



*4th International Conference on
Evidence Based Aquatic Therapy*

*10, 11, 12 November 2017 – India
Theme – Flowing Into Newer dimensions*

**Proceedings of the 4th ICEBAT
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Preface

It is with great pleasure; I take this privilege as an Organizing Chair along with my organizing team to welcome all Aquatic therapists, Physiotherapists, Occupational therapists and many aquatic body workers from across the globe to be a part of this evidence based conference on Aquatic Therapy happening for the first time in India. Aquatic therapy has been growing since a decade (In India) and now has gained popularity with many therapists getting trained both in India as well abroad and are able to bring the much needed concept to the patients. We are overcoming local challenges of infrastructure, awareness and availability of services gradually. Your esteemed presence with your research will enhance this growth. With participants and invited keynote speakers coming from across the globe, it provides great networking opportunity to interact and grow this water family with intense information exchange. It is truly amazing to see how water bonds us all together in such beautiful way as therapists and provides a great advantage in rehabilitation of our patients. After witnessing many patients recovering, it is only imperative we make this concept grow and sustain in a systematic and scientific way with good clinical practicing methodology, documentation, research while constantly looking at evolving newer methods.

This inspires our theme of the conference “Flowing into newer dimensions”.

We are thinking out of box ideas and trying to integrate aquatic therapy with newer line of thinking. Our Scientific committee is putting together information that will involve looking at pain, gait rehabilitation, muscle endurance development, setting game based paediatric approaches and other keynote sessions. We would like to invite abstracts that have newer perspective to look at aquatic therapy in all the fields of practice of aquatic therapy.

The Conference is being held in Mysore, a known international tourist destination with strong cultural heritage. Come and explore; our culture, traditions, beautiful architecture, and the beauty of local art & handicrafts.

We extend a warm welcome with an open heart to visit India and share your experiences, knowledge, and success; also take some from our delegates. Looking forward for a wonderful time with you all!!!

- C G Prashanth

Scientific Program

Timings	Friday, 10 th November	Saturday, 11 th November	Sunday, 12 th November
7.30 - 8.30	Registration		
9.00 am	Opening keynote speaker: Tasha Stanton "The power of the brain in pain: from nociception to conscious experience"	Opening keynote speaker: Ben Waller 'Acute neuromuscular adaptations during immersion'	Opening keynote speaker: Marcel Hulselmans 'The role of water specific movement therapy in the early rehabilitation of spinal cord injured patients'
10.00 am - 10.30 am	Abstract presentations - oral / poster	Abstract presentations - oral / poster	Abstract presentations - oral / poster
10.30 - 1.00 am	Tea Break	Tea Break	Tea Break
11.00 am - 11.45 am	Keynote speaker 2: Johan Lambeck 'New perspectives in aquatic therapy for CP: agility and endurance'	Keynote speaker 2: C G Prashanth 'Outcome Measures - A clinical approach for evidence and its implication in practice of Aquatic Therapy'	Keynote speaker 2: Efthymia Vagena 'Management in therapeutic pools: exploring the perspectives'
11.45 am - 12.30 pm	Abstract presentations - oral / poster	Abstract presentations - oral / poster	Abstract presentations - oral / poster
12.30 pm - 1.30 pm	Lunch	Lunch	Lunch
1.30 pm - 2.15 pm	Keynote speaker 3: Javier Gueita 'Aquatic physical therapy core sets in children - Final consensus and practical implications'	Keynote speaker 3: Eadric Bressel 'Immersion and the neuromuscular system; an opportunity for motor learning'	Keynote speaker 3: Urs Gamper 'Influencing fascia with aquatic therapy'
2.30 pm - 4.00 pm	Pool demonstration - Pediatrics: Therapeutic Aquatic Games	Pool demonstration - Immersion and neuromuscular adaptation	Pool demonstration -
4.15 pm - 4.45 pm	Tea Break	Tea Break	Tea Break
4.45 pm - 5.30 pm	Abstract presentations - oral / poster	Abstract presentations - oral / poster	Abstract presentations - oral / poster

Keynotes

New Perspectives in Aquatic Therapy for CP: Agility & Endurance

*Johan Lambeck,
Association IATF, Valens, Switzerland*

Introduction

Therapeutic aquatic exercise (TAE) programs and swimming can provide a fun and motivating form of physical activity, supporting physical, social and emotional well being and fitness (Gorter 2011, Declerck 2013, Fragala-Pinkham 2014). It is amongst the most commonly selected modes of physical activity by children with CP and their parents (Brunton and Bartlett 2010) and parents choose aquatic activity as first choice in addition to regular therapy (Hurvitz 2002).

Methods

A literature search has been conducted to find important fitness goals like aerobic conditioning, increasing muscle power and agility. They have partly been addressed in literature by Fragala-Pinkham et al(2008, 2014) and Yilmaz (2009). Dutch CP guidelines (VRA 2006) state that functional strength training needs to be included in therapy interventions for children and youth with spastic paresis.

The structure and contents of activities, as well as minimal intensity levels, frequency and duration to effect change in order to challenge adaptational mechanisms has not yet been fully established. The American Academy of Pediatrics states that activities should be interesting, enjoyable, motivational and in groups (Dymant 1991), but only provides a rough indication for aerobic levels, which will be illustrated with existing literature at various levels of evidence.

Discussion and Results

Contents of aquatic intervention programs, involving the kind and intensity of fitness exercise elements, are still in development. TAE potentially is able to include fitness elements like aerobic endurance, muscle power and agility. The increase of aerobic endurance by TAE is well established, but effects on muscle power and agility needs more research.

Conclusion

The lecture aims at implementing the present body of knowledge and will propose the elements of a valid aquatic therapy approach, applicable in e.g. Water Specific Therapy.

Keywords: TAE, CP, endurance, power, agility

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Case Directed Therapeutic Aquatic Exercise in Musculoskeletal Diseases (MSK)

Urs Gamper, Kliniken Valens, Switzerland

Description

This lecture will discuss the current body of knowledge and skills in therapeutic aquatic exercise for patients with musculoskeletal diseases, focusing on chronic Low Back Pain and Fibromyalgia. The practical workshop will specifically focus on the influence of immersion and movement in water on the tensegral characteristics of the intra- and extramuscular fascial structures and fascia

Therapeutic aquatic exercise programs are beneficial and popular all over the world, Verhagen et al (2012) stated: “Over 30 years of research demonstrates that exercises in general, and specifically aquatic exercises, are beneficial for reducing pain and disability in many musculoskeletal conditions demonstrating small to moderate effect sizes ranging between 0.19 and 0.32”.

The popularity is reflected in e.g. recommendations from EULAR for fibromyalgia (Carville et al 2008) or from the Work Loss Data Institute for Low Back pain (2006). Systematic reviews in which either specifically LBP (Waller et al 2008, Olson et al 2013) or FMS (Lima et al 2013, Bidonde et al 2014) have been critically appraised in general underpin the conclusions by Verhagen in favor of aquatic therapy.

In both chronic diseases, architecture of fascial structures and fascia is reduced (Ge et al 2009, Langevin et al 2011, Liptan, Vleeming et al 2014) Fascia is a major proprioceptive tissue and also is a major storage source of energy. It interacts closely with the neuromotor control system in regulating muscle power (Schleip et al 2012, Hodges et al 2013, Schleip & Baker 2015) . Therapeutic interventions are advocated with low load in an environment where fear of pain can be re-weighted..

The established effects of therapeutic aquatic exercise and the added theoretical rationale to address fascia with low load, in a pain modifying environment could lead to rethinking about therapeutic aquatic exercise in these conditions.

We will present an established concept: the Bad Ragaz Ring Method (Lambeck & Gamper 2011) and will include these novel ideas in this track

Learning objectives

Upon completion, participants will be able to

- justify potential benefits of therapeutic aquatic exercise for patients with chronic MSK diseases
- describe the evidence base of therapeutic aquatic exercise for patients with chronic MSK diseases
- identify the physiological rules (adapted to the target group) of addressing connective tissue
- identify the motor learning rules of proprioceptive training
- explain basic principles of adapted BRRM
- demonstrate BRRM and other aquatic therapy techniques used to improve fascial fitness in selected pathologies

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The Power of the Brain in Pain: From Nociception to Conscious Experience

Tasha Stanton

Senior Research Fellow, School of Health Sciences, University of South Australia, Australia

Have you ever received a tiny paper cut and been surprised at how much it hurt? Or have you ever noticed a bruise that you don't remember getting? If you can say 'yes' to either of these questions, you have experienced the complexity of pain: how much pain you experience often relates poorly to how much tissue damage there is. This suggests that there are other factors that contribute to the pain experience. My talk will specifically discuss the role that the brain plays in pain. It will explore new neuroscience evidence that underpins the neurobiology of pain and will discuss what goes wrong when pain becomes chronic. It will also delve into new research that suggests that the way you perceive your own body and process incoming sensory information may play an important role in the pain experience. These novel findings will be discussed with a view to informing clinical practice: how might we target the brain in pain.

Neuromuscular Responses to Immersion and Aquatic Exercise

Ben Waller, PT, PhD

Faculty of Sport and Health Sciences, University of Jyväskylä, Finland

Background

Numerous systematic reviews and randomised controlled trials, have shown that aquatic therapy improves neuromuscular function, e.g., walking speed, agility and muscle strength, in both healthy adults and different patient populations. However, there is lack of understanding of the underlying effects of aquatic exercise and thus mechanisms behind these improvements, therefore the trend has been to transfer land-based exercises, exercise prescription and tasks directly into water. When comparing the effects of land-based to aquatic exercise there is rarely a result in favour of either training option and with perceived higher cost aquatic therapy is losing ground on land-based exercise modalities.

