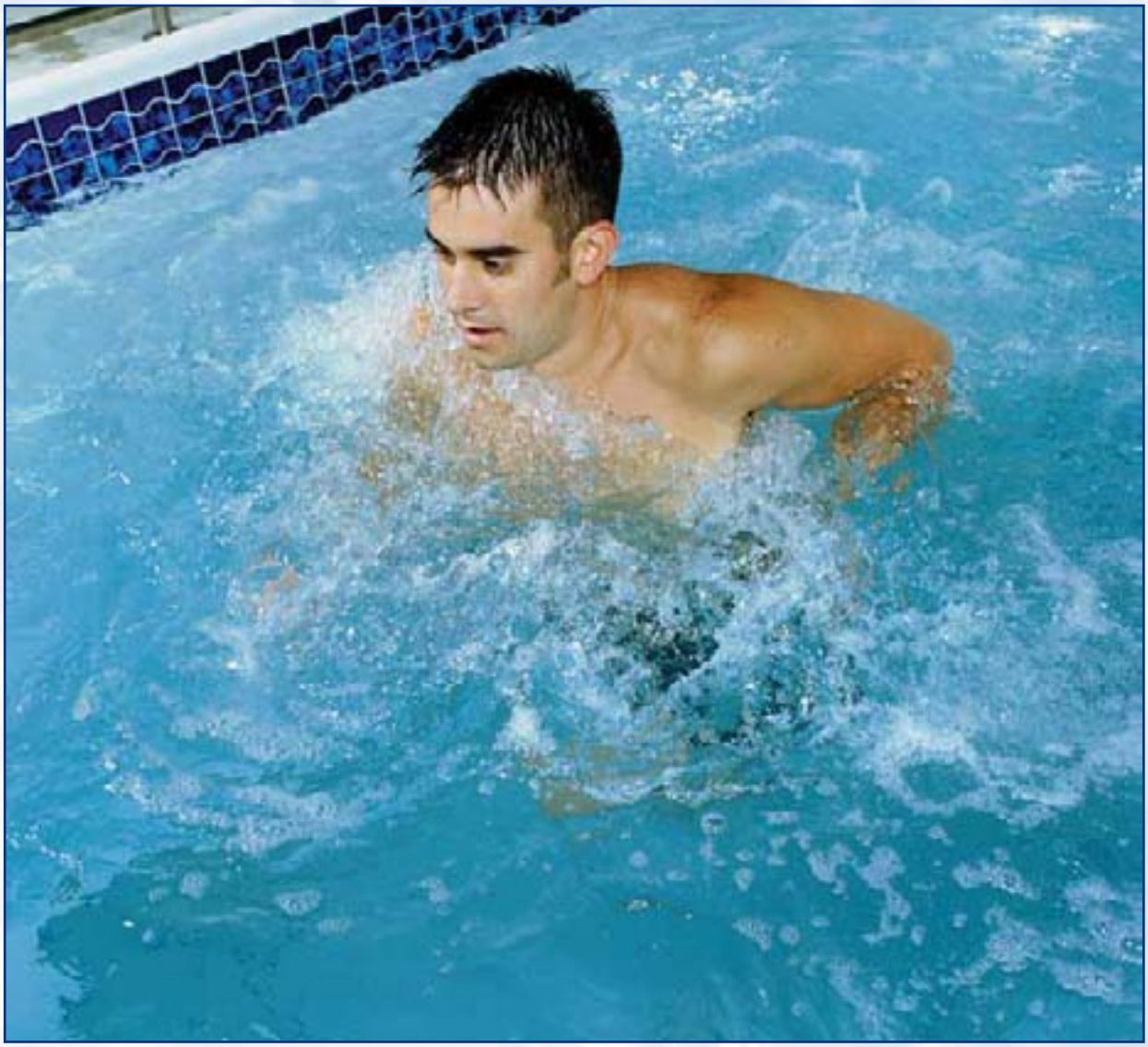
Clinical & University Research Studies Utilizing HydroWorx Technology



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Notable Findings

HydroWorx underwater treadmill exercise:

- **provides similar cardiovascular benefits to land treadmill exercise**
- **increases lean body mass**
- **increases mobility and balance**
- **significantly reduces muscle soreness and aides in recovery**
- **is far less painful than exercising on a land-based treadmill**
- **produces better balance and reduces the chance of re-injury**
- **improves flexibility, sleep patterns, reduces muscle and joint pain**

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HydroWorx and Running Study

Water Treadmill Parameters Needed to Obtain Land Treadmill Intensities in Runners

Rachel K. Rife, Joseph William Myrer, Pat Vehrs, Jeffery Brent Feland, Iain Hunter, and Gilbert W. Fellingham

Department of Exercise Sciences, Brigham Young University

Purpose:

This study was conducted to establish water treadmill running parameters with shoes and without shoes needed to obtain known land treadmill running cardiorespiratory responses.

