled assistive devices were so effective in treating a particular group of clients. The following three questions were formulated:

1. What is it about these clients that makes them able to benefit from powered devices?
2. What is it about powered devices that proved so helpful?
3. What is it about the therapists' approach that allowed these clients to benefit from powered devices?

Three women with severe physical and cognitive disabilities who had been successful in mastering switch-controlled mechanical devices were chosen for review. Their success is chronicled and several therapeutic tenets are verified to enable therapists to feel confident using similar treatment approaches with this underserved population. Case histories of the three women have been presented in the Case Reports section of previous issues of the American Journal of Occupational Therapy (Bailey & DeFelice, 1991; Chase & Bailey, 1990; Einis & Bailey, 1990).

Technology for Increasing Learning Opportunities

Switch-controlled assistive devices have been used at the facility to assist clients whose physical and cognitive impairments are so severe that they cannot manipulate the items around them. Inevitably, this means that they cannot explore their surroundings, which in turn limits their opportunities to learn from their environment. Although much has been written about the application of powered devices for those with severe physical impairments, and some has been published about their use with children with multiple disabilities, little is known about the dogma underlying the use of powered devices for adults with severe physical and cognitive limitations who are long-term residents of group living institutions.

Subjects

The three women described in the Case Reports, Pam, Chris, and Miranda, have lived in the institution most of their lives and share similar disabilities in that they all have severe functional loss due to cerebral palsy and all are cognitively impaired (they are functioning in the severely retarded range). Their speech impairments range...
from moderate to total. They were selected for review because of these similarities and because they have all benefited from the introduction into their daily lives of powered activities. Pam learned to use powered leisure and communication devices and, at the time of the study, Chris and Miranda were learning to use powered wheelchairs after mastering switch-controlled aids that facilitated communication and leisure activities.

Data Collection

Data were gathered from observation of the clients using their powered assistive devices, scrutiny and discussion of the devices themselves and of the clients' written records at the facility, and extensive group discussions with the clients' occupational therapists and at staff meetings when occupational therapists and occupational therapy assistants working at the facility were present (about 25 people).

To facilitate debate, I probed aspects of treatment deemed important by occupational therapists. I asked for facts and opinions and used their insights to loosely structure further discussions. An outline of topics covered and the major inferences drawn from the exchanges was brought to subsequent meetings and formed the basis for the next discussion. A free-flowing, unstructured approach was adopted because this seemed to generate multiple, rich ideas about the clients and their treatment.

Clients' therapists were key informants; other members of the department provided additional insights and reasoning from their own work using technology with other residents of the facility. A summary of the discussions, formulated around the three questions of the study, is presented below.

What Is It About These Three Clients That Makes Them Able to Benefit From Powered Devices?

Enthusiasm, rapport, and stamina. Perhaps the most pervasive theme that showed up in conversations about the three clients centered on the "spark of enthusiasm" they shared when faced with the challenge of a new activity. They showed a responsiveness and enthusiasm to therapists and activities that was returned in kind by therapists. The therapists were being engaged by the clients, which gave the therapists inspiration to continue working with them. Typically, other clients in the facility show less response to therapy, and therapists have to draw on outside resources for motivation to continue treatment. Therapists spoke of feeling as if they were "hooked in" to the relationship (in a positive sense) by the clients' ability to give some sort of feedback. As one therapist commented, "Pam makes things happen for herself."

Additionally, these women could gain rapport with staff members, an unusual ability among the residents. The rapport, often made solely through eye contact because speech was difficult or impossible, made interactions fun and rewarding for both clients and therapists. One therapist noted that her client showed a sense of humor, observable through a "twinkle in her eye," that made her stand out from the other clients.

The three women also showed perseverance to one degree to another. Although the training procedures were often long and tedious, they all showed the ability and desire to continue. Their stamina and persistence impressed therapists and was remarkable given their history of long institutionalization. In spite of years spent in this deprived environment, they still showed the desire to master objects and activities presented to them.

Discussion of these three issues affirmed the tenet that client enthusiasm, responsiveness, and stamina can be predictive of success in the type of long, complicated training programs needed for equipment-driven activities.

Drive for competence. These clients have physical and cognitive impairments so severe that they need assistance to enable them to manipulate items for exploration. Consequently, one of the original reasons for introducing powered devices into their lives was to enable them to explore and learn from their surroundings independently.

