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AQUATIC PHYSIOTHERAPY EVIDENCE BASED PRACTICE GUIDE - FIBROMYALGIA

What evidence?

Nine articles were found that investigated aquatic therapy for patients with fibromyalgia. A systematic review of eight pool-exercise studies is presented by Gowans (2007). Randomized controlled trials have been undertaken by Assis (2006, n=60), Gusi (2006, n= 34), Jentoft (2001, n=34), Mannerkorpi (2000, n=58) and de Melo Vitorino (2006, n=50). Patients were followed-up 6 and 24 months after intervention in a prospective study by Mannerkorpi (2002, n=26). Mannerkorpi (2003, n=19) also provided a qualitative study of how patients experienced group physiotherapy treatment of pool exercise and education.

Other articles captured under the search word of "hydrotherapy" for fibromyalgia include the randomized controlled trial of Eskioglu (2007, n=50) which investigated electro-hydrotherapy as "Stanger Bath", and Faull (2005, n=13) which investigated hydrotherapy as Watsu and Aix Massage in a pre-test post-test design. These complementary and alternative medicine (CAM) therapies fall outside the scope of this review and practice guide.

What treatment?

Assis (2006) randomized 60 subjects with fibromyalgia to deep water running (DWR) or land-based exercise (LBE) training for 60 minutes, 3 times per week for 15 weeks at anaerobic threshold. "For both groups, each session was composed of a 10 minute stretching warm-up, followed by aerobic training, according to the desired intensity, for 40 minutes, and after that, a 10 minute relaxation period. The exercise prescription was based on the heart rate at the anaerobic threshold determined at the initial assessment (graded treadmill exercise test with spirometric analyses). Heart rate was re-adjusted after week 8 based on the second test. The HR variation in immersion is influenced by water temperature and exercise intensity: therefore the DWR group trained at 9 beats/min lower than the LBE group." Sessions were supervised by 2 physiotherapists, and intensity was monitored by HR wrist watches." The LBE group walked to the desired HR or jogged or ran in the training area. DWR consisted of simulated running in the deep-end of the pool aided by a flotation device that maintained the head above water. Patients were instructed in the following technique: 1) an upright posture with spine maintained in a neutral position; 2) running in place, held in one location by a tether cord; 3) water line kept at shoulder level; 4) upper limbs alternating shoulder flexion-extension movements, with elbows at right angle, moving hands at waist level to 5cm below the water surface; 5) hands held tightly clenched; 6) lower limbs in a bicycling action; 7) end f hip flexion at 70o with lower leg being perpendicular to the horizontal and 8) through out the cycle, ankle dorsiflexion

and eversion occurring during the lower leg flexion and plantar flexion and inversion during the extension."

Gowans (1999a) program of education and exercise was conducted over 6 weeks, with 2 exercise classes and 2 multidisciplinary education sessions per week. Exercise classes were 30 minutes long. "Each class consisted of 20 minutes of walking / jogging / sidestepping / arm exercises against water resistance and 5 minutes of stretching at the beginning and end of each class."

Gusi (2006) investigated exercise in waist-deep water at 33^{o}C, 3 times per week for 12 weeks. "Each 1 hour session included 10 minutes of warming up, with slow walks and mobility exercises, 10 minutes of aerobic exercises at 65%-75% of maximal heart rate (HR_{max}), 20 minutes of overall mobility and lower limb strength exercises (4 sets of 10 repetitions of unilateral flexion and extension of the knee at slow pace with the body in a vertical position using water as resistance) another set of 10 minutes of aerobics at 65-75% HR_{max}, and 10 minutes of cooling down with lower intensity exercises. Heart rate was monitored using a pulse meter."