Method:

Eighteen trained college-aged runners participated in three running conditions. Subjects performed workouts on a land treadmill, on a HydroWorx underwater treadmill with shoes, and a HydroWorx underwater treadmill without shoes.

Results:

All subjects were able to exercise on an underwater treadmill at intensities equivalent to 80% of oxygen consumption on land treadmills. This study reveals that participants can select a treadmill speed in underwater treadmills that elicits a heart rate of seven beats per minute less than their land treadmill rate. Participants took twenty-two fewer strides per minute during the underwater treadmill workout than during the land treadmill workout. Wearing shoes created more resistance for the underwater treadmill workouts, creating a slower stride and increasing oxygen consumption.

Conclusion:

The water treadmill provides athletes an alternative method of training to maintain cardiovascular fitness without the weight bearing demands of land running. Subjects should select water treadmill speeds that elicit a heart rate response that is seven beats per minute less than typical training heart rate during land based running.

HydroWorx and Running Study

Peak Cardiorespiratory Responses during Aquatic and Land Treadmill Exercise

W. Matthew Silvers, Erin R. Rutledge, and Dennis G. Dolny

Division of Health, Physical Education, Recreation, and Dance, University of Idaho

Purpose:

This study investigated the cardiorespiratory responses elicited during maximal-effort protocols using an underwater treadmill and a land treadmill.

Method:

Participants consisted of twenty-three recreationally competitive male and female runners. Subjects performed two maximal-exertion runs, one on a land treadmill, and the other on a HydroWorx underwater treadmill, measuring cardiorespiratory rates, perceived exertion, and blood lactate after each run. Runs were separated by a forty-eight hour period.

Results:

Underwater treadmills can elicit similar peak cardiorespiratory responses compared with land treadmill running during maximal-exertion testing. Heart rate decreased during underwater treadmill exercise due to an increase in central venous return, preload, and stroke volume as a result from a shift in blood volume from the hydrostatic pressure of water.

Conclusion:

Underwater treadmill and jets elicit comparable responses to inclined land treadmill in fit individuals. Underwater treadmill training may be a viable training alternative to maintain or improve fitness levels for injured and healthy athletes alike.

HydroWorx and Running Study

Metabolic-Cost Comparison of Submaximal Land and Aquatic Treadmill Exercise

M Erin Rutledge, W. Matt Silvers, Kathy Browder, and Dennis Dolny

Department of Health, Physical Education, Recreation and Dance, University of Idaho

Purpose:

This study was conducted in order to evaluate the metabolic cost of varying aquatic treadmill exercise speed and water-jet resistance and compare with land treadmill conditions at similar running speeds.

Method:

Fifteen male and female college aged track and field athletes participated in the study. Subjects completed nine, five minute submaximal underwater treadmill workouts with jets at varying resistance using a HydroWorx pool.

Results:

Limb loading was reduced significantly in the underwater treadmill sessions. The energy expenditure per stride ranged from 30%- 56% greater during underwater running than in land running.

Conclusion:

Underwater treadmill training offers viable exercise alternatives to land treadmill running as a way to maintain or improve fitness for injured and healthy individuals.

HydroWorx Used to Treat Osteoarthritis Study

Underwater Treadmill Exercise as a Potential Treatment for Adults with Osteoarthritis

William M. Denning, Eadric Bressel, and Dennis G. Doiny

Utah State University John Worley Sports Medicine Research Center

Purpose:

This study examined the levels of perceived pain and mobility in osteoarthritis patients after using underwater and land treadmills.

Method:

Nineteen patients, diagnosed with osteoarthritis in the knee, hip or ankle participated in the study. All participants were over thirty five years old and had a clinical history of the disease. Each participant performed three consecutive exercise sessions on a HydroWorx treadmill and a land treadmill, separating exercise periods by twenty four hours and exercise mode by one week. Each exercise period was twenty minutes and consisted of four, five minute stages. Joint pain was measured immediately before and after each exercise session. "Timed Up and Go" assessed basic mobility and balance before each exercise method and after the third exercise session.

