

ATRI — THERAPY FOCUS

The Halliwick Method (PART ONE)

By Dr. Fran Stanat and Johan Lambeck

Introduction

After his return from military duty in World War II, James McMillan (1913 – 1994) was eager to resume participation in competitive swimming. McMillan quickly realized that his age limited his ability to compete. His alternative was to help youth learn to enjoy the activity he so dearly loved. As he began working with local swim clubs, he realized there was an abundance of coaches and instructors to work with able-bodied children and adolescents. The opportunity for children with disabilities to benefit from water sports was not available. So, with a long-standing and personal commitment to swimming, McMillan, who studied fluid mechanics, set out to develop a method to teach swimming to children with disabilities.



McMillan w/ child in lap in lateral rotation in vertical position.

In early 1950 McMillan's work began at the Halliwick School for Crippled Girls in London. He observed the children, spoke with medical leaders in England, pondered the hydrodynamics of water and developed a perspective of aquatics for children with

disabilities that would be known as the Halliwick Philosophy (Figure 1). This philosophy was based on General System Theory (a pre-war holistic approach to management of labor) and operationalized with aspects of fluid mechanics, neuropsychology, psychology, pedagogy and group dynamics. The result was a psycho-sensory motor learning strategy called the Halliwick Ten Point Program (Figure 2).

Figure 2

The Halliwick 10 Point Program

1. Mental Adjustment/Disengagement
2. Sagittal Rotation Control
3. Vertical Rotation Control
4. Lateral Rotation Control Combined Rotation Control
6. Uprthrust
7. Balance in Stillness
8. Turbulent Gliding
9. Simple Progression
10. Basic Swimming Movement

McMillan implemented the Halliwick Method and within months teaching staff at the school observed the children had improved mouth and head control, posture, movement and personal behavior. When asked what he was doing to enable these physical and psychological improvements, McMillan responded, "...they are being taught balance in the water using properties of fluid mechanics, moments of inertia to control unwanted movements (especially around the midline), and body movement and shape by tactile stimulation" (Cunningham, 1997).

McMillan had created a psycho-sensory motor learning program effective for individuals who needed active motor learning or relearning in a slow medium with limited mechanical impact. The advantages of the Halliwick Method were that students had time to learn (because of the different stages), vary their body responses (through learning in water), and receive assistance (through rotation) with posture and movements. Participants were actively involved in learning balance in water and focusing on postural control. It became apparent that the Halliwick Method is uniquely suited for neurological rehabilitation of both children and adults. Physical therapists from around

Europe began to work with McMillan to apply the method with their clients. This laid the foundation for therapeutic application. The therapeutic application of the Ten Point Program was developed in Bad Ragaz, Switzerland and called the Water Specific Exercise System or the Logic Approach to Exercise in the Water.

The Halliwick Philosophy

The Halliwick Philosophy is the cornerstone of the Halliwick Method. (Figure 1) Without a firm understanding and commitment to the philosophy, the method simply becomes another swim instruction technique.

McMillan's first premise was everyone is a swimmer. He believed, and regularly demonstrated, that all people, regardless of disability could swim. In fact, a key element in Halliwick philosophy is a focus on ability. McMillan would often say, "it is ability that counts" (Cunningham, 1997). For this reason, therapists have noted the Halliwick approach exemplifies rehabilitation in that the focus is maximizing strength and minimizing disability. The instructors (who are in the water – another Halliwick characteristic) identify an individual's abilities and then utilize hydrodynamic forces and compensatory techniques to provide opportunities for success. Instructors use these success experiences as motivators to encourage progression from mental adjustment to improved balance to movement control to swimming skills. Encouragement is provided and no pressure is used to reach goals.

McMillan also believed that swimming is a means to independence. And as a result he strictly forbade the use of flotation aids because such aids encourage dependence (Lambeck, 1995). Lambeck explained that McMillan identified three other problems or issues with the use of flotation aids.