Land and aquatic exercises have been traditionally compared using either size of EMG signal, ground reactions forces and kinematic measurements, which are generally the end output of a complex supra-spinal process, involving processing information about the task, environment and the individual. There is a need for researchers and physiotherapists to requestion the perceived mechanisms behind the therapeutic effects of immersion and aquatic exercise.

Objectives

This presentation will present a summary of the research investigating the acute effects of aquatic exercise and immersion on the neuromuscular system with a particular focus on during and immediately after. By modulating different immersion conditions, i.e. different somatosensory input data from our own research groups suggest how the stretch reflex could be manipulated for different therapeutic effects. Research investigating how the different somatosensory input affects the sensory and motor cortex will be integrated will be presented. This will help start to unravel the mechanisms behind the commonly observed differences in neuromuscular output and start a revolution and evolution in aquatic therapy.

Key Practice Points

The aquatic environment provides therapists with a unique non-invasive and non-pharmaceutical treatment option that clearly has effects on both the peripheral and central nervous systems. This presentation introduces a new way of thinking in the utilisation of aquatic therapy and hope to inspire new research questions.

Aquatic Physical Therapy Core Sets in Children with Neurological Disorders. Final Consensus - Practical Implications

Javier Güeita Rodríguez, PT, PhD

*Lecturer Rey Juan Carlos University and International Aquatic Therapy Faculty
Universidad Rey Juan Carlos, Spain*

The objective of this keynote is to report on the Aquatic Physical Therapy Core Sets (Brief and Comprehensive) developed for children and youth with neurological disorders based on the ICF-CY. A formal decision-making and consensus process integrating evidence gathered from preparatory studies was followed. Preparatory studies included: a systematic literature review; an international expert survey and a qualitative study of caregivers. Relevant ICF categories were identified in a formal consensus process by international experts from different backgrounds in a final Delphi process. International aquatic physical therapists experts chosen by WHO region with expertise in children with neurological disorders attended the consensus Delphi.

The ICF Aquatic Physical Therapy Core Sets for children and youth can be applied in clinical practice, research, teaching and administration. This study selects the most relevant ICF categories of functioning and disability most commonly targeted by aquatic physical therapists to be included in the Comprehensive, Common Brief Core Set and Age-Specific Brief ICF Core Sets. This guide could be included in goal setting for a given condition. This may enable aquatic physical therapists to develop treatment based classification systems and competencies for entry-level practice.

Keywords: Physical therapy modalities; Disabled children; International Classification of Functioning, Disability and Health; Clinical competence; Delphi technique.

The Role of Water Specific Therapy in the Early Rehabilitation of SCI Patients

Marcel Hulselmans

Physiotherapist BSc; IATF senior lecturer WST, Germany

The goal of rehabilitation after spinal cord injury (SCI) is to achieve as much sensori-motor recovery as possible, to allow for a self-determined life.

Despite being ISNCSCI classified as „complete SCI,“ a majority of SCI patients have partially preserved“ motor and sensory capacities that can be trained ,improved and lead to better functional abilities e.g in the upper extremity.

Research with animal and human SCI individuals, suggests that the major part of sensory-motor recovery takes place within the first three months post injury.

This means that any intervention pointed at enhancing the recovery, must take place within this time frame.

The negative effects of long bedrest and the consequence of inactivity after SCI are well documented. Research also shows that axonal activity is crucial for axonal survival. Exercise at an early stage seems to provide that activity.

In the subacute stage of SCI, exercise within the time frame of the first 3 months, demands a special environment, due to surgically stabilized spinal segments and orthostatic instability, which often limits and even prevents exercise „on land“ at this stage.

Here, water specific exercise allows for early exercise of meaningful and functional movements even with muscle force values of 1 or less (RMC Scale 1-5) without compromising limited loadable spine or multitrauma.

Active (aerobic) exercise is correlated with the expression of neurotrophic factors which enhance neural protection, recovery and synaptogenesis and, in the long run, the functional outcome. Somato-sensory stimulation also proved efficient in improving motor-and sensory capacities. Immersion in thermo neutral water allows for exercise at an early stage and moving in water presents an strong sensory input.

On a neuronal level, functional recovery consists of the regaining of function of spared cord fibers and plasticity“, that is reorganisation on cord, subcortical and cortical levels of the CNS. This reorganization will take place anyhow and should be „shaped“ accordingly, giving adequate afferent input, originating from exercised functional movements ,

Depending on the level of and extend of the cord lesion, the autonomous nerve system is also affected. Sympathetic hyperreflexia, lower limb venous blood pooling and ventilatory insufficiency in tetraplegia are the most prominent symptoms.

All of these vegetative disfunction symptoms are buffered by the effects of „ head out immersion“ in thermo neutral water.

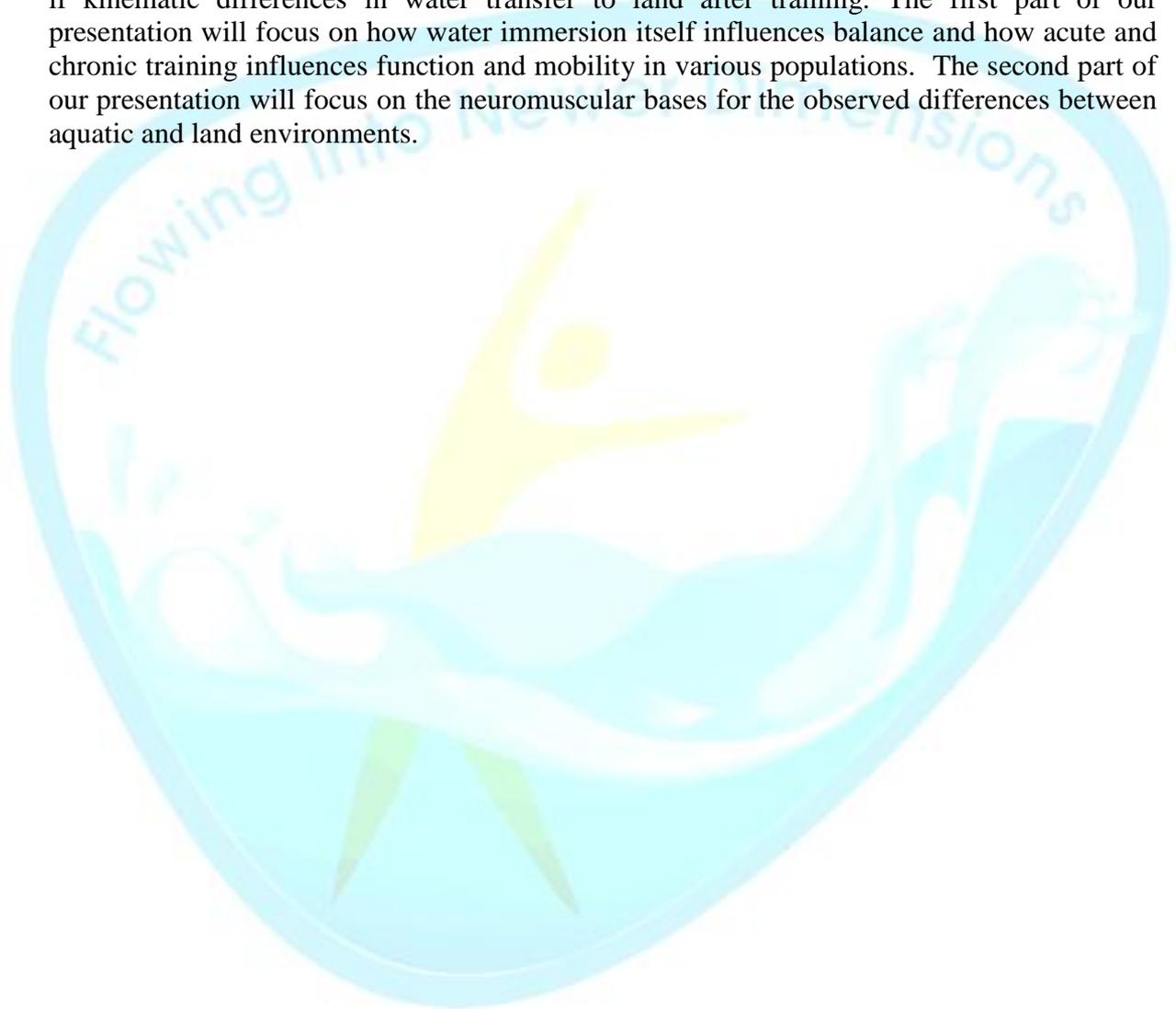
Summarizing, I think there are convincing arguments to claim that water specific movement therapy, should play a major role in *early* rehabilitation of SCI patients.

Acute and Chronic Changes in Neuromuscular Function during and after Aquatic Exercise: a Window for Therapy.