Jentoft (2001) compared pool exercise (PE) against land-based exercise (LE). "A standard exercise program based on the Norwegian Aerobic Fitness Model was used. The aim of the program was to improved cardiovascular capacity with minimal risk of injury. Each exercise session lasted 60 minutes and consisted of body awareness, training, ergonomics, warm-up exercises, aerobic dance, cooling down exercises, muscle stretching exercises, strengthening exercises, and relaxation training. The exercises followed a certain pattern and each part lasted a predetermined time. The exercises consisted of dynamic muscles work, and they were accompanied by music. The Norwegian Aerobic Fitness Model was used in its original form for the LE group. A modified version of the model, adapted to the restriction s imposed by the water, was used for the PE group. The training intensity and muscles activated were as similar as possible in the 2 groups. In at least 40-50% of the 60 minute exercise sessions the training intensity was kept within 60-80% of the maximum heart rate for the age of each patient. A pulse watch recorder monitored the heart rate at least twice during the whole exercise period".

Mannerkorpi (2000, 2002, 2003) appeared to have used the same aquatic therapy intervention for 3 published reports. Patients with fibromyalgia participated in physiotherapist supervised group exercises once a week for 6 months. "Each session lasted 35 minutes and comprised exercises for endurance, flexibility, co-ordination, and relaxation. The aims of the program were to enable the patient (a) to perform the movements, described below (1-7), with awareness and to find her own rhythm and harmony when exercising, to learn the limits and possibilities of her body; (b) to enable her to apply this new knowledge in other physical activities; (c) to increase her motivation for physical activity; and (d) to improve function. At the start and when new patients entered the group, the leader demonstrated all the movements at a slow speed and smooth pace, emphasizing that every one should adjust the exercise individually with respect to their threshold of pain and fatigue. When

the participants had learnt the exercises, and performed them correctly, the pace was increased for those who accepted it. Individual instructions were given whenever needed.

1. Walking forward and backward, or jogging forward, in the water. Either paddling with arms to select the pace and resistance, or smoothly stroking the arms in the water.
2. Arm movements and knee bending when standing. The patients were instructed to select the pace and resistance (by positioning hands during the movement) with respect to their current threshold of pain.
3. Jogging or walking on the spot combined with arm movements.
4. Relaxation and breathing exercises.
5. Jogging on the spot, alternatively jumping with one leg forward and the other back ward. The exercise was alternated with bicycling in a supine position.
6. Stretching of the hamstrings, the quadriceps and iliopsoas muscles, out ward rotators and abductors of the hip, the gastrocnemius muscles, the trapezius muscle, and the levator scapulae muscle. Individual instruction of stretching of other painful or shortened muscles when appropriate.
7. Relaxation, performed either standing and leaning against the wall or lying supine. Air-filled tires and neck collars were provided.

De Melo Vitorino (2006) sleep among fibromyalgia patients in response to 3 weeks of hydrotherapy (HT) against conventional physiotherapy (CT). "Patients underwent 60 minutes of individualized HT or CP according to their assignment… Each patient of the HT group was subjected to the following: (1) warm up (5 min), (2) stretching (6 min in the beginning and in the end) , (3) aerobic exercises (30 min), and (4) relaxation (13 min). Warm-up included exercises such as walking forward, walking backward, and walking sideways, always in association with movements of the upper limbs. Muscle groups stretched were sural, ischiotibial, quadriceps, hip flexors, upper limbs and spine muscles. The aerobic exercises included steady little jump and walking sideways, feet sliding on the pool floor, with dissociation of the pelvic and scapular waists, knee bend jump, flexion and extension using boards in the hands. During relaxation the patient was kept in dorsal decubitus by means of floaters while the therapist performed dorsal massage and pumping massage."

What effect?

Pain, function, mood, quality of life, fitness and sleep were improved in patients with fibromyalgia undertaking aquatic therapy.

Pain in patients with fibromyalgia was measured by visual analogue scale and improved (Assis 2006, Gusi 2006). Pain after performing a walk-test improved in Mannerkorpi's study (2002). The Fibromyalgia Impact Questionnaire was used by several researchers to measure improved perceptions of physical function, well-being, pain, fatigue, stiffness, anxiety and depression (Assis 2006, Gowans 1999a, and Mannerkorpi 2002). Ambulatory function was

enhanced as indicated by Six Minute Walk Test (Gowans 1999a, Mannerkorpi 2002) and walking time over 100m (Jentoft 2001).