First, aids change body position, can inhibit movement or cause unwanted movement. They may keep the face clear of the water, so breath control is not necessarily mastered. Keeping the head up also results in learning a false body position, leading eventually to poor stroke technique. Aids inhibit the learning and performance of some movement skills, e.g., submerging, rolling and balance control. Aids do not compensate for asymmetry and compound the problems of learning to control unwanted rotational movements.

cont.d on page 40

Figure 1 The Halliwick Philosophy

1. Everyone is a swimmer
2. Swimming should be fun
3. It's ability that counts
4. Swimming is a means to independence
5. No flotation devices are used
6. Group work is essential
7. Balance first, swimming strokes later
8. Teachers are in the water
9. Progression is encouraged; no pressure is used

ATRI — THERAPY FOCUS

The Halliwick Method cont.

cont.d from page 39

Second, flotation devices provide a false sense of security and over-dependence. Flotation devices slip, break, become punctured and can inadvertently support an individual face down in the water.

Finally, use of flotation aids can have a negative impact on psychosocial factors. People who are reliant on appliances on land can experience freedom in the water. Aids infringe on that sense of independence. Also aids identify the less able swimmer, which can limit integration and person-to-person interactions.

McMillan understood that most of the students with neurological impairments would need support but found that buoyancy aids are not as adaptable as an instructor. The instructor can adjust support to suit the needs of the individual. Support can be varied according to the activity and can be varied during an activity.

A final aspect of McMillan's Halliwick Philosophy was that swimming is (should be) fun! To ensure a fun and enjoyable experience, McMillan used games with small groups of students and helpers (Cunningham, 1997). The ideal group consisted of five students each with a helper. The students were assigned to groups based on their abilities and level in the Ten Point Program. Since the focus of Halliwick is on ability, students are never placed in a group based on disability.

The groups participate in various games. McMillan observed many benefits with the use of games and they are outlined in Figure 3 (Lambeck, 1995). McMillan described principles for using games. The first principle is that each game should have a name. Participants will come to know the game by its' name and the expectations of their performance. Games should incorporate music and rhythm so that participants can achieve a sense of flow and cadence. McMillan cautioned that it was critical to "know your students" so that only appropriate games and activities were used. Appropriate games and activities consider

such factors as age, ability and/or level of assistance required. Finally, McMillan had a checking system for the use of games and groups that started with a helper providing assistance, progressing to client independence and creating new situations for independence and replicating the process until the student could achieve success.

Figure 3

The Value of Games for Teaching Swimming

- Pressure is taken off one to one situations.
- Enables a change of helper.
- Encourages disengagement.
- Element of competition.
- Continuity of lesson aim by using games to link activities.
- Enjoyable way of learning
- Increases confidence - feeling of security in playing familiar games.
- One exercise - presentation different - avoids repetition.
- Immediate understanding of an activity.
- Assessment of individual skills with out pressure.
- General check of progress.
- Opportunity for academic reinforcement.
- Opportunity for hidden objectives - learn a new skill without thought.
- Overcome inhibitions.
- Learn how to win and lose.
- Uses imagination.

The Halliwick Ten Point Program

The Halliwick Method was developed to teach children with disabilities to swim. McMillan observed that before children could swim, they must learn "...about themselves and their balance control in the water" (Cunningham, 1997). He developed a psycho-sensory motor learning process for teaching swimming, which relies on learning motor skills by using "primitive reflexes."

McMillan divided the Halliwick Method teaching/learning into four phases called mental adaptation, balance restoration, inhibition and facilitation. These four phases encapsulate the Halliwick ten-point program (Figure 4). While there may be some overlap in the introduction of the steps in the Halliwick Program, the phases of the program are completed in order. For example, it is not appropriate to introduce balance

restoration before the steps in mental adaptation have been completed. For this reason, students are assigned to groups according to their aquatic abilities.