Professor Eadric Bressel, PhD

Kinesiology and Health Science, Utah state university, USA

Much is known about cardiovascular responses to aquatic immersion and exercise, yet an understanding of the neuromuscular and functional responses to water immersion and training are unclear. Recent research has identified kinematic differences between land and water environments but it is unclear if these differences make aquatic exercise suboptimal or if kinematic differences in water transfer to land after training. The first part of our presentation will focus on how water immersion itself influences balance and how acute and chronic training influences function and mobility in various populations. The second part of our presentation will focus on the neuromuscular bases for the observed differences between aquatic and land environments.

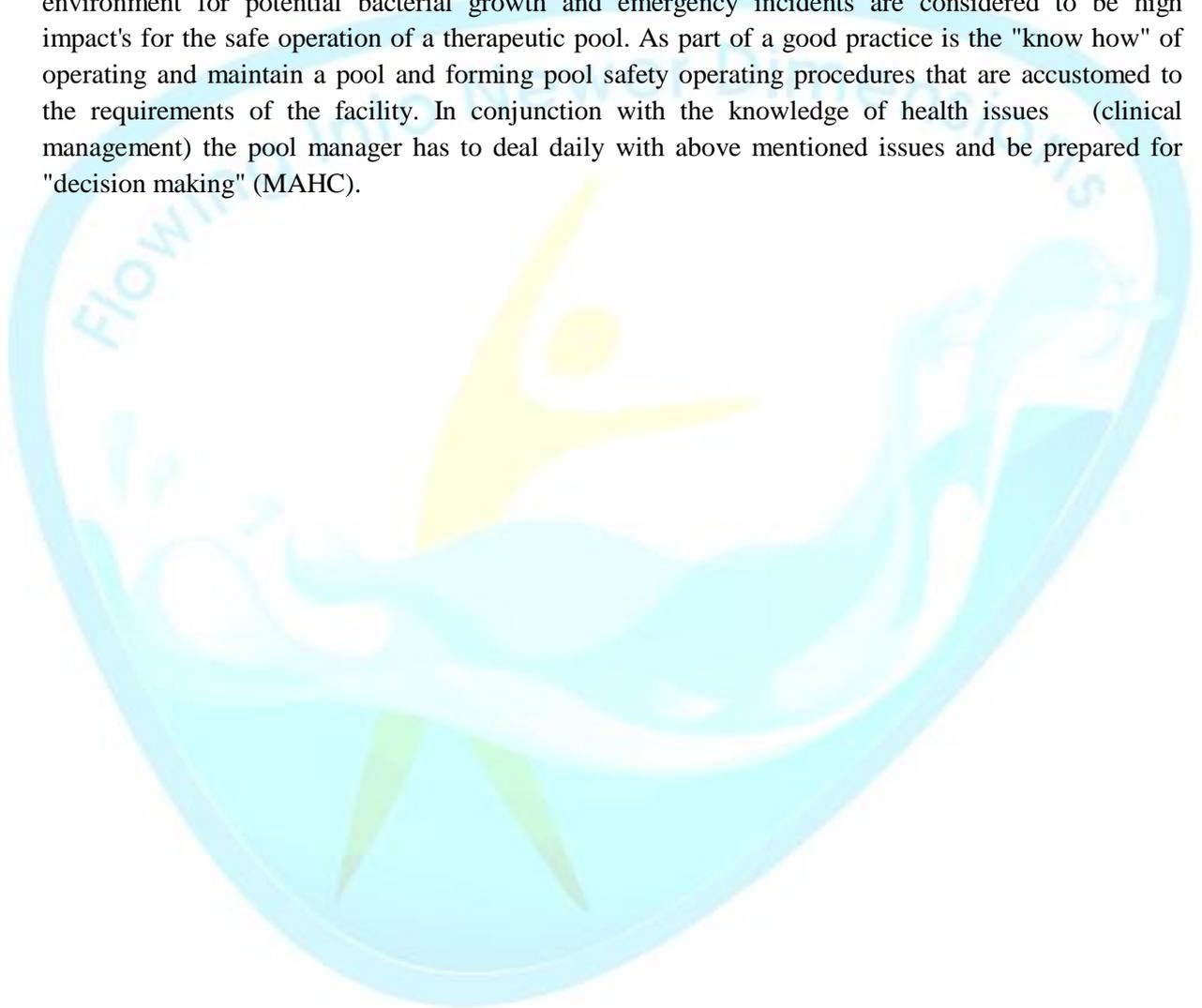


Management in Therapeutic Pools: Exploring the Perspective

Efthymia Vagena,

Flloktitis Rehabilitation Hospital, Greece

Nowadays management in therapeutic pools has become of great interested and need as many organized health facilities include therapeutic pools. A pool manager has a legal requirement to provide a safe and hygienic facility through risk assessment and control (STA). A therapeutic pool has many challenges different than a normal swimming pool (STA,PWTAG).Topics like temperature,hygiene, bathing load, disinfectants, patient factors, risk of infections due to the ideal environment for potential bacterial growth and emergency incidents are considered to be high impact's for the safe operation of a therapeutic pool. As part of a good practice is the "know how" of operating and maintain a pool and forming pool safety operating procedures that are accustomed to the requirements of the facility. In conjunction with the knowledge of health issues (clinical management) the pool manager has to deal daily with above mentioned issues and be prepared for "decision making" (MAHC).



Outcome Measures – A Clinical approach for Evidence and its Implication in Aquatic therapy

CG Prashanth,

Physiotherapy Specialist, Qatar Rehabilitation Institute, Hamad Medical Corporation, Doha

The Goal of any therapy is to improve the health status of an individual. If this can be demonstrated by measuring the change, it leads in developing faith of an individual on the therapy. There are subjective ways of measuring this change and an objective one too. Unless a measurement is taken for the change in a health status, the change is not accounted.

There are several ways of measuring this change - with physical, social and economic considerations. Using the right outcome measuring tool for understanding this change is vital in developing the evidence for therapeutic techniques used for the clinical condition. There are various outcome measures for documenting various clinical problems. It is upon the clinician to decide the right one to measure the change. The choice of an outcome measure has to be based on the reliability, validity, sensitivity and responsiveness of the scale chosen. Sometimes choosing a wrong outcome measure can give a clinician difficulties in identifying a correct therapeutic technique that can be effective. The scale can be subjective and objective. It is clinician's decision to choose the subjective or the objective scale to measure change.

The importance of outcome measures, its influence on enhancing aquatic therapy practice and its relevance in developing evidence for Aquatic therapy is the current need in the growing world of evidence based practice.

Oral Presentations

The Effect Of Aquatic Therapy on Indian Cross Leg Sitting Alignment In Children With Cerebral Palsy in the Sagittal Plane: A Quasi Experimental Study

Tejas Patel, and Mona Patel, Sparsh Paediatric Rehabilitation Clinic, Ahmedabad, India

Objective of the study

The objective of this study is to evaluate the effectiveness of Aquatic Therapy in decreasing the kyphosis and posterior pelvic tilt so that sagittal plane alignment in Indian cross leg sitting is corrected in children with cerebral palsy.

Introduction

Cerebral palsy is a non-progressive neuromotor disorder affecting posture and movement. Low tone trunk and spastic hamstrings is a common impairment in many of children with cerebral palsy, which causes them to sit in kyphosis and posterior pelvic tilt (McCarthy et al) in Indian cross leg sitting. Aquatic Therapy is frequently indicated for rehabilitation of patients with cerebral palsy. It has a global effect on cerebral palsy child's body, as well as helps to maintain and improve the functional ability and quality of life.

Methodology

- Quasi Experimental study.
- It's a Single session intervention study.
- Sample size – 13
- Pre session directly post session and one hour post session trunk alignment in the sagittal plane is measured with Angle finder at the level of Th3, Th8, and Th12.
- Pre session directly post session and one hour post session sitting duration is measured with stop watch.
- Pre session directly post session and one hour post session on tardieu scale R1 and R2 of Hamstring is measured with Angle Finders.
- Including criteria
 - ✓ Cerebral Palsy with a low tone of the trunk and spastic hamstrings.
 - ✓ GMFCS 3,4 and 5.
 - ✓ 5 kids are GMFCS 3, 8 kids GMFCS 4.
 - ✓ Children that can follow simple command like sit straight.
 - ✓ Age Group From 3 years to 6 years.
- Excluding criteria
 - ✓ GMFCS 1 and 2.
 - ✓ Complete Visually and hearing challenged.
 - ✓ Severely mentally challenged who cannot follow the commands like sit straight.
- Intervention Session time : 45 min
- Intervention Aquatic Therapy in form of
 - ✓ Water specific therapy – Halliwick.
 - ✓ Aquatic Therapy with Floatation and Aids
- Floatation and Aids used in therapy
 - ✓ Noodle to stretch hamstrings, & Pectorals

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- ✓ Neck float and Ring (used initially for noncompliance kids and to help them for mental adjustment)
- Instruments for measurements
 - ✓ Indoor temperature control pool Temp is around 30.5 to 32.5 degree centigrade
 - ✓ Angle finder
 - ✓ Stop watch

Summary - Result / Discussion

- Significant decrease in dynamic as well static component of spasticity in hamstring at both comparisons pre-session vs immediate post session and pre-session vs one hour post session. Decrease in dynamic and static component spasticity is not only maintained but there is marginal drop down at one hour post session.
- Significant increase in sitting duration in Indian cross leg sitting at both comparisons pre session vs immediate post session and pre session vs one hour post session. And this signifies increase in recruitment in back extensors (meyer et al), abdominals, and gluteal group of muscle.
- Significant correction of kyphotic alignment in sagittal plane at all level. At Th8 a significant correction is found at both comparisons pre session vs Immediate post session and pre session vs one hour post session. And this is direct reflexion of recruitment in back extensors (meyer et al), abdominals, gluteal muscles and decreases in dynamic as well static component of spasticity in hamstrings.

