The Use of Aquatics with Cerebral Palsied Adolescents

(adolescence, handicapped, human activities, occupational therapy)

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This article demonstrates the use of adaptive aquatics in an occupational therapy treatment program for a physically disabled adolescent. Included are developmental issues as they relate to the handicapped adolescent population, the concept of purposeful activity in occupational therapy, the choice of swimming as an activity for treatment, activity analysis for treatment planning, and an interdisciplinary approach to treatment. A single case study was used to exemplify the use of swimming as a purposeful activity. Therapeutic implications of the program are discussed.

Purposeful activities within occupational therapy treatment sessions promote and enhance functional abilities of the patient (1-3). The need for an activity to appeal to the patient socially and therapeutically may complicate the process of activity selection in achieving goals with the physically disabled adolescent population. Adolescence is a turbulent time, without the added burden of a physical handicap. In selecting activities for use with this population, the occupational therapist must develop a variety of intervention strategies through which treatment goals may be accomplished.

This article will discuss the use of adaptive aquatics within an occupational therapy treatment program as implemented at the Alfred I. duPont Institute. A case study is presented to exemplify the use of swimming as a socially acceptable activity that incorporates therapeutic goals with the physically handicapped adolescent population.

Unique Features of the Problem

Management of the physically disabled adolescent presents many challenges. Adolescence can be a stressful period for young people as well as one of adventure and exploration (3, 4). The healthy adolescent must learn to cope with developmental changes and problems related to independence, acceptance, and body image. A physical handicap places an even greater burden on the teenager (5). Some of the characteristics of the physically handicapped adolescent, as described in the literature, include dependence on parents as caretakers, and decreased expectations and responsibilities imposed by themselves and others (4, 5). These characteristics directly conflict with the developmental changes encountered by the healthy adolescent. The establishment of independence has been found to be an important prerequisite toward the development of self. The disabled adolescent is often limited in this area (6).

Body image, a subjective picture of a person's physical appearance established both by self-observation and by noting the reactions of others (7), is often altered in the physically disabled adolescent population (3, 4). Overt handicaps may be discouraging to the teenc-
ager, which may limit skill repertoire and promote a decreased sense of self. Depressed physical and psychological development may follow. For example, in the case study, the patient was exceptionally self-conscious of others' observations of her physical appearance, being different from her peers. Fearing failure, the patient refused to perform many activities both in treatment and extracurricularly. Thus, her development of self-esteem and performance skills was limited.

Group membership is an important aspect of adolescent development. Through participation in group activities, the young person begins to foster a sense of acceptance, which in turn promotes a stronger sense of self-identity. Due to his or her physical limitation, the disabled adolescent may not engage in group-related activities. These limitations, along with a restricted exposure to activities, may hamper the individual’s potential to develop adaptive responses that are appropriately organized on a subcortical level. Lack of exposure in eliciting adaptive responses may influence higher level output skills such as motor planning, self-esteem, and self-identity (1). The patient in this case study often retreated from group activities because of limited physical abilities and appearance. Socially, she avoided many activities in which her peers engaged. As a result, development of her self-esteem and self-identity was limited.

Patient Information
During occupational therapy assessment, a 14-year-old female with a clinical diagnosis of cerebral palsy demonstrated the following deficits:

1. spastic right hemiparesis, with posturing of the upper extremity in shoulder adduction, internal rotation, elbow flexion, and wrist flexion;
2. limitations in active movement of the right shoulder in flexion, abduction, and rotation; independent motion within the other available movement patterns was demonstrated, with the limitations mentioned earlier in the shoulder movement;
3. decreased functional use of the right upper extremity during activities;
4. decreased coordination of the right upper extremity;
5. poor kinesthetic sense on the right side of her body
6. delayed balance and equilibrium responses;
7. frustration in executing movements;
8. poor self-image.

