

ICE IS NICE

Efficacy of cryotherapy on the rate of recovery of athletes

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INTRODUCTION

Research objectives, background research

CRYOTHERAPY

The lowering of tissue temperature by the withdrawal of heat from the body to achieve a therapeutic objective

HOW ICE BATHS WORK



Blood vessels constrict Better blood circulation
Removal of waste products Inflow of oxygenated blood
Reduce swelling and tissue breakdown Removal of waste products

CONTROVERSY

J Sports Sci. 2007 Sep;25(11):1163-70.

Influence of cold-water immersion on indices of muscle damage following prolonged intermittent shuttle running.

Bailey DM, Erith SJ, Griffin PJ, Dowson A, Brewer DS, Gant N, Williams C.

Author information

Abstract

The aim of this study was to assess the effects of cold-water immersion (cryotherapy) on indices of muscle damage following a bout of prolonged intermittent exercise. Twenty males (mean age 22.3 years, $s = 3.8$; height 1.81 m, $s = 0.05$; body mass 83.1 kg, $s = 11.9$) completed a 90-min intermittent shuttle run previously shown to result in marked muscle damage and soreness. After exercise, participants were randomly assigned to either 10 min cold-water immersion (mean 10 degrees C, $s = 0.5$) or a non-immersion control group. Ratings of perceived soreness, changes in muscle temperature, muscle flux, and creatine kinase activity were monitored during the exercise and at regular intervals up to 7 days post-exercise. Exercise resulted in severe muscle soreness, temporary muscular dysfunction, and elevated serum markers of muscle damage, all peaking within 48 h after exercise. Cryotherapy administered immediately after exercise reduced muscle soreness at 1, 24, and 48 h ($P < 0.05$). Decrements in isometric maximal voluntary contraction of the knee flexors were reduced after cryotherapy treatment at 24 (mean 12%, $s(x) = 4$) and 48 h (mean 3%, $s(x) = 3$) compared with the control group (mean 21%, $s(x) = 5$ and mean 14%, $s(x) = 5$ respectively; $P < 0.05$). Exercise-induced increases in serum myoglobin concentration and creatine kinase activity peaked at 1 and 24 h, respectively ($P < 0.05$). Cryotherapy had no effect on the creatine kinase response, but reduced myoglobin 1 h after exercise ($P < 0.05$). The results suggest that cold-water immersion immediately after prolonged intermittent shuttle running reduces some indices of exercise-induced muscle damage.

PMID: 17654228 [PubMed - indexed for MEDLINE]

CONTROVERSY

Cryotherapy for Treatment of Delayed Onset Muscle Soreness

James G. Snyder BS, CSCS • Appalachian State University; Jatin P. Ambegaonkar, PhD, ATC, OT, CSCS • George Mason University; and Jason B. Winchester, PhD, CSCS • East Tennessee State University

“The effectiveness of cryotherapy for facilitation of recovery from DOMS remains unclear”

Cryotherapy is the application of cold as a therapeutic intervention,¹⁻⁵ which has been used to facilitate recovery from an acute injury since the 1800s.⁶ Although cold can be applied to the body surface in a variety of ways, ice has been traditionally used to promote healing from injuries.¹ Cryotherapy modalities are also used to promote recovery between exercise training sessions and