Although it was not always present from the beginning of treatment, at various points while learning to use the powered devices, the three women exhibited a drive for competence similar to that described by White (1971). White's concept of people's urge toward competence, rather than the term motivation, more accurately describes the type of struggle and perseverance shown by the clients during this process. White (1971) said that to be competent means to be sufficient or adequate to meet the demands of a situation or task. [People] do not take things passively; they have an urge to improve their competence in dealing with the environment by exploring, testing, and trying out their own powers to make things happen. (p. 273)

During discussions about this idea, it became apparent that therapists believed that in adults with severe disabilities, who have been residents of long-term care facilities most of their lives, the drive for competence is probably depressed due to lack of opportunities to interact with their environment. Further, they believed that powered devices can elicit clients' drive for competence by allowing them to explore and learn from their surroundings and to express themselves.

Understanding cause and effect. The first part of the clients' occupational therapy program was to teach them to use a switch, an apparently simple task until one considers that no consistent and reliable physical movement had been identified for any of the women. Furthermore, the therapists did not know whether the women were cognitively able to make the connection between hitting a switch and making something happen—the...
cause-and-effect principle.

All three did master switch use; therapists noted that all three women learned to make a second controlled movement, such as pushing a joystick in a specific direction, more quickly than they had learned the first. Apparently, the clients had realized that they could isolate and control a specific movement and this realization made the goal easier to achieve the second time. Most important, it became apparent that the three women had sufficient cognitive ability to grasp the notion of cause and effect.

Consequently, all of the therapists thought that we had confirmed the usefulness of switch-controlled assistive devices to aid therapists in assessing the cognitive level of clients whose physical disabilities are so severe that they have difficulty displaying their cognitive skills.

**What Is It About Powered Devices That Proved So Helpful?**

**Training for switch use** While working with clients with severe physical challenges and little or no verbal communication ability, it was extremely difficult to assess intellectual capacity. At the start of the project, we were not aware of any technology that was simple enough (and inexpensive enough to be accessible) for our clients' immediate use, because of the severity of their physical disabilities. Further, we did not know whether the women had the cognitive abilities to learn to use advanced technology. Thus, instead of spending many months designing and making an expensive device only to find it could not be used, we chose the short-term goal of teaching the women to use a simple switch with the long-term goal of attaching the switch to a variety of electric and battery-powered assistive devices. The eventual goal was to progress to a joystick that would increase the amount of participation the women could have in the activities.

A great array of games and aids can be added to a simple switch or joystick, enabling clients to experience a multisensory, dynamic response from a single movement. The enormous range and variety of attachments allows the therapist to match them to almost any client need and to find a resulting activity that is fun and rewarding for the client. Thus electromechanical devices are appealing because they can be adapted to the physical and cognitive needs of each client. The three clients in this study had never tried to isolate and consistently use a single motor response. However, they were not only able to achieve this goal for one-way switch operation, but also to progress to two movements for on-off operation for one client, and to joystick operation for multidirectional movement for the other two clients.

For clients who have not used powered activities previously, the aids and games are novel. Therapists capitalized on this added attraction by tailoring each device and activity to appeal to that particular client. For example, one woman's attention was held by brightly colored items; another initially responded solely to moving objects that made noise. As a result, the clients found it enjoyable to participate in a training procedure that was sometimes long and tiring. The clients seemed to have fun watching what happened when they pressed a switch. After these events, therapists thought they had confirmed the belief that generating a response from an object via a switch will allow persons with multiple impairments to interact with, to explore, and to learn from objects in their environment.

**Client choice and self-confidence.** Although the clients were not able to verbalize it, we surmised that they must have felt a sense of power when they successfully learned to manipulate a switch that allowed them to control and enjoy an activity. This was the first time these women could choose to initiate an interaction (through a battery-powered communication board, for example) or an activity, such as operating a tape recorder or a slide projector, for their own enjoyment. They were able to initiate and terminate the activity when they wished by pressing the switch. The important point is that they were able to make things happen—they were engaging in purposeful action as defined by Fidler and Fidler (1978).

Learning to operate a simple switch also opened up the world of choice, another component of independence. All three clients were completely dependent for their daily living and leisure activities. As Miranda and Chris learned to operate their powered wheelchairs, they began to understand that they had the choice of going to the kitchen for a cup of coffee or of visiting their friends, by themselves. When Pam learned to control several items that could be used for her pleasure, she had some choice in how to spend her free time.

