

Exercise-Based Pain Relief Program: Is there any Effect of Repeated Bout of Eccentric Exercise for Relieving Musculoskeletal Pain?

By
Mahdi Hossein Zadeh

Musculoskeletal pain is one of the most common causes of chronic pain. Exercise-based pain management programs have been suggested as an effective alternative for relieving from musculoskeletal pain; however the pain which is experienced after unaccustomed, especially eccentric exercise (ECC) can alter people's ability or willingness to participate in therapeutic exercises or sports. Subsequent muscle pain and tenderness after ECC, most commonly known as delayed-onset muscle soreness (DOMS), has been shown to cause localized pressure pain hyperalgesia and to decrease the muscle performance. A prior bout of ECC has been repeatedly reported to produce a protective adaptation known as repeated bout effect (RBE). There is no prior study, to our knowledge, investigating the effect of DOMS and RBE concomitantly on the sensitivity of the nociceptive system, blood supply, and functional capacity in healthy subjects. One of the main scopes of the current project was to investigate the adaptations by which the RBE can be resulted from. The approach in the current study was to use exercise induced- muscle damage followed by ECC exercise as an endogenous acute pain model and observe its effects on the sensitivity of the nociceptive system, blood supply, and functional capacity in healthy subjects. Finally, the effect of a repeated bout of the same exercise as a healthy pain relief strategy on these parameters was assessed. This dissertation indicated that high intensity unaccustomed ECC can lead to central sensitization depicted by lower nociceptive withdrawal reflex threshold. Central sensitization induced by an initial ECC probably demonstrates a mechanism for the tenderness in the muscle and pain during movement. A lack of central sensitization is seen after the repeated bouts of ECC irrespective if the initial bout of ECC involved the ipsi- or the contralateral limb. The protective effects regarding RBE to the contralateral limb are specific to the contralateral homologous innervation level. Muscle oxygen re-perfusion can be improved after a single bout of high intensity damaging ECC; however it does not play a major role in cross-transfer adaptations due to repeated bouts of ECC.

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Ph.D. lecture

by

Mahdi Hossein Zadeh

Friday 8 May 2015



DEPARTMENT OF HEALTH SCIENCE AND TECHNOLOGY
AALBORG UNIVERSITY

This thesis is based on Mahdi Hossein Zadeh's research work at:



SMT
Department of Health Science and Technology
Aalborg University
Denmark

Program for Ph.D. lecture on

Friday 8 May 2015

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To fulfill the requirements for the Ph.D. degree, Mahdi Hossein Zadeh has submitted the thesis: Exercise-Based Pain Relief Program: Is there any Effect of Repeated Bout of Eccentric Exercise for Relieving Musculoskeletal Pain?, to the Faculty Council of Medicine at Aalborg University.

The Faculty Council has appointed the following adjudication committee to evaluate the thesis and the associated lecture:

**Dr. Francesco Felici
University of Rome
Italy**

**Dr. Ulf Baumgärtner
Heidelberg University
Germany**

**Chairman:
Dr. Rogerio Pessoto Hirata
SMI, Aalborg University
Denmark**

**Moderator:
Dr. Pascal Madeleine
SMI, Aalborg University
Denmark**

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Chairman: Dr. Rogerio Pessoto Hirata
Moderator: Dr. Pascal Madeleine

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| 13.00 | Opening by the Moderator |
| 13.05 | Ph.D. lecture by Mahdi Hossein Zadeh |
| 13.50 | Break |
| 14.00 | Questions and comments from the Committee
Questions and comments from the audience at the
Moderator's discretion |
| 16.00 | (No later than)
Conclusion of the session by the Moderator |

The Ph.D. lecture is public and will take place on:

**Friday 8 May 2015 at 13:00
Aalborg University – Room D2-106
Fredrik Bajers Vej 7 D2
9220 Aalborg East**

After the session a reception will be arranged