CONI SCUOLA DELLO SPORT MARCHE

Lo Stretching nella preparazione fisica: fra evidenze scientifiche e indicazioni per la pratica

Ancona, 2 marzo 2018

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Allungamento e stretchin' in ambiente acquatico




Serie A › Più notizie per il Torino

Mbaye Niang, 23 anni, al Toro da agosto: qui è in piscina per lo scarico post Benevento LAPRESSE

3

● i gol segnati da Mbaye in questo campionato, tutti in casa (due di destro e uno di sinistro) contro il Verona, il Bologna e due giorni fa il Benevento

Walter Mazzarri, 56 LAPRESSE

4

● i gol di Obi in campionato, tre in casa e uno fuori (uno di destro, due di sinistro e uno di testa), contro il Sassuolo (2), il Cagliari e domenica il Benevento

Joel Obi, 26 anni, al Toro dall'estate 2015: in Italia è stato anche con Inter e Parma LAPRESSE

Niang-Obi: le perle nere

J Orthop Sports Phys Ther. 1998 Jan;27(1):32-41.

Aquatic-based rehabilitation and training for the elite athlete.

Thein JM, Brody LT

Elite athletes are competing for longer seasons, **training** more hours, and taking less time off. This schedule may predispose the **elite athlete** to overuse injuries. When an injury occurs, **aquatic-based rehabilitation** may expedite the recovery process, as effective cardiovascular and musculoskeletal **training** may be accomplished by aquatic exercise. The pool may be used both during **rehabilitation** and postrecovery as an adjunctive tool. Knowledge of the unique physical properties of water, as well as the physiological responses to immersion both at rest and during exercise, will aid the physical therapist when designing a **rehabilitation** or **training** program for the **athlete**. Understanding the principles of movement in water will provide a foundation for creative use of water's unique properties.

Dowzer, C. N. and T. Reilly (1998). Deep-water running. Sports exercise and injury (Edinburgh, Scotland). 4: 56-61.

High levels of competitive running entail several hours of training each week, with the majority of this training being carried out on hard surfaces. This will increase the levels of load placed on the musculoskeletal system. The need to lower impact loading as well as provide non-weight-bearing exercise for rehabilitation has meant that deep-water running (DWR) has become an increasingly acceptable form of exercise. The non-weight-bearing nature of deep-water running raises issues of specificity of training for land exercise. Prior familiarity, running style and protocol design influence the degree to which running in water simulates orthodox running on land. This review presents current research into the comparisons between running in water and on land, and the specificity of training responses.

L'acqua come ambiente di esercizio

- Situazione tendenzialmente antigravitaria *(Harrison et al, 1992)*
- Sfruttamento della spinta idrostatica *(Edilich et al, 1987)*
- Resistenza del mezzo al movimento *(Resnik et al, 1993; Hall, 1999)*
- Effetti creati da vortici e turbolenze *(Newman, 1997)*

↓

"l'immersione è considerata un mezzo semplice per produrre significative variazioni nei parametri cardiovascolari e respiratori" *(Lin et al, 1984)*

Influenza le risposte fisiologiche *(Arborelius et al, 1972; Agostoni et al, 1966; Lin et al, 1984)* e condiziona gli adattamenti biomeccanici *(Edlich et al, 1987; Onodera et al, 2003)*

Water exercise – Considerazioni ACSM

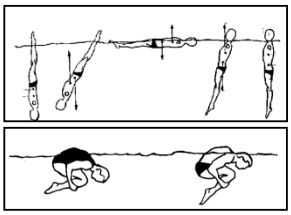
- L'acqua fornisce una adeguata resistenza per un allenamento di forza e per incrementare la funzionalità cardiaca
- Il minor carico meccanico e la diminuizione di peso favoriscono un esercizio modulato senza rischi per l'apparato osteoarticolare
- L'acqua costituisce una ulteriore opportunità per sviluppare la capacità di esplorare differenti tipi di movimento
- L'ambiente acquatico costituisce una opportunità per modificare il ROM di molti esercizi e movimenti

Modes of aquatic exercise

- DW exercise (no contact floor)
- SW exercise (xiphoid level)
- WA exercise (Water Aerobics)
- WC exercise (water calisthenics)
- Water small equipment exercise
- UT exercise (underwater treadmill / water stationary bikes / etc)

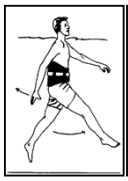
Diversificazione e modulazione del lavoro in acqua

