

Water-Activities as an O.T. Intervention

to Children (and Adults) with Physical and/or Mental Disabilities.

- a presentation of a new / different model of practice in Occupational Therapy

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"Come on, now we are going to do *"The Alarm Clock!"* I say to the children, who are gathered around me in the pool together with their aids.

Immediately all the children and their aids know exactly what is going to happen and begin to form a circle around me, the children in vertical position facing me, with the aids supporting them from behind, according to each child's specific needs.

I then say: "Now all of you are going to sleep, with your eyes closed!" The children bend their heads backward into the water, their legs floating upward, and they lie supine. (goals could be: concentration, trusting in their own ability, moving from one stable position into another by changing only head position).

Then I move around the circle, touching each child's feet, saying his or her name. "Now I know that you are all fast asleep!" (goals could be: supine stability with eyes closed). "Ding-a-ling-a-ling!" I now yell until all children move into a vertical position by flexing their necks and hips and stretching their arms forward. As moving into vertical, their mouths go under water and they begin to blow bubbles. (goals could be: moving from one stable position into another, controlled respiration). I continue yelling, until all children have placed one hand on "the alarm button" which is my head, and they start pressing it into the water (goals could be: mobile arms with stable trunk). I stay submerged as long as possible. As I emerge, I'm absolutely sure to hear all the children laughing and yelling: "Let's do it again!" (goals could be: self-esteem and playfulness)

Personnally I have always been fascinated by water. Look here in this picture how fascinating hot water can emerge from the grounds of Iceland, or in this picture how frozen water can form a landscape of glacial crevasses here in Norway, or in this picture the big white waves at the sea at The West coast of Jutland

Water may both attract and scare us – as it has great powers.

Throughout history, water has been associated with life and health. In ancient times, the Romans and the Incas built baths. People of all times have flocked to places with holy, healing springs for example in all the towns in Germany and Switzerland starting with Bad: - Bad Ragaz, Baden Baden, to the famous Gellert Bath in Hungary etc.. Today, we relax in

bathbubs, hot tubs, and at SPAs, where the letters: 'S-P-A' is an abbreviation for Sane Per Aqua – which translated from latin means 'health through water.'

Denmark is surrounded by water, and in less than one hour's drive you can reach the sea from any spot within the country. In summer the water is warm enough to go bathing at the seaside. And public swimming baths are spread all over the country. In our schools nearly all ablebodied children have swimming-lessons and learn to swim, and swimming is a very popular leisure sport for all ages.

All of us begin life in water. Before birth, children grow and frisk about in 'aqua vitae' - the water of life – just like the Norwegian 'aqua vitae' = 'Linjeakevit'. In this element, the embryo can move freely because of the upthrust of the water in the womb.

At birth, all of us face a world in which gravity predominates, making us "disabled," until we mature and learn to master our bodies in this new environment.

Most people - children and adults with or without disabilities - like water activities. Water invites movement and promotes play. Thus, occupational therapists may draw on the power of water when designing intervention programs. Physical therapists do hydrotherapy, where patients perform exercises in an environment different from that of air. Occupational therapist may have quite different intention of using water as part of treatment. To an occupational therapist goals connected with water-intervention could be:

- respiration / breathing control
- rhythmical coordination
- sensory integration
- bodyimage
- stability- and mobility control
- activities of daily living
- training for leisure sport / recreation
- fitness
- self-esteem and interpersonal relationship
- playfulness
- -
- - etc.

Water-based intervention combines 'swimming', which I define as a 'desirable and motivating recreation activity' with simultaneous involvement in a variety of therapeutic activities. In the water, we perform active movements in an ever-changing context. Because of buoyancy, it may be easier to move freely in water than on land. Water-based activities can be fun and, thus, highly motivating. In short, water-based intervention programs provide "a means of widening experience - physically, developmentally, cognitively, and psychologically".