Figure 4

The Four Phases and Ten-Points of the Halliwick Program

- Mental adjustment/disengagement
- Balance restoration
- Sagittal rotation control
- Vertical rotation control
- Lateral rotation control
- Combined rotation control
- Upright (mental/inversion)
- Inhibition
- Balance is stillness
- Turbulent gliding
- Facilitation
- Simple progression
- Basic swimming movement

(Many lay people using Halliwick are confused by the words inhibition and facilitation. For simplicity, the Halliwick Method is taught to them in three phases called mental adjustment, balance control and movement.)

Mental Adaptation

Mental adaptation is comprised of "mental adjustment" and "disengagement". During this phase, the swimmer becomes comfortable and independent in the water.

Mental Adjustment. The instructor uses games to enable the students to recognize and adjust to the effect of hydrodynamics and other forces (e.g., buoyancy, hydrostatic pressure, viscosity, relative density, refraction, reflection, inertia, and the meta-center effect). Breath control is emphasized and physical support is provided by the instructor where needed. Flotation devices are never used to provide support.

Disengagement. The ultimate goal is disengagement or elimination of any physical support. Disengagement is a planned process beginning with the instructor's hands around the student's shoulders face-to-face and maintaining eye contact. The instructor moves further away by holding at the elbows, then hands always maintaining eye contact. (Another option is to lower the hands toward the student's waist to stimulate trunk activity.) When the student is comfortable simply with hand-to-hand contact, the instructor breaks off eye contact and moves to behind the student. The instructor holds at the waist or the sides of



Participants in a game.

ATRI — THERAPY FOCUS

The Halliwick Method cont.

cont.d from page 40

the pelvic area. The instructor provides minimal support and completes the process of disengagement by eventually letting go. Once the students are comfortable and independent in the water, they are able to move to balance restoration

Balance Restoration

During phase two, balance restoration, the swimmer learns to control rotation, (sagittal, vertical, lateral and combined) establish postural control and master upthrust.

Sagittal rotation is done in an upright position bending from left to right or transferring weight. Vertical rotation surrounds the transverse axis moving from standing to supine to standing position. Lateral rotation around the spine produces a horizontal 360° roll. Combined rotation, a combination of the vertical and lateral rotations in a horizontal position, teaches the concept of "roll out of trouble."

Finally, the swimmer is taught that buoyancy is an upward thrust that brings objects and people to the surface (McMillan called this upthrust or mental inversion). The student learns to submerge and upon surfacing, uses one of the rotation patterns to achieve a comfortable breathing position.



McMillan demonstrating mental inversion.

Inhibition

Inhibition is the notion, put forth by McMillan, that "balance is stillness." (In therapeutic terms inhibition is the ability to stop unwanted movement.) It is during this phase that students practice maintaining balance and postural control. Students assume a variety of positions, standing or floating, with the instructor adding turbulence or tactile stimulation designed to compromise the students' ability to maintain a balanced position. Mastery is when the student can achieve stillness.

Once the student has mastered "stillness" and can maintain horizontal body position,

the instructor introduces movement in the water with turbulent gliding. The student, in a supine position, is passively moved through the water by the instructor who produces turbulence under the students' shoulders. This turbulence produces movement toward the instructor. The student must maintain a still and balanced body position (e.g., the student produces no sculling or kicking). This step allows the student to experience controlled movement through the water.

• • •
*The next issue
of AKWA will
continue the
Halliwick Method
with therapeutic
application.*
• • •

Facilitation

Facilitation, which includes simple progressions and basic swimming movements, is the final phase of Halliwick Method. (In therapeutic terms facilitation is the ability to initiate purposeful movement.) Once turbulent gliding is mastered, students are taught simple progressions that enable independent movement through the water. While progressions may need to be customized for each student (based on functional abilities, body composition and symmetry) self-propelling movements are usually some form of sculling and/or kicking.