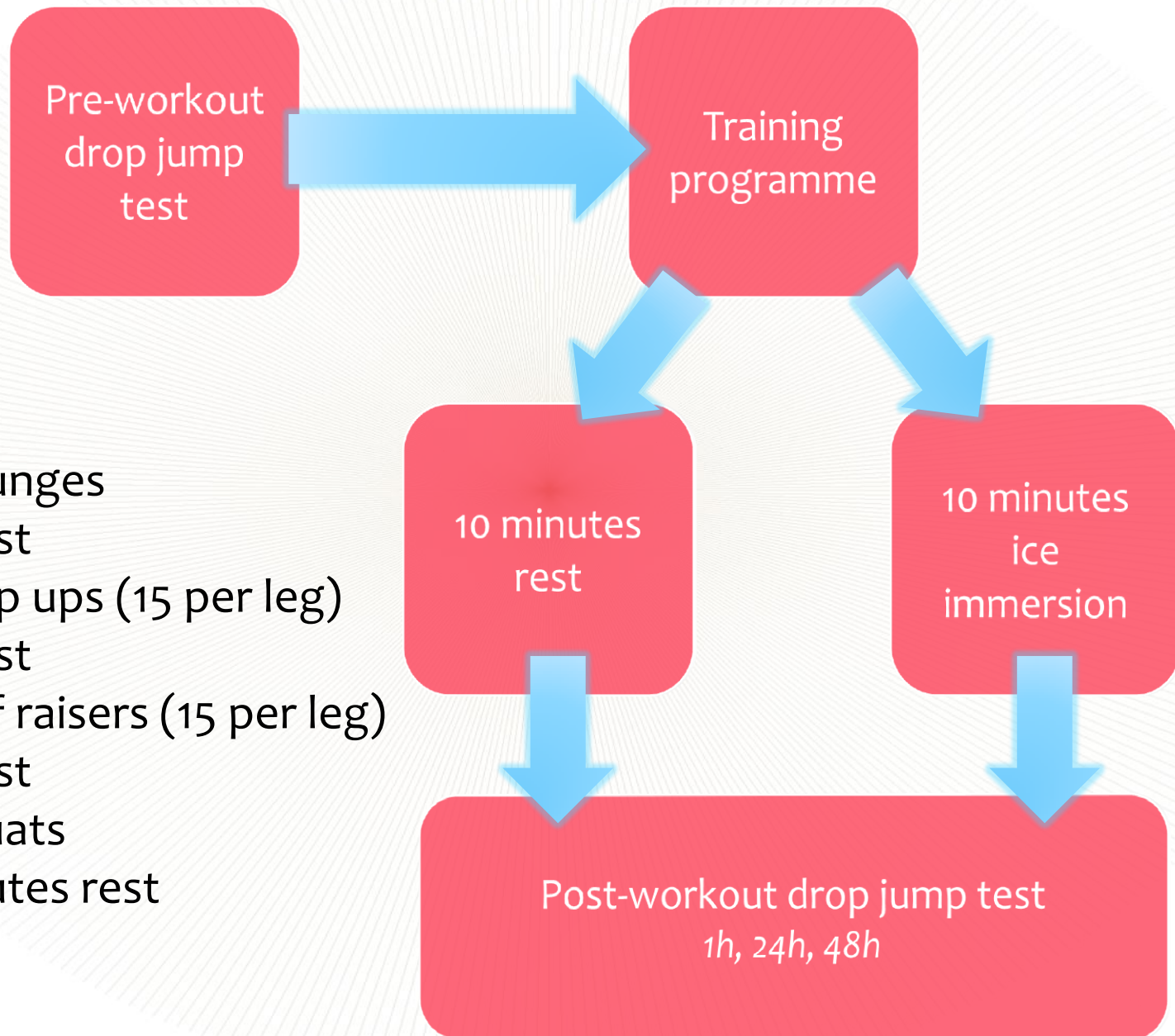
Common modes of cryotherapy administration include cold water immersion (CWI; Table 1), ice massage (Table 2), ice pack application (Table 3), or the use of a cold sprays or gels. The use of cryotherapy as part of the widely-accepted Rest, Ice, Compression, Elevation (RICE) approach to sports injury management is often the first response to a musculoskeletal injury,^{2,3} but the optimal

METHODOLOGY

Research methods, sample size

SUBJECTS

- 21 student athletes
 - 10 in the ice bath group
 - 11 in the control group
- 16-18 years of age
- From various sports CCAs



3 sets of

- 30m lunges
- 30s rest
- 30 step ups (15 per leg)
- 30s rest
- 30 calf raisers (15 per leg)
- 30s rest
- 30 squats
- 3 minutes rest

ICE IMMERSION

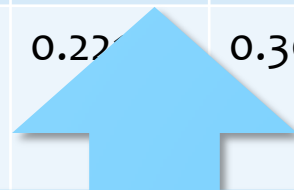
- 5 minutes of familiarisation
- 10 minutes of ice bath
- 10-15 degrees Celsius

RECOVERY ASSESSMENT

- Reactive Strength Index
 - Jump height/ Contact time
 - Muscle explosiveness
- Perceived soreness levels

RECOVERY ASSESSMENT

Name	Time	Test No.	Perceived soreness level	Contact time	Flight	Height	Power	Reactive Strength Index
Buff Lee	5.30pm	1	2	0.320	0.213	0.06	294.63	17.34
		2	2	0.22	0.308	0.12	358.66	52.52



- Chose RSI as an indicator
- Took the better one out of the 2 test jumps they were given
- 2 jump tests with the first used for familiarisation
- Collated the better result out of the two jumps from all subjects for analysis since results are obtained under the assumption that subjects are all doing their best and that poor results may be from fatigue or unfamiliarity with the machine.