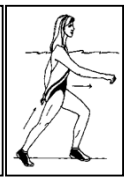
- Posizioni

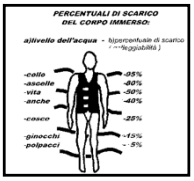


Diversificazione e modulazione del lavoro in acqua

- Posizioni
- Profondità







Diversificazione e modulazione del lavoro in acqua

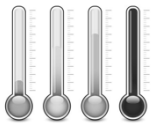
- Posizioni
- Profondità
- Temperatura

CONSIGLI TEMPERATURA

- **26/28° CAMMINAMENTO FREDDO**
- **30/32° CAMMINAMENTO CALDO**
- **28/32° RIABILITAZIONE ORTOPEDICA**
- **32/34° RIABILITAZIONE NEUROLOGICA**
- **28/30° AQUAGYM**

Suitable activities	Aquatic Temperatures				
	Cold (10°-15° C)	Cool (26°-29.5° C)	Neutral (33.5°-35.5° C)	Warm (36°-38.5° C)	Hot (37.5°-41°)
Post-exertional recovery	✔				
Contrast baths	✔			✔	✔
Vigorous exercise		✔			
Arthritis exercise			✔		
Typical Aquatic Therapy			✔		
Cardiac Rehab			✔		
Multiple Sclerosis exercise		✔			
SCI programs			✔		
Parkinson's programming			✔		
Relaxation				✔	✔

Figure 1. Immersion temperatures for rehabilitative issues.



Metabolic and Cardiovascular Responses During Aquatic Exercise in Water at Different Temperatures in Older Adults

Marco Bergamin, Andrea Ermolao, and Sonia Matten
University of Padova

John C. Sieverdes
Medical University of South Carolina

Marco Zaccaria
University of Padova

Purpose: The aim of this study was to investigate the physiological responses during upper-body aquatic exercises in older adults with different pool temperatures. **Method:** Eleven older men (aged 65 years and older) underwent 2 identical aquatic exercise sessions that consisted of 3 upper-body exercises using progressive intensities (30, 35, and 40 metronome beat · min $^{-1}$) on separate visits. Water temperatures for the visits were 28°C (cold water [CW]) and 36°C (hot water [HW]), and water depth ranged from 1.2 m to 1.4 m. Measurements for heart rate (HR), blood pressure (BP), oxygen consumption (VO_2), and rate of perceived exertion (RPE) were compared between the CW and HW conditions. **Results:** The comparison between temperatures showed a higher HR response during exercise in HW, particularly when participants exercised at the highest intensities. During a 30-min postexercise period in resting conditions, HR was statistically significantly higher for the HW condition compared with the CW condition, with a large effect size (15.9%, $d = 1.23$). Systolic and diastolic BPs were found to be lower for the HW condition (-7.2%, $d = -0.60$; -10.1%, $d = -0.65$), while VO_2 and RPE showed no differences. The effect size between double products (HR · systolic BP) for the 2 conditions was small (CW = 8,649 ± 1,287, HW = 9,340 ± 1,672; $d = 0.36$), suggesting similar myocardial oxygen requirements. **Conclusion:** This study showed that HR response was higher in an HW condition for older men. Warmer environments may add additional stressors to the body, which may impact training strategies and should be considered when estimating the effort of performing aquatic exercise.

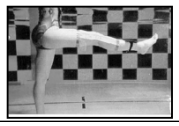
Keywords: aerobic response, oxygen cost of exercise, perceived exertion, water-based exercise

Diversificazione e mDiversificazione e modulazione del lavoro in acqua
odulazione del lavoro in acqua

- Posizioni
- Profondità
- Temperatura
- Presenza di flussi, vortici, correnti, turbolenze


Diversificazione e Diversificazione e modulazione del lavoro in acqua
odulazione del lavoro in acqua

- Posizioni
- Profondità
- Temperatura
- Presenza di flussi e/o correnti
- Utilizzo di attrezzi



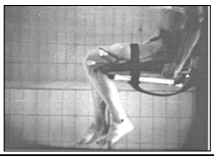



Classificazione per caratteristiche

- Attrezzi galleggianti (giubbotti o cinture, hydromanubri, hydrocavigliere, tubi, etc.)
- Attrezzi zavorranti (Pesetti, step, cavigliere zavorrate, etc.)
- Attrezzi neutri (Bastoni, elastici, guanti e palette, pinnette, etc.)
- Grandi attrezzi (hydrobike, treadmill acquatico, moon walker, etc.)