Conclusion

- This is single session Quasi Experimental study. It concludes significant short-term positive effect of Aquatic Therapy to improve sagittal plane alignment in Indian cross leg sitting.
- Multiple session intervention study is required to evaluate long term effect of Aquatic Therapy for functional changes in Indian cross leg sitting position.

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Effectiveness of Aquatic Therapy in Children with Sensory Processing Disorder

Sangoi H., Badiani C., Shukla A. Reach Therapy Center for Children, India

Objective of the study

The objective of this preliminary study was to evaluate the effectiveness of an aquatic therapy program on Sensory Processing, Motor skills and Water Orientation skills (W.O.S.) of children with Sensory Processing Disorder.

Introduction

Aquatic therapy has been highlighted in literature as a potentially powerful therapeutic intervention (Kucher 2015). Therapeutic aquatic exercise programs and swimming can provide a fun and motivating form of physical activity; supporting physical, social and emotional well-being for children and youth (Gorter 2011; Fragala-Pinkham 2014). There is a scientific basis that physical properties of water have a beneficial effect on sensory processing (Sato 2012); however, there is lack of clinical research about the use of aquatic therapy as an intervention for children with Sensory Processing Disorder (S.P.D.) using sensory based assessments (Freedman 2011).

Methodology

Two kids with Sensory Processing Disorder, ages 7 and 7 ½ years, selected through convenience sampling, completed a 6 hour aquatic therapy intervention program over a 5-week period (twice/week, 45 minutes per session). The intervention included aquatic therapy activities designed to provide sensory input (proprioceptive, vestibular and tactile); improve core and proximal muscle strength, bilateral co-ordination and motor planning. Pre-post intervention data was compared to determine the impact of aquatic therapy intervention on children's overall sensory processing using Sensory Processing Measure (S.P.M.); Bruininks-Oseretsky Test of Motor Proficiency-2 (B.O.T-2) subtests of Bilateral Coordination, Balance, Running Speed and Agility, Upper-Limb Co-ordination, Strength; Clinical Observations based on Sensory Integration Theory (Clinical Observations) and Water Orientation Test Alyn-2 (W.O.T.A-2).

Results

Pre-post data comparison indicated improvements in the overall B.O.T-2 scores by 17.15% (Bilateral co-ordination by 26.09%, Balance by 29.27%, Running speed and agility by 4.26%, Upper limb coordination by 18.75 %, Strength by 7.41%). Qualitative improvements in structured clinical observations linked to proprioceptive –vestibular functions namely prone extension, postural measures with eyes closed, jumping jacks, symmetrical and reciprocal stride jumps were seen. S.P.M. scores indicated no significant change. Overall W.O.T.A.-2 scores improved by an average of 23%.

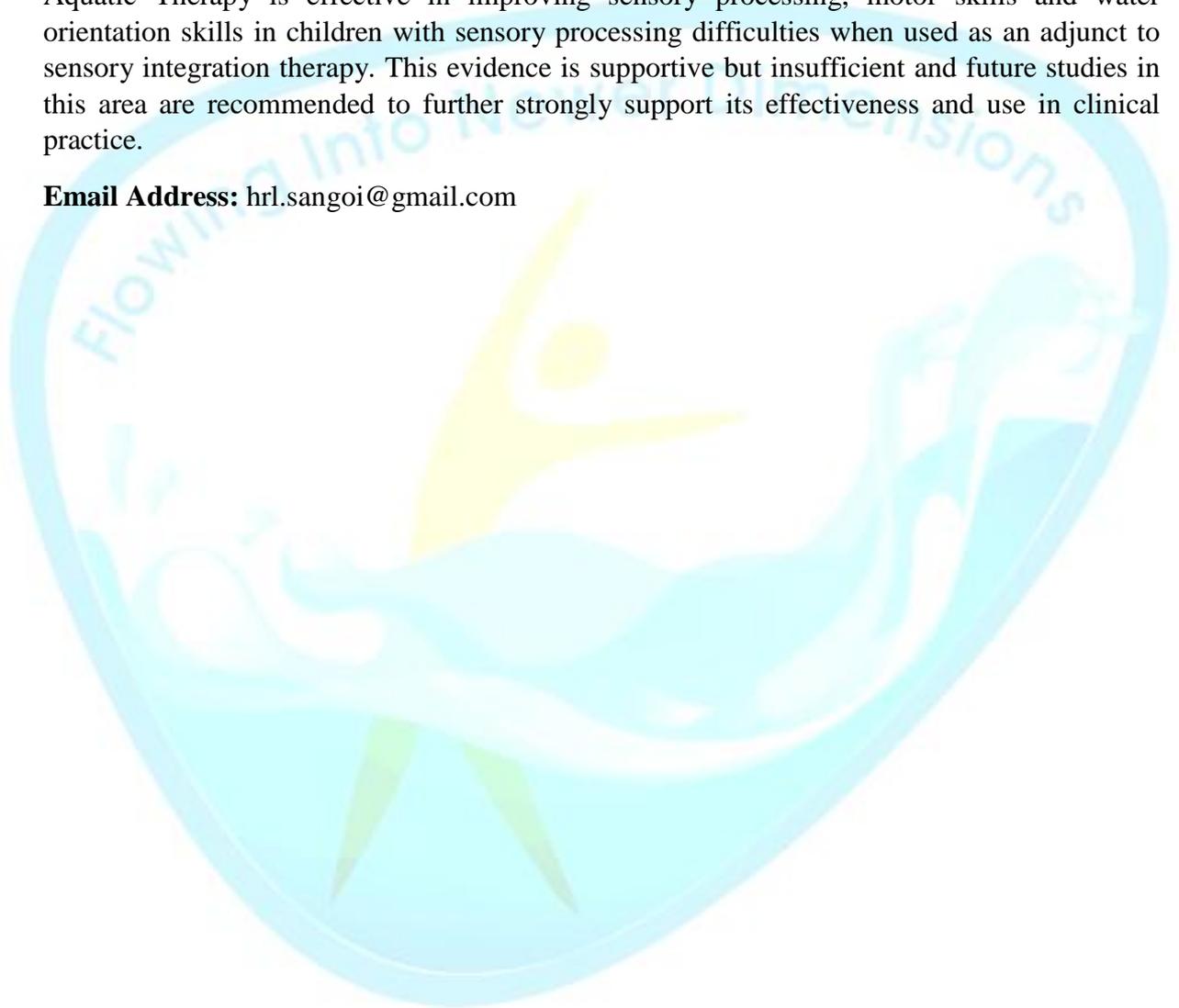
Discussion

Graded sensory activities in a motivating and fun aquatic environment helped to improve the children's water orientation, sensory processing and subsequently motor skills in a relatively short period of time. However, the study has limitations in its small sample size and short duration. Further research using larger sample size, control group, longer treatment duration and use of outcome measures to functionally translate the gains made through this intervention is recommended.

Conclusion

Aquatic Therapy is effective in improving sensory processing, motor skills and water orientation skills in children with sensory processing difficulties when used as an adjunct to sensory integration therapy. This evidence is supportive but insufficient and future studies in this area are recommended to further strongly support its effectiveness and use in clinical practice.

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Impact of Aquatic Therapy Program using a Collaborative Aquatic Approach on Water Orientation Skills of Indian Children with Developmental Disabilities

Badiani C., Sangoi H., Shukla A. Reach Therapy Center for Children, India.

Objective of the study

The objective of this case series is to describe the implementation of an aquatic therapy program using principles of Water Specific Therapy and Halliwick Ten Point Program on mental adjustment and functional abilities in aquatic environment of Indian children with developmental disabilities.

Introduction

Aquatic therapy using Halliwick concept has been used to achieve therapeutic, functional goals for children with developmental disabilities. Aquatic therapy is a relatively newer arena being utilized by occupational and physical therapists in India (Prashanth 2015). Research suggests the use of a collaborative approach using Halliwick concept and integrating specific intervention philosophies from the Halliwick Ten Point Program (H.T.P.P.), Water Specific Therapy (W.S.T.) to achieve therapeutic, educational or recreational goals of children with developmental disabilities (Kokaridas, D. and Lambeck, J 2015). H.T.P.P. helps to progressively achieve independence in water through a logical, sequential teaching method whereas W.S.T. aims to develop an intervention strategy for adults and children with orthopedic, neurological, developmental challenges focusing on objectives related to levels of function, structure and activity.

Methodology

Nineteen children with various developmental disabilities, ages 2 to 13 years (mean age 6 years 7 months) received aquatic therapy intervention over 4-12 weeks with session frequency being 1-2 times/week. Halliwick Concept served as the key organizing framework in this aquatic program with the H.T.P.P., W.S.T. methods used more specifically as treatment approaches in planning individual sessions. Treatment duration, session frequency and specific treatment method used were based on the neurological condition of the child, clinical findings from land-based occupational therapy assessment and functional goals relevant for the child and family. Pre-post intervention data was compared, to determine the impact of this intervention on children's water orientation skills using Water Orientation Test Alyn (W.O.T.A.)

