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1st European Conference on Evidence Based Aquatic Therapy

1st EUROPEAN CONFERENCE ON EVIDENCE BASED AQUATIC THERAPY (ECEBAT) ABSTRACTS OF PRESENTATIONS

1. AVRUPA KANITA DAYALI AKUATİK TERAPİ

KONFERANSI

SUNUM ÖZETLERİ

BALÇOVA TERMAL OTEL

İZMİR, TÜRKİYE

21-23 MARCH / MART 2013

ORAL PRESENTATIONS

POSTERS

S01

Is aquatic physiotherapy effective in clinical practice?

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Purpose: Evidence of clinical effectiveness is increasingly required by all stakeholders. The Measure Yourself Medical Outcome Profile, Version 2 (MYMOP2) questionnaire[1] has been used in the Aquatic Physiotherapy (AP) Department at the Brighton and Sussex University Hospitals NHS Trust since 2007. A snapshot of pre and post MYMOP2 scores for a 3 month period is presented. **Methods:** Between January and March 2012 all patients (n=125) attending for AP completed a MYMOP2 questionnaire before and after treatment. AP was given as per Aquatic Therapy Association of Chartered Physiotherapists (ATACP) Guidance on Good practice in Hydrotherapy[2]. The MYMOP2 Profile score was calculated from the mean of the pre-post differences of the 4 item scores. **Results:** 87 questionnaires were available for analysis. Mean age was 57.2 years (SD: 16.7), 67 patients had musculoskeletal conditions and mean number of treatments was 5.4 (SD:1.3).MYMOP profile score decreased in 90.8% of patients, signifying improvement. In real terms there was a median and significant improvement of 1.5 points (IQR:-1.5) on the 7 point MYMOP profile score (p=0.0001). The majority of patients (77.3%) met or exceeded "the index of responsiveness, relating to the minimal clinically important difference" of 0.85 reported by Paterson[1]. **Conclusion:** The results demonstrate the clinical effectiveness of a maximum of 9 thirty minute sessions of AP for patients with a diversity of conditions. Additionally and importantly it provides real-world evidence of outcome. The MYMOP2 tool has been shown to be a feasible and responsive measure for use in AP and with the increasing requirements for clinical outcomes is recommended as the measure of choice in AP.

S02

Perceived barriers to aquatic exercise program among healthy olders

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Purpose: The aim of this study was to determine potential barriers of healthy older adults to participate in aquatic exercise program. **Methods:** Twenty one community dwelling healthy older adults (65 – 79 years of age) participated in the study. Current aquatic and land based exercise habits and perceived barriers to aquatic exercise programs were discussed in two different focus group meetings (n=11; n=10). **Results:** None of the participants had aquatic habits during winter time and less than half of them enjoy swimming at sea as a leisure time activity. The most significant barrier to aquatic exercise were (i) exposing cold weather after the aquatic session, (ii), restriction of personal beliefs and values, (iii) suffering from incontinence and (iv) lack of recourses. Additionally participants stated clearly that they would take up aquatic exercise program if their perceived barriers were overcome. **Conclusion:** The finding of this study may not represent the Turkish population attitude to aquatic exercise. However the findings of the study may contribute to develop national standardized instrument to evaluate motivators and barriers to aquatic exercise. Accurately identifying perceived barriers to aquatic exercises would be helpful to develop more suitable facilities and aqua-based exercise program to Turkish healthy elderly population.

S03

Aquatic research effects of three weeks aquatic cycling on growth factor bdnf and cardiorespiratory functions in persons with multiple sclerosis

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Purpose: The influences of exercising on cytokine response, fatigue and cardiorespiratory values are important aspects of rehabilitation in persons with MS (PwMS). Exercise performed within these programs is often practised in water but the effects of immersion on PwMS have not been systematically investigated. The purpose of the study is to determine differences in cytokine and neurotrophin concentrations, fatigue, and cardiorespiratory values in response to three weeks endurance training conducted on a cycle ergometer or an aquatic bike. **Methods:** Randomized controlled clinical trial in 60 MS patients (Expanded Disability Status Scale, EDSS, range 1.0 - 6.5). Resting serum levels of brain-derived neurotrophic factor (BDNF) and concentrations in response to cardiopulmonary exercise test (CPET), and cardiorespiratory values were determined at entry and discharge. Subjects performed daily 30 minutes training at 60% of VO_2max. **Results:** Within the water group BDNF resting and post CPET concentrations (p<0.05) showed a significant increase after the training intervention. Short term effects on BDNF (CEPT) tended to increase at start and significantly thereafter (p<0.05). No changes occurred in the land group. Cardiorespiratory values improved significantly over time within both groups. **Conclusion:** This study indicates that aquatic training activates BDNF regulation and can be an effective training method during rehabilitation in PwMS.

S04

Performance in the fitness of stroke patients in aquatic therapy

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Purpose: Strokes occur in disturbance of brain functioning, with reduction in aerobic capacity and strength compared with healthy subjects after some time of injury. Aquatic therapy can improve the cardio-respiratory and muscular leading to better fitness. The purpose of the study is to evaluate the perceived effort of stroke in aquatic therapy with BORG scale effort and heart frequency. **Methods:** 13 chronic strokes performed only aquatic therapy in Albert Einstein Hospital during 12 month. The evaluation was performed Borg: before therapy; during aerobic conditioning; after the session. The protocol followed: warming, strengthening, aerobic conditioning, relaxation. **Results:** 31 sessions were performed within 12 months, and there was an improvement in overall fitness in 50% of patients after six months. In the first quarter, the Borg went from two points of variation and frequency heart rate went from 120x80 to 150x90 mmHg in the second quarter, the perception of effort maintain the two points reduction and heart rate remained at the frequency of initiation of therapy (120x80 mmHg). Strokes have worse physical conditioning and studies show an improvement in conditioning work with low load and 10 minutes of aerobic activity twice a week with improved effort after nine months of therapy and in this study we observed that the increased time of aerobic activity for 20 minutes, the anticipated conditioning for six months after the beginning of activities in half the population. **Conclusion:** After six months of aerobic activity, there was an improvement in 50% of patients, favoring an improvement of fitness.

S05

Aquatic research effect of aquatic therapy in residual weakness of gb syndrome: a case report

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Purpose: To observe the effect of Aquatic Therapy after a year of therapy, in residual weakness on a female subject diagnosed as a case of GB syndrome on balance & mobility. **Methods:** Pool with a temperature of 30^{0}c, large tube for Trunk, Neck floating tube, a small float tube for giving BRRM, Noodle. 23 year old female subject diagnosed as GB syndrome reported to PT department with complaints of weakness & reduced functional abilities following recovery from ICU with Ventilator support, after a year of active exercise protocol. She was willing to attempt Aquatic therapy for her recovery. Assessment & planning was done for 20 sessions of aquatic therapy. Each session was designed as per the progress of the subject. An aquatic program of warm up, mild aerobics, aquatic exercises, BRRM & a cool down phase was designed.Outcome parameters of balance and mobility were assessed pre & post therapy. **Results:** Independent standing Before – < 30 seconds (with assistance) After – > 8 minutes Ambulation: Dependency Before – walker or manual support. After – independently for 25 meters. Climbing stairs Before – maximal support After – minimal support Berg balance scale: Before – 11 After–36 The intervention with aquatic therapy improved fall risk from high fall to medium fall risk. She was discharged to join for work. Home program for maintenance was adviced. **Conclusion:** Aquatic therapy reduced fear, improved confidence, facilitated recruitment of neuromuscular system in functional pattern, bringing stability&therefore balance in mobility

S06

The effect of physical training in water on balance responses among chronic hemiplegics living in the community - pilot study

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Purpose: To examine whether physical training in water, in a group setting, contributes to an improvement in balance responses and functioning among independent chronic hemiplegics, living in the community. **Methods:** Nine individuals aged 54-77 with stroke-related brain injuries who were between 3 and 12 years after the stroke. Subjects participated in a specific program for physical training in the water, twice a week for three months. The following measures were taken before the beginning of the program and after three months: 1. Postural sway, 2. Step execution, 3. Berg test (BBS), 4. Late life function and disability instrument (LLFDI), and 5. Get up and go test (TUG). **Results:** At the end of the treatment period, significant improvements were found in the TUG, as well as in the BBS scores that was significantly improved from 6.4±14.3sec to ±12.26.0 sec (p=0.008) and from 47.3±5.8 to 50.6±4.9 (p=0.03), respectively post training. No significant improvement was found in the speed of voluntary Step execution, Postural sway or on the LLFDI functional questionnaire. **Conclusion:** The findings of this pilot study should be treated in caution due to the pilot character of the study. The results may indicate that physical training in water for people with stroke-related brain injuries have a positive effect on clinical measures of balance.

S07

Neurology thalassotherapy in neurology

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Neurological diseases are not a traditional indication for spa therapy. Furthermore they used to be a contra-indication in many cases. The mechanisms by which immersion in mineral or thermal water or the application of mud alleviates suffering in rheumatic diseases allowed us to think in using them for other medicine areas as a probable result of a combination of factors, with mechanical, thermal and chemical effects among the most prominent ones and many other non-specific factors that may also contribute to the beneficial effects observed after spa therapy as climatotherapy, and changes in the environment, pleasant surroundings. According to literature motivation is a key factor on chronic rehabilitation. Stroke is one of the most serious healthcare problems and a major cause of impairment of cognition and physical functions. Aquatic rehabilitation approaches have been used for enhancing functional recovery that may lead to increase autonomy according to International Classification of Functioning, Disability and Health (ICF). In the last two years we have experienced improvements in physical & cognitive impairments among 70 chronic and acute stroke patients doing a rehabilitation program of two or three weeks in a Talassotherapy Centre in Spain. Some pilots studies have been already presented.

S08

Neurology aquatic physiotherapy vs. land based physiotherapy for people with multiple sclerosis. a standardised data collection tool.

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Purpose: The current health and social care agenda in the United Kingdom focuses on issues of quality relating to the delivery of innovative, effective and efficient services that meet real health needs. Services are facing increasing demands to prove the value of their service, and collecting the evidence to present to commissioners and planners of care is at the heart of 'making the case'. **Methods:** Burrswood Hospital has completed a 'Standardised Data Collection Tool' (SDCT) that evaluates service provisions for people with Multiple Sclerosis (PwMS). The SDCT evaluates 8 sessions of physiotherapy. The first contact is an initial 'land based' assessment followed by either 6 land based physiotherapy or 6 aquatic physiotherapy interventions and on the 8th contact a 'land based' repeat follow up assessment. All types of treatment were recorded on the standardised data collection tool. Specific validated outcome measures were used to assess effectiveness. The first 100 data sets have been analysed. **Results:** Outcome measures showed an overall percentage improvement in fatigue, quality of life and balance and gait using MFIS, MSIS-29 and POMA respectively in both land and aquatic physiotherapy. The Balance and gait scale (POMA) showed aquatic physiotherapy was 17% more effective than land based physiotherapy. Burrswood's SDCT was easy to use and could be replicated with few adjustments to services for PwMS around the world. **Conclusion:** The data collected is too vast to properly summarise here however the full version will be published by the Chartered Society of Physiotherapy this year.

S09

Assessment of bone geometry in postmenopausal women with osteoporosis of the spine before and after a 6 month aquatic exercise program

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Purpose: For women with vertebral fractures (VFs), exercising has demonstrated positive gains in balance, strength and QOL. Water provides reduced spinal compression and reduces fall impact. An RCT investigating bone properties in response to aquatic exercise for women with established osteoporosis would help to determine best practice guidelines in exercise prescription for women at high risk to fracture. **Methods:** This study was a before and after community-based 6 month aquatic exercise intervention. Feasibility measures of recruitment, adherence, safety and retention were recorded. Measures at baseline and 14 months were aBMD, vBMD, and vertebral height.

Back extensor strength, flexicure and TUGT were measured at baseline, 6 months and 12 months. **Results:** Ten women were recruited over 10 weeks out of 180 women identified at 2 rheumatology clinics. Average adherence to the aquatic exercise program was 68%. One adverse event after class resulted in a fracture. Eight women were retained for final measures and did not change in bone measures over the 14 months in a pre to post comparison. Physical performance improved at 6 months.