Once comfortable with independent movement in the water, the student is ready for more traditional swimming movements. While adaptations may be necessary, it is the goal of the Halliwick program to prepare students to swim in as traditional a fashion as possible. While little data is available, there are an abundance of clinical observations suggesting that individuals with disabilities taught with the Halliwick Method become independent swimmers who utilize traditional swimming strokes (Lambeck, Shanda, Stanat).

The Halliwick Method: Water Freedom for Individuals with Disabilities Book - This is a comprehensive explanation of the Halliwick Method of swim instruction for individuals with disabilities. Paper \$15, Available on CD \$15, (pdf. File/MS Word-MAC, program site license available upon request).

Available from: Aquatic Consulting Education Resource Services, 7252 W. Wabash Avenue, Milwaukee, WI 53223

Other Halliwick products available through www.constellate.com

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The Halliwick Method: Therapeutic Application

THIS IS THE SECOND PART OF A TWO PART ARTICLE.

By Dr. Fran Stanat and Johan Lambeck

Logic Approach to Exercise in the Water (The 10-point program)

The magic of the Halliwick Method as a strategy for teaching swimming lies in the combination of factors (hydrodynamic forces, metacenter effects, inertia and primitive reflexes) that enable students to learn to control movement. This is referred to as a psycho-sensory motor learning process. This same combination of factors makes the Halliwick Method an effective therapy technique. While many of these factors have been widely discussed in the literature, McMillan conceptualized and explained the impact of several hydrodynamic forces from different and multiple frames of reference.

McMillan believed all of the literature on the therapeutic benefits of buoyancy, especially the notion of weightlessness, but theorized one additional benefit: The reduction in postural tone. "...tone is influenced by proprioceptive input stimulated by gravitational forces. In other words, tone is a function of weight". When a person is

immersed in the water (weightless), proprioceptive input is compromised and tone is reduced. Tactile information is enhanced and an individual may rely on primitive reflexes to monitor and control movement and posture. "In the water, the primitive reflexes are inertia patterns - they can be used to cause movement". McMillan used these inertia patterns to achieve motion from a position of stability. [NOTE: McMillan also found that the effect of weightlessness on tone reduction was present regardless of water temperature. He was often heard saying "there is so such thing as cold water."]

In order to understand the use of inertia patterns, it is important to understand the concept of the metacenter. Metacenter is a naval architectural term used to describe the point around which the force pendulum of gravity and buoyancy rotate. Both forces are equally important and influential with small changes causing imbalance. The shape, density and symmetry of a body will also

influence the metacenter. A body in water has to make the necessary adjustments to cause the forces of gravity and buoyancy to be equal and directly opposite of each other, resulting in balance. When these forces are not equal and opposite, the body will become unstable causing the body to continually strive to reach balance. The body uses automatic reactions to balance and stabilize posture. In cases where loss of balance can not be coordinated well, the body uses patterns based on "primitive reflexes". These reflexes coincide with inertia patterns and can block unwanted rotation and stabilize posture.

McMillan used various handling techniques, turbulence, water depth and tactile stimulation to disrupt the client's equilibrium. This disruption in equilibrium forces the body to roll causing individuals to continually act to balance themselves. These metacentric effects acting in tandem with compromised proprioceptive input (brought about by weightlessness), might

FIGURE 5 — ASPECTS OF THE LOGIC APPROACH TO EXERCISE IN WATER

TREATMENT OBJECTIVES (TO)	ROTATIONAL PLANES (RP)	STARTING POSTURE (SP)	EXERCISE PATTERNS (XP)	TREATMENT TECHNIQUES (TT)	MODE OF TREATMENT (MT)
Strengthen Weak Muscle Groups (+WMC) Increase range of motion (+RM) Facilitate posture and balance reactions (FPBR) Improve general physical condition (+GPC) Reduce pain (-P) Reduce spasticity (-Sp) Increase mental adaptability (+IMA)	1. Sagittal rotation control (SR) 2. Vertical rotation control (VR) 3. Lateral rotation control (LR) 4. Combined rotation control (CR)	1. Standing • N± = Water at T11 • N+ = Water above T11 • N- = Water below T11 2. Sitting or kneeling 3. Supine 4. Prone 5. Oblique	1. Symmetric 2. Asymmetric 3. Cross-lateral 4. Bilateral	1. Gravity dominant 2. Upthrust dominant 3. Turbulence assisted 4. Turbulence resisted 5. Metacentric 6. Wave of transmission 7. Neurologic techniques • Specific skin stimulation • Transference	1. Pre-training • Mental adjustment and disengagement • Sagittal rotation control • Vertical rotation control • Lateral rotation control • Combined rotation control 2. Inhibition - Posture control • Balance is Stillness 3. Facilitation - Change of posture or shape or change of base • Controlled movement 4. Dynamic - Change of posture, shape and base • Challenging controlled movement