Results

Data Analysis indicated a statistically significant positive effect of the intervention on water orientation skills of the children. For the Mental Adjustment (M.A.) section, the average baseline score was 2(S.D±1.06) and post-intervention score was 2.64(S.D±0.60). For the Breath Control (B.C.) section, the average baseline score was 2.52 (S.D±3.74) and post-

intervention score was 4.64 (S.D±4.31). For the Rotational Control (R.C.) section the average baseline score was 14.47 (S.D±10.44) and post-intervention score was 24.23, (S.D±10.88). For the Swim Progression (S.P.) section, the average baseline score was 0.11 (S.D±0.33) and post-intervention score was 0.17 (S.D±0.39).

Discussion

The results support the use of a collaborative treatment model in aquatic therapy on water orientation skills of Indian children with developmental disabilities. Breath Control and Rotational Control were more intensively worked upon in H.T.T.P and W.S.T. since they are the foundations for independent water skills; which explains the higher gains made in these sections. Most children in this study were happy, well-adjusted in the water when we did the baseline scoring leading to lesser difference between their pre-post scores in Mental Adjustment section. Most children did not make gains in Swim Progression skill within the duration of the study due to limited time frame of the intervention. The study has its limitations in variable durations of intervention and session frequency and wide age range.

Conclusion

Aquatic therapy program using a collaborative aquatic approach and integrating principles of Water Specific Therapy and Halliwick Ten Point Program is effective in improving mental adjustment and functional abilities in aquatic environment of Indian children with developmental disabilities

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Waterproof Success Rate of Transparent Film Dressing In Aquatic Therapy Setting

Emily Dunlap, USA

Objective of the study

This pilot study evaluates the waterproof success rate of transparent film dressing with and without special skin preparation on elbow or knee joints after two hours of immersion with exercise in a 90 degree Fahrenheit pool.

Introduction & Methodology

Sixty-four trials of transparent film dressing applications were collected during four pool sessions and separated into four groups by joint (knee or elbow) and skin preparation (none or liquid film-forming barrier). The outcome of waterproof success rate was measured as lack of water penetration after immersion.

Results

The waterproof success rate for the knee site was 80% when the dressing was applied with skin preparation compared to only 56% when the dressing was applied without skin preparation. The success rate for the elbow site was 69% when the dressing was applied with skin preparation however surprisingly increased to 75% when the dressing was applied without skin preparation. Overall, 75% of all dressings remained waterproof with skin preparation compared to only a 67% when the dressing was applied without skin preparation.

Discussion

The waterproof success rate of transparent film dressings following two hours of immersion with aquatic exercise in this study was at best 80%. Skin preparation with a liquid film-forming barrier improved the waterproof success rate of the knee dressing but reduced the success rate of the elbow dressing. Therefore, in practice the treating therapist is advised to cautiously monitor dressing sites for signs of waterproof failure during the treatment session.

Conclusion

When making decisions about aquatic therapy patient selection the therapist must consider that a transparent film dressing will reduce, but not eliminate, the risk of pool water contacting non-intact skin during immersion. This preliminary report shows that use of a liquid film-forming barrier can increase the waterproof success rate for transparent film dressings however benefits may be joint-specific.

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Prevalence of Waterproof Dressing usage in Aquatic Therapy Settings: Results from an International Online Survey

Emily Dunlap, USA

Objective of the study

Background: There exists limited information about the trends of waterproof dressing use in aquatic settings in terms of global health. An important question is what are the indicators of safe waterproof dressing use in aquatic practice. Objective: To review current practice of waterproof dressing use in aquatic therapy settings to describe prevalence, treatment procedures and outcomes to help guide future research.

Introduction & Methodology

A 10-question online survey using Survey Monkey® was designed to gauge the prevalence and related circumstances involved with waterproof dressing use in aquatic therapy practice. The survey was sent to members in the Aquatic Physical Therapy Section of the American Physical Therapy Association and participants of continuing education programs (one international and two US based) and posted on an international Aquatic Therapy social media site. Survey data was collected during a 4-month period from Oct 20, 2016 to Feb 21, 2017.

Results & Discussion

204 aquatic therapy professionals responded (144 from US and 58 from 16 other countries and 2 unknown). Results indicated that 66.5% of those surveyed use waterproof dressings in their practice. More than half (52.17%) of those using waterproof dressings had used a waterproof dressing 2-10 times in the past 12 months. Waterproof dressings were most often used to cover non-infected wounds (67.15%) and surgical incisions (58.39%). Tegaderm was the most common product used (78.1%) with Opsite the next most common (22.63%). A large portion of those surveyed (57.35%) do not use any special kind of skin preparation before applying the waterproof dressing. More than half (59.12%) have experienced waterproof failure. A small percent (7.07%) reported a complication associated with waterproof failure. The most common complication reported was skin irritation.

Conclusion

These results indicate over half of aquatic professionals surveyed currently use waterproof dressings. The majority of aquatic professionals surveyed do not perform any type of special skin preparation prior to dressing application. Over half of the aquatic professionals who use waterproof dressings have experienced at least one waterproof failure and a small percentage reported a complication from the waterproof failure. Results indicate a need to further investigate waterproof dressing procedure to improve waterproof success rate as well as study the rate of adverse effects with the use of waterproof dressings during aquatic therapy treatment.

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Effect of Aquatic Therapy on Shoulder Girdle Muscle Strength and Fine Motor Activities in Autism Spectrum Disorder (ASD) in the Age Group of 3 years-8 years

Objective of the study

The purpose of the present study was to examine the effect of aquatic therapy on shoulder girdle muscle strength to improve fine motor functions in the ASD children.

Introduction & Methodology

Children from India of both genders with an age group of 3yrs- 8yrs with Hypotonia with GMFC level I and II were chosen. To assess and compare the strength of shoulder muscles and fine motor functions pre and post aquatic therapy measured by Daniel muscle testing(MMT) and Paediatric Arm Function Test(PAFT) With an exception of Paediatric population who had undergone any Neuro-musculoskeletal surgeries and GMFC level III and IV. 4 children were selected and given exercises with noodles, ball, kickboard, rings in aquatic atmosphere for 3 times a week for 4 weeks.

Results & Discussion

MMT and Paediatric Arm Function Test scoring before and after the treatment in relation to fine motor activities like handwriting and holding a spoon for feeding from 0 session to 12th sessions were measured.

Conclusion

Few studies have investigated the effect of Aquatic Therapy on Strength of overall all muscles of children with ASDs. While there is an increasing body of evidence of Aquatic Therapy for children with ASDs, this is constrained by small sample size, lack of comparator, crude sampling methods, and the lack of standardized outcome measures. Aquatic Therapy shows potential as a treatment method to develop strength in Shoulder Girdle Muscles and to improve the Fine motor functions in children with ASDs.

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Group Hydrotherapy Activity for Children with Duchene Muscular Dystrophy - A Project Description

Objective of the study

The aim of this presentation is to describe a unique project of group hydrotherapy activity that has been customized for children with DMD.

Introduction & Methodology

Duchene muscular dystrophy (DMD) is the severe muscular dystrophy, affecting 1/3500 boys. The publication of standardized care guidelines in 2010 was an important step towards improving DMD patient care.

The recommendations regarding physiotherapy include stretching of the muscles and prevention of joint stiffness. In Israel, there are approximately 250 children with Duchenne, according to "Small Steps" Association for Duchenne & Becker disease

Project Description

We design aquatic group activity for 7 boys with DMD age 6-8. All of the children were able to walk independently. The program included water-based activity The group is conduct by 2 therapists (physiotherapist and hydrotherapist) and volunteers.

Intervention

Every child assessed on land and in the water by a physical therapist with expertise in hydrotherapy and child development. Relevant goals were set for each. During the treatment, part of the activity is carried out in a group and part individually, within the group. During the children's activity, the parents meet for conversation or guided activity."

Results

Group therapy is conducted during the last 3 years till now, once a week in the hydrotherapy warm pool (34.4°C, 120 CM deep). 7 children participate in the group regularly. The compliance level of the children and their parents is very high (between 80-90 percent attendance) and they show high levels of satisfaction.

Discussion

Bendixen et all wrote in his RM research from 2014 that, participation for boys with DMD demonstrates low levels of engagement in physical activities. Based on our understanding of muscle weakness and mobility difficulties in boys with DMD, this is not a surprising finding. Our boys also report very low levels of participation in skill-based activities. Past research has shown that both boys and girls with physical limitations report lower levels of skill-based engagement in skill-based activities than recreational, social or self-improvement type activities.

The group hydrotherapy treatment, in addition to its care aspects, provides the opportunity for these children to participate in normative social activities involving suitable motor abilities."

Conclusion

Group hydrotherapy is a new treatment model that addresses both the physical and social needs of children with DMD. The activity enables work on the physical goals of the group, and is a social framework, with a high response rate as well as high levels of satisfaction of both parents and children, and this measure should be taken into account in the construction of similar programs in the future.

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Effectiveness of Hydrotherapy on Locomotor function in Person with Chronic Cervical Spinal Cord Injury: A Case Study

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Objective of the study

This study describes the translational effect of hydrotherapy on land based walking function in person with cervical SCI.