Conclusion: A pilot RCT should include additional exclusion criteria, follow-up on data collection, implement a screening test, and enhance safety precautions on deck. All tests were tolerated well and a more comprehensive self-report would improve data capture.

S10

The effects of water exercise on bone density among postmenopausal women

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Purpose: The present study focuses on the question of whether water exercise can delay bone density loss among post- menopausal women. **Methods:** 35 women, mean age 55.45±3.97, volunteered to participate in the study. Over a period of seven months the women in the experimental group (N=25) participated in a water training program that included three one-hour sessions per week. At the same time, a control group (N=10) did not engage in any physical activity at all. Bone density was measured by means of Dual-energy X-ray absorptiometry (DEXA) and qualitative ultrasound (QUS) equipment in four different anatomical sites: vertebrae L1-L4, the neck of the femur on both legs, the proximal radius and the midshaft tibia. Bone density for all of the women was measured in the same part of the body before and after the training program (the proximal radius and the midshaft tibia were measured only for the experimental group). **Results:** The main finding of the study was that although no significant pre- and post-test differences in bone density were found in the vertebrae (L1-L4 and L2-L4) for either the experimental or the control groups, a significant interaction was found between the variable Time and the variable Group for all four measures of BMD, BMC, T-Score and Z-Score. This interaction indicates that water exercise had a positive effect on bone density and allowed women in the experimental group to preserve and even increase their bone density, in comparison to the control group which registered a loss. On the other hand, for hip bone density a significant interaction was found between the variable Time and the variable Group only for BMC and in the right leg only ($p<0.01$). No significant pre- and post-test differences in bone density (as measured by means of QUS) were found in the radius or the tibia for the experimental group. **Conclusion:** The main conclusion of this study is that water exercise several times a week constitutes an appropriate medium for preserving and even improving bone density among post-menopausal women who generally suffer from a natural decline of about 1%-2% per year in bone density.

S11

Is aquatic therapy more effective than land physiotherapy in conservative treatment of lumbar disc herniation

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Purpose: Physical therapy plays a major role in the conservative treatment of lumbar intervertebral disc herniation. The scientific literature indicates that both, aquatic and traditional land therapies can significantly relieve pain and improve quality of life (Dundar et al., 2009; Bressel et al., 2011), but it is remains unclear which of these methods is more effective. The aim of this study is to determine which physiotherapy technique, land or aqua, is more effective in conservative treatment of lumbar disc herniation. **Methods:** Clinical trial. 32 patients (age 45-59 yr.; average 50.9±4.3 yr.), with MRI confirmed lumbar herniation at L5-S1 level, were enrolled into the study. Participants were divided into two groups: aquatic therapy (n=16; mean age 48.1±3.5 yr.), and land physiotherapy (n=16, mean age 52.5±3.9 yr.). Straight leg raise angle, back pain intensity, static endurance of abdominal and back muscles, Oswestry disability index and functional state of participants were evaluated twice: before and after the intervention. Every patient got 7 individual physiotherapy treatments with duration of 30 minutes.

Results. Both, the aquatic and land therapies significantly increased patients' straight leg raise angle and static endurance of abdominal and back muscles, relieved back pain, and decreased Oswestry disability index. There were no significant differences between aquatic and land physiotherapy groups after the intervention in all completed tests and measurements. **Conclusion.** Aquatic therapy was not more effective than land physiotherapy in conservative treatment of lumbar disc herniation.

S12

The effectiveness of aquatic exercises on pain intensity and disability severity of the patients with chronic low back pain

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Purpose: To identify the categories of the ICF-CY needed to describe "what to measure" in children treated with Aquatic Physical Therapy and so build the bases for a Core Set in Aquatic Therapy for children with disabilities. **Methods:** (i) A world-wide expert 3-round survey using a Delphi technique (n=69, from 21 countries); ii) a multicenter qualitative study, using the methodology of "focus group" (n=23, 5 groups) and individual semi-structured interviews (n=20) with parents of children with disabilities; and iii) a systematic review of the aquatic outcome measurements and a content comparison of the 4 scales identified. **Results:** (i) Delphi: Overall in the 4 groups groups (neurology, psychomotor delay, musculoskeletal and pervasive developmental disorder), 83 body functions, 43 body structures, 87 activities and participation categories, 7 environmental factors that are intervention targets, 12 environmental factors that influence aquatic therapy and 24 personal factors were identified. (ii) "Focus group" and individual semi-structured interviews: In both type of interviews, 73 body functions, 22 body structures, 79 activities and participation categories, 14 environmental factors that are intervention targets, and 21 personal factors were identified. (iii) Review: Seven body functions, 25 activities and participation categories, 4 environmental factors and 6 personal factors were identified. **Conclusion:** This study shows that children receiving Aquatic Physical Therapy have very diverse problems in functioning. A formal consensus is needed to integrate the outcomes from these qualitative studies and expert opinion based on the ICF-CY framework. This study was supported by the Colegio Profesional de Fisioterapeutas de Madrid (CPFM). Spain.

S13

Musculoskeletal effects of water-based spinal stability exercises on flexibility, static and dynamic spinal endurance in chronic lumbar disc herniation patients

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Purpose: Spinal stabilitization is a method widely used for the treatment of lumbar disc herniation (LDH). LDH patients also are often referred to aquatic therapy. Our aim was to combine both methods and investigate the effects of spinal stability exercises in water. **Methods:** Thirteen patients (7 male, 6 female) diagnosed with LDH at least 6

months previously were recruited for the study. All patients underwent water-based stability exercises 3 times a week for 8 weeks. Flexibility was measured with finger to ground distance, static muscular endurance was measured with lateral bridge, Sorensen and trunk flexors endurance tests, and dynamic endurance was measured with sit-up and modified push-ups tests. **Results:** Twelve patients (7 male, 5 female) completed the intervention. One patient was excluded from the study due to low adherence. The mean age was 48±13.94 years and the mean time since diagnosis was 112.17±98.90 months. All patients showed improvements in all tests after the 8 week program. Significant differences were found ($p<0.05$) between pre- and post-intervention measurements in all parameters. **Conclusion:** According to these findings water-based spinal stability exercise programs may improve physical characteristics such as flexibility, static and dynamic spinal endurance of chronic LDH patients.

S14

Aquatic physical therapy program on functional changes resulting from lumbar hernia

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Purpose: To analyse the results of a program of aquatic physical therapy in the treatment of functional alterations resulting from lumbar disc herniation. Specifically changes in the level of pain, flexibility, performance, quality of life of individuals and balance. **Methods:** The sample consisted of 8 subjects (five female and male, average age: 39,7 years old) with a clinical diagnosis of lumbar disc herniation and were randomly divided into two groups, received 60 minutes of intervention, two times a week for 8 weeks interventions. The intervention was composed of four steps: Warm-up (10min), stretching (5min), stabilization exercises and Lumbar segment strengthening (35min), relaxation (10min). Roland Morris, Timed Up and Go Test, Checklist for Physical Therapy subjects standardized with spinal injury, the Visual Analog Scale, Test Bank of Wells, Lasègue Test, Pentacle of Welfare were assessed pre and post intervention in addition, a daily journal to record the clinical evaluation of the participants. **Results:** Subjects had better responses in all tests in the review which suggests that the proposed protocol was adequate. Pain (Vas) reduced 45%, TUG reduced 19,5%, Wells increased 46,9%, Pentacle of Welfare increased 18% and Roland Morris Questionnaire values decreased 29%. **Conclusion:** The proposed aquatic therapy program improvements expressed in terms of pain, flexibility, performance, balance and quality of life of participants.

S15

Hydrotherapy for the ventilated patient with guillain barre syndrome: a case report

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Purpose: To look at the practicalities and effects of hydrotherapy for a patient with Guillian Barre Syndrome still requiring ventilation. Hydrotherapy has potential physical and psychological benefits for an early Guillian Barre Syndrome sufferer. To our knowledge, this is the first reported case of its kind in the UK and Ireland. At the time, no guidelines existed for taking a ventilated patient into a hydrotherapy pool. **Methods:** We report a case of Guillian Barre Syndrome in a patient with electrophysical evidence of severe axonal sensory and motor loss requiring admission to an Intensive Care Unit for ventilation. An intensive physiotherapy programme was undertaken, including hydrotherapy which was commenced when the patient still required mechanical ventilation. **Results**: Hydrotherapy facilitated identification and treatment of muscle tightness which had previously not been identified. Subjectively the patient reported psychological benefits due to the ability to move her lower limbs independently in water. She found hydrotherapy enjoyable and requested further sessions. **Conclusion**: It is possible to safely commence a hydrotherapy programme in the relatively early stages of Guillain Barre Syndrome while respiratory muscle weakness persists and ventilation is required. This requires careful planning and a considerable investment of time and personnel.

S16

Impact of functional aquatic physical therapy on individual´s quality of life

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Purpose: Verify the impact of 24 sessions of aquatic physical therapy on quality of life of adults and compare to different aquatic interventions. **Method:** All Adults who performed treatment of aquatic physical therapy (group or individual) and physical conditioning group at Saga Swimming School (São Paulo, Brazil) were invited to participate in this study. Measuring instrument used was SF-36 applied before and after 24 aquatic interventions. Participants were divided in 2 groups of interventions for statistical analysis, individual aquatic therapy and group activities. **Results:** Twenty-nine voluntaries, 6 males and 23 females were included in this study. Eight participants performed individual activities age between 24 to 80 years old, and 21 (twenty-one) group intervention average age of 48.5 years old. Individual aquatic therapy frequency varies from one to three times a week and 45 minutes duration with different disorders. Group interventions were limited to maximum of 8 subjects and 45 minutes of session. People submitted to individual treatment reached best results when their *scores* compared with the other participants of this research. **Conclusion:** The possibility to identify activities limitations allows planning and conducting physical therapy treatment to achieve the best result possible in a short period. SF-36 shows to be sensitive in the population analyzed and presents relevant aspects to be investigated before and after aquatic physical therapy intervention.

S17

Comparison of the effectiveness of aquatic training and one mile jogging on vo2 max among a group of differently able military recruits

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Purpose: Cardio-respiratory fitness refers to the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity. Cardio-respiratory fitness is measured through VO2 max testing. VO2 max is essentially a measurement of the maximum amount of oxygen that the body is capable of consuming to generate energy that can be used at the cellular level. **Methods:** A prospective study was conducted for three months among 50 differently able military recruits to compare VO2 max. Two different methods of evaluating VO2 max were used separately. One mile walk test was used to evaluate one mile jogging and Critical swim speed test was used to evaluate aqua training among the selected groups. Ethical clearance was taken from the ethical clearance committee of the Faculty of Medicine. Written consent was taken individually from the participants. The data was analyzed by using Minitab computer software. **Results:** There was a significant difference ($p<0.05$) in the results of VO2 max among the military recruits who followed aqua training for a three months period while there was no significant difference ($p>0.05$) **Conclusion**: In the results of VO2 max among the military recruits who followed 1 mile jogging for a three months period.

S18

Pediatrics swimming for youth with cerebral palsy: a randomized controlled trial

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Purpose: Introduction. Youth with Cerebral Palsy (CP) are considerably less active[1] than their able-bodied peers. Walking-capacity, coordination, fatigue and pain contribute to this problem. Swimming is a popular physical activity (PA) suggested for youth with CP as it is fun, incorporates skill-learning and has many recreational opportunities. This study aims to investigate the effect of a 10-week swimming-program on relevant factors of the International Classification of Functioning, Disability and Health for youth with CP. **Methods:** Fifteen children with CP (7-17 years;GMFCS I-III), participated in a RCT, comparing swimming (10 weeks, 2/wk, 30-60 minutes) to usual care, with a 5-week follow-up. Outcomes were pain, fatigue, walking-capacity, coordination and swimming-skills, and secondarily, functional independence, self-esteem and QOL. **Results:** Swimming-skills showed a group*time effect in favour of the swimming group (87% increase) (p=0.004), that remained at follow–up. A group*time effect (p=0.04) was evident for the 1-min walk test in favour of the swimming group (12m increase). Pain and fatigue showed no differences. Bilateral coordination increased 17% compared to 10% in the control group (p>0.05). Upperlimb coordination improved 50% compared to 0% for the controls (p>0.05). Secondary outcomes have not been analysed to date. **Conclusion:** Swimming is a safe community-based exercise that may enhance skill-development without increasing fatigue and pain, and will encourage participation in community and PA. Specialists, physiotherapists and parents should become aware of the benefits for youth with CP, as swimming could potentially replace part of the tiresome therapy-program in order to increase adherence to therapy and PA in adolescence.