Adattamenti dell' apparato locomotore in acqua

- Maggiore vascolarizzazione a livello distrettuale muscolare
- Diverso modello di reclutamento muscolare
- Differente dinamica muscolatura agonista ed antagonista
- Lavoro in scarico gravitazionale - Minor carico osteoarticolare
- Diverse modalità di contrazione



ELSEVIER

Clinical Biomechanics 16 (2001) 496–504

CLINICAL BIOMECHANICS

www.elsevier.com/locate/clinbiomech

Electromyographic and kinematic analysis of therapeutic knee exercises under water

Tapani Pöyhönen [a,*], Heikki Kyröläinen [b], Kari L. Keskinen [b], Arto Hautala [c], Jukka Savolainen [c], Esko Mälkiä [a]

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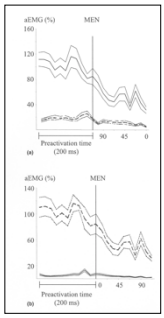
Received 23 October 2000; accepted 23 March 2001

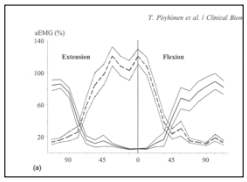
Protocollo sperimentale (disegno sperimentale entro soggetti):

·18 soggetti;

·1 singolo movimento di **flesso-estensione** massimale della gamba in acqua ferma; 6-8 flesso-estensioni della gamba in acqua corrente

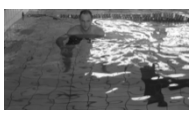
·**sEMG** del vasto mediale e laterale, del bicipite femorale e semitendinoso; **velocità angolari** della gamba

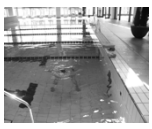




Conclusioni: nei movimenti ripetuti in acqua corrente c'è un elevato intervento degli antagonisti durante tutto il movimento di flesso-estensione del ginocchio

Fuller – The activity levels of the vastus medialis oblique muscle during a single leg squat on the land and at varied water depths – J Aquatic Phys Ther 1999





Kelly, Fujisawa e a. (1998) – Studio elettromiografico durante esercizi isometrici della spalla in immersione (sovrasoinato, infraspinato, sottoscapolare, pettorale, deltoide, gran dorsale): l' attivazione muscolare diminuisce notevolmente in acqua rispetto alla terra ferma

Il decremento dell' attivazione muscolare della spalla in acqua dipende principalmente dalla diminuizione del peso dovuto alla spinta di galleggiamento

-Maggiore sicurezza nei programmi riabilitativi in acqua
-Esercitazioni in acqua proponibili più precocemente

J Shoulder Elbow Surg (2013) ■, 1-7
ELSEVIER
Journal of Shoulder and Elbow Surgery
www.elsevier.com/locate/ymse

Analysis of arm elevation muscle activity through different movement planes and speeds during in-water and dry-land exercise

Romualdo Castillo-Lozano, MSc[a], Antonio Cuesta-Vargas, PhD[a,c,*], Charles Philip Gabel, PhD[b]

Practical implications

1. Shoulder muscle activity levels in water compared with dry land were significantly lower at low speed, similar at medium speed, and significantly higher at high speed.
2. The pectoralis and latissimus dorsi muscles showed higher activity during abduction and scaption in water, indicating a greater stabilization function.
3. A best-practice rehabilitation model suggests protocols whereby active flexion is introduced first at low speeds in water, then at medium speeds in water or on dry land, and finally at high speeds on dry land before in water.
4. Abduction movement requires higher stabilization, necessitating its introduction after flexion, with scaption introduced last.

Journal of Orthopaedic & Sports Physical Therapy

Effects of Aquatic Therapy on Joint Flexibility and Functional Ability in Subjects With Rheumatic Disease

<u>**EFFETTI E BENEFICI**</u>

riduzione carico gravitazionale
mobilizzazione precoce
↑ rilassamento muscolare
↓ contrattura muscolare e rigidità articolare
↓ sintomatologia dolorosa
↑ miglioramento circolazione e del trofismo distrettuale (vasodilatazione locale)
↑ miglioramento mobilità articolare con aumento ROM
↓ riduzione carico articolare
↑ coordinazione motoria
benefici a livello psicologico

- Profondità d'immersione
- Posizione
- Temperatura
- Attrezzi
- Flussi e correnti

The Effect of Eight Weeks Aquatic Balance Trainingand Core Stabilization Training on Dynamic Balance in Inactive Elder Males

HajarJahadian Sarvestani, HosseinBerenjeian Tabrizi, Ali Abbasi and Jamal Rahmanpourmoghaddam

Middle-East Journal of Scientific Research 11 (3): 279-286, 2012
ISSN 1990-9233

Obiettivi del trattamento in acqua

- Mobilizzazione
- Flessibilità articolare
- Elasticità muscolare
- Riduzione edema
- Rinforzo muscolare
- Core-stability
- Controllo neuromuscolare
- Rilassamento
- Allungamento
- Recupero




2017 Jan BMC MS Dis
Rivas Neira S
Effectiveness of Aquatic Therapy vs Land-based Therapy for Balance and Pain in Women with Fibromyalgia: a study protocol for a randomised controlled trial

Both interventions include 60-min therapy sessions, structured into 4 sections: Warm-up, Proprioceptive Exercises, Stretching and Relaxation