Results:

Results of this study indicated that patients diagnosed with OA may walk on an underwater treadmill at a moderate intensity with less pain and equivalent energy expenditures, compared with walking on a land based treadmill at a similar moderate intensity. Patients revealed that pain was 140% greater during land treadmill exercise sessions than during underwater treadmill exercise sessions. The "Timed Up and Go," which measured the ability for patients to arise from a chair and walk a set distance was 240% greater after land treadmill exercise sessions.

Conclusion:

Patients diagnosed with osteoarthritis may receive the same aerobic conditioning with less joint pain and greater improvements in mobility by utilizing underwater treadmills opposed to land treadmills.

HydroWorx Used to Decrease Obesity Study

Comparative Efficacy of Water and Land Treadmill Training for Overweight of Obese Adults

Nicholas P. Greene, Brad S. Lambert, Elizabeth S. Greene, Aaron F. Carbuhn, John S. Green, and Stephen F. Crouse

Department of Health and Kinesiology, Texas A & M University, College Station, TX

Purpose:

This study was conducted in order to explore the efficacy of underwater treadmill exercise training programs by comparing changes in physical fitness, body weight, and body composition in physically inactive, overweight, and obese men and women.

Method:

Fifty-seven overweight men and women participated in this study. Subjects maintained dietary logs during the twelve week test period, making no alterations to diet or physical activity outside of the exercise training protocol. Participants exercised three times a week during the twelve week testing period in a HydroWorx pool.

Results:

Underwater treadmill exercise training programs performed by overweight and obese men and women is an effective training modality, producing beneficial changes in body composition and improvements in physical fitness. Health benefits were comparable to those of land-based treadmill training programs. More lean body mass was gained in the underwater treadmill training program compared to a land treadmill training program. Body mass index, percent body fat, and waist-to-hip ratio were significantly reduced in participants. Additional advantages of underwater treadmill training programs are the lower risk of pain and injury.

Conclusion:

This study shows that underwater treadmill training is a viable alternative to traditional land treadmill training for overweight users_. Underwater treadmill training produces modest reductions in body weight, improvement in body composition, and aerobic capacity in a twelve week period without dietary intervention. The non-weight-bearing exercise reduces pain and risk of injury in overweight and obese people.

HydroWorx Increases Lean Mass Study

Lean Body Mass Increases following 12-Week Aerobic Training with Underwater but not Land Treadmill

Elizabeth S. Greene, Nicholas P. Greene, Aaron F. Carbuhn, John S. Green, FACSM, Stephen F. Crouse, FASCM

Texas A&M University

Purpose:

This study was conducted in order to compare the changes in body composition following twelve weeks of exercise training using either a land treadmill or an underwater treadmill.

Method:

Forty-seven overweight and obese men and women participated in this study. Subjects were randomly assigned to exercise three times a week on either a land treadmill or a HydroWorx underwater treadmill. Exercise intensities and durations were calculated such that subjects in both groups had the same caloric expenditure during each bout. Before and after the twelve week period, weight, percent body fat, fat mass, lean body mass and regional fat and lean mass were assessed.

Results:

There was no difference in oxygen uptake in either workout programs. Participants in both the underwater treadmill and land treadmill groups saw decreases in weight, percent body fat, and fat mass. Lean body mass increased in the underwater treadmill workouts, primarily in the legs while lean body mass did not increase in the land treadmill workouts.

Conclusion:

Aerobic exercise training on the underwater treadmill is able to elicit similar decreases in weight, percent body fat, and fat mass as the land treadmills. However, lean body mass increases with underwater treadmill training, with gains seen mainly in the legs.

HydroWorx used in ACL Recovery Program

In the Pool: Knee Anterior Cruciate Ligament Recovery Program

Mary E. Sanders, Ph. D. FACSM, RCEP, and B aryl Lawson, PT, D.Sc.

Summary:

An aquatic environment may be ideal during all phases of ACL rehabilitation post surgery. The reduced weight-bearing environment can provide a safe environment for the patient's range of motion and neuromuscular recovery activities that are not possible on land.

A thirty five year old world-class soccer player who sustained a complete tear of his ACL was able to return to play within ninety days of surgery due to aquatic therapy six days per week, twice a day.

Twenty patients with intra-particular ACL reconstructions were randomly assigned to a land or water exercise group. Participants in the water exercise group noted a greater minimization of joint effusion and greater self reports of functional improvements. Participants also found greater muscle girth at the calf and thigh, greater quadriceps strength, and better range of motion at the knee for those doing the water treadmill workout.