S19

The effect of pictograms on learning to swim of children with autism spectrum disorders: a randomised research

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Purpose: The effect of using pictograms as an additional aid for children with Autism Spectrum disorders learning backstroke and underwater swimming has been researched. Studies suggest that children with ASD are having more motor learning problems than contemporary children without ASD. **Methods:** Fourteen ASD diagnosed children (n=14) participated in the study. The experimental group n=6 and the control group (n=8). Both groups were in the same swimming curriculum and trained once a week for twelve weeks. Both groups got the same interventions, but the experimental group were shown pictograms as an organisational and learning aid. There was pre- and post-measurement for backstroke and underwater swimming. The measurement instrument was based on a guidance for swimming programs used in the Netherlands. **Results:** A quasi-experimental design was used for statistical analyses. A Mann-Whitney U test analysed the differences between both groups in pre and post measurement. A Wilcoxon signed-rank test was used to analyse learning effect in each group. **Conclusion:** The use of pictograms has a positive learning effect on backstroke swimming for children with ASD in the experimental group compared to those in the control group. Yet both groups scored a significant learning effect on underwater swimming. Therefore, this research shows that the learning effect of using of pictograms remains equivocal. Nevertheless, observation and evaluation shows that teachers find working with pictograms effective when working with children with ASD. The outcomes of this study make further research desirable.

S20

Swimming instruction as part of young children´s pool therapy in finland

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Purpose: The Finnish Association for Swimming Instruction and Life Saving (FSL) acts as a guide regarding swimming instruction and lifesaving issues in Finland. FSL is a strong driving force in bringing swimming instruction as part of pool therapy. In Finland there is lack of education concerning pool therapy and it isn't included in the physiotherapy undergraduate curriculum. FSL organizes training for physiotherapists including a theory element as well as practical exercises with a group of children, along with reflection on the goals of pool therapy. **Methods:** There are few highlights in training for physiotherapists: The starting age for swimming is individual and it`s beneficial to start the swimming at an early age. Different individual swimming positions, holds, and the child's ability to function in water are taken into account in individual instruction. Versatile experiences of different positions and movements in water; experiencing it's properties increase one's perception and control of the body and it's movements. The goals in swimming are planned individually. The main aim is to develop water skills and swimming ability without forgetting water safety, joy and enjoyment. **Results**: The skills are practiced through songs and play, both of which aim to activate and motivate the children to do things themselves. Different kinds of aids are used to activate movement and to create a pleasant and interesting practice session. **Conclusion:** A physiotherapist can make the water exercises more versatile when he knows the basics of swimming instruction. Physiotherapists, who participate in our training course learn how to stimulate a more active role to the child and observe child´s ability to function in the water. By teaching the basics of swimming, physiotherapists also reach the aims of therapy. Feedback of the course has been very good.

S21

Translation and cross - cultural adaptation to brazil of aquatic skills evaluations, aquatic independence measure (aim) and water orientation test alyn (wota 1 e 2)

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Purpose: Currently there are few established and widely used assessment tools that measures function in aquatic environment for children and adults with neurological and motor disabilities. Two instruments for measuring aquatic skills were recently published in English (Getz, Hutzler, & Vermeer, 2006; Tirosh, Katz-Leurer, & Getz, 2011). In Brazil there are no instruments that can measure these aspects. Thus, the translation and cultural adaptation of each one of these assessments in our language will provide new tools for research and treatment for professionals of aquatic therapy and adapted aquatics. Translate to Portuguese and adapt to Brazilian culture measures of aquatic skills: Aquatic Independence Measure (AIM) and Alyn Water Orientation Test 1 and 2 (WOTA 1 and 2). **Methods:** Methodological procedure followed internationally recommended steps (for each one of assessments separately): translation, synthesis of translation, back translation and expert committee formed by professionals from different fields including physiotherapy, physical education, translators and language professional (D. Beaton, Bombardier, Guillemin, & MB, 2007; D. E. Beaton, Bombardier, Guillemin, & Ferraz, 2000). **Results:** Preliminary versions of the translation and cultural adaptation of AIM and WOTA 1 and 2, including manual was produced with the discussion of all versions of translation and back translation by a committee of experts. **Conclusion:** AIM and WOTA were translated to Portuguese and culture adapted to Brazil. Application of the preliminary version in Brazilian population is the last stage to validate the translation to Portuguese language spoken in Brazil.

S22

Pediatrics comparison between a session of classical aquatic therapy and specific according to the halliwick concept on the modification of spasticity in children with cerebral palsy (cp)

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Purpose: The aim of the research was if two methods of aquatic therapy would yield differences in spasticity. **Methods:** 10 spastic quadriplegic children (5-12 years) receive 20 minutes classical aquatic therapy: manual support at the head, standardized exercices, in supine, without rotations, or on the Halliwick 10 points programme, providing appropriate manual support, not at the head, targeted at rotations. Assessment: spasticity (modified Ashworth and Tardieu scales) of the elbow, wrist, knee and ankle; directly before therapy, after therapy, after dressing, 1/2 hour after dressing. **Results:** Data analysis of the 4 muscle groups: *Baseline homogeneity for all groups. * Ashworth: high statistical significant difference for the 3 times after the swimming session versus before in favour of Halliwick, especially for the wrist. (p=0,00001) *Tardieu: same results but the difference is highly significant. (p=0,0039). Separate analysis of muscle groups: *Ashworth AND Tardieu: significant to very high difference in favour "Halliwick", specifically for the wrist and the Ankle. *Lowest results for wrist and ankle. Discussion Spasticity decreases more after Halliwick, mainly in wrist flexors, probably because of the active movement of the head and the rotation movements of the body. The effect was less in the legs. "Activation" of proximal muscles might be responsible for tonus decrease at a distance according to Coelho de Morais et al, 2009 and "the Bobath philosophy" regarding spasticity (Graham & coll, 2009). Lesser effect on the elbow might be due to spasticity of the knuckle: more important at the beginning. Length of the session didn't allow a so evident proportionally relaxing. **Conclusion:** In children with CP, HALLIWICK aquatic therapy shows "significant" results on the global decrease of spasticity lasting in time.

S23

Characterization of the buoyancy load of equipments used in aquatic therapy

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Purpose: The purpose of this study was to determine the buoyancy load of different equipments used in aquatic therapeutic exercises through verifying of their hydrostatic weight. **Methods:** Dynamometry was used to identify the buoyancy load in 22 different equipments, composed of ethylene-vinyl acetate or polyethylene foam, which were classified in three groups: buoyancy support, buoyancy resistance, and aquatic noodle. Force data were measured by a previously calibrated load cell (sensitivity of 2 mV / V and capacity of 2500 N), which was connected to a signal conditioner, set at the bottom of a pool and tied to each device. **Results:** The buoyancy resistance equipment group presented an average buoyancy load (BL) of 1.28 kgf (±0.96 kgf), while buoyancy support group showed a higher BL (1.93 ± 0.90 kgf). Different BL was found comparing aquatic noodle with and without hole, the used/soggy and the new one. Equipments larger also showed higher values of BL, however, this relationship was not linear. **Conclusion:** Among the equipments with the same format, but with more than two versions in different sizes a progressive and regular load was not found, considering their distinct sizes. More research is necessary to investigate different equipments for the precise planning and progression of aquatic therapeutic exercises. Moreover, it is necessary to standardize the materials by the manufacturers of equipments used in aquatic therapy.

S24

Water-exercise versus land-exercise therapy in chronic venous insufficiency- a pilot study

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Purpose: The exercise therapy in Chronic Venous Insufficiency (CVI) has been showed calf muscle pump benefits, but the differences between land and water exercise program still unclear. Evaluate the effects of a structured exercise-protocol in water and on land, in patients with CVI. **Methods:** A pilot controlled longitudinal study was performed. All subjects signed informed consent. Patients were selected with CVI C_{2-5} for clinical classification CEAP (Clinical-Etiological-Anatomical-Pathological) and two intervention groups (mean age=47.86±7.55) were created according to their preferences. The water group (WG), with 8 subjects, and the land group (LG), with 6 subjects, performed an 8-week intervention of a structured exercise-protocol in land and in water, respectively, twice a week, focused on a resistance, power and flexibility. The strength of plantarflexors muscles (PM), ankle range of motion, quality-of-life (QoL), functional status and related symptoms were evaluated at baseline and at end of treatments. One educational session was given to all after baseline. **Results:** Exercise (land and water) improved QoL (p=0.016), physical, psychological and social function (p=0.006, p=0.046 and p=0.016, respectively), total work (60º/s) and fatigue (120º/s) of PM (with p=0.48 and p=0.017, respectively), but no changes were found in symptoms. Water exercise appears to mostly improve physical function (p=0.026) and the land exercise the total work (60º/s) of PM (p=0.028), but no differences were found between groups. **Conclusion:** and and water exercise appears to improve QoL and Function in CVI patients. Future studies with a large sample with a control group, and a follow-up, must be achieved.

S25

Effects of a progressive aquatic resistance exercise program on the biochemical composition and morphology of cartilage in women with mild knee osteoarthritis: protocol for a randomised controlled trial

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Purpose: Symptoms associated with osteoarthritis of the knee

result in decreased function, loss of working capacity and extensive social and medical costs. There is a need to investigate and develop effective interventions to minimise the impact of and even prevent the progression of osteoarthritis. Aquatic exercise has been shown to be effective at reducing the impact of osteoarthritis.The purpose of this study is to investigate the effect an intensive aquatic exercise intervention has on the cartilage in postmenopausal women with mild osteoarthritis of the knee. **Methods:** A minimum of 80 volunteers who meet the inclusion criteria will be recruited from the local population through newspaper advertisements. Primary outcomes for this study are assessment of knee cartilage using T2- relaxation time and delayed gadolinium-enhanced magnetic resonance imaging techniques. Secondary outcome measurements consist of body composition and bone traits using dual energy x-ray absorptiometry and peripheral quantitative computed tomography, pain, quality of life and function using questionnaires and physical performance measures. Following initial assessment volunteers will be randomized into two groups. The intervention group will participate in an intensive progressive resistance aquatic exercise program of 1-hour duration 3 times a week for period of four months giving a total of 48 training sessions. The control group will be offered two sham treatments during the same period. The outcome measurement will be performed at baseline and after the 4-month intervention period and at one year follow up. **Results:** This randomised controlled trial will investigate the effect an intensive progressive aquatic resistance exercise program will have on the quality of cartilage in post-menopausal women with mild osteoarthritis of the knee. This study is the first investigate what impact aquatic exercise has on the structure of human cartilage. In addition it will investigate the effect aquatic exercise on physical function, pain, bone and body composition and quality of life. **Conclusion:** The results of this study will help optimise the prescription of aquatic exercise to persons with early mild osteoarthritis.

S26

Self - perceived health related with quality of life through aquatic therapy for aging adults with disabilities an exploratory study

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Purpose: To describe (i) self-perceived health related quality of life and (ii) the benefits that aging adults with disabilities reported from an aquatic therapy program. **Methods:** An exploratory study using a self-administered structured questionnaire and the RAND 36-item Health Survey. The study was conducted in two different swimming pools of Ovar city with aquatic therapy programs for aging adults with disabilities. 56 older adults of the two programs were included for the study, representing 100% of the users. Data were collected at the end of the program in individual interviews by a trained professional. This process had been granted ethical approval and informed consent of was taken from all participants. **Results:** The perceived health related quality of life of the participants in these programs is lower than the original sample described in the validation of RAND 36-item Health Survey except for the domains of Energy/Fatigue ($p=0.26$) and Social functioning ($p=0.17$) and the number of pathologies is associated with domains of Physical function ($rho=-0.38$, $p<0.01$), Pain ($rho=-0.28$, $p<0.04$) and General Health ($rho=-0.31$, $p<0.03$). 76.7% of participants reported that the aquatic therapy program is an opportunity for social contact. The use of music as the most valuable aspect for motivation ($rho=0.34$, $p<0.01$) and the stretching exercises for improvement of physical condition ($rho=0.27$, $p<0.05$). **Conclusion:** This study shows the growing interest in aquatic therapy programs for aging adults with disabilities and the need of deeper assessment of the impact on health related quality of life in users of aquatic therapy programs.