Range of motion (ROM) at the time of evaluation was noted as follows: (a) shoulder flexion 0 to 145°; (b) shoulder abduction 0 to 150°; (c) internal rotation of the shoulder 0 to 30°; and (d) external rotation of the shoulder 0 to 45°. All other movements were within normal limits. The patient had become left dominant for activities. She did not bring her right arm toward midline during activities requiring bilateral hand use unless encouraged to do so. The patient reported deficiencies in self-care and leisure activities, due to the lack of function and awareness of the right upper extremity.

Coordination of the upper extremities was assessed by using clinical observation of the following tasks: motor execution in slow movement patterns; diadochokinesia; thumb-finger touching; and object manipulation/placement of graded sizes and shapes. Execution of movement during bilateral activities appeared tedious to the patient. Cognitive motor planning of movements using the right upper extremity predominated. Balance and equilibrium responses were consistently delayed when tested both on a tilt board and during ambulation. During ambulation, reciprocal arm swing was absent as the patient held the right arm in a postured position. The patient reported difficulty with balance skills in physically oriented peer group activities, such as team sports. The patient exhibited a poor self-image, as demonstrated through decreased participation in peer group activities and verbal abuse of self: “I'm deformed, no one wants me around. I can't do what my friends can.” The patient also appeared slightly overweight for her age and build.

Treatment goals established as a result of these deficits included:
(a) increasing ROM, active and passive, at the shoulder; (b) increasing functional use and coordination of the right upper ex-
tremity during bilateral activities; (c) increasing bilateral integration of the body during activities; (d) increasing balance and equilibrium skills; and (e) promotion of a positive self-image.

A regular course of occupational therapy treatment incorporated activities into treatment sessions and home program tasks to enhance the functional status of the right upper extremity. These activities included basic body stretching exercises and crafts, such as macrame and needlework, that were pertinent to the patient's life-style. Compliance with home program activities fluctuated; the patient voiced concerns about finding time and enthusiasm to perform the suggested activities. The patient requested the home program be combined with leisure activities that could be pursued with her peer group. Modification of the program to meet this request entailed finding activities that were socially acceptable to the patient, that would initially include the participation of both the patient and the therapist, along with consultation from other disciplines to meet the treatment goals, in addition to being therapeutically goal-oriented. A swimming program was recommended by the occupational therapist.

The Occupational Therapy Program

Prior to initiating the treatment program, the patient and therapist agreed on swimming as the method to accomplish the following treatment goals: (a) increasing bilateral movement and coordination of extremities; (b) increasing reciprocal movement of upper extremities; (c) enhancing balance and equilibrium skills, and (d) providing a medium to heighten self-esteem. Swimming, a purposeful activity to the patient, allowed for the development of skills for a specific task that could be pursued both through treatment and leisure activities (8-10).

Under the auspices of the physical therapy department, an outdoor heated swimming pool was maintained on the hospital premises. Before initiating the activity with the patient, the occupational therapist coordinated services with the physical therapist and the pool instructors. The physical therapist, although previously not active in this treatment case, provided information on the use of water as a modality, and the aquatics instructor assisted the occupational therapist in planning and carrying out the swim program. An integrated therapeutic and recreational approach was accomplished with the help of the aquatics instructor, who had water safety instruction (WSI) background, and the occupational therapist who knew the neurophysiological principles of treatment. The occupational therapist analyzed planes of movement, body positions, and graded movement patterns in swimming strokes through which treatment goals could be met. The aquatics instructor taught the swim strokes, incorporating the occupational therapist's suggestions on reciprocal movement patterns of the upper extremities through a graded activity.

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At the beginning of the swim program, the patient participated with some coaxing from the occupational therapist and the aquatics instructor. Sensitive about her handicap, the patient appeared to have a low sense of self-esteem, expressing continual concerns about her physical appearance in a swimsuit and making frequent negative remarks about her swimming ability. Self-conscious of her appearance, the patient refused to perform swimming activities when her mother or outside observers were present. To ensure optimum performance, it became necessary to restrict the immediate area surrounding the pool during treatment sessions.

