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Influence of recovery strategies upon performance and perceptions following fatiguing exercise

Submission date
31/10/2017

Recruitment status
No longer recruiting

Registration date
05/11/2017

Overall study status
Completed

Last Edited
17/07/2018

Condition category
Other

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

Plain English summary of protocol

Background and study aims
Despite debate regarding their effectiveness, many different recovery strategies are used by athletes after exercise. The aim of this unique study is to investigate the effects of five recovery strategies on indicators of performance, sit and reach flexibility, and perceptual recovery after fatiguing exercise in non-elite athletes.

Who can participate?
Healthy men aged 18-40

What does the study involve?
Participants undertake a simulated team-game fatiguing circuit followed by one of the following recovery strategies: cold water immersion (a cold bath), contrast water therapy (alternating between a cold bath and a hot bath), active recovery (jogging), a combined recovery of cold water and active recovery, or a control condition (sitting on a chair). Participants repeat this process for all five recovery strategies once per week. Before the fatiguing exercise, and at 1, 24 and 48 hours after, indicators of performance (repeated sprint ability and repeated countermovement jump), sit and reach flexibility, and perceptual recovery are assessed.

What are the possible benefits and risks of participating?
Participants are able to try different recovery strategies and find out how each recovery strategy affects their performance. Participants are informed on the most effective recovery strategy for them. There are risks of injury to the participant.

Where is the study run from?
James Cook University (Australia)

When is the study starting and how long is it expected to run for?
August 2012 to August 2014

Who is funding the study?
1. Australian Government Department of Education, Employment and Workplace Relations (Australia)
2. James Cook University (Australia)

Who is the main contact?
Fiona Crowther

Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Influence of recovery strategies upon performance and perceptions of healthy male recreational athletes following fatiguing exercise

Study objectives
Water immersion strategies were hypothesised to be superior to active and the control for performance and perceptual indices of recovery over the 48-hour time period.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Human Ethics Committee of James Cook University, 22/11/2013, ref: H5415

Study design
Single-centre randomised cross over trial

Primary study design
Interventional

Study type(s)
Other

Health condition(s) or problem(s) studied
Performance and perceptual recovery from exercise

Interventions
Healthy male participants undertook a simulated team-game fatiguing circuit followed by one of the following recovery protocols undertaken for 14 min. A verified randomisation tool (random.org) was used for randomisation of recovery strategy order for participants. Testing was undertaken once per week. All participants were assigned to complete all 5 recovery strategies (five participants were unable to complete all scheduled testing sessions, due to external factors unrelated to testing; however their data were included for completeness in quantitative analysis of the completed recovery protocols).

1. Cold water immersion included being seated in an inflatable bath, with shoulders immersed at a temperature of 15°C
2. Contrast water immersion included alternating between a cold bath set to 15°C and a hot bath set to 38°C, both to shoulder immersion depth, with participants instructed to change baths every 1 min
3. Active recovery included outdoor jogging around a marked and measured grass track at 35% peak speed with continual feedback to maintain the desired speed
4. The combined recovery was performed as per the cold water immersion protocol with the addition of low intensity cyclic leg movement inside the cold bath
5. The control protocol involved participants passively sitting on a chair, with as little movement as possible

Prior to the fatiguing exercise and at 1, 24 and 48 hours post-exercise, perceptual, flexibility and performance measures were assessed.

Intervention Type
Other

Primary outcome(s)
Measured on each initial testing day - there were 5 initial testing days (1 per recovery strategy), on these days the measures were assessed at baseline (when participants arrived) and 1 hr after the fatiguing exercise. These measures were then assessed at 24 and 48 hr post fatiguing exercise
1. Muscle soreness assessed using the muscle soreness scale, a 10-point Likert scale from 0 (no soreness) to 10 (very very sore) (Pointon & Duffield, 2012)
2. Total quality recovery (TQR) assessed using a scale that ranged from 6 (below very very poor recovery) to 20 (above very very good recovery) (Kenttä & Hassmén, 1998)
3. Flexibility assessed using the sit and reach test
4. Repeated sprint ability, assessed using a maximal 20 m sprint every 30 sec with six repetitions (Elias, Varley, Wyckelsma, McKenna, Minahan, & Aughey, 2012; Elias, Wyckelsma, Varley, McKenna, & Aughey, 2013)
5. Jump height and power measured using the countermovement jump test including five jumps of maximal height on a mat, one jump every 15 sec (Eias et al., 2012; King & Duffield, 2009)

Key secondary outcome(s))
1. Daily analysis of life demands, assessed using the DALDA questionnaire which lists a series of life-stress and symptoms of stress, where participants label each item with a letter; “a” means worse than normal, “b” means normal and “c” indicates better than normal (Rushall, 1990), assessed at the beginning of the testing day
2. Hydration status, assessed via urine specific gravity measurement with the use of a handheld refractometer. These measures were conducted when participants arrive on the initial testing day, and when they arrive for their 24 and 48 hr post testing session days
3. Heart rate monitored throughout the fatiguing exercise
4. Rating of perceived exertion, measured using Borg’s RPE (Borg, 1998) at the completion of the fatiguing exercise

Completion date
07/08/2014

Eligibility

Key inclusion criteria
1. Uninjured
2. Males
3. Able to complete the fatiguing exercise
4. Participated in regular aerobic exercise
5. Aged 18-40 years

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
40 years

Sex
Male

Key exclusion criteria
1. Not elite athletes
2. Contact sport athletes

Date of first enrolment
01/12/2013

Date of final enrolment

01/05/2014

Locations

Countries of recruitment
Australia

Study participating centre
James Cook University
Australia
4811

Sponsor information

Organisation
James Cook University

ROR
https://ror.org/04gsp2c11

Funder(s)

Funder type
University/education

Funder Name
Australian Government Department of Education, Employment and Workplace Relations (ice bath purchase)

Funder Name
James Cook University

Alternative Name(s)
JCU Australia, James Cook University in Queensland, James Cook University - Australia, jamescookuniversity, James Cook University in Queensland - JCU Australia, JCU

Funding Body Type
Government organisation

Funding Body Subtype

Universities (academic only)

Location
Australia

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from Fiona Crowther.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	28/12/2017		Yes	No