S27

Effective hydrotherapy system for treatment of obese malaysian

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Purpose: The alarming rise in obesity has ranked Malaysia as the most obese country in Southeast Asia region, and placed sixth in the Asia Pacific. Regular physical activity has been recognized as one of the key elements in weight control and prevention of obesity. Unfortunately, about 75% of Malaysia 27 million populations do little or no physical exercise at all. The percentage is worse for obese people. With the emergence of many active hydrotherapy (mainly in hospitals) and passive hydrotherapy (at health & wellness centers and at homes), such therapy can promote the physical activity amongst the obese in Malaysia. This action research addresses the distinctions between hydrotherapy system practices in Malaysian hospitals, rehab and health centres including indications and contraindications of using hydrotherapy on obese people. The results will describe the findings on the practice of effective hydrotherapy system in terms of management, facilities, operational measures and policies. **Methods:** The scheduled hydrotherapy program was imposed on Subjects with BMI above 35. Initial observations on the empirical trials have shown that hydrotherapy can reduce body weight, with passive hydrotherapy showing higher weight loss. A) Active hydrotherapy: A 16 year old boy, weighing 120kg have shown insignificant weight reduction after 5 sessions. B) Passive hydrotherapy: Informal introductory trial sessions on several Subjects of various demographic backgrounds **Results:** Results showed weight loss between 1.5% (after two sessions) to 8.2% (after eight sessions). At this initial research phase, it can be deduced that the trial results will provide the key inputs and requirements for an effective obesity treatment using hydrotherapy. **Conclusion:** These are relevant to health systems' decision makers who are confronted with high prevalence of the obesity and its related diseases, on the utilization the non-evasive hydrotherapy system which is in abundance in Malaysia.

S28

A swot analysis results related to aquatic therapy among physiotherapy students in yeditepe university

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Purpose: Aquatic therapy as an important aspect of clinical interventions requires competency to the students during the physiotherapy education. According to our standard four years physiotherapy curriculum, although each student should take Hydrotherapy lecture during the first year, Hydrotherapy doesn't have appropriate practice to gain skills compared to other lectures such as electrotherapy, manipulative techniques, therapeutic exercises. The purpose of this study was to assess the attitudes of the students who had taken Hydrotherapy lectures during the first year and who had participated in a selective aquatic therapy course containing basic aquatic therapy methods for undergraduate physiotherapy students. **Methods:** A SWOT analysis was used to 3 groups of physiotherapy students. Group 1 included students who had taken only Hydrotherapy undergraduate lectures; Group 2 included students who had taken Hydrotherapy undergraduate lectures and also participated in the aquatic therapy course given by Yeditepe University and Group 3 included students only just in the 1st semester and taken none of Hydrotherapy lectures and aquatherapy course. We intended to investigate "internal factors as strengths and weaknesses" and "external factors as opportunities and threats" that might affect the attitutes of the students towards the hydrotherapy interventions. The online questionnaire was sent to 296 students. Almost half of the students returned, the collection of the data is still going on. **Results:** The students who had participated in the aquatic therapy course indicated that these skills are important for physiotherapists to provide good knowledge both of theory and the practical background of Hydrotherapy and gain competency in

comparison to who had not participated in the course. **Conclusion:** We think that promoting practical oppurtunities in aquatic therapy is to contribute cognitive and practical perspectives among physiotherapy students

S29

Effects of water-based spinal stability exercises on pain, functional status, quality of life in chronic lumbar disc herniation patients

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Purpose: Spinal stability is a method that widely used for treatment of lumbar disc herniation (LDH). Additionally, LDH patients are often referred to aquatic therapy. Our aim was to combine both methods and investigate the effects of spinal stability exercises in water on pain, functional status and quality of life in chronic LDH patients. **Methods:** Thirteen patients (7 male, 6 female) with chronic LDH with symptom duration of at least 6 months ago were recruited for the study. All patients underwent water-based stability exercises for 3 days/week for 8 weeks. The progression for the exercises was achieved by changing base of support (i.e. sitting in a swimming board instead of a noodle), adding more resistance to the extremity movements (i.e. having a swimming board in the hand). Pain was measured with visual analog scale at rest and during activity, functional status was measured with Oswestry Disability Index, and quality of life was measured with Nottingham Health Profile. **Results:** Twelve patients (7 male, 5 female) completed the intervention. One patient was excluded from the study due to low adherence. The mean age was 48±13.94 years and the mean time since diagnosis was 112.17±98.90 months. All patients showed improvements in all tests after 8 week program. Significant differences were found ($p<0.05$) between before and after measurements in all parameters. **Conclusion:** According to these findings water-based spinal stability exercise programs may decrease pain at rest and during activity, and improve functional status and quality of life of chronic LDH patients.

S30

Elderly the influence of ai chi on balance and fear of falling in older adults: a randomized clinical trial

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Purpose: Examine the effect of Ai Chi on balance and fear of falling in older adults. **Methods:** Thirty community dwelling frail older adults were randomly allocated to an experimental or control group, which had baseline similarity. Inclusion criteria were aged 77-88 yrs with either high or medium risk of falling (POMA score from 0 to 24). Balance was assessed with the Performance-Oriented Mobility Assessment (POMA) and fear of falling (FOF) with the Falls Efficacy Scale (FES). The experimental group received 16 Ai Chi sessions over 6 weeks at a community aquatic centre. The control group received no instruction and was encouraged not to change their ADLs. Prior to intervention, 2 familiarization sessions were held **Results:** The experimental group showed statistical significant improvements in balance but not in fear of falling. The control group did not show a change in balance, but a significant increase in FOF. Intergroup comparisons showed significant differences in favor of the experimental group. Clinically significant effect size (ES, Cohen's d) of 1.3 for the tPOMA (balance), with 1.1 and 1.4 for bPOMA and gPOMA respectively were found. A clinically significant ES for the FES was also reached (1.5). **Conclusion:** Findings show that Ai Chi leads to a clinical relevant increase of static and dynamic balance in older persons. Participants also showed maintenance of their level of FOF. Therefore an aquatic program based on Ai Chi could be made available for frail elderly. No follow up has been made, which prevents conclusions about long-term effects.

P01

Effectiveness of aquatic therapy in post-surgery rehabilitation of the rotator cuff

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Purpose: rotator cuff injuries very often require surgical repair and subsequent rehabilitation. The aim of this study was to compare the effectiveness of a traditional and an aquatic post-surgery rehabilitation program of the rotator cuff in 20 adult (60±5y) patients. **Methods:** patients were randomly assigned to a traditional (TR; n=10) and to an aquatic (WR; n=10) rehabilitation group. Both programs started 15 days after the surgery, lasted 3 months (3 times-a-week), and consisted in passive mobilization followed by strengthening exercises. The only WR group underwent to an adjunctive aquatic mobilization program. Before (pre-intervention) and after (post-intervention) the programs, patients underwent the following assessments: shoulder range of motion (ROM), in both flexion and extra rotation positions; pain perception (visual analogue scale); simple shoulder test. **Results:** pre- vs. post-intervention results were compared in each group by means of a dependent-samples t-Test on each variable. An independent-samples t-Test was used to analyze pre-intervention differences between TR and WR groups; since no significant differences were found, the same test was used to analyze post-intervention differences. Pre- vs. post-intervention results showed significant improvements in all variables in both groups ($p<0,005$), whereas post-intervention between groups comparisons did not reveal any significant difference: flexion 5,50 to 4,20, external rotation 3,30 to 2,60, V.A.S. 1,90 to 1,80, S.S.T. 10,25 to 9,80 (p always > 0,005). **Conclusion:** Although the water-based program did not result more effective than the traditional program at the end of the three months, the aquatic rehabilitation seemed to improve shoulder ROM faster than the traditional one and to be better tolerated by the patients. It's authors' opinion that both evidences may increase the adherence to the program during the rest of the rehabilitation program.

P02

Outcome measurements of aquatherapy in hip and knee arthroplasty

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Purpose: The aim was examining the use of aquatheraphy in the rehabilitation of hip and knee. Besides, the aim was searching the compatibility between the evaluation parameters which were used in this study and parameters which was taken as a standard in literature in evaluating the patients.**Methods:** We searched the keywords "aquatherapy", "hydrotherapy", "water- based", "aquatic physiotherapy", "rehabilitation", "hip", "knee", "arthroplasty", "arthroprosthesis" and "replacement" in Pubmed, Cochrane Central Registry and PEDro databases between 2003 and 2013. **Results:** 24 of the studies out of 107 were being investigated. 8 of them were about the use of aquatheraphy in the rehabilitation of hip and knee arthroplasty. 5 of these studies were randomly controlled studies and the other 3 were follow-up studies. 4 out of 5 randomly controlled and 6 in total out of 8 studies, WOMAC were being used. In 8 studies, 18 different evaluation parameters were being used. **Conclusion:** In hip and knee arthroplasty rehabilitation, the use of aquatheraphy was supported by these studies; however, more studies are needed. In the studies of aquatheraphy in the rehabilitation of arthoplasty, it was generally seen that WOMAC was used as the suggested evaluation parameter. Nevertheless, literature report that use self-report assessment of physical function may lead to false outcomes due to pain interference. Therefore performance measures such as 6 minutes walking test, whose validity was proven in arthoplasty rehabilitation like WOMAC, just used in 1 study out of 8, is suggested to be used in forthcoming studies.

P03

The correlation between symptoms and mobility tests in ankylosing spondylitis patients of different age groups

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Purpose: The aim of this study is to evaluate and determine the correlation between mobility and symptoms in ankylosing spondylitis patients with different age groups before and after conventional physical therapy. **Methods:** Our retrospective study is performed with 197 cases. Accompanied by 101 patients under age of 40 and 96 patients over age of 60.It consists of ankylosing spondilitis cases treated at our center in years 2003-2004. Every patient received a combined therapy consisted of 2 passive and 3 active treatment modalities in a day, totally 20 sessions during the period.(Individual gym, land and pool gym, paraffin, massage) In order to evaluate the spinal mobility of the patients by the BASMI score. The number of shortening muscles, morning stiffness, disturbance in sleep, chronic fatigue, range of motion, muscle strength and walking distance were assessed before and after treatment. Pain measurement was done by VAS. **Results:** It is determined that measurements of pain, number of shortness in muscle, morning stiffness and sleep disturbance were significantly high in patients ,age of over 60 before treatment ($p<0.05$). Significant increases in spinal mobility of the cases under 40 year were found in post-treatment evaluations, as well as the significant decrease in morning stiffness, chronic fatigue, pain and number of limited joints($p<0.05$). **Conclusion:** Significant increases in spinal mobility of the cases under 40 year were found in post-treatment evaluations, as well as the significant decrease in morning stiffness, chronic fatigue, pain and number of limited joints. Our study shows that the developments of mobility measurement with age is less, but symptoms were observed in the higher value.

P04

Evaluation of hand functions and quality of life (sf-36) in rheumatoid arthritis patients

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Purpose: The objective of this study is to evaluation of hand function and quality of life in rheumatoid arthritis patient. **Methods**: 213 Norwegian RA cases treated in 2005. Patients received a combine therapy for three weeks (3 active,2 passive).The assessment included demographic variable, disease duration, functional classification, evaluation of hand deformities, grip strength, grasping type, distance between tip of finger and their bases. SACRAH questionnaire and Norwegian version of the SF-36 ware used to assess before and after treatment. **Results:** The improvements in hand function were determined significantly high in cases that have less than 5 year disease duration and functional class I-II. The total score of SACRAH and 3 subscale score were found significantly decrease all patients ($p<0,05$). No differences were observed in the total scores according to sex and disease duration. SACRAH score showed a statistically correlation with hand functions. SF-36 domains scores pre-treatment, physical functioning, mental functioning and social functioning has affected from RA. (%62 PF, %57 MF, %43 SF). Means scores of physical functioning, role physical functioning, bodily pain, social functions, role emotional functioning were significantly high in cases with less than 5 years disease duration after treatment. The mean score of physical functioning, bodily pain, general health and social functioning were determined significantly high in cases that have functional class I and II than III. Also, there was strongly negative correlation between SACRAH total score and two summary score of SF-36. **Conclusion:** The physical and mental health related QOL was reported to be worse in women patients with RA. SACRAH may be a useful tool in measuring the degree of rheumatic hand functions and effectiveness of therapy. Our study shows that comprehensive physiotherapy and medication increase the quality of life and ability of doing activity of daily living in rheumatoid arthritis patients.