Introduction & Methodology

The most obvious consequences of cervical spinal cord injury (SCI) are paralysis of trunk and all four limbs, sensory deficits and bowel-bladder dysfunction. Among them recovery of functional ambulation is one of the main goal of rehabilitation in SCI patients, irrespective of the severity or duration of SCI. Conventional Physiotherapy (CP) is important and commonly used in rehabilitation of SCI but hydrotherapy for walking is least explored. Kinematics parameters of gait in water of SCI is more similar to those of the healthy people, particularly speed, stride length, and stance phase, which supports walking in a water may be of rehabilitative significance after SCI. However, very little is known about the effect of underwater walking and exercises on functional gains in strength and land-walking.

A 22-year old male injured his cervical spine at C4, 5, 6 level while diving in a swimming pool. He recovered his sensations and some muscle activity below the level of injury in one year but he was not able to do independent sit-to-stand, standing and walking. He then enrolled in a hydrotherapy study at Asian Physiotherapy & Research Institute. He started with vigorous CP sessions of six hours/day for three months. After that, hydrotherapy along with conventional physiotherapy (HCP) sessions, one hour session of hydrotherapy along with CP of five hours/day for three months was started. Hydrotherapy exercises were combination of strengthening exercises; standing static & dynamic balance exercises; gait training; and functional training. Functional Independence Measure (FIM), American Spinal Cord Injury Association (ASIA) Scale and Manual Muscle Testing (MMT) were examined before CP, after CP and after HCP.

Results

After completing CP sessions, he showed some improvements in MMT but no significant changes in functional activities. However, after completing HCP, there was noticeable improvement in lower limb scores in motor category of ASIA scale, which were 12/50 (before CP), 14/50 (after CP) and progressed to 20/50 (after HCP). Remarkable progression was noted in walking component of FIM scale which was 2 (maximal assistance with walker) and improved to 5 (under supervision with walker). Now, he is able to perform sit to stand activity with moderate assistance and able to stand with good postural alignment, which was possible with maximal assistance after CP.

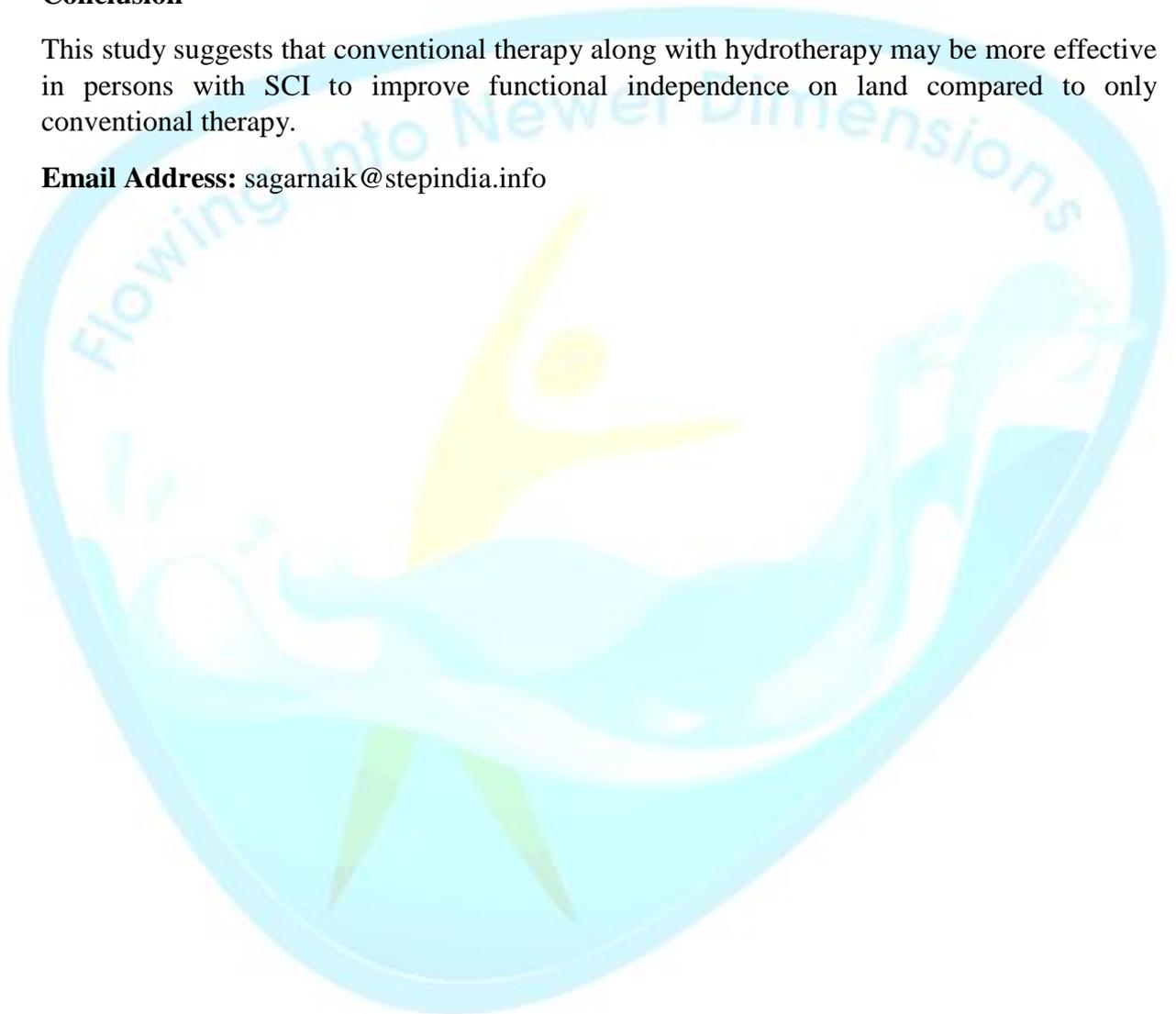
Discussion

Implementation of hydrotherapy in chronic SCI patient showed significant changes in all outcome measures. His postural stability and right lower limb strength increased, which improved his walking capacity and physical fitness. The physical properties of water like buoyant force, lower apparent body weight, provided the required time for reorganization of gait phases making walking training and all lower limb activities easier. This showed remarkable translational improvement in sit-to-stand and walking on land. Now he is able to do land based independent walking with walker under supervision.

Conclusion

This study suggests that conventional therapy along with hydrotherapy may be more effective in persons with SCI to improve functional independence on land compared to only conventional therapy.

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Effect of Hydrotherapy on Postural Stability and Functional Independence in Dystonic Cerebral Palsy Child: A Case Study

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Objective of the study

To examine the effect of hydrotherapy compared to conventional physiotherapy in dystonic CP child with poor postural stability in functional activities.

Introduction

The presentation of cerebral palsy (CP) can be mental and physical dysfunction or isolated disturbances in gait, cognition or sensation. Gaining independence in walking, standing and transfers is assumed to be a key factor in rehabilitation of CP. Various treatment approaches and functional activity training on land are conventionally used to treat CP. Hydrotherapy is an attractive form of exercise for children with CP. The buoyancy of water decreases the influence of gravity and provides increased postural support, which allows more freedom during exercises in water than on land. Despite theoretical benefits of hydrotherapy, little research has been done on its effects in spastic diplegic CP. However, there is no evidence about its impact on dystonic CP.

Methodology

A five-year old boy with dystonic CP, level III on Gross Motor Function Classification enrolled in this study. He had hypotonia in trunk muscles and tightness in both hip adductors and plantar flexors with difficulty in sitting independently, poor postural stability in standing and severe gait disturbances. He underwent conventional land-based physiotherapy (CLP) of six hours/week for two months. After which, hydrotherapy along with conventional physiotherapy (HCP) was started for another two months. Three alternate days' hydrotherapy sessions were included followed by CLP in remaining three days of the week. Hydrotherapy exercises included trunk control, postural stability, upper & lower limb co-ordination, and lower limb strengthening. Gross motor function measure (GMFM), manual muscle testing (MMT), and baropodometric analysis of postural sway in standing were examined before CLP, after CLP and after HCP."

Results & Discussion

After CLP sessions, less improvement was noted in MMT with no difference in GMFM score: 32.13% (before CLP) to 33.87% (after CLP). However, at the end of HCP his GMFM score improved statistically to 65.06%. The significant changes were noted in crawling (5.46% to 69.04%), standing (5.12% to 33.33%), and walking (8.11% to 36.11%). Also, trunk muscle MMT improved from grade 1 to grade 3. Before and after CLP, he was not able to stand independently so recording of postural sway was not possible. Further, after

completing one month of HCP, he was able to stand independently on baropodometric plate for recordings. His postural sway area reduced in standing (4052 mm² to 1254 mm²) and became more stable after HCP.