Original Research

Aquatic Versus Land-based Exercises as Early Functional Rehabilitation for Elite Athletes with Acute Lower Extremity Ligament Injury: A Pilot Study

Eunkuk Kim, MD, PhD, Taegyu Kim, PT, ATC, Hyunyong Kang, PT, Jongha Lee, MD, PhD, Martin K. Childers, DO, PhD

Objective: To compare outcomes between aquatic and land-based exercises during early-phase recovery from acute lower extremity ligament injuries in elite athletes.
Design: A single-blinded, covariate adaptive randomized, controlled study.
Setting: National training center for elite athletes.
Participants: Twenty-two athletes with isolated grade I or II ligament injury in ankles or knees were randomized into either an aquatic or land-based exercise group.
Interventions: Early functional rehabilitation program (ranging, strengthening, proprioceptive training, and functional exercises) was performed in both groups. All exercises were identical except for the training environment.
Main Outcome Measurements: Data were collected at baseline and at 2 and 4 weeks using a visual analog scale (VAS) for pain; static stability (overall stability index [OSI] level 5 and 3); dynamic stability (TCT), and percentage single-limb support time (%SLST).
Results: Both groups showed decreases in VAS, OSI 5 and 3, and TCT, with a concomitant increase in %SLST at 2 and 4 weeks ($P < .05$). No significant differences were detected between the 2 groups in any of the outcome measures. However, the line graphs for VAS, OSI 3, TCT, and %SLST in the aquatic exercise group were steeper than those in the land-based exercise group indicating significant group by time interactions ($P < .05$). These data indicate that the aquatic exercise group improved more rapidly than the land-based exercise group.
Conclusions: For elite athletes with acute ligament sprains in the lower limb, aquatic exercises may provide advantages over standard land-based therapy for rapid return to athletic activities. Consequently, aquatic exercise could be recommended for the initial phase of a rehabilitation program.

PM R 2010;2:703-712

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amail.com

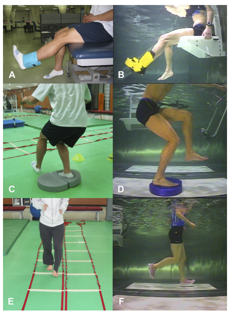

Figure 2. Land-based exercise and adapted aquatic exercise showing strengthening exercise **(A, B)**, proprioceptive training

Table 1. *Aquatic versus land-based exercises for the early functional rehabilitation of acute lower extremity ligament injuries*

	Aquatic Exercise		Land-based Exercise	
	Ankle	Knee	Ankle	Knee
RICE (1 week)	Braces (short-term if necessary), ice pack, compression sleeve, elastic wraps, leg elevation			
ROM exercise (2-6 weeks)	Active ROM: pain-free Achilles tendon stretching	Active ROM: pain-free Quadriceps/hamstring stretching	Active ROM: pain-free Achilles tendon stretching	Active ROM: pain-free Quadriceps/hamstring stretching
	Isometric strengthening (pain-free per direction)	Isometric strengthening (pain-free per direction)	Isometric strengthening (pain-free per direction)	Isometric strengthening (pain-free per direction)
Strengthening exercise (2-6 weeks)	Isotonic contraction: full ROM (plantar/dorsiflexion, inversion/eversion)	Isotonic contraction: full ROM (flexion/extension)	Isotonic contraction: full ROM (plantar/dorsiflexion, inversion/eversion)	Isotonic contraction: full ROM (flexion/extension)
Proprioceptive training (2-6 weeks)	Wobble boards (full weight bearing) with eyes open or closed, with or without resistance, initial two legs to one leg			
Functional exercise (2-6 weeks)	Walking-jogging-running, figure of 8 drills, lateral cutting drills, double leg jumping, single leg hopping			

RICE = protection, rest, ice, compression, elevation; ROM = range of motion.

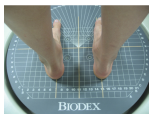

Figure 3. Foot position on the platform. Both feet were placed on the same standard position on the platform to ensure the same foot position for all participants and for all measurements.

Berger – Immediate effects of physiotherapy session of lower limb by balneotherapy on postural control – Ann Readapt Med Phys 2006

- Esercitazioni dei muscoli degli arti inferiori in acqua rinforzano gli stimoli propriocettivi, producendo un miglior controllo posturale

Pantoja 2009, J Strenght Cond Res 2009
Effect of resistive exercise on muscle damage in water and in land

- L'ambiente acquatico riduce in maniera significativa la possibilità di danno muscolare dopo esercizio intenso; protocolli specifici possono essere utilizzati nelle situazioni in cui si vuole limitare le possibilità di lesione muscolare

AquaStretch Overview

by George Eversaul, A.P.H.

