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The effect of cold water immersion, massage and their combination on muscle soreness symptoms in amateur athletes

Submission date
05/05/2020

Recruitment status
No longer recruiting

Registration date
13/05/2020

Overall study status
Completed

Last Edited
14/06/2023

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[X] Results
[ ] Individual participant data

Plain English summary of protocol

Background and study aims
Delayed-onset muscle soreness (DOMS) is the most common clinical manifestation after intense muscle exercise for both professionals and amateur athletes. Despite the extensive research that has been performed in order to determine its origin and effective treatment, there is currently no clear scientific proof. On this basis, this research effort is primarily designed to investigate the effects of three different methods of physiotherapy to restore the delayed muscle pain.

Who can participate?
Healthy college athletes, participating in amateur sports, with no injury at the lower extremities in the last 6 months.

What does the study involve?
Participants will be randomly allocated to receive athletic massage, cold water immersion, both or neither of these, following a brief period of intense activity designed to produce DOMS. Measurements including a blood test will be taken before and after exercise up to 72 hours.

What are the possible benefits and risks of participating?
The benefits of participation include the possibilities of evaluating the effect of an individual fatigue program on each participant evaluated at any time and the effects of the evaluated treatment on them.
The risk is small and includes the prolongation of some symptoms of DOMS such as pain and tenderness for more than 2-3 days.

Where is the study run from?
University of Patras (Greece)

When is the study starting and how long is it expected to run for?
January 2020 to May 2020

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
Dr Konsstantinos Fousekis, kfousekis@upatras.gr

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
05052020

Study information

Scientific Title
The effect of cold water immersion, athletic massage and their combination on delayed onset muscle soreness symptoms in amateur athletes

Acronym
DOMS

Study objectives

This research effort is primarily designed to investigate the effects of three different methods of physiotherapy to restore delayed muscle pain.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 25/06/2019, Ethics committee of the University of Patras (Psaron 6, Egio PC 25100, Greece; +30 26910 22058; orthopatras@yahoo.gr), ref: 23-25/06/2019

Study design
Interventional randomized controlled study

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Other

Study type(s)
Treatment

Participant information sheet
No participant information sheet available

Health condition(s) or problem(s) studied
Delayed onset muscle soreness (DOMS)

Interventions
Male amateur athletes will randomly be assigned by computer, to four equal groups (three intervention and one control)

The interventions consist of athletic massage, cold water immersion and the combination of these two.

All subjects perform a plyometric exercise consisted of consecutive drop jumps (5 sets of 20 drop jumps) according to the protocol of Nosaka and Miyama (2004), aiming at producing delayed onset muscle soreness (DOMS). The examination and evaluation of DOMS will be based on acceptable markers such as exercise intensity (BORG) and muscle pain (VAS), upper thigh (CUT) and medial circumference (CMT), femoral rectal perimeter, with (PFRC)) and without (PFR) contraction, knee flexion range of motion (ROM), maximal quadriceps isometric (MQI) and serum creatine phosphokinase (CPK) levels.The control of the above parameters will be assessed in 5 conditions (at baseline, immediately after plyometric exercise, 24, 48 and 72 hours after the exercise). Control in blood serum was performed before exercise and then 24, 48, 72 hours after it.

Immersion in ice water: Athletes will be immersed in a container with ice water 10 ± 1oC for 10 minutes. The water level will reach up to the anterior superior iliac spine (Ascensao et al, 2011; Goodall and Howatson, 2008; Sellwood, 2007). The water temperature will be controlled with a liquid thermometer.

Sports massage: Applying aggressive massage to athletes for 20 minutes, 10 minutes for each lower limb. The massage process will initially be 1 minute of gentle massage on the entire quadriceps and then application of athletic aggressive massage for 1 minute on the vastus lateralis, 1 minute on the right femur and 1 minute on the vastus medialis. The series will be repeated once again and in the remaining two minutes there will be an application of 1 minute of sports massage on the entire quadriceps and finally 1 minute of relaxing massage. The massage will be done slowly but with increased intensity so that it also affects the deep tissues (Nosaka et al., 2005; Hart et al., 2005; Jönhagen et al., 2004).

Intervention Type
Behavioural

Primary outcome measure
The examination and evaluation of DOMS will be based on:
1. Exercise intensity (BORG)
2. Muscle pain (VAS)
3. Upper thigh (CUT) and medial circumference (CMT)
4. Femoral rectal perimeter, with (PFRC) and without (PFR) contraction
5. Knee flexion range of motion (ROM)
6. Maximal quadriceps isometric (MQI)
7. Serum creatine phosphokinase (CPK) levels
Assessed in 5 conditions (at baseline, immediately after plyometric exercise, 24, 48 and 72 hours after the exercise). Control in blood serum was performed before exercise and then 24, 48, 72 hours after it.

Secondary outcome measures
None

Overall study start date
10/01/2020

Completion date
30/05/2020

Eligibility

Key inclusion criteria
1. Healthy college athletes
2. Participating in amateur sports
3. No injury at the lower extremities the last 6 months

Participant type(s)
Healthy volunteer

Age group

Mixed

Sex
Male

Target number of participants
60

Total final enrolment
16

Key exclusion criteria
Does not meet inclusion criteria

Date of first enrolment
10/05/2020

Date of final enrolment
20/05/2020

Locations

Countries of recruitment
Greece

Study participating centre
University of Patras
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Sponsor information

Organisation
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Sponsor type
University/education

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ROR
https://ror.org/017wvtq80

Funder(s)

Funder type
Other

Funder Name
Investigator initiated and funded

Results and Publications

Publication and dissemination plan
Planned publication in a high-impact peer-reviewed journal.

Intention to publish date
20/06/2020

Individual participant data (IPD) sharing plan
All data generated or analysed during this study will be included in the subsequent results publication.

IPD sharing plan summary
Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		05/12/2020	14/06/2023	Yes	No