Clinical results show that athletes who participate in water rehabilitation and land-based post-rehabilitation have better scores on postural sway, indicating better balance. They also experienced fewer episodes of re-injury after return on play.

HydroWorx Benefits in Active Aging Study

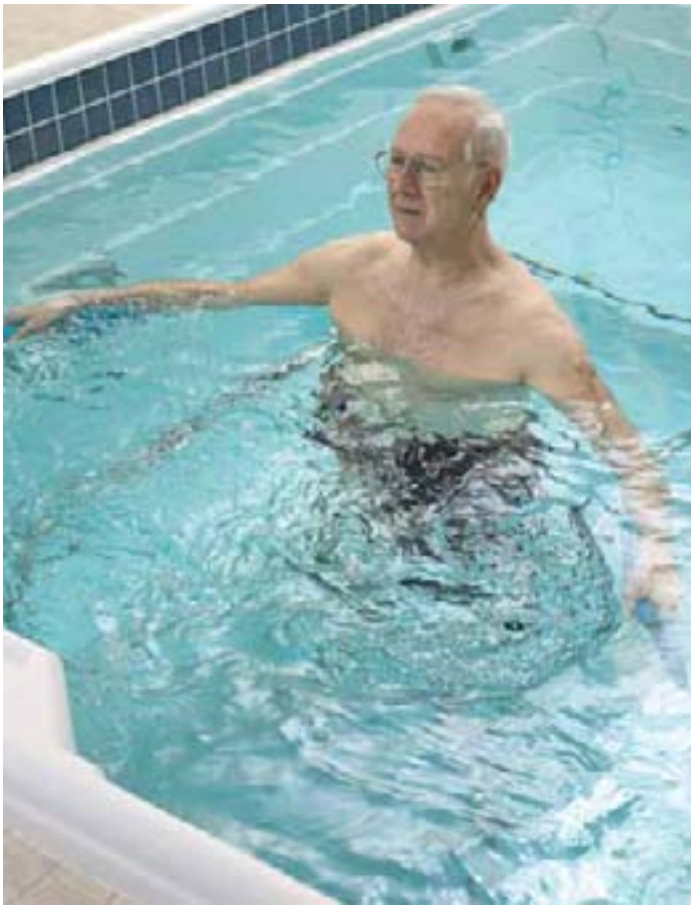
Health Benefits of Underwater Treadmill Exercise for Active Adults

Amanda Desmond, Ashley Bayliss, Heather Jacobson, Hillary Hardy,
Kristen Jarvey, and Don Bredle PhD

Department of Kinesiology, University of Wisconsin

Purpose:

This study was conducted in order to assess the health benefits of hydrotherapy in active adults.



Method:

Fourteen adults, who already exercised three days a week, participated in the five week study. Each participant had a history of physical ailments. Participants exercised on a HydroWorx underwater treadmill two days a week for forty minutes performing both aerobic exercise and aquatic resistance training. Participants also took a quality of life survey that measured changes in flexibility, the ability to perform daily activities, energy levels, and overall sleep patterns.

Results:

Subjects expressed feeling better both physically and psychologically during the exercise period. Eleven reported decreased joint pain while seven reported better quality of sleep. The group average for flexibility improved about twenty percent after the test period.

Conclusion:

Hydrotherapy is a positive way to improve flexibility, sleep patterns, and reduce muscle and joint pain in middle-aged and older adults with a history of orthopedic limitations and discomfort.

HydroWorx and Walking Study

The Effect of Water Depth on Energy Expenditure and Perception of Effort in Female Subjects While Walking

Wafa Alkurdi, David R. Paul, Kelsey Sadowski, and Denis G. Dolny

Health, PE, and Recreation and Dance Department at University of Idaho

Purpose:

This study was conducted in order to compare energy expenditures, heart rate, and perceived effort during walking in water at several depths versus land in female participants.

Method:

Eighteen females participated in this study. Participants on three separate days in one week on a land treadmill, walking six, five minute bouts at different speeds with a three minute rest period between each bout. Participants walked followed the same procedures at different depths on a HydroWorx underwater treadmill on a different week. During each walking bout heart rate, oxygen consumption, and carbon dioxide production were recorded continuously.

Results:

Minor changes in water depth significantly influenced cardiorespiratory variables and the subject's perception of effort during walking on an aquatic treadmill. Heart rate, energy expenditure, and rate of perceived effort increased significantly as water depth was lowered by twenty centimeters.