I am working part time in a Pedagogic-Psychological Counselling Centre in a small district. My water-experience mostly comes from more than twenty years' work in the pool with children with all kinds of activity problems and problems in participation. Besides that I lecture a lot and conduct lots of courses about children and motor learning, about water-

activities, The Halliwick Swimming Concept etc. From that I get a lot of water-experience with adults, too.

I have been on the board of both The Danish Halliwick Association and The International Halliwick Associations Committee of Education and Research for many years. In The United States there is an Aquatic Network for OTs, which I'm a member of. And I have given courses on Water-activities in many countries around the world as I'm really believing in the benefits water may offer people, to whom gravity is a problem on land.

Besides being an OT, I'm a swimming and disabled-swimming instructor, (The halliwick Concept) and that has helped me a lot in learning to do qualitative assessments in water and to design appropriate training-programs in water.

In my daily work I have two or three groups with children in the pool each week – each group in the water for 30 minutes.

- one group with appr. eighteen small school-children from six to ten years
- one group of about eight children from appr. six months to three years
- one group of about ten children from appr. four to six years

We use an ordinary public swimming bath. Water-temperature is 28 degrees C, appr. 84 degrees F , and the depth of the water from 110 centimetres to four metres.

The small children are each followed by a caregiver or parent, and with the bigger children we work one adult to appr. three children.

I'm responsible for referring children to the groups, for doing the qualitative assessments of each child's ability in water, for the training-programs, the evaluation of each child and the supervision of the aids. The children will attend the groups at least one year, most of them for several years.

The children and adults referred to the programs may have many different activity problems and problems in participation, i.e.:

- emotional disorders (e.g. sexually abused or neglected children)
- behavior disorders
- learning difficulties
- speech problems
- visual and hearing impairments
- sensory integrative dysfunction
- MBD / DAMP
- congenital abnormalities / dysmeli
- cerebral palsy
- mental retardation
- muscular dystrophy
- spina bifida / hydrocephalus
- arthritis
- -

- -etc.

Persons with different disabilities often work well in groups in which their abilities and needs, in water, are similar.

I have found that people of all ages, and with nearly all kinds of disabilities, benefit from intervention in water, but only when conducted by instructors who have been specially trained in water-based intervention.

My experience with adults include clients from:

- rest homes for old people
- institutions for younger blind and deaf people
- psychiatric institutions

Some main differences between being on land & being in water.

Being in water is different from being on land to all of us. It is in quite another way we move, keep stable, and restore stability in water.

There are four main differences between being on land and being in water. In water:

1. bodies are influenced by the upthrust or buoyancy
2. bodies get the freedom to move three-dimensionally
3. small alterations in shape of the body or with the body have considerable impact on stability and movements in water
4. you will have to learn new automatic breathing reactions, appropriate to the new surroundings

re 1.

In water - as well as on land - the body is influenced by the downthrust or gravity.

But in water the body is also influenced by the upthrust or buoyancy. Those to whom gravity is a problem on land - e.g. persons with cerebral palsy, muscular dystrophy, spina bifida, multiple sclerosis, polio, hemiplegia and paraplegia - may in water achieve independent freedom of movement using the assistance of buoyancy or upthrust, when conducted by a skilful instructor.

re 2.

On land we are dependent on firm surfaces to support us, but in water we can rest and move without "being grounded" to something firm or fixed. It requires good motor control to move three-dimensionally, so it is a good element for training body-sensation, body-awareness, joint positions, spatial awareness and postural control. In the water - whenever

you are not symmetrical in shape or density around the longitudinal axis of the spine or the transverse axis - you will start rolling, so when moving you are at once and continually reminded of your body-shape. You need not tell clients that or correct them - it is felt! Clients are immediately aware of this effect and so automatically you try to react to prevent the rotation. Through this you become motivated to sense, feel and try to develop a greater variability of motor programming rules in order to control your body.

re 3.

As small alterations of / or with the body have considerable impact on postures and movements, you may use that

- to avoid unwanted movements by making your body symmetrical, and
- to initiate voluntary changes in postures by making your body asymmetrical.