P05

Relation between lumbar and cervical mobility in ankylosing spondylitis patients

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Purpose: The objective is to investigate the relation between lumbal mobility, cervical mobility and symptoms in Ankylosing Spondylitis (AS) patients **Methods:** 588 ankylosing spondylitis patients are participated our study. All patients had a combined treatment program for four weeks. BASMI score,pain and morning stiffness by visual analog scale, thorax expantion were recorded .Also,chest circumstances after expirasyon and inspiration, muscle shortness (M.İliopsoas, M.Hamstring, M.Pectoralis),we asked whether or not sleep disorders, muscle strength (M.Quadriceps, M.Gluteus Maximus, M.Ercetor Spinae,M.Rectus Abdominis were assessed before and after treatment. **Results:** The patients had significantly lower tragus-wall distance (before treatment (BT):16,14±4,980, after treatment (AT):13,97±4,702), right cervical rotation (BT: 14,88±10,119, AT: 13,74±12,041], left cervical rotation [BT: 13,60±6,217,AT: 13,06±5,174],means of the value morning stiffness, totally the numbers of painfull regions after treatment than before treatment. (p:0.002) Schober [BT:4,27±3,675, AT: 4,64±2,423], lumbal-side flexion [BT:18,59±17,588, AT: 21,27±14,965], intermalleolar distance, thorax expantion were significantly higher after treatment (P=0,000). There was a moderate significant correlation negatively between morning stiffness, tragus-wall distance, schober and lumbal-side flexion both before and after treatment (P=0,000 r:-0.537). The measurements of lumbal-side flexion increased as also schober measurements both before and after treatment. There was a moderate positively significant correlation between these measurements.(p:0.004 r:0.483) **Conclusion:** We concluded that a combined treatment program increases the cervical and lumbal mobility in AS patients.

P06

Relation between symptoms and treatment results in female and male patients with ankylosing spondylitis

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Purpose: The objective of this study is to investigate the relation between symptoms and treatment results assessed by standard evaluation methods in male and female patients with ankylosing spondylitis (AS). **Metarials and Methods:** Our retrospective study is performed with 574 (346 male.228 female) Norwagian cases. It consists of AS cases treated between 2003-2004. Every patient received a combined therapy consisted of 2 passive and 3 active treatment modalities in a day for 20 sessions. In order to evaluate the spinal mobility of the patients we used tragus-wall distance, schober test, fingertip to floor distance, cervical rotation, lumbar lateral flexion, intermalleolar distance and thorax expansion. The number of shortness in muscles (M.İliopsoas, M.Hamstring, M.Pectoralis), morning stiffness by visual analog scale, sleep disorder ,chronic fatigue, muscle strength (M.Quadriceps, M.Gluteus Maximıus, M.Erector Spina,M. Rectus abdominis) and walking distance were assessed before and after treatment. Pain measurument was done by VAS. **Results:** The measurements of lumbar side flexion, cervical rotation, intermalleoler distance, visual analogue scale (VAS) pain and morning stiffness duration in male were lower than female before treatment. Also measuruments of tragus-wall distance and number of limited joints in male were significantly higher than female ($p<0.05$). The symptoms such as sleep disturbance chronic fatigue higher seen in female than male before treatment (p:0.003). The measurements of tragus-wall distance, visual analogue scale, number of limited joints, number of weak muscle and duration of morning stiffness were found significantly high both in male and female group (p=0.00). The measurements of schober, lumbal side flexion, intermalleoler distance, thorax expansion were found significantly high both in male and female after treatment (p:0.002). The morning stiffness, sleep disturbance and chronic fatigue symptoms were found significantly low both male and female cases (p:0.013).

Conclusion: Our study show that comprehensive therapy decrease of symptoms and enhance mobility in ankylosing spondylitis patients.

P07

Aquatic physical therapy for a poliomyelitis survivor with tracheostomy and ventilatory support: a case report

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Purpose: The aim of this study is to assess the benefits an aquatic therapy treatment may have for a poliomyelitis patient who has tracheostomy with non-invasive ventilatory support. **Methods:** A case report of a 39 years old patient who works as an administrative assistant in the school sector. Subject was affected by wild poliovirus at 03 years old, which required river Tracheostomy ventilatory support and BiPAP (Bilevel Positive Pressure Airway) and uses a wheelchair. In medical history there was no report of corrective surgeries and or attending physiotherapy specifically for polio. On physical examination, subject presented with disproportionate tetraparetic with higher prevalence in the lower limbs. Scholium up showed no limitation in range of motion of the upper limbs and knee flexion deformity of 90° cavus and foot deformities in equine adduct in the lower limbs were observed. The patient underwent an intervention of twenty sessions of aquatic therapy. Fatigue, pain and quality of life scales were used for evaluation and the additional parameters of oxygen saturation (SaO2), heart rate (HR), and respiratory rate (RR), were also analyzed. **Results:** There was a striking improvement in the scores of all scales used for fatigue: before treatment 55 and after 28, demonstrating a reduction in fatigue at the end of the study. A similar find was also observed in the quality of life mainly in the periods of vitality, before (29.16) and after (50). The HR, RR and SaO2 did not change significantly, demonstrating the safety of the treatment. The pain had ceased in the major joints at the end of treatment. **Conclusion:** The results show that the use of aquatic therapy was favorable for the treatment of the patient poliomyelitis with tracheostomy. Results demonstrate that aquatic therapy is safe, reduces fatigue and pain and thereby improving the quality of life.

P08

Effects of thalassotherapy for mobility and balance in chronic stroke patients: a pilot study

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Purpose: Stroke is one of the most serious healthcare problems and a major cause of impairment of cognition and physical functions. Aquatic rehabilitation approaches to postural control have been used for enhancing functional recovery that may lead to a decrease in the risk of falling and others related with increase autonomy according to International Classification of Functioning, Disability and Health (ICF). To investigate the effects of balance training in a complete thalassotherapy intensive program that contents aquatic therapy (based on halliwick method) for the improvements of mobility and balance in chronic stroke patients. **Methods:** Fifteen (Swedish) chronic stroke patients were assessed. The group (n=15) underwent aquatic therapy on a sea water pool based on halliwick method for 45 minutes a day, 5 days a week for 2-3 weeks, in addition to intensive conventional rehabilitation program (physical therapy, speech therapy, neuropsychology) , spa therapy 30-45 minutes a day, 3 days a week and climatotherapy (Mediterranean coast, Spain). All participants were assessed by: Berg Balance Scale (BBS), Modified Barthel Index (MBI), and Manual Muscle Test (MMT) before training, and at 2 or 3

weeks of training. **Results:** Statistically significant improvements on all measurements were observed. Comparing the two groups at 2 and 3 weeks of training respectively, BBS showed statistically more significant improvements in the 3 weeks group ($p<0.05$). **Conclusion:** Rehabilitation on a Thalassotherapy Center may be an effective way to improve balance and gait in ambulatory chronic stroke patients. Furthermore, aquatic and spa therapy may provide additional benefits when used in conjunction with conventional therapies. More studies with larger samples are needed. Find a proper control group is the goal of the scientific group.

P09

Evaluation of thermal pool aquatic exercises balneotherapy among parkinson's patients

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Purpose: The aim of this study was to evaluate the welcome and the physical and psychological effect of balneotherapy doing thermal pool aquatic exercises among Parkinson's disease (PD) patients. **Methods:** Five patients (n=5) diagnosed with PD were included in the study. Individuals: 3 men and 2 women, aged between 68 and 77 years old. Hoehn and Yahr Scale were from 1 to 4. All patients received twenty minutes daily of thermal pool aquatic exercises in addition to respiratory techniques or showers during 10 days. **Results:** After 10 days of thermal pool exercises, 60% of the patients (n=3) felt "better" than at starting therapy; one patient (20%) felt "equal" and another one (20%) said that was "worse". All patients enjoyed with the received thermal treatment: 80% (n=4) enjoyed "really much" and 20% (n=1) enjoyed "a lot". Patients were asked if they considered that the treatment that had received was appropriate or not for their disease: 60% said "very suitable"; one patient (20%) said "appropriate" and another patient (20%) answered "inappropriate" because he felt worst. **Conclusion:** The positive results in general state of these patients and the positive welcome and evaluation of the treatment received among these patients, makes thermal pool aquatic exercises a tool to consider and to promote, since it is possible to improve functional capability, psychological conditions, and therefore an improvement in the quality of life of these patients.

P10

Self-esteem and self-safety through the upthrust point of halliwick in aquatic therapy for adults with disabilities - an literature review

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Purpose: Older adults with disabilities have a big challenge on mental adjustment and motor control throughout the 10 point programme of Halliwick. The most important point is upthrust or mental inversion. The physiotherapist has to be able to get involvement of the patients to achieve all aims and confidence on their motor control in waterin terms of self-esteem and self-safety. Also, the work in apnea has a good aim for health of lung. The slow inspiration and the apnea aim to match the time constants of the units whose peripheral pulmonary compliance and resistance are altered. These alterations are responsible for the uneven distribution of ventilation, like ventilation inhomogeneous characteristic of asynchronous breathing. **Methods:** In order to design a qualitative visual framework for self-esteem and self-safety, we performed a preparatory project, showing photos of persons during the Halliwick point of upthrust. This was to support the search for literature. The Scopus database of Fade-UP VPN (keywords: self-safety; self-esteem; water therapy; water exercises; Halliwick concept) and the book "Comprehensive Aquatic Therapy (CAT3) were accessed. **Results:** No references about self-esteem and self-safety could be retrieved. CAT3 however gave valuable information and could be used as basis for the qualitative visual project. **Conclusion:** So we propose future studies to validate that this Halliwick point is important for the self-esteem and self-safety of aquatic therapy users.

P11

Underwater swimming for the training of polio patients

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Purpose: Persons with prior polio may experience a decline in muscle strength making conventional training difficult. This situation can be depressing for them. This study was planned as a pilot study with the aim to evaluate the effect of respiratory training for polio patients by training underwater swimming with techniques from elite diving. **Methods:** Twelve polio patients, yielding no results by conventional training, volunteered for the project. The training comprised two 45 minutes sessions: one on land and one in water. The land session focused on practicing relaxation, mindfulness, consciousness of respiratory function, breath holding and respiratory muscle training. The exercises and experiences from this session were then used in the water session to train underwater swimming. Training was conducted twice a week for three months. Prior to, and after three months of training, the following measurements were done: Pulse, blood pressure, FEV1, FEV6, pain (VAS), sleep tendency (ESS), stress (stress test), quality of life (SF-36), and tiredness (MFI-20). **Results:** Eleven patients completed the training program. Significant improvement ($p< 0,05$) was found for pain (VAS and physical pain aspect of SF-36), stress, and for physical tiredness and motivation in the MFI-20. Tendency to fall asleep also improved with $p=0.05$. Pulse, blood pressure, FEV1 and FEV6 changed only very little, and with no general trend.**Conclusions:** This pilot study indicates that respiratory exercises used for the training of diving can be beneficial for polio patients in terms of quality of life, pain, stress and sleep. Acknowledgements: the training has been carried out with assistance from the world champion in free style diving Stig Åvall Severinsen, Breatheology ®.