Conclusion:

These results suggest water depth can be used to selectively adjust exercise intensity during water walking. Therefore, substituting aquatic treadmill walking for land walking might be beneficial for overweight individuals as they strive to incorporate physical activity into their lifestyle.

HydroWorx Training and Blood Pressure Study

Aquatic Treadmill Training Reduces Blood Pressure Reactivity to Physical Stress

Greene, Nicholas P.; Lambert, Brad S.; Carradine, Alex T.; Joubert, Dustin P.; Fluckey, James D.; Riechman, Steven E.; Crouse, Stephen F.

Department of Kinesiology, Texas A&M University

Cardiovascular Research Center, University of Virginia

Purpose:

This study was conducted in order to test blood pressure responses to aquatic treadmill training. Endurance exercise can reduce blood pressure, therefore reducing overall stress. This study sought to test the efficacy of a low-impact form of endurance training, the aquatic treadmill, to improve blood pressure

Methods:

Sixty sedentary adults were randomized to twelve weeks of either aquatic treadmill training (ATM) or land-based treadmill (LTM) training. The maximal 'Bruce treadmill test' protocol was performed before and after training with blood pressures measured prior to training, at the end of each stage and for five minutes following exercise testing.

Results:

ATM but not LTM training significantly reduced resting diastolic BP, exercise systolic BP, diastolic BP, mean arterial pressure and pulse pressure during stages of exercise stress and recovery.

Conclusion:

Data suggests that aquatic treadmill training may provide superior benefits over land-based treadmill training for promoting reductions in exercise blood pressure.

ATM training can reduce blood pressure reactivity to physical stress.

HydroWorx and Muscle Growth Study

Aquatic Treadmill Training Enhances Muscle Protein Synthesis Rates When Combined with Resistance Training

Stephen F. Crouse, Ph.D, FACSM, James Fluckey, Ph.D, FACSM,

Brad Lambert, Research Assistant

Department of Kinesiology, Texas A&M University

Purpose:

This study was conducted in order to address issues related to the effectiveness of hydro-training using the HydroWorx aquatic treadmill compared to traditional forms of resistance and land-based aerobic training.

Method:

Sixty-three healthy men and women were recruited to participate in this study. Subjects completed baseline measurements and tests prior to participating in this twelve week study. Following physiologic baseline and strength measurements, subjects were divided into four training groups:

1. Resistance Training Only (RT)
2. HydroWorx Aquatic Treadmill Training only (ATM)
3. Combined Resistance and Land Treadmill Training (RT-LTM)
4. Combined Resistance and HydroWorx Aquatic Treadmill Training (RT-ATM)

The RT subjects performed total body exercises two times per week. The ATM group trained on a HydroWorx underwater treadmill for 3 sessions per week for 12 weeks. Both concurrent RT-LTM and RT-ATM groups performed the same resistance training programs as the RT group and each performed the same treadmill exercise sessions, one being on land and one on the HydroWorx underwater treadmill.

Results:

There was a benefit in almost every aspect for the resistance training plus underwater treadmill training group. Those aspects are: Muscle Protein Synthesis, gains in lean mass following training, muscle protein synthesis and gains in total strength following training. All four had the highest results with the combination RT-ATM training.

Conclusion:

This final report demonstrates that HydroWorx aquatic exercise combined with resistance training results in a greater 24-hr rate of protein synthesis (FSR) than any other exercise or exercise combination. Additionally, RT-ATM training increased the amount of Akt present in the cell. Akt is a signaling protein that is highly involved in regulating cell survical, cell growth and metabolism. Therefore, the potential for an anabolic response from exercise may be greater following RT-ATM training.

HydroWorx Used to Treat Knee Osteoarthritis

Acute Aquatic Treadmill Exercise Improves Gait and Pain in People with Knee Osteoarthritis

USU UTAH STATE

Roper JA, Bressel E, Tillman MD. John Worley Sports Medicine Research Center, Utah State University, Logan, UT; Department of Applied Physiology and Kinesiology, University of Florida, Gainesville, FL.

Purpose:

To examine the acute effects of aquatic and land treadmill exercise on gait kinematics as well as the level of disease-specific and movement related pain for individuals with osteoarthritis.