Learning to operate electromechanical devices also increased the clients' awareness of activities they wanted to try. After successfully using switches attached to small devices, Miranda saw Chris using a powered wheelchair and decided she would like to try one. Miranda has also expressed a desire to improve her academic skills using a computer program and has generally been more assertive in her own behalf. It appears that the successful acquisition of skills through the use of switch-controlled activities has given the clients more self-confidence so that they are interested in trying new activities.

The experience of these three women has affirmed that interaction with an activity (in this case a switch-controlled device) will increase self-confidence and will prompt the desire to investigate other objects; in other words, success will be self-perpetuating.

**What Was It About the Therapists' Treatment Approaches That Allowed These Clients to Learn and Benefit From Powered Devices?**

**Therapists' facilitative and collaborative style.** In
discussions following the case studies, therapists said they had sensed that these three clients were craving activity— they wanted to do. Somehow the clients had managed to convey this feeling, in spite of little or no speech and severe physical and cognitive impairments, and the therapists had been sensitive enough to detect the feeling. The therapists saw themselves as facilitators, enabling the women to be active by introducing creatively tailor-made devices that were, therefore, correct for the client.

One crucial role of the occupational therapist who assisted Miranda in learning switch operation was that of recognizing the importance of motivation. As long as the outcomes available from switch operation were desirable for Miranda, she worked hard at controlling her movements so as to activate the switch. If, on the other hand, the ultimate advantage of operating the switch was unclear to her, she was unwilling to make the effort. In realizing this, the therapist was careful to design activities and rewards that were important and meaningful to Miranda.

This sounds like an obvious approach and one that all therapists strive to achieve. However, Miranda was not able to indicate her interests and pleasures clearly and had baffled other therapists and staff members for many years. Her therapist worked long and hard with Miranda, developing rapport and taking the time to know her well. The therapist noticed small clues missed by others (for example, eye contact and vocal production at specific moments), and was willing to try many approaches before finding one that worked. The effort obviously paid off. Not only is Miranda learning to operate the powered wheelchair, but she has become interested in her surroundings and is excited about exploring other rewarding activities.

**Conditional clinical reasoning.** During discussions it became apparent to me that therapists used the conditional track extensively in their clinical reasoning. Fleming (1991) described conditional reasoning as “a complex form of social reasoning... used to help the patient in the difficult process of reconstructing a life” (p. 1007). During discussions, I saw that therapists were demonstrating Fleming’s list of requirements for conditional reasoning; they were thinking about the whole condition of the women, imagining how their conditions could change, knowing that the success or failure of the treatment depended on the clients’ participation and that the clients needed to share the image of their revised conditions. Therapists were constantly adjusting treatment, altering its direction, introducing new activities, ending others, and so on. They “used imagination in order to match treatment selections to the specific interests, capacities, and goals of the [women].” The treatment, therefore, “was not simply a link to future performance, but also was imagined within the context of a life in process” (Fleming, p. 1012).

Therapists were completely open to what might happen during the evaluation and teaching process. Later, therapists commented that they were aware that they were practicing an art rather than a science during this time and they called it a trial-and-error approach. They saw the method of trial and error, or conditional practice, as an appropriate and positive one.

Therapists were working with clients who have two distinct and severe disabilities (cognitive and physical) and were conscious of trying to isolate which elements of the treatment process would work and how to capitalize on the specific and sparse abilities of the clients. Sometimes a procedure was a long shot, but the trial portion of trial and error was based on and grounded in skilled knowledge. When therapists indicated to the clients the experimental nature of the process, the clients were willing to get involved in the conditional mode and even appeared to enjoy the additional challenge.

All of this led us to conclude that, for adults with multiple impairments in treatment using powered activities, a facilitative and collaborative style bolstered by conditional clinical reasoning will be a favorable occupational therapy approach.

**Summary**

Several occupational therapy tenets have been presented related to the successful use of switch-controlled assistive devices by adults with multiple impairments:

- client enthusiasm, responsiveness, and stamina can be predictive of success in using technology
- a client’s drive for competence may be elicited by powered devices
- powered devices can aid therapists in assessing the cognitive level of adults with extreme physical disability
- powered devices allow persons with multiple impairments who were previously unable to do so to interact with objects in their environment
- when clients learn to use powered devices, success will be self-perpetuating
- persons with multiple impairments using technology are well served by conditional clinical reasoning

I hope that other therapists will continue to test the assumptions inherent in these tenets. If other adults with severe physical and cognitive impairments experience successful outcomes using powered devices, the therapeutic opportunities for this challenging population will be increased.

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References


