

## Cold water immersion attenuates performance increases and promotes fat loss following resistance training

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Recently, a large body of research has focused on modalities designed to hasten the recovery process after exercise training, with one of the most common techniques being cold water immersion (CWI). Several studies have shown beneficial effects of CWI on recovery following a single exercise bout, however the effects of repeated CWI exposure on adaptations to exercise training are unclear. We therefore investigated the effects of CWI on body composition and performance adaptations to a resistance training program.

Sixteen non-resistance trained males completed a resistance training program 3d/wk for 7 weeks. Participants were randomly allocated to CWI (10°C water) or CON (23°C room air) recovery interventions for 15 minutes, which they performed immediately following each workout. CON and CWI groups were matched for age (mean±S.D. 25.0±4.9, 20.9±3.4 years), body mass (89.2±22.7, 81.0±11.4 kg), height (1.84±0.06, 1.80±0.08 m), and chest press one-repetition maximum (1RM, 79.5±17.2, 75.6±16.0 kg). Body composition (DXA), strength (chest press and leg press 1RM), and peak force (counter-movement jump, squat jump, explosive push-up) were measured pre- and post-training. Thigh muscle temperature was measured during the recovery intervention *via* an indwelling needle probe inserted 3 cm below the skin.

During the recovery intervention muscle temperature decreased by 2.48±1.3°C in CWI and 0.51±0.19°C in CON ( $P<0.05$ ). Peak force during a squat jump or explosive push-up did not change as a result of training. CWI had no effect on training induced increases in whole body lean mass, chest press 1RM, or leg press 1RM, however CWI prevented the training induced increase in peak force during a counter-movement jump (CON 98±102 N,  $P<0.05$ ; CWI -62±103 N,  $P=0.13$ ). CWI also caused a decrease in whole body fat mass (-12.4±8.6%,  $P<0.05$ ; Figure) whereas there was no reduction in CON (-4.1±10.6%,  $P=0.10$ ).

These results suggest that repeated CWI attenuates some performance adaptations to resistance training, but also causes favourable decreases in fat mass.