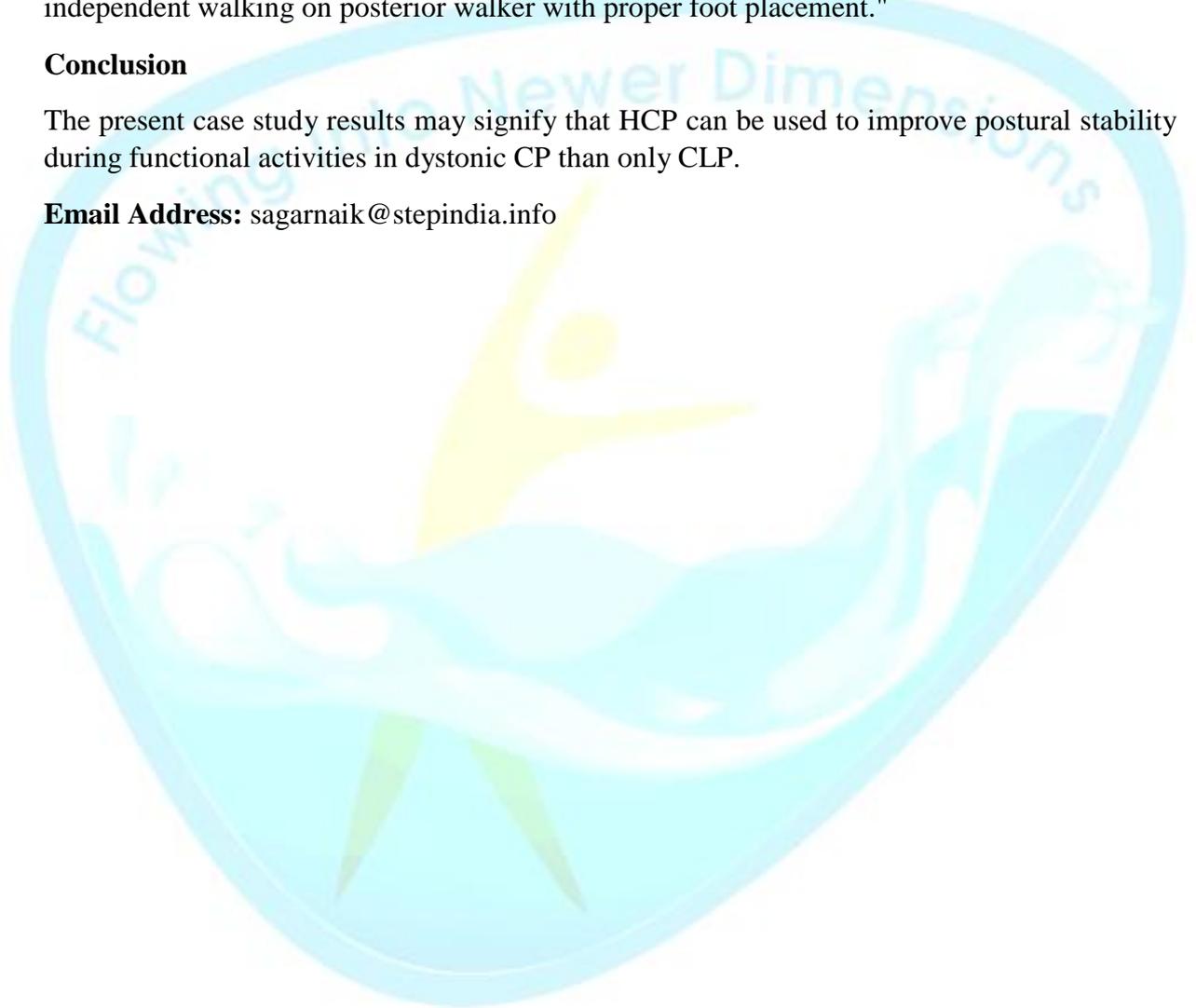
Discussion

Hydrotherapy used as an interventional tool showed noticeable changes in all outcome measures. Water properties also helped him in dystonic movements, which are smoother than before. His postural alignment has improved which showed decreased startle reflex in all activities. As a result, he is now able to do independent sitting with proper trunk control and standing independently for few minutes with minimum postural sways. Also, he is able to do independent walking on posterior walker with proper foot placement."

Conclusion

The present case study results may signify that HCP can be used to improve postural stability during functional activities in dystonic CP than only CLP.

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Aquatic Exercise for Hemophilia: a Review of Literature

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Objective of the study

To find and analyze the existing literature on the benefits on aquatic exercise in individuals with hemophilia

Introduction

Hemophilia is a congenital bleeding disorder with second highest number of recorded cases (11,456) globally being present in India. Therapeutic exercise can maintain the joint range of motion, muscle strength, and improve function after the bleeding episodes that occur mostly in the muscles and joints. Aquatic exercise decreases the stresses on the joint due to buoyancy and has the potential of an ideal exercise environment in hemophiliacs with joint involvement. Though there is early literature on the benefits of aquatic exercise for hemophiliacs there is no review that synthesized the research evidence in this topic

Methodology

The systematic search on the effectiveness of aquatic exercise in hemophiliacs is carried out in databases; PubMed, PEDro, CINAHL. All the types of study designs published in English from 1990 till June 2017 were included in the review. The keyword combinations used are as follows: hemophilia or hemarthrosis or hemophilic arthropathy, hemophilia A or hemophilia B AND aquatic exercise or hydrotherapy or aquatic therapy. After initial title and abstract screening two independent authors reviewed the full texts of the eligible articles. Relevant articles were included in the review after arriving at consensus. Data extraction of the included articles was carried out independently. Demographic data and intervention details were analyzed.

Results & Discussion

Four studies out of 602 potential yielded articles were included in the review. The included studies state clear benefits of aquatic exercise for hemophiliacs in terms of pain, knee range of motion, knee muscle strength. There is preliminary supportive evidence of aquatic therapy in improving cardiorespiratory and clotting variables

Conclusion

Few trials support the use of aquatic exercise to improve knee muscle and range of motion in participants with hemophilia. Considering the limited number of studies that were identified, further randomized controlled trials are warranted investigating the benefits of aquatic exercise in this population.

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Chronic Pain In Musculoskeletal Diseases: Can Aquatic Therapy Offer Relief To Patients? A Systematic Review

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Objective of the study

The purpose of this systematic review is to evaluate the effectiveness of aquatic therapy in a population of patients suffering from chronic musculoskeletal pain.

Introduction

Chronic pain is a global health problem and it involves disability and high socioeconomic costs. Musculoskeletal diseases such as LBP, osteoarthritis, and fibromyalgia are among the main sources of chronic pain and are associated with a gradual decline in quality of life. Scientific evidence already supports the effectiveness of some non-pharmacological treatments, such as exercise, to reduce pain and increase functional performance. Aquatic therapy, due to the intrinsic properties of water, facilitates active movement and could be an ideal setting to improve pain and quality of life.

Methodology

RCT research was conducted on PubMed, PEDRO and Cochrane libraries to identify the most relevant studies between 2000 and 2017 by matching aquatic therapy, musculoskeletal diseases, and pain in simple version and Mesh. An adult population with chronic musculoskeletal pain (> 3 months) was subjected to aquatic therapy not associated with any other pharmacological or physiotherapeutic intervention. Outcome investigated: pain and quality of life before and after surgery. Two independent reviewers selected the articles, made a methodological evaluation according to the PEDRO scale (cut-off at 6/10) and extracted the data.

Results & Discussion

16 articles met inclusion criteria. The methodological quality of RCTs stands at an average value of 7.2/10 according to the PEDRO scale. The stratification of the articles by pathology revealed: 8 studies on osteoarthritis 5 on fibromyalgia, 2 on rheumatoid arthritis and 1 on ankylosing spondylitis. The intervention protocols described are highly heterogeneous among them. Aquatic therapy is significantly effective in treating pain compared to control groups in only 6 studies on 16, while equal or not significantly superior in the latter. For quality-of-life outcome, this data dropped to 4 out of 16. Given the good methodological quality of the studies included, we can consider the results found to be in line with those already expressed

by the latest systematic reviews of single pathologies in the literature: a moderate efficacy of aquatic therapy for the outcomes considered. It was not possible to conduct quantitative evaluation of data through meta-analysis because of the heterogeneity of the reporting data and variability of outcome measures.

Conclusion

The data showed an improvement in the outcome investigated in all studies, but research does not support the superiority of pool treatment compared to land-based or no treatment at all. Aquatic rehabilitation stands as a valid approach for all patients with difficult access to other kind of active therapies. Further studies are needed to understand the mechanisms behind perception of pain and aquatic therapy and to optimize protocols for this specific population.

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The Effect Of Aquatic Aerobic Training On Cardio respiratory Endurance In Chronic Stroke Patients

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Objective of the study

To study the effects of Aquatic aerobic training on cardiorespiratory endurance in chronic stroke patients.

Introduction & Methodology

Ambulatory Stroke patients , able to walk with minimal and/or without support with a BBS score > 40 were evaluated according to the inclusion and exclusion criteria, the Pre test scores were taken, patients were then taken to the pool for the intervention. The intervention programme included 10 minutes warm-up 40 minutes Aquatic Aerobic Exercises, these exercises were modified according to the patient's capacity and progression level, and 5 minutes of cool down period was included relaxation techniques.

Results & Discussion

After the 10 sessions of Aquatic therapy sessions the outcome measures of Pre and Post data was compared which showed improvement in the scores of the Outcome measures.

Conclusion

This study showed Aquatic Aerobic training is effective for improving cardio respiratory endurance, ambulation and also improves balance in a chronic stroke patient.

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The Effect of Aquatic and Land Stretching Exercises on Disease Activity, Quality of Life and Pulmonary Function in Ankylosing Spondylitis

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Objective of the study

The aim of the study is to investigate the effectiveness stretching exercises in ankylosing spondylitis in different environment.

Introduction & Methodology

Ankylosing spondylitis is a chronic, progressive disease with an unknown etiology which characterise with inflammation that leads bone fusion in spinal joints. Besides the systemic manifestations, chronic pain, acquired kyphosis, diminished exercise capacity may cause pulmonary dysfunction, muscle imbalance, reduced quality of life, sleep disruptions and depression. Although stretching exercises are most common exercises in this group the literature on effectiveness of stretching exercises is scarce.