Well-being, depression, and self-efficacy were gainfully measured by the Beck Depression Inventory (Assis 2006), and Arthritis Self-efficacy Scale for controlling pain and other symptoms and function (Gowans 1999a). The emotional health domain of the Short Form 36 Health Survey was sensitive to change (Assis 2006). Del Melo Vitorino (2006) concluded better quality of life from SF-36 measurement and Mannerkorpi (2002) recorded changes across several SF-36 domains. Health-related quality of life was assessed using the EQ-5D questionnaire and improved with aquatic therapy (Gusi 2006). Sleep, recorded by sleep diary, changed over the course of aquatic therapy, with total sleep time (TST) increasing by 1 hour and total nap time (TNT) decreasing (Del Melo Vitorino 2006). The qualitative study of Mannerkorpi (2003) on patient perceptions of group exercise and education concluded; "Positive experiences of body were intertwined with a new relationship to self and objects in the world. Interactions between co-participants promoted the process of new patterns of thinking and acting in the social world."

Strength improvements were more difficult to yield with only knee concentric extensors changing of all the strength measures undertaken by Gusi (2006): "maximal isokinetic strength for knee flexors and extensors in concentric and eccentric actions at 60^{o}/second and 210^{o}/second, and in the shoulder abductors and adductors in concentric contractions." Grip strength was measured by Jentoft (2001), finding greater improvement in their land-exercisers compared to the pool-exercisers. Mannerkorpi (2002) measured positive gains in grip strength over 10 seconds using the Grippit Method.

Over time, Gowans (1999a) showed that enhanced walking distance, well-being and self-efficacy were maintained 3 and 6 months post aquatic intervention, while their recording of subject's perception of fatigue and knowledge of fibromyalgia were lost. Six month follow-up by Jentoft (2001) similarly showed sustained improvements including cardiovascular capacity with cycle ergometry. Symptom severity, physical function, and quality of life measures (all SF-36) still showed improvement 6 months post intervention, and 2 years post-intervention gain was still noticeable for pain, fatigue, walking ability (6 minute walking test) and social function (Mannerkorpi 2002).

Compared with land-based exercises, deep-water-running yielded faster change in Fibromyalgic Impact and higher recordings by patients of "global response to therapy" (Assis 2006). Similarly, pool-exercisers in the trial of Jentoft (2001) showed greater improvement in "number of days feeling good", self-reported physical impairment, pain, anxiety and depression. Improvements in sleep were less dramatic among patients treated with conventional physiotherapy than those in the hydrotherapy group of Del Melo Vitorino (2006).

AQUATIC PHYSIOTHERAPY EVIDENCE BASED PRACTICE GUIDE - COMPLEX REGIONAL PAIN

What evidence?

One paper reported on the inclusion of hydrotherapy in an intensive exercise therapy program for the treatment of childhood complex regional pain syndrome (CRPS). This was a prospective study of 103 children (median age 12.7 years, range 7.7-21.1), with 49 followed for more than 2 years Sherry (1999).

What treatment?

The intensive exercise program was delivered to a majority of patients treated in the 1980s as inpatients (60). Due to insurance changes over the years, the majority of those treated in the 1990s were outpatients (31). "The duration of exercise therapy was 5-6 hours daily for most. Four hours were divided by occupational and physical therapy and 1-2 hours consisted of hydrotherapy in a heated (34^{o}C) swimming pool. All patients also had evening and weekend home exercises programs that would take from 45 minutes to 3 hours to perform… The mean duration of exercise therapy was 14 days (range 1-90), but over the past 2 years had decreased to 6 days (range 1-25).'

"Our program stressed function almost exclusively through aerobic exercise training rather than progressive resisted exercises…Therapeutic activities for the lower extremity included jumping activities, running up and down stairs, various bilateral co-ordination movements (such as mini-trampoline, skiing, jumps, and jumping jacks), and relevant age-appropriate physical education simulated activities and sport drills. Upper extremity exercises concentrated on weight bearing, functional activities (such as wall washing and hand writing), and co-ordination drills. Hydrotherapy was administered in a pool and focused on specific limb exercises and general aqua aerobic training."