Method:

Participants had to be over 35 years of age, able to walk a city block (without the use of an ambulatory assistive device), and walk up stairs in a reciprocal manner. Each participant completed three exercise sessions on an aquatic treadmill and on a land treadmill. The three exercise sessions in each condition were separated by at least 24 hours and completed within one week. The order of exercise mode was randomly assigned and separated by one rest week. The amount of walking for each exercise bout was 20 minutes and consisted of four 5-minute stages at 0˚ incline. Each of the four stages required differing increments of speeds. These increments in speed were intended to achieve a moderate to somewhat hard rating of perceived exertion as evidenced in previous work using aquatic treadmills. Participants performed the aquatic treadmill exercise at a water depth equal to the xiphoid process. The same protocol was completed for the land treadmill exercise in the same room.

Results:

The angular velocity gain score during stance for left knee extension was improved by 38% after aquatic treadmill exercise. Similarly, during swing the gain scores for angular velocity were also greater for left knee internal rotation and extension by 65% and 20%, respectively. During stance, the joint angle gain score for left hip flexion was 7.23% greater after land exercise. During swing the angular velocity gain score for right hip extension was significantly greater for aquatic exercise by 28%. Only the joint angle gain score for left ankle abduction during stance was significantly higher after land exercise. No other joint angle gain scores for either stance or swing were significantly different for either condition. Perceived pain was 100% greater following land than aquatic treadmill exercise. Step rate and step length were not different between conditions.

Conclusion:

An acute training period on an aquatic treadmill positively influenced joint angular velocity and arthritis related joint pain. Acute aquatic treadmill exercise may be useful as a conservative treatment to improve angular speed of the lower extremity joints and pain related to OA.

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Achieve Threshold Intensity Training with HydroWorx

Land Versus Water Treadmill Running: Lactate Threshold

Ron Garner, Dale Wagner, Eadric Bressel, and Dennis G. Dolny
Utah State University John Worley Sports Medicine Research Center

Purpose:

This study was conducted to compare whether the lactate threshold (LT), which is when lactic acid starts to build up in the blood stream according to the intensity of exercising, is different when running on land vs. an aquatic treadmill. The study also explored if LT occurs at similar levels of energy expenditure (VO2) and treadmill running speeds.

Methods:

Fifteen males and females free of musculoskeletal injury and recreationally active runners participated in this study. Each participant performed a VO2 peak test using the aquatic treadmill. The requirements each subject met determined the speed of the treadmill. The LT test had different stages that lasted 3 minutes. Each participant was tested on land and water for: 1) running speed at which LT occurred, 2) percentage of VO2 peak at which LT occurred, and 3) absolute blood lactate concentration at which LT occurred.

Results:

The LT point occurred at statistically significantly lower VO2 and HR levels in the water compared with land. Results were similar for running speed, lactate concentration, rating of perceived exertion and respiratory exchange ratio.

Conclusion:

This study shows that aquatic therapy is beneficial to achieve threshold-intensity training while lowering the joint stress that is caused by land running. The lower HR and VO2 response in water may reflect a lower energy requirement due to body weight being partially supported.

HydroWorx Metabolic Cost Comparison

Metabolic Cost Comparison of Running on an Aquatic Treadmill with Water Jets and Land Treadmill with Incline

Ryan Porter, Sarah Blackwell, Gerald Smith, Dale Wagner, Richard Gordin, and Dennis G. Dolny

Utah State University John Worley Sports Medicine Research Center

Purpose:

This study was conducted to compare the metabolic cost (MC) at specific inclines while running on a land treadmill (TM) to running speeds on an aquatic treadmill (ATM) with selected jet resistance.

Methods:

Sixteen male and female adults who were well-trained runners participated in the study. During each trial, 3 things were recorded: oxygen consumption (VO2), heart rate (HR) and rating of perceived exertion (RPE). All subjects participated in three different sessions. The first session was a familiarization session understanding the participant's body. The other two sessions consisted of either running on land or on the aquatic treadmill. These sessions began with a 5 minute warm-up and each participant completed 18 trials. Each trial lasted a minimum of three minutes or until steady state was reached. Steady state was defined by two 60-s averages of VO2 within 2 ml/kg/min.

Results:

During the first few stages of running at slower speeds, the MC was greater on the TM than on the ATM with low jet resistance. When there was an increase in speed on the TM and an increase in jet resistance on the ATM the MC were comparable to one another. However, when jet resistance was 100% on the ATM, the MC was greater than a 10% incline on a TM. HR followed a similar pattern to VO2 for all speeds, while RPE changed with different speeds and then became similar as the speed increased.