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require an individual to rely on primitive reflexes to monitor and control movement and/or to re-learn movement.

Halliwick as an Aquatic Therapy Technique

At its' most basic level, the therapeutic use of the Halliwick Method is the disruption of the metacentric forces causing an individual to use primitive reflexes to learn or relearn postural control, balance and movement. These disruptions are carefully assessed, planned and executed to achieve the desired therapeutic effects. Halliwick, as an aquatic therapy technique, is a "...clinical decision-making system" (Lambeck, 2000), which enables a therapist to choose between 10,000 options to produce the desired outcome. The options are created with combinations of six aspects of treatment planning. These aspects include treatment objectives, rotational plane, starting positions, exercise patterns, treatment techniques and mode of treatment. The aspects of treatment can be seen in Figure 5.



Johan Lambeck teaching Halliwick

Treatment Objectives (TO)

The purpose of the Logic Approach to Exercise in the Water is to enable an individual to improve functional abilities on land. McMillan identified seven areas (or objectives) that can be enhanced with the Logic Approach to Exercise in the Water. The objectives are to:

- strengthen weak muscle groups (+WMG)
- increase range of motion (+RM)
- facilitate posture and balance reactions (FPBR)
- increase general physical condition (+GPC)

- reduce pain (-P)
- reduce spasticity (-Sp)
- increase mental adaptability (+MA).

The abbreviations were used to develop short, succinct treatment plans. Once an assessment has been completed and treatment objectives identified, the therapist selects the appropriate rotational plane, starting position, exercise patterns, treatment techniques and mode of treatment. [NOTE: Facilitation of posture and balance reactions is a very broad objective and applicable to most individuals with neurological impairments. Currently, therapists using the Logic Approach have narrowed the FPBR objective to include such intents as symmetry, disassociation, centralization, reciprocal motion, etc. (Lambeck, 2000)].

Rotational Patterns (RP)

Selection of the best rotational plane is based on the effect of impairment on the clients' body symmetry.

Sagittal rotation starts with the individual facing the therapist in a sitting position (called the cradle in Halliwick or open saddle in Watsu®). This position gives the therapist maximal control to engage the client in sagittal rotation. A client who is hemiplegic may benefit from the side-flexing activities produced with sagittal rotation (SR) to assist with learning posture righting reactions when in the vertical position.

A client who has had a stroke (resulting in hemiplegia) might begin work in lateral rotation (LR) along the longitudinal axis to facilitate posture and balance reactions.

An individual with an endoprosthesis hip with muscular instability in the frontal plane might work in vertical rotation (VR) along the transverse axis to strengthen weak muscle groups and facilitate posture and balance reactions.

A person with severe spastic quadriplegia might work in combined rotation (CR) along the combined axis to reduce spasticity and increase range of motion.

Starting Positions (SP)

Starting positions are designed to cause predetermined biomechanical and hydrodynamic effects.

Standing positions are affected by the water depth (WD) in which the client is standing. Generally, clients standing in water at T11 are neutral (N±). Clients in water above T11 (N+) are relatively non-weight bearing, feel increased effects of buoyancy and reduced proprioceptive input. Balance is difficult and maintained with the head and outstretched arms. As the water level drops below T11 (N-), the client experiences increased weight-bearing, reduced affects of buoyancy and more proprioceptive input.