P12

Aquatic therapy as a part of the rehabilitation team in a sci patient: a case study

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Purpose: Aquatic therapy is based on the biophysiologic effects of water immersion (1), utilizes novel techniques (2) in clinically safe environments (3), and provides effective neurological rehabilitation, especially in SCI cases. It aims at increasing mobility, independence and participation, and decreasing functional deficits (4). This paper presents key procedural and evaluation data from a SCI case study treated by aquatic therapy. **Methods:** The patient, a 45 years old female (weight 47 kg, height 1.65 m) with SCI caused by a C4-C5 whiplash subluxation, was hospitalized for 10 months in "Filoktitis" (Athens, Greece). The intervention included selected aquatic techniques (Water specific therapy, Bad Ragaz ring method, obstacle course and falls prevention) and hydrotreadmill. Halliwick ICF and VAS were the main methods of assessment. **Results:** At "admission" the patient showed low quality (1 point) of respiratory function, ambulation (8 steps in 1.5 m with maximal assistance in 1.40 m water depth), upper extremity functional ability (5), with increased pain in both arms (VAS scale 8/10) (6), and complete difficulty in engangement (0 points), entrance and exit (0 point), adapted swimming (0 points) (5). On "discharge" the patient showed substantial improvement on: 13 meters supervised ambulation in 0.80 m water depth, respiratory function of moderate quality (2 points), supervised entry - exit of the pool (2 points), adapted swimming (7 meters) of moderate quality (2 points), and moderate to high level (2 to 3 points) disengagement. **Conclusion:** The applied therapy was effective, and the patient achieved adequate functional mobility.

P13

Aquatic physical therapy and therapeutic swimming in pediatrics: similarities and differences

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Purpose: n recent years, due to the current ideas on human disability and new theories of motor development and control, exercise as therapy has attracted special attention. Therapeutic exercise in an aquatic environment can contribute to the development of motor and functional performance. Swimming is the most advantageous form of aquatic exercise for disabled children as it provides physical and biopsychosocial benefits by adapting to their needs and capabilities. Adapted swimming programs can be extended beyond the confines of the educational and recreational character of adapted aquatics becoming a physical therapy. The purpose of this review is to investigate the similarities and differences of swimming, both as part of aquatic physical therapy and as part of adapted aquatics. **Methods** Adapted swimming, being part of adapted aquatics, aims specifically at improving physical and mental health, as well as promoting recreation. Adapted swimming, in conjunction with the physical and dynamic properties of warm water facilitates therapeutic goals without actually addressing them. Thus, adapted swimming can be considered therapeutic and is sometimes defined as therapeutic swimming. **Results**: However, therapeutic swimming should be differentiated from aquatic physical therapy, which uses the term therapeutic swimming to define the therapeutic character of swimming movements-postures-activities, designed and applied by physiotherapists as an integral part of any hydrokinesiotherapy program with the intention to improve a specific aspect of the physical function of disabled children. **Conclusion:** Although the terms therapeutic swimming and aquatic physiotherapy are sometimes used interchangeably in clinical practice, they are distinct. A clear differentiation needs to be made, for understanding their role and services in general pediatric rehabilitation.

P14

Scientific evidence of aquatic physical therapy in pediatrics

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Purpose: The benefits of aquatic physical therapy have been demonstrated in scientific studies on various disorders. Methodological and ethical issues are nevertheless reflected in the scant existing research in Pediatrics. The aim of this review was to assess the evidence produced in the last ten years, highlighting new trends and outlining guidelines for physiotherapists working with children through aquatic therapy. **Methods**: The target population included children with all type of disorders, aged one month to 21 years. The following databases were searched for English language studies from 2000 to 2012: PUBmed, Physiotherapy Evidence Database (PEDro), IBECS, Cochrane Library, LILACS, SciELO. Search terms included 'aquatic physiotherapy', 'aquatic physical therapy', hydrotherapy•, 'children', 'pediatrics'. Inclusion criteria included: randomized and quasi-randomized clinical trials, case studies and systematic reviews on children doing aquatic physical therapy. Twenty one articles met the criteria for inclusion (12 clinical trials, 5 case studies and 4 systematic reviews). Analysis and interpretation of the results was discussed at the level of main objectives, populations and samples studied, the measured variables, methods selected as well as the instruments used to collect data. **Results**: The results suggest that most studies tried to determine the effectiveness of the aquatic programs. The population most studied was between 5-12 years old with small samples. Descriptions of the programs are not rigorously given. Most of the studies report improvements in the measured variables, but not all of them present data or statistical test results. Studies did not often make conclusions on the effectiveness of programs in general, but only on the effectiveness of certain variables. **Conclusion**: Due to the large number of case studies, no extrapolations can be made. Starting in 2010 there was a significant increase of published evidence in aquatic therapy, however further investigation concerning randomized clinical trials need to be performed to examine the effectiveness of aquatic training programs and strategies for children.

P15

Aquatic activities for children and youth with muscular dystrophy: aspects to be considered

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Purpose: Aquatic activities are often requested by parents or indicated by doctors at Neuromuscular Disease Unit at Unifesp as a supportive treatment to improve quality of life in children with Muscular Dystrophy (MD). Review available evidence regarding aquatic activities for children with MD and present aspects to consider. **Methods:** Electronic database search using MEDLINE, PubMed, PEDro and Cochrane established since 2000 until 2012. MD connected with keywords: water activities, aquatic therapy, hydrotherapy, water exercise and swimming. Inclusion criteria were language, intervention (aquatic activity), population (children with MD) and any study design. Additional search includes related topics to MD, water activities and immersion effects on human body. **Results:** Initial search identified 19 articles that matched searching criteria, 18 were excluded, 2 because of language, 5 intervention were about medication, genetic therapy or nutrition, 6 population were adults or other neuro muscular diseases and 5 presented animal models. The included article was a systematic review, including one article with sample of 3 individuals with progressive muscular weakness. According to additional research, practical experience and knowledge of professionals at Neuromuscular Disease Unit, there are some relevant aspects to discuss related to water immersion and exercises with MD. **Conclusion:** There is insufficient high-level evidence to evaluate the effectiveness of aquatic interventions in children with MD because of limitations in design and the use of different measurement instruments.However, the available literature supports important factors to consider: muscular fatigue, type of exercise training, severe and decompensate heart failure and respiratory distress in aquatic environment.

P16

Aquatic research the effect of aquatic therapy on the improvement of functional balance and walking ability in cerebral palsy (cp)

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Purpose: Fitness programs should focus on functional mobility, training of motor control with skill and flexibility to try and prevent soft tissue adaptations. This research was designed to determine the effect of an aquatic program, including trunk rotation (Halliwick) and gait training in water on functional balance and walking ability in CP. **Methods:** Eight participants aged 6 to 18 years participated in an aquatic exercise program for 35 minutes, one time per week for a period of 15 weeks. Participants were assessed pre and post intervention. The aquatic program consisted of warm-up, Halliwick trunk rotation and gait training, followed by a cool-down phase. Measurements were the functional reach test (FRT), 4m walking test in water and on land, time up and go test (TUG) on land, the level of trunk rotation control in water and the time of blowing bubbles through the mouth or nose in water. **Results:** Significant improvements were seen in FRT (water<.005, land<.007), 4m walking test (water<.066, land<.043), TUG (<.038), the level of rotation control (Transversal <.003, Sagittal rt<.008, Sagittal lt<.009, Combined rt<.002, Combined lt<.000). Trends toward decreasing breath time were also observed. **Conclusion:** Halliwick rotation control and a gait training program are promising interventions that may improve functional balance and walking ability in water and on land for this population. There is a need to determine the efficacy of Halliwick and gait training improving the daily activity and compare the functional movement in water and on land.

P17

Musculoskeletal the influence of myofascial release in posture and range of motion

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Purpose: The neurological disorder can cause secondary changes in the musculoskeletal system, such as muscle weakness, spasticity, and/or contractures around joints, which makes cerebral palsy a leading cause of childhood disability. Some of the effects of aquatic therapy are related to pain relief, a reduction in spasms, muscle relaxation, an increase in the range of motion, an increase in blood circulation and muscle strengthening. The goal of this study was to verify the influence of myofascial release in posture and range of motion of six patients with cerebral palsy (CP) after only one session of aquatic therapy. **Methods**: observational study through the analysis of posture and range of motion of six children with cerebral palsy after one session of aquatic therapy. Each patient was placed in an indoor warm pool (33°C) at a comfortable position and treated by a physical therapist with myofascial techniques. The myofascial techniques were stretching and myofascial trigger point release. **Results** :All patients were assessed before and immediately after the intervention by the same observer, by using a photographic camera. Photos were taken before and after the session, for comparisons. **Conclusion:** The session lasted 35 minutes: qualitative improvements were observed in the photos, such as increasing the range of motion of the knee joint and improvement of biomechanical alignment of the trunk in a sitting posture.

P18

Interference of aquatic therapy in the agility in wheelchair of a patient with duchenne muscular dystrophy not ambulatory - case study

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Purpose: Duchenne Muscular Dystrophy (DMD) is a progressive disease. Usually by early adolescence independent walking is restricted, at this stage of the disease use of wheelchair is often the only form of locomotion. The agility in a wheelchair is a key factor for functional independence of these individuals. The objective of this study is to verify the interference of aquatic therapy in children with DMD who rely on wheelchairs for locomotion. **Methods**: The design of this paper is a case study of a subject with interventional clinical evaluator blinding. The sample consisted of a 12 years old male patient with DMD who has been unable to walk since 2 years ago. The patient underwent assessments at pre and post intervention. The assessment was verified by an agility test of zigzag, consisting of a path in a rectangle with measurements of 6 m and 9 m, the child runs away with the CR, making changes of direction, with maximum speed. The patient underwent 10 sessions of aquatic therapy. The initial phase of therapy consisted of passive mobilization and exercises to improve flexibility of upper and lower limbs and trunk. Subsequently, active exercises of upper and lower limbs using only water resistance, followed by breathing exercises. And finally, function was trained with placement of a wheelchair into the pool and the patient touched the chair with a level of immersion in the xiphoid process. **Results**: the aquatic therapy as the only form of intervention in the study showed a quantitative change in the patient's agility evaluated, showing a decrease in travel time in the wheelchair from 120 to 90 seconds. **Conclusion**: The results showed that for this patient to aquatic therapy may interfere positively on agility in wheelchair.

P19

The effects of aquatic physical therapy in pregnant women

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Purpose: The benefits of aquatic exercises for pregnant women are many and aqua natal classes (ANC) are getting popular in Portugal. Understand what motivated pregnant women to practice physical therapy in the aquatic environment and to identify which effects they considered removing from this therapy. **Methods:** This is survey study. Subjects were 21 pregnant women with an average of age of 33.0 years and pregnancy time of 28 weeks. The data were analyzed using the PASW® statistics program, version 19.0. **Results:** Lumbar back pain (LBP), edema in the lower limbs and constipation were the symptoms that affected the majority of the sample, with 71.4%, 33.3% and 47.6% respectively. The factors that motivated pregnant women to practice ANC were the decrease in LBP with 47.6% of the answers in the category of "very important" and 23.8% as "quite important". The decrease in edema of the lower limbs was also a major factor with 28.6% of the sample ranking it as "quite important" and constipation was referred by 38.1% in the "important" class. Other motives stood out: 76.2% to ensure healthy pregnancy, 71.4% to maintain good physical condition, 66.7% to maintain an active life style during pregnancy, 52.4 % to promote relaxation. The majority of pregnant women, who presented symptoms, improved those symptoms since the beginning of the classes. **Conclusion:** With this study, it could be verified that it were not only the physical discomfort that motivated pregnant women to attend the sessions of water-based physiotherapy, but also the psychological aspects.

P20

Undesirable effects of aquatic therapy. a purpose of a case (a real case)

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Purpose: Show the adverse effects of aquatic therapy. **Methods:** A 40 year old woman spent 2 days in a Spanish aquatic resort with a therapeutic/entertainment purpose. She did not have any previous pathology (diabetes, skin disorders or immunosuppression disease). When she submerged in a pool of ichthyotherapy, a fish bit her left lower limb. 48 hours later she evidenced a Cellulitis and Lymphangitis of her left lower limb which required medical treatment and was recurring the following two months. A veterinary inspection confirmed that the accident was produced by a species of tiny fish with teeth, capable to produce lesions in healthy skin. **Results:** A Cellulitis and Lymphangitis of lower limbs lasting 2 months with a recurring character in a 40 year old woman without previous skin pathology. In this case the Garra rufa fish was replaced with another species called Tchin-Tchin. **Conclusion:** With this consideration we want to warn that, independently of the beneficial effects of aquatic therapy, undesirable effects were observed due to the bite of the Tchin- Tchin fish, coming from China. The Tchin-Tchin fish has teeth and does not only suck the dead skin, it pulls off and eats the living skin, causing micro-lesions and greater damage such as Cellulitis which is our case of study. There are centres of aquatic therapy that substitute the species Garra-rufa for Tchin-Tchin, the cheaper species and for this reason while practicing aquatic therapy these centres should be required a Certificate of authenticity and veterinary supervision.