What effect?

Pain and function comprised the outcome measures of interest. Psychological evaluation was also undertaken and the authors comment on this with respect to predictors of recurrent symptoms and poorer outcomes. Pain was measured by visual analogue scale, and dysfunction was measured by self-report and observation – participation in physical education, dressing one's self, endurance walking or ability to open a car door

"Complete resolution of pain and full function were observed in 92% of patients." Long-term follow up (> 2 years) revealed "88% with no symptoms of CRPS, and 15% had had recurrent episodes of disproportional pain (with or without symptoms of autonomic dysfunction) that resolved with reinstitution of an exercise program. One child was still dysfunctional with CRPS, and 10% had mild pain but were fully functional." Out patient treatment was less effective than inpatient treatment.

Back pain & Aquatic Therapy – the "Evidence"

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Aims of the Article

- To see what evidence exists in the databases
- To see how relevant this evidence is
- To take examples from life
- To look at an example of an acute back pain patient in the pool
- To look at the real "costs" of the pool patient

Chronic Low Back Pain (LBP)

I looked through all the databases to see what evidence there is to justify treating back pain in pools, and to see how good the evidence is. As there was little high quality evidence to be found I then looked at examples of how we can compile evidence.

In 2002, Jenny Geytenbeek found 7 trials investigating LBP with a total of 366 subjects. She looked at studies undertaken between 1980 – 2001 and found 3 studies of moderate quality (e.g. Pedro score of 5 – 6).

Overall Aquatic therapy was found to be of benefit in improving pain, function, self efficacy, joint mobility, strength & balance. She did not distinguish between studies of individual or group work. Most studies used standardised interventions – the author felt that this may have reduced the potential to demonstrate effective aquatic therapy as physiotherapists don't work like that!

In 2007 Anne Jackson reported on the aquatic therapy element of the CSP Guidelines on the management of LBP. They found that Aquatic Therapy improves function
(Grade A – at least 1 Randomised Controlled Trial of high quality) and that Aquatic Therapy helps reduce pain & improve psychological status (Grade C – evidence from consensus techniques – directly applicable higher quality studies absent)

Studies found included:-

- McIlveen & Robertson (1998) (The good study) found significantly more participants reported improved function after aquatic therapy for LBP
- Roberts J Freeman J (1995) in an audit of 81 patients found a highly significant beneficial response for pain, Range of Movement (ROM), and Activities of Daily Living (ADL).
- Yurtkuran M et al (1997) looked at aquatic therapy against land exercise and found-greater improvements in the water group compared to the land group for pain & ROM
- Nguyen M et al (1997) – (a 3 week session of spa therapy) found benefits for pain, function and Quality of Life (QOL), with reduced drug use, but who wouldn't after 3 weeks in a spa resort!

- Balogh Z et al (2005) comparing tap water against low sulphur mineral water for LBP patients found "statistically" significant improvements in pain & ROM in the mineral water group compared with the tap water group…

- Pittler M H et Al (2006) analysed 5 RCTs looking at spa therapy/balneotherapy for LBP. They found statistically significant effects for pain reduction compared to controls. The data was compelling but warranting large scale trials…
- Barone D Gangaway JMK (2007) in a literature review of aquatic physical therapy (APT) found that APT allows early initiation of exercise and shorter rehab periods. Pain reduction, ROM, strength, and QOL were all found to benefit.

An Example from life (The Pilgrim Experience) -Maynard 2007

We run an aquatic back mobility group which is referred into by physiotherapists and run by physiotherapy assistants working to protocols. Patients have a maximum of 6 sessions which have a high educational content - we really push the fact that they need to continue these exercises long term.