SUMMARY: AquaStretch is a new form of individual and facilitated aquatic exercising, which may be used in Wellness programs and also as an aquatic therapy. It's like being stretched by an athletic trainer, only with movement in various depths of water (3'-5'), and with 5 to 15 lb weights attached to your body. It's also like a "cranial unwinding" in water, with verbal psychological encouragement to "Move, if you feel the need to move".

BASIC PROCEDURE: The basic AquaStretch procedure consists of four steps:

1. Play 2. Freeze 3. Pressure 4. Move (if you feel the need to move)

Finding Pressure Points: There are four ways to find pressure points or fulcrums to AquaStretch: 1. Playing 2. Palpation 3. Intentional Movement 4. Gravity Aggravated

AquaStretch Theories: Many people ask, "Why does AquaStretch work? In summary, there are four basic explanations that may synergistically be interacting to account for the many physiological changes observed with AquaStretch exercising:
1. The body's enhanced flexibility in water; 2. The use of variable "Stress Resistance";
3. The Fascial Adhesion Theory; and, 4. Intuitive Movement.

The second theoretical explanation for why AquaStretch works is that AquaStretch controls "stretch resistance" with three variables, by: 1. Attaching 5 lb to 15 lb weights; 2. Changing buoyancy; 3. Varying facilitator pressure either directly or isometrically.

AquaStretch is a breakthrough in aquatic therapy, pain management and physical medicine. It often succeeds when other traditional treatments have failed. In addition, the benefits have been reported to last up to 3 to 4 times longer. Immediately, I realized it blew all other techniques (i.e., aquatic and land

What is AquaStretchTM?
AquaStretchTM is a one-on-one, assisted, stretching and myofascial release technique performed in shallow water using weighted resistance.

How Does AquaStretchTM Work?
AquaStretchTM is a 10-step procedure that can be extrapolated upon. Therapists have a great understanding of physiology and anatomy, which will assist, in the level of effectiveness that can be achieved with this technique. The purpose of this technique is to release myofascial adhesions. Adhesions can form between the muscle fibers, the tendons, ligaments, nerves, organs, lymph glands, blood vessels, or anywhere within the body that has fascia. In other words, they can form anywhere. They are temporary hardenings particularly around injured or overused areas.

April 2017 Volume 21, Issue 2, Pages 297–305
Journal of bodywork and movement therapies
Keane L..
Comparing AquaStretch with supervised land based stretching for Chronic Lower Back Pain

Results & conclusion
Statistical significance ($p < 0.05$) was observed in the AquaStretch group for pain reduction ($P = 0.006$), kinesiophobia ($P = 0.029$), and perceived disability ($P = 0.001$). Both techniques are suggested to be beneficial for CLBP patients however AquaStretch has key additional benefits including time efficiency, cost effectiveness and the ability to be performed by qualified individuals other than physiotherapists. A reduction in pain post eight weeks of treatment using AquaStretch versus twelve weeks of land based stretching could result in potentially less treatment time needed and a possibility of less medication.

KURUME MED J1999;46(2):91-6
Ariyoshi M
Efficacy of aquatic exercises for patients with low-back pain

The exercises employed consisted of strengthening exercises for the abdominal, gluteal, and leg muscles, stretching of the back, hip, hamstrings, and calf muscles, walking in water, and swimming

The improvement in physical score was independent of the initial ability in swimming. The results obtained suggested that exercises in water may be one of the most useful modes of exercise for a patient with low-back pain.

Hydrotherapy—a new approach to improve function in the older patient with chronic heart failure

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[b]*Department of Rehabilitation Medicine, Institution for Community Medicine, The Sahlgrenska Academy at Göteborg University, Sahlgrenska University Hospital, Goteborg, Sweden*

Received 15 April 2002; received in revised form 9 December 2002; accepted 7 January 2003

Abstract

Aims: Hydrotherapy, i.e. exercise in warm water, as a rehabilitation program has been considered potentially dangerous in patients with chronic heart failure (CHF) due to the increased venous return caused by the hydrostatic pressure. However, hydrotherapy has advantages compared to conventional training. We studied the applicability of an exercise programme in a temperature-controlled swimming pool, with specific reference to exercise capacity, muscle function, quality of life and safety. *Methods and results:* Twenty-five patients with CHF (NYHA II–III, age 72.1±6.1) were randomised into either 8 weeks of hydrotherapy ($n=15$), or into a control group ($n=10$). The training program was well tolerated with no adverse events. Patients in the hydrotherapy group improved their maximal exercise capacity (+6.5 vs. −5.9 W, $P=0.001$), isometric endurance in knee extension (+4 vs. −9 s, $P=0.01$) together with an improvement in the performance of heel-lift (+4 vs. −3 n.o., $P=<0.01$), shoulder abduction (+12 vs. −8 s, $P=0.01$) and shoulder flexion (+6 vs. +4, $P=0.01$) in comparison to patients in the control group. *Conclusion:* Physical training in warm water was well tolerated and seems to improve exercise capacity as well as muscle function in small muscle groups in patients with CHF. This new approach broadens the variety of training regimes for older patients with CHF.