A classic starting position in the Halliwick Method is the "cube" or sitting position at N+. The client basically appears as if they are sitting at a table with arms stretched in front on the table. Hips and knees are in 90° of flexion, back is straight, feet flat on the bottom with feet and knees together and arms stretched out in front the entire length. The kneeling position is the same as the "cube" except the client is resting on the knees.

In the supine or back-lying position, at N+, the lumbar spine is in neutral alignment, hands at the side or apart (depending on the amount of trunk stability), head neutral or slightly flexed, hips in neutral flexion with legs together and feet in dorsiflexion.

The prone position or front-lying position, at N+, places the lumbar and cervical spine in an extended position and is seldom used.

In the oblique position, at N+, the body is in neutral extension, angling diagonally in the water with the feet on the bottom and with the face floating at the surface.

Exercise Patterns (KP)

The exercise patterns used in the Logical Approach to Exercise include symmetrical, asymmetrical, cross-lateral and bilateral.

In symmetrical, both sides of the body are performing at the same time. When only one extremity is performing it is asymmetrical. Cross-lateral patterns involve the upper extremity on one side the lower extremity on the opposite side performing an activity. Finally, bilateral (same as symmetrical?) patterns are either upper or lower extremities performing in unison.

Treatment Techniques (TT)

The Logic Approach to Exercise in Water uses seven treatment techniques to disrupt the metacentric balance. The disruption forces an individual to use inertia patterns to develop postural control, balance and movement. While each of these techniques will be discussed individually, one should understand that each technique will produce multiple results. For example, when a client is challenged to regain posture and balance, that individual will perform isometric, isokinetic and isotonic exercises that will aid in the strengthening of weak muscle groups. Buoyancy, and the concomitant weightlessness, will naturally cause a reduction in spasticity. The reduction of spasticity coupled with increased movement and strength will enable the client to experience greater range of motion. All of the activities and hydrodynamic forces will create a favorable environment for a reduction in pain. While the general purpose of each treatment technique will be described, one should consider the broader impact on the client.

The first two treatment techniques are gravity dominant and upthrust dominant which involve using gravity or buoyancy to alter or aid a clients' postural control, balance and movement.

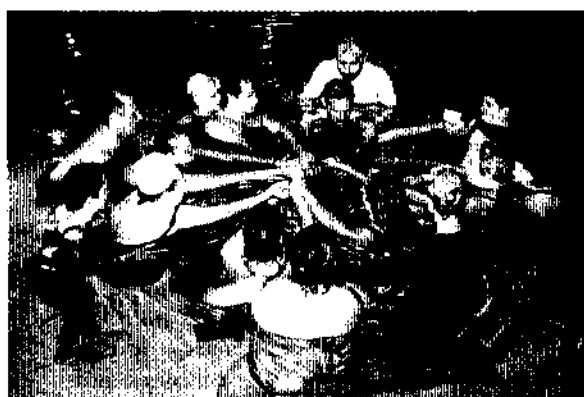
The third and fourth treatment techniques are turbulence assisted and turbulence resisted. In the assisted technique, the therapist produces turbulence to assist the client to maintain postural control and balance as well as achieve movement. The turbulence resisted technique is designed to challenge a clients' ability to maintain postural control, balance and/or movement.

McMillan's explanation for the fifth treatment technique, the metacentric effect, was that "...when a body part is lifted out of the water, the body rotates to try to get that part of the body back under the water" (McMillan, 1986). The therapeutic impact is that the client must resist the rotation to maintain balance. Maintaining balance requires the clients to work in a rhythmic, stabilizing isometric activity in the joints of the spine and lower extremities.

The wave of transmission is a technique used for stabilizing. The client walks through the water one step forward and stops. The incoming wave will push the client from behind. The challenge is for the client to hold a balanced position until the wave has passed.