In general, no artificial flotation aids are used in the pool, as that may easily disturb a person's possibilities to control her / his body. With floatation aids the person may learn some programming rules for postural control and movements, but the person will have to learn different programming rules for postural control and movements when she / he takes off the aids. So often it is not appropriate using artificial floatation aids, but that may depend on the goals you have set in your water-programs.

Until clients have developed full independence in water, an aid assists them. The aid may be a parent, a relative or a caregiver. I supervise the aids, both in the changing-room and in the pool. The aid gives the client both physical and psychological support. In the water, the aid uses her or his hands to facilitate the client's own balance-reactions, so it is essential that the aid know the correct handling of a person in water. This may be quite different from the correct handling of the same person on land. In order not to disturb the client's balance-control in water, the aid supports the client at the body's center of balance - about waist level.

re 4.

Usually - on land - we are not aware of our respiration. We have automatic respirational reactions. When in water, you will have to learn new appropriate breathing patterns, as you can only inhale with your nose and / or mouth out of the water. And you will have to overlearn these new breathing patterns, so they become automatic reactions, too, which means that you in all situations - also and especially the unexpected - will use these new automatic breathing reactions appropriately.

Wateractivity and sensory integration and occupation

Water activities may provide clients with a number of benefits related to sensory integration. The provision of enhanced sensory input is natural to water-based intervention. Further, active involvement and the demand for an adaptive behavior also are a part of water-based intervention.

Water-based intervention also may reflect occupation, a construct much larger than sensory integration. Swimming is a valued leisure or recreation activity that can be shared with friends and family. Water-based intervention programs often lead to participants' attending swimming clubs or going with family or friends to public pools. Such recreation is fun for the whole family and capitalizes on a client's abilities rather than emphasizing their disabilities. Water activities provide satisfying experiences that lead to increased self-esteem and opportunities to develop valued interpersonal relationships. These are certainly as important as, if not more important than, the sensorimotor and fitness goals also achieved in water.

As mentioned, water programs provide an opportunity for the mastery of numerous other occupational performance based goals. Undressing and dressing, toileting, showering, and using public transportation are a few of the many tasks individuals may perform when involved in a therapeutic water-based program. Children readily understand the relevance of these skills in the context of a meaningful activity for which they are required.

In my program, we spend a long time in the changing room and in the shower as well as the sauna. Caregivers are taught not to help children with tasks they already master, to assist with tasks the children are about to learn, and to do only what the children are not yet able to do by themselves.

As with intervention on land, the OT in water often motivates children -and adults - through play. With children, we use a lot of action songs and rhymes. We also use colourful, plastic playthings (e.g., balls, rings, and water pistols) to promote the child's understanding of different tasks. These activities provide useful feedback and knowledge of the results of their movements.

Occupational therapists primarily design group games and learning situations. Games need groups, and groups need games! Some of the activities have goals that apply to all the clients. For example, clients learn to anticipate movements associated with different songs, rhymes and playthings. Later, these movements will be incorporated into specific purposeful 'water-skills' such as automatic breathing control, stability, rotational control, mobility and swimming strokes.

Other activities have goals more specific to an individual. For example, we place markers along the edge of the pool with playthings and written or drawn instructions for tasks that may be done by different clients in different ways depending on their abilities and needs in water.

Water may be a powerful and highly motivating therapeutic medium. A number of physical and psychosocial benefits may be associated with water-based intervention.

Water-based intervention may provide important benefits for individuals with sensory integrative dysfunction.

Water provides many different kinds of sensory information. Because movement of the water is felt differently from that of the air, *the tactile system* receives a great deal of stimulation. In a pool with a lot of people moving around, the water also moves in

continually new ways. This may result in lack of habituation by the tactile receptors. Water invites movement in a number of positions including the vertical and horizontal planes. Because of buoyancy, rotations of the body are also common. Movement in a number of planes provides enhanced information to the *vestibular system*. In water, it is not possible to compensate for poor processing of vestibular information by using vision, as you cannot see your body well and, therefore, lack visual reference. When the client moves against the resistance of water, *proprioceptors* receive input. However, due to buoyancy or upthrust, the proprioceptors receive different stimulation than that received on land, where gravity or downthrust dominates. Therefore, it is difficult to tell exactly the effect of proprioceptive stimulation received in water. However, I believe that the increased tactile input provided by the water may make up for the changes in proprioceptive input.