Aerobic exercise
1. Jumps in place: contra lateral knee towards contra lateral elbow. Body twisting with the arms working under surface in the opposite direction. Jog in place with high knees while swimming breaststrokes with the arms (130 b/min).

Endurance and strength training
1. Eight exercises each performed for 2 min (60 b/min).
   - Sitting: reciprocal knee flexion and extension using a chair with water level to the sternal notch.
   - Standing: unilateral knee extension and flexion with a hip angle of approximately 45°.
   - Standing: unilateral hip flexion and extension (fast small movements).
   - Standing: reciprocal shoulder flexion and extension with paddles.
   - Standing: bilateral shoulder abduction (90°) fast small movements with weights.
   - Standing: reciprocal shoulder flexion and extension with floating weights.
   - Standing: bilateral elbow extension (upper arms held towards thorax) with floating weights.
   - Standing: unilateral heel-lift with water level to waist.

Aerobic exercise:
1. Jumps in place: contra lateral knee towards contra lateral elbow. Bicycling forwards and backwards with the legs in a supine position (120 b/min).
2. Jumps in place: ski jumps with reciprocal arm movements. Walking/Jumping side to side (120 b/min).

Stretching
1. Stretching exercises for leg and arm muscles.

Relaxation:
1. Supine position with floating devises and soft classical music.

BMC Musculoskeletal Disorders

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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

BMC Musculoskeletal Disorders 2013, **14**:82 doi:10.1186/1471-2474-14-82

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Discussion

This randomised controlled trial will investigate the effect a progressive aquatic resistance exercise program has on the biochemical composition of cartilage in post-menopausal women with mild knee osteoarthritis. This is the first study to investigate what impact aquatic exercise has on human articular cartilage. In addition it will investigate the effect aquatic exercise has on physical function, pain, bone and body composition and quality of life. The results of this study will help optimise the prescription of aquatic exercise to persons with mild knee osteoarthritis.

Table 1 Description of exercises included in the intervention

Warm-up (10-15 minutes)	Strength training (35 minutes)	Cool down (10 minutes)
1. Standing hip flexion/extension	1. Hip adduction/abduction (Figure 2): Stand on right leg with knee fully extended. Keeping knee straight and ankle in dorsiflexion swing left leg from side to side as fast as possible using full range of motion. Left leg crosses over in front of right leg. Particular attention is paid to maintaining a neutral pelvic and spinal position.	3-5 minutes of walking and supported cycling against wall
2. Standing hip abduction/Abduction	2. Standing hip flexion/extension (Figure 3): Standing side on to wall and stand on leg furthest away from wall. Swing leg nearest wall forwards and backwards as fast as possible using full range of motion. Keep knee of moving leg in full extension and ankle in dorsiflexion. Maintain spinal neutral at all times.	Stretches, 30 seconds stretch for each side.
3. Seated bilateral knee flexion/extension.	3. Standing knee flexion/extension (Figure 4): Standing side on to wall and transfer weight on to leg furthest away from wall. Lift leg nearest wall straight up in front stopping just before any stretch sensation is felt in the posterior aspect of thigh. Keeping thigh still, flex and extend knee as fast as possible using full range of motion.	1. Hip flexors (Iliopsoas)
4.Calf raises on edge of step (weeks 1-8 double leg, weeks 9-16 single leg)	4. Seated knee flexion/extension (Figure 5): Sitting on chair keeping back of legs fixed against seat, alternately flex and extend both knees as fast as possible using full range of motion.	2. Gluteus maximus
5. Balance beam (EWAC, Netherlands) walking forwards and backwards (weeks 1-6 without arms, weeks 6-12 carry tray with ball on, 13-16 same eyes closed)	5. Kickback (reverse hinge) (Figure 6): Standing on edge of step board so that moving leg can be swung down next to it. Starting position is with supporting leg in full extended and other legs hip and knee is in flexion up near wall. Leg is explosively straightened down towards bottom of pool and then kicked backwards with leg straight as far as possible. During this movement supporting leg is flexed but plantar aspect of foot is kept firmly pressed against step.	3. Quadriceps

J Athl Train 2000 Jul;35(3):382-9
Thein JM
Aquatic-based rehabilitation and training for the shoulder

All aspects of the rehabilitation program, including passive stretching, resistive exercise, functional movement patterns, and cardiovascular training, can take place in the same location. The water's warmth and buoyancy enhance stretching, while the buoyancy allows initiation of resistive exercise at a low level. The water's viscosity provides resistance throughout a movement pattern in any plane

