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The effect of deep water running on aerobic fitness in female football players

Submission date
12/12/2017

Recruitment status
No longer recruiting

Registration date
12/01/2018

Overall study status
Completed

Last Edited
12/03/2018

Condition category
Other

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Deep-water running (DWR) is a popular alternative form of training for athletes looking to increase training volume and for those who are unable to train sufficiently on land due to injury. The buoyancy of the water lightens the loading on the legs but does not decrease the performance level of the heart nor the circulatory system. DWR could therefore be a valid form of aerobic training as it enables the athletes to keep their training volume high without increasing the risk of injury.It has been proven that it is possible with DWR training to maintain or even improve aerobic capacity (the ability of the heart and lungs to get oxygen to the muscles). DWR can therefore be considered as a good alternative when the goal is to increase an athlete's fitness level. Studies have investigated the effects of DWR with endurance athletes, but DWR is also used by athletes from teams sports such as football. Therefore, there is a need to investigate the effects of DWR in such sports, where agility and explosive abilities are essential for high level performance. However, there is concern that DWR may impair these properties due to the lack of ground contact, changes in muscle activation and speed of movement. To date, this has not yet been rigorously tested. Therefore, there is a need for research investigating how football players' neuromuscular (nerve and muscle) system responds to a DWR program and not just aerobic fitness. The aim of this study is to find out whether DWR is an effective training method to improve aerobic power in female football players.

Who can participate?
Healthy female football players aged 15-25, recruited from a single football team in Iceland

What does the study involve?
The participants undergo tests of their oxygen consumption on a land-based treadmill, an agility test, a speed test, a kick speed test, and perform counter movement jumps (CMJs). Participants are requested to rest for 24 hours before each test. After the tests, the participants are randomly allocated into two groups. Both groups perform three 45 minute training sessions a week, one group in water and the other on land. Also, all participants take part in their football team practices (3 times a week + 1 game). The training of both groups is conducted by trained individuals. The training intervention lasts for 8 weeks. The tests are repeated within 4 days after completing the training program.

What are the possible benefits and risks of participating?
All participants are provided with individually prescribed training either on land or pool. Each session is completed in small groups with each session being supervised by trained coaches. Additional to the training benefits, each participant receives personal feedback on aerobic fitness and neuromuscular function. After the intervention period the coaches of the football team are provided with feedback from the aerobic and neuromuscular outcomes, with suggestions for future development. Additionally, each coach receives training and example programs from both the land and water based training. This study consists of two high intensity exercise programs, prescribed to active, training female athletes. However, there are still some risks associated with participation in this study. As with any exercise testing there is a risk of abnormal blood pressure, fainting, irregular, fast or slow heart rhythm, and in rare instances, heart attack, stroke or death. There is a risk of muscle or joint injury during the neuromuscular function testing, but this will be minimised with appropriate warm up and cool down as well as full instruction of correct techniques for each test. Only athletes with suitable footwear for the facilities will be allowed to complete the test. Complications related to the intervention include increased muscle soreness after training, predicted to be higher after land training than pool training, as well as a risk of injury.

Where is the study run from?
Reykjavik University (Iceland)

When is the study starting and how long is it expected to run for?
December 2017 to April 2018

Who is funding the study?
This project is funded primarily by Reykjavik University with assistance from the Football Association of Iceland and Breiðablik Club (Iceland)

Who is the main contact?
Dr Jose Saavedra

Contact information

Type(s)
Scientific

Contact name
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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
201701

Study information

Scientific Title
The effect of deep water running on aerobic fitness in female football players: a randomized controlled trial

Acronym
The SAFE trial (Soccer Aquatic FitnEss trial)

Study objectives
A program of deep water running is an effective training method to improve aerobic power in female football players.

Ethics approval required
Old ethics approval format

Ethics approval(s)
The ethics board of the Háskólinn í Reykjavík, Reykjavik University, 16/10/2017, ref: 2017-002

Study design
Randomized controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Other

Study type(s)
Other

Participant information sheet
Not available in web format, please use the contact details to request a patient information sheet

Health condition(s) or problem(s) studied
Aerobic fitness

Interventions
The subjects are randomly divided into two groups. Randomisation will be completed using an external researcher with no interest in the study. The allocation will be concealed by providing

the researcher with only ID number with no identifying information. Randomisation will be completed using STATA (Version 14.0). Both groups will perform three 45 minute training sessions a week, one group in water (G1) and the other on land (G2). Also, all the subjects will take part in their football team practices (3 times a week + 1 game). During the workout sessions, the subjects will train on their individual fitness level devised from a condition specific, i.e. land and water, maximum aerobic capacity test. The workouts consist of medium to hard intensity intervals and easier, aerobic bouts. The intensities between the two training groups will be matched with heart rate. The training of both groups will be conducted by trained individuals. The training intervention will be 8 weeks.