In 2006 a Measure it yourself Medical Outcome Proforma (MYMOP) study was carried out on 28 patients. MYMOP is ideal for aquatic therapy as it is not condition specific, and details are available from – www.hsrc.ac.uk/mymop

The results were (a change greater than 1 is statistically significant, and a minus shows benefit)

CONDITION	NUMBERS	DURATION	MALE	FEMALE	MEAN AGE	RANGE
BACK PAIN	**28**	**4-12 week 2** **3–12 month 3** **1-5 year 8** **5 year + 13** **Unknown 1**	**10**	**18**	**54.4 year**	**27 – 86 years**
MYMOP RESULTS		**AVERAGE CHANGE**				
SYMPTOM 1		**- 1.04**				
SYMPTOM 2		**- 1.24**				
ACTIVITY		**- 0.85**				
WELLBEING		**- 0.89**				
OVERALL CHANGE		**- 1.01**				

Overall these results would indicate that these classes are effective for patients, & many of these group members carry on via our Self Help group for which they pay. They are also cost effective in terms of therapist time.

What about Acute Back Pain?

There are NO research articles I could find. So what about the classic patient that is too tender to do anything with on land? How can we use the water?

We can use water to help us mobilise patients: - for example, “drag” techniques, working with buoyancy (either assisted or counterbalanced movements), or contract/relax work.

Advantages of mobilising in water are: - water assists in relaxation and pain relief, a spinal length increase of 2.5 – 4.0 cm occurs (Kirsch1990), there is easier manual handling for the therapist (everybody weighs the same in water) and immersion reduces postural muscle tone (Mano 1990)

We can carry out passive mobilisations - Lee & Evans (1994) found that Postero – Anterior (PA) glides on land cause bending & sagging of the spine. The result in movement of the mobilised vertebrae is relative to the supporting ends. This movement is greater than true intervertebral movement & seems to support PA’s in water (usually classed as a “general” mobilisation) – Lee & Evans (1994).

Advantages of passive mobilisations in water are that the water provides a relaxing, supportive, friction free environment. The dynamic properties of water (e.g. buoyancy) can be used to assist the movements, and spinal mobilisations are assisted by spinal lengthening.

We can use water to help strengthen by working against the upward thrust of buoyancy, holding against drag, utilising turbulence via the speed of movement, utilising therapist created turbulence or the turning effect caused by the imbalance of buoyancy against gravity. Bad Ragaz (PNF) patterns of movement are also very useful.

Advantages of strengthening in water are that one movement can cause work throughout the body, movements are smooth with less jarring, and that the spine is offloaded. It is easy to work maximally and to finely grade exercise, and early functional work is easier.

We can work on stability by carrying out rhythmical stabilisations using the support from water, stimulate pelvic setting/balance utilising turbulence (Try standing still in a pool while others are moving around you!), work with concentric/eccentric work – the buoyancy affects movement as you move around the vertical, or use the metacentric (turning) effect (stand chest deep and look up and down – see how you have to work to hold balance!)

Advantages of stabilising in water are that it is easy to introduce movement when setting, easy to find variety of ways of working, and class activity is simple (e.g. use of turbulence created by one person affects all others). There are 2 forces acting on body (Gravity and Buoyancy) therefore it is easier to destabilise the patient, while the water creates a safe environment as falls do not result in broken bones.

<u>A Case Study – Hyper acute back pain(Mrs Post Partum)</u>

A brief outline of the patient: -

- 3 weeks post partum
- Had right sacro-iliac SI joint pain ++ in last weeks of pregnancy
- Still sore ++ (VAS 10/10) - can only walk with crutches.

- Seen in department – too tender to touch.
- SI joint disruption diagnosed by the Extended Scope Physiotherapist – Interferential therapy, TENS, Acupuncture etc tried to reduce pain – no go.
- ESP felt that mobilisation/manipulation indicated but not possible
- Aquatic therapy discussed and agreed

Treatment outline

- Session 1
- Supine floating 20 minutes to relax out – allowed very gentle movement of the spine via the movement of water.
- "Sea weeding" from shoulders

Session 2

- Supine floating (10 minutes) plus: -
- Sea-weeding from both legs
- Sea-weeding from right leg to enable stretch
- Standing in deep water with gentle leg swings (alternate legs)
- Supine float laying alternate leg abductions

Session 3

- Patient reported VAS down to 7/10
- As session 2 plus: -
- Passive left rotation stretch to discomfort – she suddenly started to relax and manipulation was achieved while still in the water.
- Buoyancy assisted rotations to the left were taught and the patient passed back to OP physio to teach stabilising exercises and self mobilisations.