Hay I . E al. – Towards evidence-based emergency medicine: best BETs from the Manchester Royal Infirmery. BET 4: Hydroteraphy following rotator cuff repair - Em Med J 2011

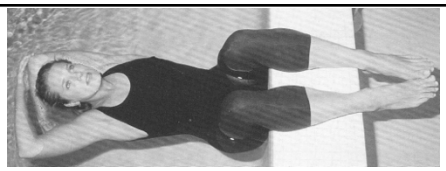



Lavoro in acqua - Riabilitazione spalla

- Esercizi attivi e passivi nelle differenti posizioni per sfruttare la spinta di galleggiamento, con elevazione della spalla, incrementando la mobilità e la stabilità della stessa riducendo il lavoro della cuffia dei rotatori in elevazione







Esperienze personali 1 (dati da tesi)

PREMESSE: i soggetti traumatizzati tendono a perdere parte della propria escursione articolare; uno dei metodi che sembrerebbe contribuire maggiormente per il recupero di un adeguato ROM (Range of Motion) è l'Idrokinesiterapia

SCOPO: valutare quanto sia efficace una seduta di idroterapia per il recupero della mobilità articolare e per il rilassamento muscolare in soggetti che hanno subito traumi agli arti inferiori (in particolar modo a carico del ginocchio

VALUTAZIONI: misurazioni delle modificazioni che si ottengono, a breve termine (subito dopo una seduta di idrokinesiterapia, in termini di flessibilità e stifness)

MATERIALI E METODI

GLI STRUMENTI UTILIZZATI

- *FlexAbility (TechnoGym)*

Macchinario per valutare e stimolare l'allungamento della catena flessoria degli arti inferiori

- *Myoton*

Piccolo dispositivo, portatile e totalmente non invasivo che permette di rilevare Tono, Elasticità e Resistenza di un muscolo sollecitato.

- *GyKo (Microgate)*

Strumento di misura inerziale per l'analisi del movimento. Viene applicato al segmento corporeo da valutare e ciò permette il monitoraggio della funzionalità articolare e della forza muscolare durante il processo di acquisizione dati

TONO

STIFFNESS

RILASSAMENTO

ELASTICITA'

SCORRIMENTO

MYOTON®
MUSCLE DIAGNOSTICS

	DATI		ARTO LESO
SOGGETTO 1	Età: 80 Altezza: 169cm Peso: 70Kg	Sesso: Maschio	Destro Ricostruzione del ginocchio mediante protesi
SOGGETTO 2	Età: 25 Altezza: 178cm Peso: 75Kg	Sesso: Maschio	Sinistra Rottura del Vasto mediale
SOGGETTO 3	Età: 31 Altezza: 175cm Peso: 70Kg	Sesso: Maschio	Destro LCA + menisco
SOGGETTO 4	Età: 20 Altezza: 192cm Peso: 90Kg	Sesso: Maschio	Sinistra LCA (trattamento pre-operatorio)
SOGGETTO 5	Età: 15 Altezza: 162 Peso: 63Kg	Sesso: Femmina	Destro LCA (deambulazione con stampella)
SOGGETTO 6	Età: 69 Altezza: 153cm Peso: 65Kg	Sesso: Femmina	Destro Gonartrosi
SOGGETTO 7	Età: 21 Altezza: 168cm Peso: 58Kg	Sesso: Femmina	Destro LCA + menisco
SOGGETTO 8	Età: 26 Altezza: 170cm Peso: 57Kg	Sesso: Femmina	Destro LCA + menisco
SOGGETTO 9	Età: 71 Altezza: 171cm Peso: 97Kg	Sesso: Maschio	Sinistra Rottura del femore; operato chirurgicamente

PROTOCOLLO DI LAVORO IN ACQUA

La vasca è stata predisposta con una temperatura di circa 32°C.

È importante notare come queste sedute siano particolarmente efficaci in acqua calda, poiché oltre agli aspetti prettamente funzionali dell'elemento, l'effetto termico provoca un generale rilassamento muscolare nel soggetto, il quale si troverà in una situazione di benessere psico-fisico.

Per quanto riguarda l'aspetto tecnico, la seduta ha avuto una durata individuale di 45 minuti ed ogni soggetto è stato sottoposto agli stessi esercizi a prescindere dalla personale situazione lesiva.

La seduta è stata così suddivisa:

- Un riscaldamento generale
- Esercizi con piccoli movimenti senza attrezzi
- Esercizi di allungamento e stabilizzazione con attrezzi (tubi, cavigliere, etc)
- Esercizi dinamici con tavoletta e step
- Esercizi con diverse andature in acqua bassa (140cm).
- Stretching per muscoli flessori ed estensori.