Intervention Type
Behavioural

Primary outcome measure
Maximal oxygen consumption (VO2max) testing will be performed on a land-based treadmill. The runners will perform an incremental treadmill test starting at 8 km/h followed by an increase of 1 km/h every second minute until exhaustion. The slope will be kept at 0.5 degrees during the whole test. Heart rate will be recorded continuously using a heart rate monitor. Oxygen consumption will be measured breath-by-breath throughout the test using a portable gas analyzer. To analyze blood lactate concentration, the treadmill will be stopped after each 2-min stage for about 10-20 s to take a fingertip sample. At baseline (at rest), after each increment and immediate after the following the maximal oxygen measurements Rating of Perceived Exertion (RPE) will be asked to assess athlete's perception of fatigue, as RPE can be considered a good indicator of global internal load when used with trained athletes (Impellizzeri et al. 2004). The highest 60-s VO2 value during the treadmill test will be selected as maximal oxygen uptake (VO2max). Measured prior to randomisation (within one week of initiating the training program) and within 4 days after completing the 8-week training program

Secondary outcome measures
Measured prior to randomisation (within one week of initiating the training program) and within 4 days after completing the 8-week training program:
1. Lower body power will be measured with a countermovement jump (CMJ) test. Flight time and height will be measured with a high speed camera. Subjects will perform the CMJ five times with a 15-20 seconds rest between the jumps. They'll place their hands on their hip and feet shoulder width apart.
2. Agility will be tested on a flat, non-slip surface with the Illinois agility test. Four cones will be placed on the ground as markers, the length of the course is 10 meters and the width is 5 meters. Another four cones will be placed in line in the middle, 3.3 meters apart. The subject lies down on her stomach with her arms at her side. At starting command, she gets up and runs through the course as fast as possible. The time to complete the course will be the result.
3. Speed will be tested with 5*30 m max sprint test. The subjects run 5*30 m maximal sprints with a 25 seconds rest between each sprint. The time of each sprint is measured with light sensors.Before the sprints the subjects do a proper warm-up, led by the researchers, including 2-3 times 20 m full acceleration sprints at 90-95% max speed.
4. Maximum kicking speed is measured with a speedometer. The subject performs a penalty kick to the center of a goal and the speed of the ball is measured. Each subject gets two tries with the left and two tries with the right leg.
5. Muscle soreness experienced will be monitored using a VAS (0-100mm)

Overall study start date
26/12/2017

Completion date
10/04/2018

Eligibility

Key inclusion criteria
1. Female aged 15-25
2. Post puberty
3. Second team level (at least two years of training) football players
4. Ability to read, understand and sign informed consent
5. Ability to attend all sessions including the familiarization session for DWR, and the two or three testing sessions.
6. Healthy with no medical, e.g., cardiovascular disease, musculoskeletal disease or injury reason prevention participation in a maximal oxygen consumption test

Participant type(s)
Healthy volunteer

Age group
Mixed

Sex
Female

Target number of participants
48

Key exclusion criteria
1. Female older than 25 years old
2. Female pre puberty
3. Non-ability to attend all sessions including the familiarization session for DWR, and the two or three testing sessions
4. Disease or infection preventing full participation in measurements

Date of first enrolment
01/01/2018

Date of final enrolment
05/01/2018

Locations

Countries of recruitment
Iceland

Study participating centre
Reykjavik University
Physical Activity, Physical Education, Health and Sport Research Centre (PAPESH)

Menntavegur 1, Nauthólsvík
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101

Sponsor information

Organisation
Reykjavik University

Sponsor details
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Sponsor type
University/education

Website
https://en.ru.is/

ROR
https://ror.org/05d2kyx68

Funder(s)

Funder type
University/education

Funder Name
This project is funded primarily by Reykjavik University with assistance from the Football Association of Iceland (http://www.ksi.is/english) and Breiðablik Club (https://breidablik.is/)

Results and Publications

Publication and dissemination plan
The results of this study will be published in the form of at least two high-impact peer reviewed journals in the fields of sports and health sciences.

Intention to publish date

10/04/2019

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are not expected to be made available due to the inclusion of participants below the age of 18 years old.

IPD sharing plan summary

Not expected to be made available