Treatment Results

Following the eighth week of the

The patient received the individualized attention of both staff members during the session, with the occupational therapist analyzing the activity throughout the sessions. The patient was sched-
swim program, an occupational therapy re-evaluation was performed, using ROM measurements and clinical observation of the tasks performed in the initial assessment. An increase of 15° in shoulder flexion and 10° in shoulder abduction of the right upper extremity, actively and passively, was noted. The patient began to bring her right arm to midline in occupational therapy activities without prodding by the therapist. The swing phase of the upper extremity was noted reciprocally in ambulation, appearing automatically, thus implying an improvement in gross coordination.

The patient spontaneously began using her right upper extremity during activities of daily living (ADL) at home, such as self-care and homemaking, incorporating bilateral use of the arms, as reported by her mother. Within the specific coordination activities, the patient exhibited increased automatic movements and exhibited less frustration in the execution of motor planning skills. She appeared to have an increased internal awareness of the right side of her body during activities, as demonstrated during coordination and balance activities. Equilibrium responses were inconsistently delayed, which was a change from the initial assessment.

The most significant changes were noted in self-image. The patient became an active participant in planning the pool sessions, along with incorporating the use of pool equipment, such as kickboards, with swim strokes. Although body image continued as a concern, the patient began participating in the presence of pool observers, such as her mother and other guests. Acquiring an enhanced sense of her abilities, the patient started to focus on her strengths. In an attempt to feel more comfortable with her body, she participated in a weight reduction program.

In addition to the physical improvements, the patient also learned how to swim at a beginner's level, performing the front crawl, backstroke, and sidestroke. Her family reported that she pursued this activity independently during her free time and in the presence of peers. As an adolescent, she exhibited the need for independence.

**Discussion**

The use of adaptive aquatics within an occupational therapy treatment program appears to be a functional activity for the physically disabled adolescent. In the water, the handicapping condition seems less apparent in limiting skill functions (8). Water is known to be an acceptable treatment medium in relaxing abnormal muscle tone (11). With the combined expertise of the occupational therapist, physical therapist, and the adaptive aquatics instructor, an activity such as swimming may be used for both recreational and therapeutic goals within an occupational therapy program for the physically disabled adolescent.

As the occupational therapist seeks activities to incorporate treatment techniques, it is important to assess the patient's response in order to promote a successful program. The individual's cooperation and involvement is an essential of treatment planning (2). Adolescents have been found to respond positively toward activities if presented in a nonthreatening manner. Thus, the direct participation of staff members in activities may help encourage and meet the developmental needs of the teenager (17). To most adolescents, swimming is purposeful, enjoyable, and physically, mentally, and socially beneficial. It allows for participation with peers and family. In addition, it addresses issues of developmental concern such as independence, acceptance, and body image (8, 12).

Swimming uses multiple sensory inputs to the central nervous system (CNS). This activity allows sensory input to the body via tactile-kinesthetic mediums. Movement in linear and horizontal planes enhances vestibular input. Physically, swimming requires bilateral movements of all extremities, increases ROM at joints, potentially strengthens muscles, and increases gross motor coordination and eye-hand coordination through the use of water games (13-16). Swimming has many psychodynamic aspects: It requires active movement; it is a structured activity; the participant can progress and note personal achievements; and the activity can be
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As demonstrated in this case, treatment goals achieved through instruction in the basic swim strokes incorporated a new skill of interest to the patient, with an increased incidence of patient satisfaction and compliance with treatment. An interdisciplinary approach to treatment such as this may promote positive interaction between therapy departments in a facility. If a pool is not available at a facility, the occupational therapist can integrate treatment into a community setting. Through consultation with a local swim program, peer group involvement of the disabled adolescent may be encouraged. Through selection of an activity such as swimming, which also fosters family and peer participation, treatment goals in occupational therapy may be heightened.

Conclusion
Planning treatment activities for the disabled adolescent population presents a challenge to the occupational therapist. A crucial factor is that activities must meet the adolescent’s social and therapeutic needs. Huss states: “We know that normal activities are the basis for human development and well-being physically, mentally, psychologically, and economically.” (2, p 579). When the occupational therapist selects an activity that is both purposeful and appealing to the patient, the functional status of the individual should be enhanced through active participation.

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