Conclusion:

The differences between MC and jet resistance on an ATM is much different than TM incline. During an increase in speed and incline TM shows a linear increase in MC, while ATM shows a more cubic change in MC. Running with selected jet resistance on an aquatic treadmill results in a greater change in metabolic cost than running on a land treadmill.

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HydroWorx Aquatic Therapy Improves Balance and Stability

Effect of Aquatic Immersion on Static Balance

Talin Louder, Eadric Bressel, Matt Baldwin, Dennis G. Dolny,
Richard Gordin, and Andrew Miller
Utah State University John Worley Sports Medicine Research Center

Purpose:

The study was conducted in order to compare the measures of static balance and limits of stability (LOS) in an aquatic environment to land.

Methods:

Fifteen, healthy and young, males and females from the ages of 21-25 participated in this study. Participants were asked to perform a 90 second static balance trial under varying conditions. The three environmental conditions were land, water immersion at the greater trochanter (waist high) and xiphoid (chest high) process depths with eyes open and eyes closed. To understand environmental influences, participants performed anterior-posterior and medial-lateral LOS excursions.

Results:

The differences between land and water that resulted from the study showed that there were significant effects on LOS. Percentages show that compared to land values 155% and 317% increased for the greater trochanter and xiphoid conditions in water. LOS revealed that anterior-posterior and medical-lateral excursions were significantly different between land and both water conditions.

Conclusion:

When the participants took part in this study, measures of balance and stability were inferior when the task was performed in water compared to on land. The participants also achieved greater center of pressure maximum excursions in water than compared to land. Therefore, it was determined that the inclusion of aquatic training is an important consideration as part of a comprehensive training/rehabilitation program. Developing stability through exercises that are characteristically instable improves neuromuscular coordination and postural control strategies and reduced risk for falls for special populations (e.g. older adults, those with impaired neuromuscular function.)

High Intensity Interval Training for Osteoarthritis with HydroWorx

High-Intensity Interval Training on an Aquatic Treadmill in Adults With Osteoarthritis: Effect on Pain, Balance, Function and Mobility

Eadric Bressel, Jessica E. Wing, Andrew I. Miller and Dennis Dolny

Biomechanics Laboratory, Utah State University, Logan, Utah;
John Worley Sports Medicine Research Center, Utah State University, Logan, Utah;
Exercise and Wellness, Arizona State University, Tempe, Arizona

Purpose:

The purpose of this study was to quantify the efficacy of a 6-week aquatic treadmill exercise program, specifically for individuals with osteoarthritis (OA), on measures of pain, balance, function and mobility.

Methods:

Eighteen participants (average age 65 years old) with knee osteoarthritis completed a non-exercise control period for 4-weeks. This was followed by a 6-week exercise period. Outcome measures included visual analog scales for pain, balance, sit-to-stand test and a 10m walk test for mobility. The exercise protocol included balance training and high-intensity interval training (HIIT) on an aquatic treadmill using water jets to destabilize while standing and achieve high rating of perceived exertion while walking.

All aquatic exercise sessions were performed in a sports medicine clinic using an underwater treadmill (HydroWorx 2000 Series) with no shoes at a water depth equal to xiphoid process.

Results:

In comparison with the pretests, participants displayed reduced joint pain, improved balance, improved function and mobility after participating in the exercise protocol. The same benefits were not observed after the non-exercise control period.

Conclusion:

In conclusion, this study observed that patients with OA display reduced joint pain and improved balance, function and mobility after participating in a 6-week aquatic treadmill exercise program that incorporated a balance and HIIT training component.

Adherence to the exercise was exceptional and no participants reported adverse effects, suggesting that aquatic treadmill exercise that incorporates high-intensity intervals is well-tolerated by patients with OA and seems to be effective at managing symptoms of OA.

Reduce Muscle Soreness with HydroWorx

Aquatic Treadmill Running Reduces Muscle Soreness Following Intense Sprint Exercise in Trained Men

Brad S. Lambert, Charles R. Hewitt, Craig M. Lowrie, Melissa C. Milner, John S. Green (FACSM), Stephen F. Crouse (FACSM)

Department of Health and Kinesiology, Texas A&M University, College Station, Texas

Purpose:

The purpose of this study was to determine if short duration aquatic treadmill (ATM) running reduces muscle soreness following intense sprint exercise in trained men.

Methods:

Twenty trained men volunteered for this study and were randomly divided in two groups: ATM recovery (ATMRec) and passive recovery (PRec).

