

Effects of Cold Water Immersion on Competitive Female Dancers During 3 days of Unaccustomed Training



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Introduction

- Athletes training multiple times per day require fast, effective recovery methods. Cold water immersion (CWI) is commonly used by athletes to speed recovery and attenuate muscle soreness, edema, and inflammation¹ in order to maintain performance during subsequent exercise bouts.
- The purpose of this study was to investigate the effects of post-exercise CWI during three days of unaccustomed intense training on fatigue, perceived muscle soreness (PMS), flexibility, thigh circumference, vertical jump, agility, and anaerobic capacity in competitive female dancers.

Materials and Methods

- Subjects: 12 female dancers
- Based on initial testing, the control and treatment groups were statistically similar (Table 1).
- Practices were held 3 times daily, from 9:00am to 11:00am, 2:00pm to 5:00pm, and 7:00pm to 8:00pm. Measurements were performed at 7:00am, 11:15am, and 5:15pm. CWI for treatment group was performed immediately after measurements following the morning practice.

Results

- No significant differences were found between groups for changes in vertical jump, thigh circumference in two areas, PMS, fatigue, flexibility, anaerobic capacity, or agility.
- CWI attenuated increases in sprint times compared to the control (Figure 1). This is consistent with previous research showing performance gains in athletes.²
- The CWI group increased hamstring flexibility more than the control group over time (Figure 2).
- CWI attenuated mid-thigh circumference increase, as compared to the control group (Figure 3), which is consistent with previous research showing attenuated swelling and inflammation.³

	CWI	Control
N	7	5
Height (cm)	166.47 ± 4.39	165.63 ± 6.27
Weight (kg)	67.02 ± 10.55	63.94 ± 5.40
Body Fat (%)	23.91 ± 5.36	23.83 ± 4.59
Days per week of exercise	3.79 ± 1.65	4.58 ± 1.46
Min per day of exercise	72.86 ± 21.96	66.67 ± 28.93

Table 1. Descriptive characteristics of subjects.

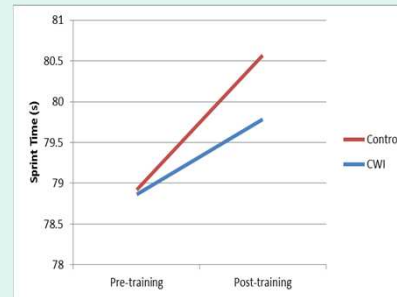


Figure 1. Mean 300 yard shuttle test times (seconds) pre- and post-training.

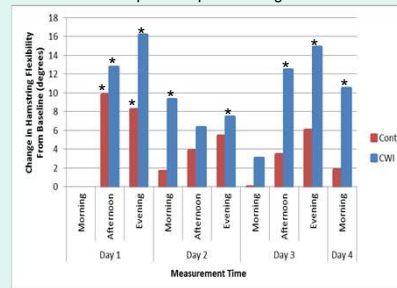


Figure 2. Hamstring flexibility (degrees), measured three times daily during three days of unaccustomed training.
*Cohen's d > 0.6 compared to baseline

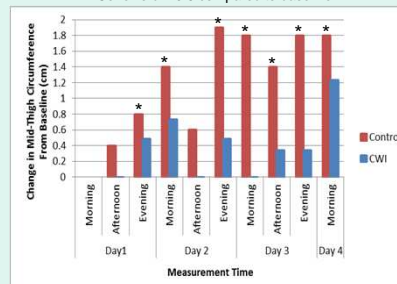


Figure 3. Changes in mid-thigh swelling, as compared to baseline mid-thigh circumference (cm).
*Cohen's d > 0.3 compared to baseline

Discussion

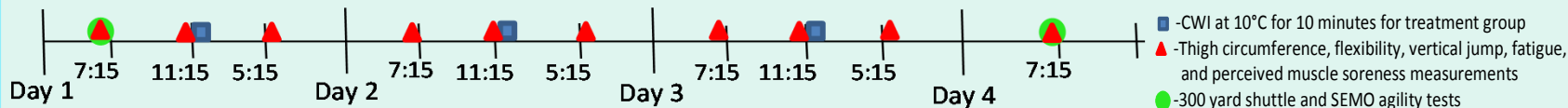
- Although not statistically significant, results may have practical implications:
 - Maintained flexibility with CWI may enhance dance performance
 - Attenuated inflammation and swelling by vasoconstriction and hydrostatic pressure may limit muscle stiffness and further muscle damage.^{4, 5}
 - CWI is not detrimental to recovery or performance.¹
- Greater immersion depth and a larger sample size may enhance the effects seen in the present study.¹
- Measurements of creatine kinase or myoglobin would be useful to quantify extent of muscle damage.

Conclusion

- Although CWI did not provide statistically significant changes in performance or recovery variables over 3 days, there may be greater practical implications for performance.

Literature Cited

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