RISULTATI

Le seconde misurazioni fatte, hanno permesso di quantificare le modificazioni avvenute in seguito alla seduta idroterapica

La media dei dati raccolti ha evidenziato che:

FlexAbility	Destro = 8,1° Sinistra = 8° Bipodalica = 6,4°
Myoton	Retto Femorale: Rilassato DX = -1,2% SN = -4% Contratto DX = +5,8% SN = -2% Bicipite Femorale: Rilassato DX = -4% SN = -2% Contratto DX = -1,2% SN = +1,2%
GyKo (ROM)	Flessione = +3,2% Estensione = +6,4%

CONCLUSIONI

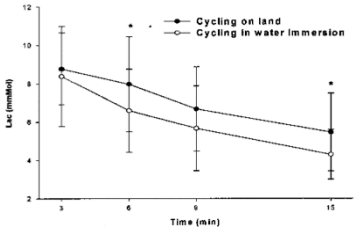
I risultati ottenuti mostrano un andamento positivo rigurdo l'escursione articolare e la rigidità muscolare (stifness)

Relativamente alla tipologia dei traumatismi, gli effetti più significativi sono stati quelli relativi a soggetti con traumi a livello articolare rispetto a quelli con traumi muscolari o ossei

Da questi primi dati sembra che una seduta di attività acquatica mirata incrementi l'escursione articolare e riduca la rigidità articolare e il tono muscolare in soggetti con traumatismi dell'arto inferiore, dopo pochi minuti (15') dalla fine della seduta stessa. Ulteriori studi sono necessari per verificare effetti più duraturi e per ottimizzare i protocolli di lavoro, sia per gli atleti sia per altre tipologie di soggetti

Di Masi e coll. – J SpSc & M 2007

- Is blood lactate removal during water immersed cycling faster than during cycling on land?



Dopo 6' al treadmill al 10% al di sopra della LT, esercizio di 15' di recupero attivo al 65% della APMHR

Rimozione del LA più rapida in acqua al 6° e 15° minuto

Di Masi , 2007, J Sports Sci and Med 6: 188-192

EFFECT OF DIFFERENT TYPES OF RECOVERY ON BLOOD LACTATE REMOVAL AFTER MAXIMUM EXERCISE

Types of recovery on blood lactate

JACIELLE CAROLINA FERREIRA[1], RODRIGO GUSTAVO DA SILVA CARVALHO[1], THIAGO MOREIRA BARROSO[1], LESZEK ANTONI SZMUCHROWSKI[1], DARIUSZ ŚLĘDZIEWSKI[2]

Pol. J. Sport Tourism 2011, 18, 105-111

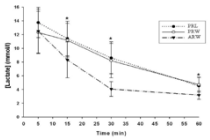
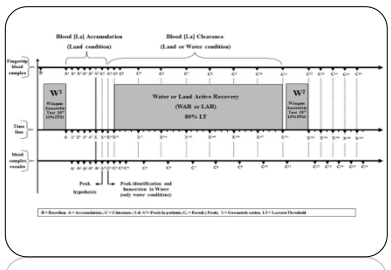


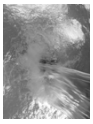
Figure 1. Graph representing the kinetics of blood lactate removal of the ARW, PRW and PRL

Esperienze personali – 2 (Tesi di dottorato)



Stretchin' in acqua

- Esercizi in scarico parziale e totale (variazione profondità)
- Stretchin' alternato a mobilizzazione blanda (stretchin' dinamico in acqua?)
- Utilizzo di idrogetto
- Ricerca e lavoro sulle rigidità
- Utilizzo di più tecniche (es.PNF)



Stretchin' in acqua

- Sfruttare le caratteristiche dell'ambiente acquatico
- Tenere conto dell'azione combinata di spinte idrostatiche, resistenze, flussi, correnti, turbolenze
- Finalizzare il lavoro all'obiettivo
- Utilizzare attrezzi dedicati
- Coordinarsi con le altre attività

Conclusioni

- La pratica di tecniche di allungamento, rilassamento, mobilizzazione in acqua (stretchin', aquastretchin', aquarelax, watsu, ai-chi, etc) possono essere inserite in sessioni specifiche o alla fine di sessioni più o meno articolate, o fra esercitazioni specifiche.
- Le caratteristiche dell'ambiente acquatico sembrano essere particolarmente favorevoli per ottenere effetti, almeno parziali, più significativi rispetto ad esercitaizoni simili a secco; peraltro, è interessante anche sperimentare l'effetto combinato delle due tecniche
- Non essendoci ancora protocolli e indicazioni strutturate, sono necessari ulteriori studi e ricerche che tegano conto delle varie proposte

GRAZIE!


IDROCHINESITERAPIA
RIABILITAZIONE IN ACQUA

IDROCHINESITERAPIA
MANUALE DI RIABILITAZIONE IN ACQUA

Graz