Post Script

- Phone call from patient 2 days later– she reported her VAS was 1/10, that she was off crutches and that the exercises from the ESP were continuing to help.
- She was convinced that without the aquatic therapy that she would have been suffering for months – who knows?

A common misconception is that Aquatic Therapy is very expensive…

- Costing an aquatic therapy service is quite straightforward.
- The Pilgrim pool is representative of most pools and costs £7.96 per usable hour.
- Costs per patient contacts are good value.

Costing an Aquatic Therapy Session (2006 costs)

- Session (3 Hours) – (1 band 7 physiotherapist) costs: -
- 3 Hours Band 7 £67.92
- 3 Hours Band 2 (poolside assistant) £25.44
- 3 Hours Pool time £23.98
- Total £117.34

- Average 11 patients = cost of £10.66 per treatment

Comparable Costs

- Same Physiotherapist carrying out "normal" Outpatient session (3 Hours)
- 3 Hours Band 7 £67.92
- 0.5 Hours Band 2 £4.24
- Total £72.16
- Average 6 patients = cost of £12.02 per treatment!

Costs of the Back Group

- 45 minutes of pool time.
- 45 minutes of assistant (Band 2) time (times 2)
- Average number of patients per session = 12.
- Pool time - £ 5.99
- Assistant time - £12.72
- Cost per patient contact £1.56
- 6 sessions costs £9.35 – very good value!!

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Evaluation in the aquatic setting: WOTA1 & 2 (Water Orientation Test of Alyn)

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When I joined Alyn hospital's aquatic therapy department over 10 years ago, I started looking for some sort of evaluation format that will help me work in a methodological way with my patients. A tool to help me evaluate and track progress, setup treatment goals, creates common language among my team and not less important – communicate with the healthcare administration through structured reports.

I was looking for a tool that would fit the Halliwick Concept, the main method we use at Alyn for treating our patients, but couldn't find one that is also reliable and valid.

I then decided to develop this form myself according to and structured by the Halliwick Concept. During that process we realized that in fact we need two different tools: One for patients who are capable of fulfilling instructions (WOTA2) and another one for those who cannot (WOTA1).

This very practical project turned into a 7 years process through which we've developed, revised, tested and validated the forms. The result is that today the aquatic therapy department of Alyn as well as several other centres around the world are using WOTA to design, track and set goals for aquatic therapy treatment. The following gives a high-level overview of the WOTA evaluations.

Rationale for the development of the WOTA

For many years, aquatic-therapy and swimming have been recognized as rehabilitation modalities for people with special needs (Becker & Cole, 2003; Ruoti, Morris & Cole, 1997). This is based on the many advantages that therapy in the water presents. As with all therapeutic modalities, it is important to objectively quantify the changes that we as therapist observe.

Like every other evaluation tool, this one too has to be reliable and valid, to reflect actual abilities of the swimmer.

The form needs to evaluate specific components of aquatic behaviour such as Mental Adjustment & Function. Objective data, about the swimmer's level of those components allows us to set treatment goals and plan a treatment program accordingly.

Another important parameter is the evaluation's ability to depict change and track progress over time. That means the form has to be sensitive to the swimmer improvement. This will enable us to modify our goals accordingly.

It is important to use common terminology as used by different therapists, thereby enabling smoother hand over of patients from one therapist to another.

When therapy outcomes are objectively quantified, it improves clarity and credence in communication with the health authorities, funding providers and clinical administration.

The evaluation has to fit the rehabilitation centre's therapeutic concept. Halliwick is one of the leading approaches to Aquatic Therapy, especially in neurology and paediatrics, developed by James McMillan in 1949. It includes a ten point program based on a motor learning sequence that focuses on postural control. Ten successive steps lead the swimmer, with or without disabilities, to experience and master a variety of movement patterns, culminating in functional swimming (Lambeck & Stanat, 2001).