Two neurologic techniques are also used in the Logic Approach to Exercise in Water. The first is specific skin stimulation that can produce various postures, balance and movement. Light strokes or tapping is all that is needed. Since skin receptors adapt quickly, skin stimulation must be used very lightly with frequent changes in areas on the body.

The second neurologic treatment technique is transference. It is engaging the client in movement first on the unaffected side of the body with an attempt to perform the same movement on the affected side. The notion is that the client will be able to transfer learning.



The Cube Position

Mode of Treatment (MT)

The final aspect of Halliwick as an aquatic therapy technique is the Mode of Treatment that considers the phase and elements of treatment delivery. The phases in the Logic Approach to Exercise in Water (pre-training, inhibition, facilitation, dynamic) are similar but not identical to the phases (mental adaptation, balance restoration, inhibition, facilitation) of the Halliwick Ten Point Program. As can be seen in Figure 6, the points are organized a bit differently. The goals of each phase are also different in that the goals of the Logic Approach are directed toward therapy outcomes as opposed to swimming abilities.

The elements of treatment delivery includes the selection of appropriate interventions from the first five aspects (treatment objective, rotational patterns, starting positions, exercise patterns and treatment techniques) of the Logic Approach to Exercise in the Water as well as the intensity of the activities chosen. Intensity can include many factors such as (but not limited to) amount of weight bearing, velocity,

speed, change of radius and levers, length of time, visual control and position during movement. The decisions regarding which aspects and intensities to employ are based on the phase of the program in which the client is participating. Each phase, point and element of the Logic Approach to Exercise in the Water will be explained.

Pre-training. In order for the Logic Approach to Exercise in Water to be effective, a client must have achieved the first five steps of the Halliwick Method plus the addition of sagittal rotation control (see Figure 6). A prerequisite for aquatic therapy is client comfort (mental adjustment) and independence (disengagement) in the water. Therapists must assure that clients can tolerate the physiological response to immersion and hydrodynamic factors, exhibit comfort with water on the face and in the ears and demonstrate breath control. Once a client has achieved mental adjustment and disengagement, the therapist assists the client to master sagittal, vertical, lateral and combined rotation. The client's move to one of the Logic Approach phases (inhibition, facilitation, dynamic) when they are able to submerge, rise to the surface and use a rotational pattern to achieve a comfortable breathing position.

Inhibition. Inhibition is posture control. Throughout the course of the intervention, the clients' posture, position, shape and base remain the same. The posture may be sitting ("cube" position), kneeling, standing, supine or oblique. The base is the bottom or side of the pool or support from the therapist. Postural control is challenged with the use of buoyancy only (gravity and upthrust dominant, - N+, N-, N±). Activities in the inhibition phase can also be used for the reduction of pain or spasticity.

Facilitation. Facilitation is posture control with changes occurring in the clients' position, posture and/or shape or with changes in the base. Examples of changing posture may be sitting to standing, supine to oblique. An example of changing the base is walking (step/stop). The base may be the bottom or side of the pool support from the therapist. Postural control is challenged with metacentric effect or turbulence assisted/resisted waves of transmission.

Dynamic. The dynamic phase is postural control with changes occurring both in the clients' position, posture and/or

shape and the base. An example of changing posture is jumping. Postural control is challenged with metacentric effect and turbulence assisted/resisted waves of transmission.

Treatment Examples Using the Logic Approach

The treatment examples will use the succinct format devised by McMillan. A narrative explanation describing all aspects of treatment intervention will be presented for each case.

Case One

The client is a 65-year-old woman with an endoprosthesis hip with muscular instability on the frontal plane.