In the water, alertness also is enhanced and clients may become more aware of their bodies and surroundings. Clients with sensory defensiveness also react positively to the kind of tactile stimulation water offers. Further, clients may develop abilities in self care and instrumental activities of daily living activities as well as important leisure interests and skills.

Client's abilities in water are different from their (dis-)abilities on land. While intervention in water and 'on land' share many traits, in water we use different strategies to promote movement and stability. Therapists must learn the hydromechanical principles of control for posture and movement. This may be learned from The Halliwick Concept. To create appropriate intervention plans, therapists must do qualitative assessments of each client's abilities in the water. In addition, they must do continuous evaluation of each client's development and learning in water in order to adjust goals and plans appropriately. The Halliwick Concept inspires what we do in water, why, and how we do it.

Conclusion

We know that good health is closely related to a person's engagement in occupation. If a client with disabilities have skilled teachers or therapists, they may be able to experience more freedom to move independently in water. And that may increase their self-esteem and promote playing freely. Through different activities and games in water, clients may '...learn how to win and how to lose, as well as develop greater ego strengths.' (quot. Dorval, Tétreault and Caron).

The atmosphere of "fun and games" - which is easily created in water - particularly suits my habilitation- and rehabilitation concept as an occupational therapist in paediatric.

"The art of occupational therapy is to make activities look tempting

- not to manipulate or force" as Lorna King once said.

I feel that treatment in water / aquatic programs deserves much more attention from specific qualified occupational therapists all over the world, as there are so many therapeutic goals to be worked on in a "water-context".

Hope I have made some of you curious to learn more about the connexions between water and our body.

But remember: **it requires more than a swimsuit and a pool to get qualified - also for an occupational therapist!**

Thank you!

Trondheim

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Appendix – about The Halliwick Concept

About 50 years ago, a swim coach named James Mc Millan was asked to teach children from The Halliwick School to swim for leisure / recreation. The Halliwick School was a residential-school for girls with physical disabilities in London.

Before that McMillan had trained the olympic swimming team. He soon discovered that these girls could not be taught swimming using the same teaching methods as he usually applied.

Professionally Mc Millan was a hydro-engineer, and he used his knowledge of hydromechanical principles to analyse the mechanisms of independent control of postures and movements in water, and through that to develop a structured teaching method.

This method is more than just swimming-technique.

It is also a concept about:

- water familiarisation
- motor learning
- holistic learning
- looking at ability in water instead of disability on land
- improving quality of life
- integration between ablebodied and people with disabilities

- and mind you, this was started in the early fifties, long before these 'terms' were actually invented !

In acknowledgment of what these girls had taught him, he named his method / the concept after the girls' school.

The Halliwick Concept is now applied in sport, fitness, habilitation and rehabilitation in many countries all over the world (in USA there is an 'Aquatic Network for OTs' - address in the references). It is based on the swimmer's and the instructor's understanding of, how water influences a body, and how it may be utilized in controlling stability and mobility in water.

The Halliwick Concept describes appropriate development of motor learning in water, and in some respects it is similar to principles known from motor development and motor learning on land:

- mental adjustment and disengagement to " the element" ("water familiarisation")
- development of rotational control around the axes of the body
- inhibition of involuntary movements = development of balance and co-ordination
- facilitating creation of desired and controlled active movements in a variability of practice (could be different "swimming-patterns").

- but we use different strategies to move and restore balance stability in water than we do on land.

Many activities in water will in the beginning be with the body in an upright position, unlike what many of us are used to, when we are in the pool. In the upright position it is easier to familiarize yourself with the new element, to feel basic trust, to communicate, to see and hear what is happening, and to participate in social activities. In the upright position you may work well on postural control of the neck ("head-control") and on breathing control.