P21

Rating the quality of life in dermatological disease after treatment of balneotherapy in roche posay

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Dermatology. Roche Posay, France.

Purpose: We aim to evaluate the effectiveness of balneotherapy of Roche Posay in the most common dermatological pathology that is treated in this centre. **Methods:** Quality of life, pain, pear sleep and itch in patients older than 18 years who visited the Roche Posay spa between july 30 and august 18 of 2012 were measured initially and three weeks after. Overall questionnaire of quality of life in dermatology, the Dermatology Life Quality Index (DLQI) has been used for assessing the first one. The pain, pear sleep and itch have been measured through

visual analogue scale (VAS) from 0 to 10. **Results:** 35 patients (11 with breast cancer, 15 with eczema and 9 with psoriasis) have been included. DLQI showed that 28,57% of the patients had a light improvement, 31,43% a mild improvement, 20% showed no change, 2.86% worsened slightly and 17,14% did not answer one of the two questionnaires. The evaluation of the pain showed that 57, 14% of the patients had an improvement, 25,72% had no change and 17,14% did not answer one of the two questionnaires. Increase of pain wasn't found in any patient. The evaluation of the itch showed that 54, 29% of the patients had an improvement, 5,71% worsened, 22,86% had no change and 17,14% did not answer one of the two questionnaires. Finally, the evaluation of pear sleep through the VAS showed that 37,14% of the patients had an improvement, 5,72% worsened, 40% had no change and 17,14% did not answer one of the two questionnaires **Conclusion:** Thermal waters seems to be and effective treatment of these skin diseases since most of the patients have shown an overall improvement in quality of life, pain, pear sleep and itch.

P22

Impact of functional aquatic physical therapy on individual´s quality of life

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Purpose: Verify the impact of 24 sessions of aquatic physical therapy on quality of life of adults and compare to different aquatic interventions. **Methods:** All Adults who performed treatment of aquatic physical therapy (group or individual) and physical conditioning group at Saga Swimming School (São Paulo, Brazil) were invited to participate in this study. Measuring instrument used was SF-36 applied before and after 24 aquatic interventions. Participants were divided in 2 groups of interventions for statistical analysis, individual aquatic therapy and group activities. **Results:** Twenty-nine voluntaries, 6 males and 23 females were included in this study. Eight participants performed individual activities age between 24 to 80 years old, and 21 (twenty-one) group intervention average age of 48.5 years old. Individual aquatic therapy frequency varies from one to three times a week and 45 minutes duration with different disorders. Group interventions were limited to maximum of 8 subjects and 45 minutes of session. People submitted to individual treatment reached best results when their scores compared with the other participants of this research. **Conclusion:** The possibility to identify activities limitations allows planning and conducting physical therapy treatment to achieve the best result possible in a short period. SF-36 shows to be sensitive in the population analyzed and presents relevant aspects to be investigated before and after aquatic physical therapy intervention.

P23

The importance of the water adaptation in the rehabilitative process

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Purpose: Our purpose is to explain the utility of the environmental adaptation in the rehabilitative process, when patients experience the water, which increases their interests. **Methods:** The used method is an observational cross study of clinical cases. The patients are children and adults suffering from various pathologies: neurological, orthopaedic, cognitive, linguistic and relational diseases. The therapeutic way is differed from clinic characteristics of the patients and it changes on the basis of operative decision and length of treatment. We have using scale of valuation but the results of this work cannot be measured quantitatively. These patients were carrying out a long working program and it's completed by other rehabilitative treatments in a multidisciplinary setting. **Results:** For this reason, in a non-scientific way, we can only measure the level of satisfaction of the patient, the quality of their smile, the frequency, the request of the continuation and the attachment to the water to the end of the treatment. We had measuring the satisfaction by two instruments: a visual analogue scale and a questionnaire. The patients don't lose the link with the water and they continue with the practice of swimming, aquatic fitness and diving. These observational studies permit to sustain that new researches are necessary on this argument, because the present scientific evidence of literature confirms the efficacy of aquatic therapy, if it is particularly completed by traditional land treatment, but scientific literature doesn't give the information about best approach or method to working in the water. **Conclusion:** The rehabilitative aquatic approach, based on adaptation is most adapted and respectful for the patient; in other words it positively influences the recovery, avoiding the possible slowing down or abandoning of therapeutic activity.

P24

Balance parameters improvements after a long-term aquatic therapy rehabilitation program for low back pain and drop foot: a case study

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Purpose: Herniated nucleus pulposus can compress the nerve roots of the peroneous nerve, resulting weakness of the peroneal and tibialis anterior muscles, causing drop foot. This affects functional level of motion and balance in everyday life. The aim of the present case study was to evaluate the effectiveness of a long term aquatic rehabilitation intervention for low back pain and drop foot. **Methods**: One male patient (45yrs, 1.79m, 82.4kg, 24.4kg/m^2) with low back pain and right side drop foot due to L4-L5 vertebral disc prolapse and L5-S1 vertebral central hernia was evaluated before and after a 12-month aquatic therapy rehabilitation program (ATRP). ATRP, conducted twice weekly, consisted of: passive and active aquatic stretching, breath control training, static and dynamic balance exercises, proprioception exercises, walking exercises with forward and backward body transition supported on the heels and on the toes, muscle strengthening, and synergy in sagittal, longitudinal and transverse planes. Water resistance was enhanced by the use of water depth (1.30m - 1.70m), flotation equipment and swimming accessories. Double and single leg balance tests were conducted in the Lab using the 2D-DELTA Stabilometer (developed by IA Kollias; sampling frequency: 50Hz) and a concurrent video-analysis (sampling frequency: 50fps) with the Kinovea 0.8.15 software. **Results**: The parameters related to balance i.e. duration of the tests without modifying the stance, vertical Ground Reaction Forces, trajectory and kinematics of the Center of Pressure, were improved after ATRP. **Conclusion**: Balance can be improved in L4-L5 vertebral disc prolapse and L5-S1 vertebral central hernia patients submitted to long term aquatic therapy rehabilitation program.

P25

A comparison between aquatic therapy and combination with physiotherapy in a group of patients with pain in the lower back. grand hotel la toja spa, spain.

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Purpose: The purpose of using a combination of aquatic therapy and physiotherapy in the treatment of some patients with musculoskeletal disorders, specifically low back pain, is to maximize the benefits of both interventions. The aim of this study is to compare the effect the addition of an aquatic therapy intervention to a normal physiotherapy treatment has on symptoms related to non-traumatic low back pain in 48 male patients. **Methods:** Forty eight male patients diagnosed with pain in the lower back of non-traumatic origins evaluated in the Medical Service of the Grand Hotel La Toja were recruited. Age ranged from 36 to 42 years. All of them received the "Terra program" which comprised of physiotherapy, immersion in bathtubs with medicinal mineral water and thermotherapy. Only twenty eight received aquatic

therapy which consisted of strengthening, relaxation and stretching exercises in a dynamic pool. Treatment lasted 10 days. A subjective questionnaire about pain, mobility, daily activities and quality of life was used and answers were measured with a scale with a range from 1 (minimum value) to 10 (maximum value). The use of analgesics and anti-inflammatory drugs before and after the aquatic therapy also was questioned. **Results:** After the treatment, all the patients indicated a notable improvement in their general health state. All those who participated (n = 28) in the additional aquatic therapy, felt "much better". From those patients who did not (n = 20), eighteen (90%) felt "better" and two (10%), "equal". All the groups enjoyed the procedures. When asked if they considered aquatic therapy appropriate for the treatment for their symptom, 100 % of the aquatic therapy group said "very suitable". Those patients who didn't participate in aquatic therapy replied "very suitable" in 54,5%, and "appropriate" in 45,5%. **Conclusion:** When an aquatic therapy program is added to conventional physiotherapy treatment, the patients have less pain, their mobility improves, the intake of anti-inflammatory drugs diminish, and their mood is better. The combination of aquatic therapy and physiotherapy seems to decrease the lower back pain in a more effective than physiotherapy alone.

P26

Aquatic education breathing awareness in water, back to basic

Kluis Anna

BALANS

Purpose: How can people independently relax in water and for als long as they want? Not all beneficial water techniques require an active Waterworker. By experimenting over 2 years together with clients in a rehabilitation center I discovered a method that enables free relaxation in water. Accomplishing more by doing less. Other techniques require motion and an active Waterworker. **Methods:** The subjects were individuals who are suffering from pain caused by extensive mental and physical stress. The method consists of a 6 stage approach. Each stage or phase requires a different type of breathing. With every next phase the breathing deepens and becomes more relaxed, resulting in less bodily tension. The most important beneficial effect of this method is Breathing Awareness and better breathing. Breathing sets us in motion. While floating in water it deepens and reduces our respiration and loosens our muscles. Positive results have been achieved with spasm, pain reduction and stress relieve. This method deserves to be investigated more thoroughly. Much is known about breathing techniques "on land"! What is the precise influence of water on our breathing? It's pressure, the stillness and other physical and mental experiences. **Results:** Breathing Awareness in water results in: – lower abdominal and deeper respiration; – better perfusion; relaxes the muscles; – awareness of your body; – growth of independency; – increased confidence, also outside the water; – more inner strength. Not all beneficial water techniques require an active waterworker **Conclusion:** Better breathing results in better perfusion and relaxes the muscles. Accomplishing more by doing less – Back to basic

P27

Survey study of the security level, training and responsibilities of the portuguese physiotherapists working in aquatic environment

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Purpose: There is a lack of studies in Portugal describing the clinical world of physiotherapists working in aquatic therapy relative to security level, training and responsibilities. The objective of this work was to assess the environment of Portuguese physiotherapists working in aquatic therapy as to their responsibilities, security and training level. **Methods:** This was a survey study. The study population was 226 physiotherapists registered in database of Portuguese. Aquatic Physical Therapy Interest Group. From those 44 fit the criteria. The sample was 44 physiotherapists with an average age of 28 years old and more than half were female. All of them had attended a basic course of aquatic physiotherapy and 48.9% also attended aquatic specific courses (e.g Halliwick, Bad Ragaz). **Results:** For security level 95.1 % of the swimming pools have regular and normal function, but 76.2 % of physiotherapists never performed a simulation of emergency evacuation at the workplace.Regarding the training level 86.4 % of physiotherapists have attended specific training in the aquatic area, but they still find the need to reinforce some of their knowledge. For responsibilities, the majority of physiotherapists have time to assess and re-evaluate their clients. **Conclusion:** Concerning training and responsibilities physiotherapists have good practices and show great interest in their training. Regarding safety, workplaces where physiotherapists work have some gaps in their training in facility emergency systems.

P28

Aquatic therapy teaching adapted to european higher education area

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Purpose: The main aspects of the European Higher Education Area, its structure and the European Credit Transfer System are shown, as well as the last guidelines of the Spanish Ministry of Education about these matters. **Methods:** The frequently cited "Bologna Declaration" consolidates the basis for the construction of the European university formation system, called Superior Education European Space (SEES), the structure of the SEES, is based on the next aspects: qualifications easily understandable and comparable; ECTS credits; two cycles system; diploma's supplement; students, teachers and researchers mobility & european cooperation to reach good quality levels. For a hundred years, teaching in our Department is supported by water. **Results:** 1) Water related to spas (Health Resorts): Balneology, Balneotherapy, Thalasotherapy, Mud Therapy, Aquatic Therapy, Climatotherap. 2) Water as food: natural mineral water and bottled water. **Conclusion:** Today, SEES adaptation allowed us to give aquatic therapy as a significant part of the Degree programs in Physiotherapy, Medical Degree and Medical Hydrology specialty.