- TO +WMG, FPBR
- RP VR
- SP Standing
- WD N+ going to N-
- XP Asymmetrical
- TT Uprthrust dominant to gravity dominant
Wave of transmission and turbulence resistance
- MT Facilitation
Dynamic

The client has received a hip implant as a result of degenerative joint disease. The treatment objectives are to strengthen weak muscle groups and facilitate posture and balance reactions. The starting position is standing with the water depth above T11 (relatively non-weight-bearing with reduced proprioceptive input). As the client progresses, she will move to a water depth below T11 (more weight-bearing, closed chain activity and proprioceptive input). The exercise pattern will be asymmetric because it focuses on an asymmetric problem. Treatment techniques are the use of upthrust to gravity dominance, wave of transmission and turbulence resistance. The way these techniques are used is indicated with the mode of treatment. In this case the client begins with facilitation and moves to the dynamic phase. In the facilitation phase, the client will maintain body position while changing the base. The client will walk continuously, at a constant depth at N+. As more weight bearing can be tolerated, the client will walk continuously at N-. The client will not walk from N+ to N- but stay at a consistent depth. Walking in this manner will utilize not just buoyancy and gravity in the manner described earlier but turbulence

in the form of drag as well. As the client gains more strength and improves balance reactions, the client will walk in a step/stop sequence to produce a wave of transmission challenging the client to maintain balance. This activity will also be performed at water depths from N+ to N-. In the dynamic phase, the client will change both position/posture and base. In this case the client would start in the standing position and move from a jump/stop producing a wave of turbulence.

Case Two

The client is a 16-year-old boy with ataxic cerebral palsy.

- TO +WMG, +RM, FPBR
- RP LR
- SP Supine
- XP Asymmetric
- TT Metacentric
Kinetic chains
- MT Facilitation

The treatment objectives for this client are to strengthen weak muscle groups, increase range of motion and facilitate posture and balance control. The rotation pattern is lateral. The starting position is with the client in supine, hands at the side. The exercise pattern is asymmetric and utilizes a low impact rhythmical stabilization of the entire body axis. Support is given under both heels (kinetic chain to control unwanted movement). The metacentric effect is employed by asking the client to lift one hand out of the water while maintaining alignment of pelvis, trunk, shoulders and head. Then the client is asked to maintain this alignment when lowering the hand back into the water and raising the other hand out of the water. The mode of treatment is facilitation with the clients' body position changing while maintaining the base.

Summary

The Halliwick Method was originally developed as a method for teaching swimming to children with disabilities. Using his vast array of knowledge about fluid mechanics, neuropsychology, psychology, pedagogy and group dynamics, McMillan developed a technique that is a psycho-sensory motor learning program. Medical personnel at the Halliwick School very quickly noted the therapeutic effect of the Halliwick Method on the physiological and psychological functioning

FIGURE 6

Comparison of the Phases and Points of the Halliwick Ten Point Program and the Logic Approach to Exercise in Water

The Four Phases of the Logic Approach to Exercise in Water

- Pre-training
- Mental adjustment & disengagement
- Sagittal rotation control
- Vertical rotation control
- Lateral rotation control
- Combined rotation control
- Uprthrust & mental inversion
- Inhibition – Posture control
- Balance is Stillness
- Facilitation – Change of posture or shape or change of base
- Controlled movement
- Dynamic – Change of posture, shape and base
- Challenging controlled movement

The Four Phases and Ten-Points of the Halliwick Program

- Mental adjustment/disengagement
- Balance restoration
- Sagittal rotation control
- Vertical rotation control
- Lateral rotation control
- Combined rotation control
- Uprthrust (mental inversion)
- Inhibition
- Balance is stillness
- Turbulent gliding
- Facilitation
- Simple progression
- Basic swimming movement

of the students. Physical therapists in Europe began to work with McMillan to develop the Logic Approach to Water Exercise. This approach to aquatic therapy utilizes hydrodynamic forces, the metacentric effect, moments of inertia and primitive reflexes to enable clients to improve functioning on a variety of levels. The Halliwick Method and the Logic Approach were originally used with individuals with neurological disorders. Today it is widely used for clients with many disabilities, particularly in neurology, orthopedics, pediatrics, geriatrics and behavioral health. In addition, Halliwick and Watsu© have been combined very successfully. ■