57 patients were assessed and randomized into two group control and intervention. Control group informed on importance of exercise and given a home exercise brochure. Intervention group was also randomized into aquatic and land stretching group and received stretching exercises two days in a week for eight weeks. Bath Ankylosing Spondylitis Metrology Index (BASMI) for spinal mobility, Bath Ankylosing Spondylitis Functional Index (BASFI) for functional level, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) for disease activity and Ankylosing Spondylitis Quality of Life Questionnaire- ASQoL were used. Pulmonary functions of the patients were evaluated with SFT and inspiratory (MIP) and expiratory muscle strength (MEP). Supervised stretching exercises were performed twice in a week for eight weeks either in 32-34°C treatment pool or in an exercise unit. Assessments were repeated after eight weeks.

Results

Two patients from control group and nine patients (three from aquatic, six from land) from intervention group were excluded. At the end of eight weeks, except FEV1, FVC, VC all results of intervention group improved whereas quality of life was the only result improved in control group. When aquatic and land stretching groups analysed results were improved similarly. The improvements of BASFI and MIP of aquatic group are superior to land group.

Discussion

Stretching exercises are essential in treatment of AS regarding environment. This study also showed that aquatic stretching exercises may have some benefits than land stretching exercises.

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Poster Presentations

Effects Aquatic Exercises on Balance and Hand Function in Multiple Sclerosis: Halliwick versus Aquatic Plyometric Exercises

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Objective of the study

The aim of this study was to compare the effects of two different aquatic exercises on MS symptoms.

Introduction & Methodology

Multiple Sclerosis (MS) is a degenerative central nerve system disease even though symptoms vary individually; walking impairment, upper limb dysfunction and balance problems are most common and disabling problems. Studies showed that aquatic therapy (AT) are safe and effective for people with MS.

Thirty relapsing remitting MS patients were recruited from local MS society for this single blinded randomized controlled study. Patients were randomized either to the aquatic plyometric exercise (APE) group or Halliwick group (HAL) and both groups were performed their exercise program in a private pool owned by local MS society twice in a week for 8 weeks. Pool depth was 120 cm and water and room temperature was held between at 30-31°C and 26-28 °C consecutively. Patients were taken in group of threes to a 45 min session of plyometric exercises.

Limits of stability (LOS) of the patients were measured with Biodex Balance System (BBS; SD 12.1° Display 115 VAC). Nine hole peg test (NHPT) was used to measure upper extremity functionality. Fatigue impact scale was used to measure patients' fatigue. Multiple Sclerosis International Quality of Life questionnaire (MusiQoL) was administered to understand the effect of treatment on quality of life (QoL).

Results

Two patients dropped out from HAL group due to personal issues. Groups had similar demographic properties (age, sex BMI). LOS and hand functions significantly improved after AT ($p < 0.05$). Hand functions improved in both groups ($p < 0.001$). LOS (time, overall, left, backward right) and fatigue (cognitive, physiological) values improved in HAL group where LOS (overall, backward) improved in APE.

Discussion

This study showed that AT is an effective treatment in people with MS to improve hand function and balance. To our knowledge this is the first study using APE in MS, this study showed that APE is safe and effective in this group.

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Exploring the Effect Of Aquatic Exercise on Cognitive Function in the Aging Population

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Objective of the study

The role of exercise in the maintenance or fortification against neurocognitive decline. To examine the effects of aquatic exercise on cognitive function.

Introduction & Methodology

The aging process is comprised of many regular changes that occur in a maturity population across a lifespan. Symptoms have been noted to begin rapidly accelerating after age 60.

This neurocognitive frailty is a serious concern for the aging population.

Research on neurocognitive frailty associated with the aging process has focused on exercise as a means of maintaining or fortifying cognitive ability and executive function.

Ten women and one man received a 12-week intervention consisting of aquatic exercises for strength, agility, flexibility, balance and relaxation. The Psychological Well-Being in Cognitively Impaired Persons Scale (PW-BCIP) and the Revised Memory and Behavior Problems Checklist (RMBPC) were completed by registered nurses at baseline, week 6, week 9 and post intervention.

Results & Discussion

Ten women and one man (median age = 88.4 years, interquartile range = 12.3) participated. Statistically significant declines in the Revised Memory and Behaviour Problems Checklist (RMBPC) and Psychological Well-being in Cognitive Impaired Persons Scale (PW-BCIP) were observed over the study period.

Research supports the link between participation in chronic aerobic exercise and improvements in working memory, cognitive flexibility and overall cognitive function. Participants in combined strength and aerobic training regimens improved to a reliably greater degree than those in aerobic training alone.

Implications that specifications or personalization in intensity of exercise, or total energy expenditure may result in increased benefits for cognitive function have been suggested (Angevaren, Vanhees, Nooyens, Wendel-Vos, & Verschuren, 2010)

Conclusion

Exercise can acutely or chronically affect the somatic systems to provide alterations resulting in improvements in cognitive function. The varying physical properties of water may provide further opportunity for cognitive adaptation via utilizing both the physiological attributes (somatic stimulation and enhanced circulation) as well as the environmental qualities

(support, resistance, and comfort) that the aquatic environment possess. Aquatic exercise may be the ideal mode and medium to enhance cognitive function in the aging population.

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Differences in Cognitive Performance during Water Immersion, Montreal Cognitive Assessment and Postural Control in Healthy Older Adults

Sushma Alphonsa; Talon Louder; Eadric Bressel

Objective of the study

The overarching goal of the current study was to understand how aquatic environment influences higher-order neural responses in older individuals. We achieved this by comparing cognitive and motor performance on land and in aquatic environments using a dual task paradigm. Additionally, we were interested to see the differences between an independent cognitive assessment tool (Montreal Cognitive Assessment- MoCA) and cognitive tasks performed in the aquatic environment.

Introduction & Methodology

Lot has been done to understand the effect of water immersion on biomechanical and physiological responses. However, it is unclear how higher-order neural responses would be affected in such an environment. Twenty one older participants (age = 71 ± 8.34 yrs) with mild cognitive impairment performed a cognitive (auditory vigilance) and motor (standing balance) task separately (single task condition) and simultaneously (dual task condition) on land and in chest-deep water. Listening errors (# = count) from the auditory vigilance task and center of pressure (CoP) sway area (cm²) for the balance task measured cognitive and motor performance, respectively. Environment (land vs water) and task (single vs dual) comparisons were made with a Wilcoxon matched-pair test. MoCA scores were used to assess dementia rates for all individuals as an inclusion criteria.

Results & Discussion

Listening errors on land (single = $4.0 \pm 3.5\#$; dual = $3.8 \pm 2.6 \#$) were 111% - 192% greater than in water (single = $1.9 \pm 1.7\#$; dual = $1.3 \pm 1.2\#$; $p < 0.03$). The findings of this study expand current support for the potential use of partial aquatic immersion as a viable method for challenging cognitive and motor abilities in older adults. Overall, for the MoCA test, older adults had worse performance for the delayed recall compared to other domains of the test.

Conclusion

In conclusion, older adults tended to make fewer listening errors while immersed chest-deep in thermoneutral water than on land. These same participants also tended to display a more unconstrained postural control strategy although with greater postural sway in water than on land. Asking participant to perform a cognitive task concurrently with quiet standing did not influence their cognitive errors or postural control strategy. Additionally, the use of a dementia assessment tool (MoCA) provided supporting evidence to cognitive performance which was contrary to their performance on the cognitive test during the task. In conclusion, partial aquatic environment is much more challenging for cognitive and motor tasks compared to assessments such as MoCA and should be used as the primary assessment strategies for older adults.

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Effect of Aquatic Therapy in Functional Recovery in a Chronic Stroke Patient - A Case Study.

Suraj N Shukla

Objective of the study

To study the effect of Aquatic therapy In functional recovery in Chronic stroke patients

Introduction & Methodology

As we all know Stroke is a global health problem and the 2nd leading cause of death and red leading cause of disability worldwide.

Aquatic Therapy is a common treatment modality used to address the complexity of patients with neurological disorders with the goal to achieve optimal independence.

An Ambulatory Stroke patient with minimal support, able to walk with a BBS score of 48 was explained about the study and was included in the study. A consent was taken in the beginning of the study.

Pre Sessions the Patient was out on the outcome parameters such as HR, BBS, Functional Reach Test, TUG, 10 Meter walk test, and Vo2Max.

The intervention programme included 10 minutes warm-up, 40 minutes Aquatic Exercise designed for improving Balance, Gait, Endurance, Functional activity and Ambulation. The exercises were modified according to the patient's capacity and progressed, to conclude 5 minutes of active cool down period was given.

Post 15 sessions again the patient as our on the outcome measures: HR, BBS, Functional Reach test, Time Up and Go test, 10 Meter Walk test, Vo2 Max.

Results & Discussion

After the 15 sessions of Aquatic therapy the outcome measures of Pre and Post data were compared that showed improvement in the chosen parameters. The resting Heart rate was reduced; BBS was improved to 52, Functional reach increased by 4 inches, timed up and Go test was reduced from 16.2 sec to 11.5 sec, 10 meter walk changed from 28 sec to 16 sec and Vo2 Max increased from poor to good.

Conclusion

This study showed Aquatic therapy is effective for improving Balance, endurance and ambulation and overall Functional recovery in a chronic stroke patient.

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