Following a 10 minute dynamic warm-up, subjects performed sixteen 110 yard cutback runs with a sprint of 60 yards, change of direction and then a return sprint of 50 yards. Following the sprints, the ATMRec group performed ATM running on the HydroWorx underwater treadmill at 5mph for 10 minutes. The PRec did no recovery activity. Both groups evaluated their level of soreness/pain using a numerical rating scale following the ATMRec and PRec time period.

Results:

The individuals ranked their soreness levels (on a scale of 1-10) following the sprint exercise in the following areas: legs, back, hips and abdomen.

The results show that in each of those areas, the individuals who performed ATMRec following the sprint workout experienced less pain and soreness.

Conclusion:

In conclusion, aquatic treadmill running significantly reduces perceived muscle soreness and may enhance recovery following intense sprint exercise in trained men.

Increase Muscle Strength and Growth with HydroWorx Treadmill Training

Anabolic Responses to Acute and Chronic Resistance Exercise are Enhanced When Combined with Aquatic Treadmill Exercise

Brad S. Lambert, Kevin L. Shimkus, James D. Fluckey (FACSM), Steven E. Reichman (FACSM), Jessica M. Cardin, Stephen F. Crouse (FACSM)

Department of Health and Kinesiology, Texas A&M University, College Station, Texas

Purpose:

The purpose of this study was to examine acute and chronic anabolic and general physiological responses to resistance training (RT), concurrent RT and land treadmill training (RT-LTM) and concurrent RT and aquatic treadmill training (RT-ATM).

Methods:

Forty-seven untrained volunteers participated in this study. Prior to being randomized into 3 groups, the individuals were tested for VO2(max) and strength through a collection of strength exercises. The three groups were:

1. Resistance Training
2. Concurrent Resistance Training and Land Treadmill Training
3. Concurrent Resistance Training and Aquatic Treadmill Training

The three groups all performed resistance training for 12 weeks. Additionally, during that time the RT-LTM and RT-ATM groups performed aerobic LTM or ATM exercise respectively. ATM or LTM exercise took place immediately following RT sessions and then independently on the 3rd day of the week.

Results:

Positive improvements were shown in almost every area tested for the RT-ATM group. Those areas include: lean mass, leg lean mass, trunk lean mass, total strength, chest press, leg press, % change in body fat, % change in trunk fat mass and VO2max. Additionally, the effects of training on muscle protein synthesis and muscle protein content were calculated. All three tests had the highest results with the concurrent resistance training and aquatic treadmill training (RT-ATM) group.

Conclusion:

This research study concludes that concurrent resistance training and aquatic treadmill training (RT-ATM) exercise results in greater skeletal muscle growth compared to just resistance training (RT) or concurrent resistance training and land treadmill training (RT-LTM) in previously untrained men and women.

Additionally, chronic RT-ATM training elicits greater increases in lean mass and strength than RT alone or RT-LTM. Therefore, in combination with RT, the novel use of ATM running may benefit those who desire both aerobic fitness and maintenance of strength and muscle mass. Conversely, RT-LTM training elicits greater decreases in fat mass compared to RT or RT-ATM training.

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HydroWorx 3500 Series Pool

- Large footprint (12' by 16') allows treatment for multiple patients
- (1) Underwater treadmill- standard feature with option to add an additional underwater treadmill
- Resistance therapy jets & massage- standard feature

HydroWorx 2000 Series Pool

- 8' wide by 12' long pool accommodates 4 people comfortably
- Zero depth access with moveable floor, depths vary from 0 to 6'
- Entire floor doubles as underwater treadmill- standard feature
- Resistance therapy jets with massage hose- standard feature

HydroWorx 1200 Series Pool

- 6' wide by 9'6" long pool accommodates 1-2 people
- Zero depth access with moveable floor, depths vary from 0 to 6'
- Entire floor doubles as underwater treadmill- standard feature
- Resistance jets with massage hose- standard feature

HydroWorx 750 Series Pool

- 8'2" wide by 14' long foot print for multiple patient use
- (1) Underwater treadmill- standard feature
- Resistance therapy jets & massage- standard feature
- Customize your pool with an optional 7' deep water area

HydroWorx 500 Series Pool

- This 7'6" wide by 14' long foot print for multiple patient use
- (1) Underwater treadmill- standard feature
- Resistance therapy jets & massage- standard feature
- Customize your pool further with two underwater cameras (optional)

HydroWorx Thermal and Polar Plunge Pools

- These pools are designed for flexibility- choose from 3 different sizes
- Wide range water speed, resistance jets- standard feature
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- Attachable massage hose (optional)

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