

Effect of hydrotherapy on the signs and symptoms of delayed onset muscle soreness

Joanna Vaile · Shona Halson · Nicholas Gill ·
Brian Dawson

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Abstract This study independently examined the effects of three hydrotherapy interventions on the physiological and functional symptoms of delayed onset muscle soreness (DOMS). Strength trained males ($n = 38$) completed two experimental trials separated by 8 months in a randomised crossover design; one trial involved passive recovery (PAS, control), the other a specific hydrotherapy protocol for 72 h post-exercise; either: (1) cold water immersion (CWI: $n = 12$), (2) hot water immersion (HWI: $n = 11$) or (3) contrast water therapy (CWT: $n = 15$). For each trial, subjects performed a DOMS-inducing leg press protocol followed by PAS or one of the hydrotherapy interventions for 14 min. Weighted squat jump, isometric squat, perceived pain, thigh girths and blood variables were measured prior to, immediately after, and at 24, 48 and 72 h post-exercise. Squat jump performance and isometric force recovery were significantly enhanced ($P < 0.05$) at 24, 48 and 72 h post-exercise following CWT and at 48 and 72 h post-exercise following CWI when compared to PAS. Isometric force recovery was also greater ($P < 0.05$) at 24, 48, and 72 h

post-exercise following HWI when compared to PAS. Perceived pain improved ($P < 0.01$) following CWT at 24, 48 and 72 h post-exercise. Overall, CWI and CWT were found to be effective in reducing the physiological and functional deficits associated with DOMS, including improved recovery of isometric force and dynamic power and a reduction in localised oedema. While HWI was effective in the recovery of isometric force, it was ineffective for recovery of all other markers compared to PAS.

Keywords Recovery · Eccentric exercise · Water immersion · Performance

Introduction

Delayed onset muscle soreness (DOMS) is a well-documented phenomenon, often occurring as the result of unaccustomed or high intensity eccentric exercise (Connolly et al. 2003; MacIntyre et al. 1995). Associated symptoms include muscle shortening, increased passive stiffness, swelling, decreases in strength and power, localised soreness, and disturbed proprioception (Proske and Morgan 2001). Symptoms will often present within 24 h post-exercise and typically subside after 3–4 days (Clarkson and Sayers 1999). Elite athletes are often susceptible to muscle damage due to muscles being regularly subjected to repetitive, high intensity contractions (Allen et al. 2004).

Recently, the use of various forms of hydrotherapy such as cold water immersion (CWI), hot water immersion (HWI), and contrast water therapy (CWT) as post-exercise recovery interventions have gained popularity and are now a common practice within the elite sporting environments (Cochrane 2004; Vaile et al. 2007). However, such recovery interventions are being employed despite lack of scientific

J. Vaile (✉) · S. Halson
Department of Physiology, Australian Institute of Sport,
PO Box 176, Belconnen, ACT, Australia
e-mail: jo.vaile@ausport.gov.au

N. Gill
School of Sport and Exercise Science,
Waikato Institute of Technology, Hamilton, New Zealand

N. Gill
Division of Sport and Recreation,
Auckland University of Technology, Auckland, New Zealand

B. Dawson
School of Human Movement and Exercise Science,
University of Western Australia, Perth, Australia