It was important to us to develop short, uncomplicated assessments which encourage the evaluation of many swimmers in a short time, several times a year.

The last parameter that led us to develop two forms was the need to match the evaluation to the swimmers' ability. One form for patients who are capable of fulfilling instructions (WOTA2) and another one for those who cannot (WOTA1).

WOTA1

The WOTA1 form has 13 simple-to-follow items.
Each item is graded from one to four on an ordinal scale, with four being successful completion of the task.
The form is based on the Halliwick Concept focusing on the first 2 phases: Mental Adjustment and Balance Control.
The whole evaluation can be performed in 15 minutes and can be applied as often as appropriate for each swimmer. WOTA1 is appropriate for the evaluation of children approximately at the age of 3 years and for older children with limited cognitive level. These children are often difficult to evaluate. The difficulty is in identifying their abilities and observing small changes over time.
When the child has limited motor function and cognitive skills, it is important that each test items consists of a single clear instruction.

Numerous means of giving instructions are used in WOTA1. Initially verbal instruction is given, followed by demonstration of the required action, giving the swimmer a chance to respond and initiate action. If no response is observed the therapist uses facilitation to help the swimmer perform the item. The verbal feedback provided by these children is often limited. This means that therapist observation is crucial for grading results as one cannot rely on the swimmer's verbal feedback but rather on his overall response.

With this population progress is expected to be gradual, therefore the form items and grading system must be sensitive in order to highlight even small changes.

Successful evaluation & documentation of progress, enables the therapist to set treatment goals and plan and periodically adjust treatment programs accordingly.

WOTA2

The WOTA2 form has 27 items
Each item is graded from one to three on an ordinal scale, with three being successful completion of the task.
The entire evaluation can be performed in 30 minutes and can be applied as often as appropriate for each swimmer depending on their progress.

The 27 items in WOTA2 cover the ten points of the Halliwick Concept, and the rating of each item is based on the idea of gradual disengagement of support.

The first part of WOTA2 is dedicated to Mental Adjustment and specifically to adjustment to the properties of the water such as buoyancy, hydrostatic pressure, water density, drag force and turbulent flow.

Swimmers who have not attained Mental Adjustment can be expected to show stress related motor behaviours such as widening of the base of support, increasing body tone, moving in fixed patterns and changes in facial expression.

Swimmers with atypical development often exhibit fewer strategies to facilitate this adaptation to the water environment. Limitation in motor function, postural balance and head control, body asymmetry or breathing difficulties can all prolong the process of mastering Mental Adjustment.

Mastery of Mental Adjustment is a prerequisite for any further activity or therapy in the water. Once adjustment is achieved, the swimmer is open to learn and acquire new skills. This is the reason many of the evaluation's items were dedicated to this subject in both forms.

Current Status and further development

During 2000-2001 both these evaluation forms were reviewed by experts in the Halliwick Concept. Reliability & validity studies were performed and further changes were instituted. The process was reviewed in 2002.

These evaluations have been presented at several international conferences and for the past six years have been incorporated into the curricula of Aquatic Therapy courses in Israel through a one day workshop. WOTA is also taught by Johan Lambeck (PT) a senior lecturer of the Halliwick Concept in both

basic and advanced courses worldwide. In addition to Alyn, these forms are used in numerous Aquatic Therapy centres internationally.

Publication of the WOTA: in "IJARE" in August 2008.
Additional research is done these days using the WOTA.
Future plans: publish a paper on the subject of WOTA as a practical mean for writing: "goals setting" & "reports".
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The WOTA evaluations are available in a kit including the assessment forms and guidelines for administration. Also included is a laminated assessment form for pool-side use.

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*Both the WOTA1 and WOTA2 were developed at the Alyn Hospital, Pediatric and Adolescent Rehabilitation Center in Jerusalem, Israel in 1999. They were developed by the team led by Ruthy Tirosh, Head of the Aquatic Therapy Department. Ruthy has been involved in swimming instruction and Aquatic Therapy for the past 20 years, was a member of the Board of Directors of the Israel Hydrotherapy Association.