But all activities will be experienced under different conditions in order to develop a greater variability of motor programming rules: horizontal / vertical, in a stable position / in mobility, in stagnant water / turbulent water, in shallow water / at greater depths, alone / in a group etc.

I am now briefly going to mention what "water-activities" among others also may stimulate:

* Respiration / Breathing Control:

In water you can see the expiration, when making bubbles or puffing away play-things. You sing by means of expiration, and you need not be afraid of getting water into your mouth while singing.

Because of the pressure of the water on your chest, there is resistance against inhaling, and expiration gets "deeper". Breathing control in water may also help the swimmer's control on land of mouth-closure, eating and speaking

.

* Rhythmical coordination:

Your respiratorical rhythm is the base of your whole body's rhythmical coordination.

Therefore in learning by the Halliwick Method the swimmer will have to learn mastering new breathing patterns before working on specific swimming-patterns.

The current in water is rhythmical, and movements in water get rhythmical, especially when they are also supported by automatic breathing rhythm, rhythmical music or singing.

* Sensory Integration:

The tactile system gets a lot of stimulation, because the movement of the water is felt differently from that of the air. I believe, that the continuous movement of the water - in a pool with lots of people moving around - will cause the tactile receptors do not

adapt. This may also result in increased "arousal" and may help the swimmer to be

more aware of her / his body and the surroundings. I have never experienced, that people with sensory defensiveness react negatively to this kind of tactile stimulation

- on the contrary, they feel secure.

Water invites moving, and that gives lots of stimulation to the vestibular system. When the body is in the water, you cannot compensate for poor vestibular sensation by using vision, as you haven't got the usual datum points or reference and cannot see your body well.

The proprioceptive system gets stimulated by alteration in pressure. Proprioception from the antigravitational muscles may gradually diminish due to the influence of buoyancy / upthrust. But the limbs may get increased proprioception, due to extended body movements. But we do not know much about that yet.

* Stability - & Mobility Control:

Water has great impact on stability and movement control. Even small alterations within the body will cause rotation of the whole body around either one axis or a combination of axes. So you will have to "listen" carefully to the basic sensations you are feeling in order to develop postural control and desired movements in constant changing surroundings.

Movement control in water may be controlled from the head, both in upright and in lying positions. As soon as you bow or turn your head, you create asymmetry, and your whole body will start rolling. "Swimming in general and the Halliwick Method in particular....reinstates one of the earliest stages of the ontogeny as far as its concerns brain centres involved in the programming of movements" (A.R. Cools).

The "damping down" of proprioceptive feed-back may have a positive effect on spasticity. The muscle-activity in the antigravitational muscles is decreased in water due to the weightlessness, and that may give e.g. a swimmer with spasticity better control of desired movements and more time to react to involuntary movements.

So water-programmes may give people with disabilities greater performance variations of postures and movements, which are often difficult or impossible on land. This may promote children's ability to play independently. It may also give people with disabilities opportunities to achieve independent movement control, which also has great psychological benefit.

For many people with disabilities, water may be the best element to improve fitness.

* Perceptual training:

In group-activities you may train the swimmer's concentration by using a structured training-program which is predictable and with lots of repetition and variations.

Variations may be achieved through the use of playthings of different shapes, colours, numbers, weights or in the instruction, position in the pool, the current of the water etc.

* Training for a Leisure Sport / Recreation:

Water- programmes may be followed by a person with disability's wish to attend a swimming club for leisure and recreational purposes. Many of my swimmers will also during the week and in holidays go to public swimming baths with their parents, sisters and brothers, as it is fun to the whole family, too.

The Halliwick Concept is a unified approach in teaching and in treatment of people with different kinds of activity problems and problems in participation.

Throughout the years the Concept has developed further (like concepts tend to do)

as many different professionals - such as occupational therapists, physiotherapists, doctors, speech therapists and swimming instructors, researchers - together with swimmers with disabilities have practiced and experienced The Concept.
