During NMES, subjects were provided with 24 minutes of electrical stimulation (NMES), and cold water immersion (CWI) on the first day of training, to pre-exercise (PRE), immediately post exercise (IP), and 30 minutes post exercise (30P) in neuromuscular electrical stimulation (NMES), cold water immersion (CWI), and control (CON) groups.

No group differences were observed in CK concentration on the first day of training (T2), Day 2 (T3) and Day 3 (T4) for neuromuscular electrical stimulation (NMES), cold water immersion (CWI) and control (CON) groups.

Despite changes in CK concentration on the first day of training to pre-exercise (PRE) and immediately post exercise (IP), no differences were observed in IL-10 concentration (pg·ml⁻¹) between treatment groups, with no differences between groups for CK (p = 0.773) or IL-10 (p = 0.350).

**RESULTS CONT.**

**Figure 7:** Rectus Femoris Echo Intensity (RF EI) improves at 48P in CON compared to NMES.

* Denotes a 'possible' difference in change from IP compared to NMES.
# Denotes a 'likely' change from IP compared to CON.

**Figure 6:** C-Reactive Protein (CRP) increases at 24P following CWI.

* Denotes a 'possible' difference in change from IP compared to WMES.
# Denotes a 'likely' change from IP compared to CON.

**Figure 5:** Interleukin-10 (IL-10) is increased at 30P and suppressed at 48P following CWI.

• **No significant differences were observed between groups for training experience, anthropometrics, squat strength or dietary intake.**
• A significant decrease in IL-10 (p < 0.001) in the number of repetitions performed and average squat power was observed despite no significant differences between treatment groups.
• Significant increases in pain and soreness, as assessed by VAS, were observed in all groups (p < 0.001) with no differences between groups for soreness (p = 0.773) or pain (p = 0.350).

**SUMMARY & CONCLUSIONS**

• Performance decreased on T3 and T4, and was consistent with previous studies.
• Neither recovery method led to greater recovery of performance measures.
• Myoglobin increased in all groups across the study, with CWI resulting in significantly greater increases than NEMS and CON.
• No group differences were observed in OI concentration, however, significant increases occurred. IL-10 increased at 30P in CWI compared to NEMS and CON, which was reduced at 24H and 48H in CWI compared to NEMS and CON.
• CRP increased in CWI at 24H compared to NEMS, and possibly increased in CON at 24H.
• RF EI increased at IP in all groups, and decreased most at 48H in CWI with no changes in ultrasonographic measures.
• Therefore, high volume, low body resistance exercise induces muscle damage, that neither recovery modality ameliorates.
• Elevations in IL-30 and CRP observed following CWI indicate an enhanced pro- and anti-inflammatory response with CWI. 2, 4, 5
• The prior elevation in RF EI, post-CWI, may lead to the reduced IL-10, and greater muscle quality at 48H following CWI. 4, 10
• Without changes in CSA, it is difficult to say the CWI is due to reductions in edema, as previously suggested. 10

**REFERENCES**