P29

Analysis of extra-aquatic activities by icf-cy codes.

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Purpose: Aquatic therapy has a long tradition of being part of the treatment program for populations with intellectual disabilities. Important treatment goals for this population will often be to improve ADL function. It is well known from literature of motor learning that progress is more significant if these activities are taught in a relevant setting. The pool can be a natural focal point for teaching and exercising ADL on participation level. **Methods:** 1: Illustrating how the extra-aquatic teaching opportunity is integrated in an institutional setting as part of the treatment/pedagogical program for improving ADL skills: Preparing bag, preparing sandwiches, walking to/ from pool, undressing/dressing, shower and hygiene, entering/ exiting the pool, picnic, laundry. 2: Using The ICF-CY codes for standardized evaluation of relevance on the levels of Activity and Participation. Methods: The codes of ICF-CY One level classification: Activities and Participation were graded relevant or not, by one tester for the eight structured tasks. Exclusion: Chapters on Work and employment and Economic life. **Results:** The eight extra-aquatic tasks covered between 58%-68% of the codes describing activity and participation according to ICF-CY. **Conclusion:** The ICF codes relating to the classical areas of physical therapy (Changing and maintaining body position (d410-d429), Walking and moving (d450-d469) were included one hundred percent in all eight tasks.

P30

Development of an aquatic physical therapy network

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Purpose: The aquatic physical therapy network of the World Confederation of Physical Therapy - WCPT - (www.wcpt.org/apti) was established in 2011 in order to facilitate communication amongst aquatic (physical) therapy professionals worldwide. Goals were defined and a website was launched. However, activities were marginal and needed to be facilitated. The aim of this survey was to find common views on the role of the network. **Methods:** A short internet based survey was sent by e-mail to current members and member organizations of the aquatic physical therapy network of the World Confederation of Physical Therapy (www.wcpt.org/apti). In addition a possibility to complete the survey via the WCPT website was created for non-members. Data collection was conducted between October and December 2012. **Results:** In total 109 replies were received from 67 members and 31 non-members representing 28 different countries. Most represented countries were Australia (18), United Kingdom (15) and Argentina (11). The results of the survey indicates that aquatic therapist perceive the role of the network as one that should provide information on evidence based practice, knowledge and promote the development of educational material. Most are willing to share their knowledge on educational material and evidence base aquatic therapy however few where prepared to discuss health, safety and hygiene. Most expected the network to provide updates on best practice and research, facilitate international communication, communication between clinicians and researchers and link people with interests in specific areas of aquatic therapy. **Conclusion:** There is a clear role for the APTI network in the development of aquatic therapy with a need to improve and facilitate interaction and sharing of information. The current forum appears inadequate for this purpose based on feedback from members. New methods need to be discussed and implemented to improve this area.

P31

Aquatic therapy course for physiotherapy students in yeditepe university

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Purpose: Aquatherapy has been a fundamental management strategy in physiotherapy practice. Recently, there has been an increasing interest in aqua therapy practice within physiotherapy education as a method for reducing the 'theory-practice gap. Thus we aimed to organize a selective course with basic aquatherapy methods for undergraduate physiotherapy students. **Materials and Metods:** Yeditepe University has two pools that one is also has a platform and a lift for safety. We planned to utilize these facilities into the education program of the Department of PTR. The inclusion criteria for the course is to succeed in Heat & Light and Hydrotherapy undergraduate courses and to have efficient swimming skills that was assessed by the swimming coach of the University, and to be voluntary to participate the course. The basic aquatherapy methods, theoretically (15 hours) and practically (8hours) were given free-of-charge to the students. The primary topics of the course were usage of water in physiotherapy, the chemical and physical characteristics of thermal water, the properties of therapy pools, safety and safety principles in pool environment, biomechanics of water, aquatherapy techniques and Halliwick Approach. Two invited teaching staff gave the aquatherapy techniques and Halliwick Approach. **Results:** In 2010-11 and 2011-12 spring semesters, we have organized two courses and totally twenty (20) students (11F; 9M) completed the course. They enjoyed learning to use water as a modality of treatment and learned how to create motion with the power of water. **Conclusion:** We believe that the awareness on the importance of aquatherapy will increase among the students

P32

Aquatic research muscle recruitments patterns in the bad ragaz ring method: a preliminary study

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Purpose: The Bad Ragaz Ring Method (BRRM) is an aquatic version of Proprioceptive Neuromuscular Facilitation, improving muscle function via patterns of movement, using operator resistance. The aims of this study are to examine muscle activation in a common leg/trunk pattern and to assess similarities and differences in EMG signals between two expert therapists operating the pattern. **Methods:** One healthy person, familiar with the pattern, with no previous history of leg or back injury and 2 experienced BRRM therapists participated. A BRRM pattern was used with the right leg performing a flexion-adduction-external rotation movement (isotonic) and the left leg a stabilizing isometric extension adduction- external rotation pattern. Two therapists performed 2 sets of 15 repetitions of the pattern with intervals of 1 hour between series. Wireless surface EMG (4 channel, Kine Pro) was used to examine agonist muscles in leg and trunk (right Tibialis Anterior (TA), right Adductor Magnus (AM), left and right External Obliques (EO)). Electrodes were placed according to the SENIAM recommendations. **Results:** Mean pattern cycle duration (n=66) was 2.38s ((+0.2s). Relative activity time of TA was 76% (+/- 4.5%) of cycle duration. There was a significant ($p<.001$) difference in cycle duration between Therapist 1 (2.47s +/- 0.18) and 2 (2.29s +/- 0.21) due to contraction time (1.88s vs. 1.72s). Trial 2 was faster than trial 1 (2.49s +/- 0.19 vs. 2.29s +/- 0.18) with reduced contraction and relaxation times. Variability was equivalent in both trials. There was no difference in relative activity time. The RMS of TA represented 85% (+/- 9) of RMS for the entire cycle, with significant differences ($p<0.001$) between trials, therapists and interaction. Therapist 2 (faster) produced higher relative RMS (83% vs. 88%, $p<.001$) and lower CV 12.5% vs. 8.0% and likewise trial 2 (faster) showed more activity 78% vs. 93%, ($p<.001$). Other muscles were all active during TA activity but right and left EO showed 10% more variability in RMS over cycles. **Conclusions:** Experts operated a BRRM pattern with moderate consistency, both within 15 repetitions and between 2 series. Implications: A BRRM leg pattern can activate EO muscles. This might be important for patients needing core stabilization.

P33

Physiological responses to pedaling on a water stationary bike at different immersion heights

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Purpose: Only a few studies[1-4] have investigated oxygen consumption (V'O2) and heart rate (HR) responses to pedaling on a stationary bike in water (WSB), while literature is still lacking on the effects elicited by variations in immersion depth. **Methods:** 14 subjects (8 M, 6 F, age 30±6y, weight 67±14kg, BMI 22.8±2.3kg/m2, fat mass 21,4±3%) performed 2 testing sessions and 2 exercise sessions: i) dry-land incremental exercise test (cycle-ergometer) to age-predicted maximum HR (HR); ii) underwater (hip-height) incremental exercise test (on a WSB) to exhaustion; iii/iv) two 2-stage (18-minutes each) underwater pedaling exercises on a WSB (Aqquatix S.r.l., Italy) at 2 different immersion heights (armpit/hip). Breath-by-breath VO2 and beat-by-beat HR were recorded continuously throughout dry-land sessions. The intensities of the exercise sessions were 45%-55% (stage#1) and 70%-80% (stage#2) of the underwater VO2 peak (a metronome was set at the VO2 peak pedaling rate). A repeated-measures (2 exercise intensities) 2-way (armpit/hip heights) ANOVA was performed on each variable and the Bonferroni test was used for post-hoc comparisons.**Results:** Compared to the hip-height condition, pedaling immersed at the armpit level elicited significantly lower VO2 and HR (significant solely at high-intensity for HR) responses, either exercising at high (25.5±4.6 vs. 29.1±4.8 mL·kg-1·min-1; 127±14 vs. 140±19 beats·min-1) or low (17.9±3.6 vs. 20.1±3.6 mL·kg-1·min-1; 105±16 vs. 110±15 beats·min-1) intensity. **Conclusions:** While peak VO2 didnt differ significantly between dry-land and underwater tests (36.2±5.4 vs. 38.8±5.8 mL·kg-1·min-1), mean HRs at both intensities and both water heights were significantly lower when expressed as percentage of the HR resulting from the underwater test to exhaustion, rather than applying the 220-age prediction equation.

P34

Aquatic therapy for clients with a tracheostomy

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Purpose: Using the Chartered Society of Physiotherapy SKIPP process (Supporting Knowledge in Physiotherapy Practice) Heather Maling and Susie Grady have formulated a Risk Management Tool and supporting document to assist in the reasoning process preceding aquatic therapy for patients with a tracheostomy. Careful risk management is needed when taking someone with a tracheostomy into water as there is a risk of water entering the airway leading to aspiration. **Methods:** Three methods were used: 1. A literature search 2. A national clinician survey 3.Stakeholder consultation. **Results:** The literature search identified eleven papers most of which were case studies containing limited evidence. The Taylor (2003) article provided the most information as it detailed the process of taking a client with Guillain-Barre syndrome into a pool. The national clinician survey provided evidence that clients with tracheostomies are being referred for aquatic therapy but that the staff do not know of any specific protocols for this client group. The stakeholder consultation allowed us to gather the views of individuals and groups with a specific interest in this area. The SKIPP process then allowed us to synthesise the limited evidence base with expert clinical opinion in order to identify key risk assessment considerations to ensure that clients with tracheostomies, who might benefit from aquatic therapy, are appropriately managed. The finalised risk management tool pathway that we devised can now be viewed on the CSP website (www.csp.org.uk). **Conclusion:** The recommendations from our work are: 1. Risk assessment is important and the risk assessment process needs to be carried out for both the client to be taken to the pool, and the pool itself. 2. Risk assessment needs to be made both on an individual basis but also depending on the staffing situation / expertise and equipment available. 3. Individual client clinical features, staff experience and numbers, and the availability of necessary equipment need to be considered when carrying out the risk assessment process. 4. Further research is required – particularly to standardise the recording of adverse events and the outcome measures used for this client group.

P35

The impact of swim training on arm and leg frequency and performance in a female swimmer with cerebral palsy: a case study

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Purpose: As far as training adaptations in swimmers with cerebral palsy are concerned, studies are limited and none have so far reported shifts in arm stroke and leg frequency and performance improvements. The purpose of this study was to observe the changes in a teenage swimmer with cerebral palsy, after a 10 week swimming program, on velocity, and stroke and leg frequencies during a 25 meter backstroke trial at 3 different intensities. **Materials & Methods:** A 12 year old female swimmer with cerebral palsy and paraplegia volunteered and participated in this study after consent was taken by both her and her parents. Her weight was 57kg and her height 153 cm. She trained twice a week for 45 minutes and covered a distance between 350 to 400 meters per session. The temperature of the therapy pool she trained in was 33 degrees C, and once every 3 practices she swam in a cooler Olympic sized pool for endurance enhancement (at 27 degrees C). The equipment used for recording measurements were a casio stop watch and a sony camera. Performance (time in seconds) and stroke and leg frequencies (number of strokes and kicks) were recorded at 3 different intensities (100%, 90%, and 70% of maximum performance), before and after the training intervention. **Results:** At maximum effort of 25 meters of backstroke (100%), arm frequency was reduced by 15,4%, leg frequency increased by 2,1%, while time improved by 7.88%, at 90% effort, arm frequency was reduced by 10,5 %, leg frequency increased by 5,6%, while time improved by 8,5% while at 70% effort, arm stroke frequency was reduced by 18,5%, leg frequency increased by 1%, while time improved by 13,3 %. Both coordination of leg and arm use improved as well as ratings of perceived exertion. **Conclusions:** Improvement were noticed at all levels of intensities but more pronounced at a medium intensity (70% of maximum effort). The most important finding of this study was that in swimmers with cerebral palsy -as in swimmers without- the improvements in performance were attributed mainly by shifts in arm frequencies (reductions) than shifts in leg characteristics and that overall coordination and perceived exertion of the swimmer was greatly improved.

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