DATA ANALYSIS

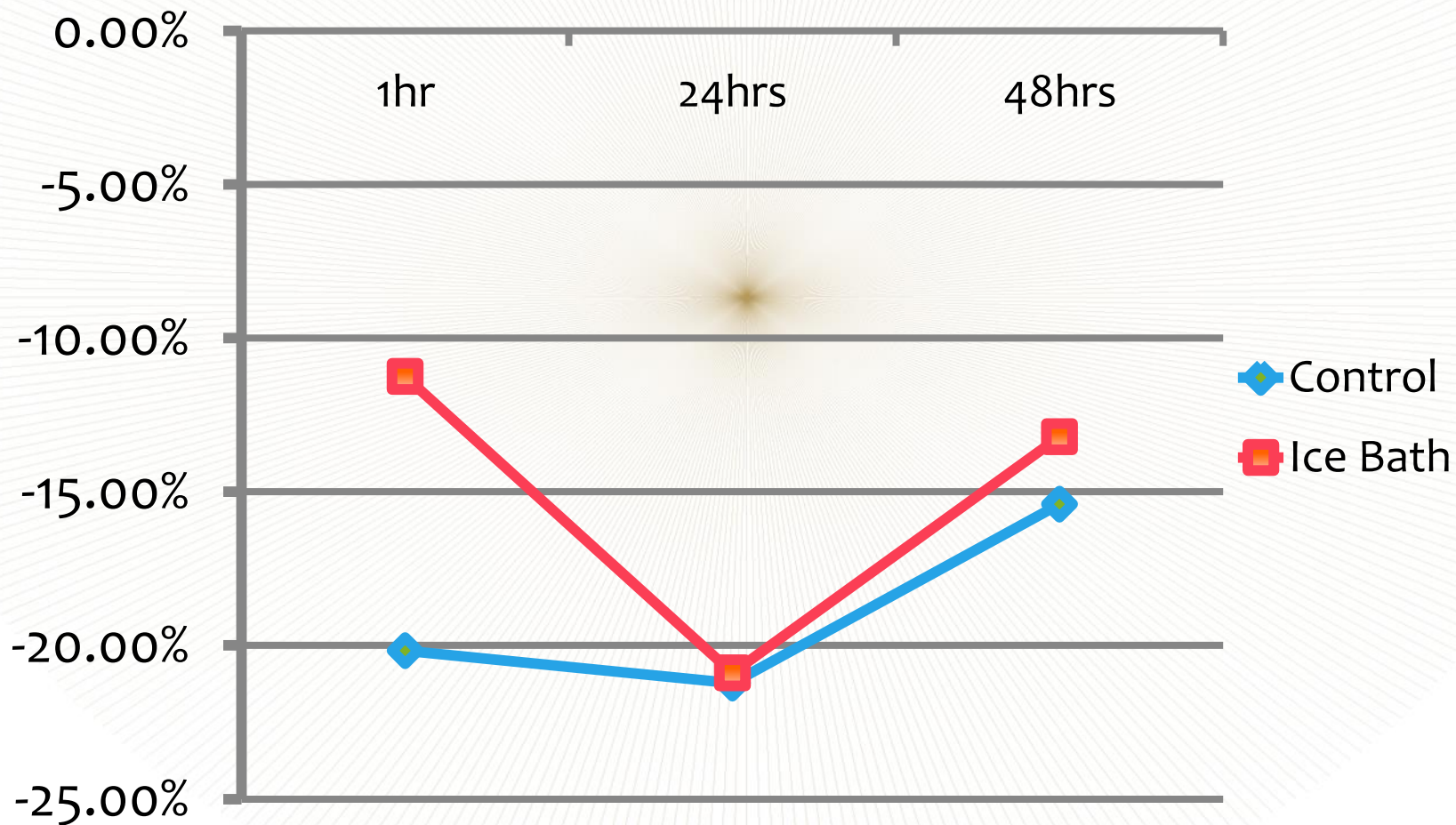
RSI, power, perceived soreness levels, analysis of results

Calculating % Change in RSI

E.g. at 1hr post-workout

	Pre	1hr	% Change
Student A	47.01	63.87	35.86471
Student B	77.02	64.05	-16.83978
Student C	64.42	62.3	-3.290903
Student D	57.91	54.54	-5.819375
Student E	47.98	50.96	6.2109212
Student F	57.25	42.34	-26.04367
Student G	85.81	62.54	-27.11805
Student H	132.09	60.02	-54.56128
Student I	101.04	90.85	-10.08511
Student J	49.47	42.83	-13.42228
Student K	75.42	68.87	-8.684699
		Average:	-11.25359

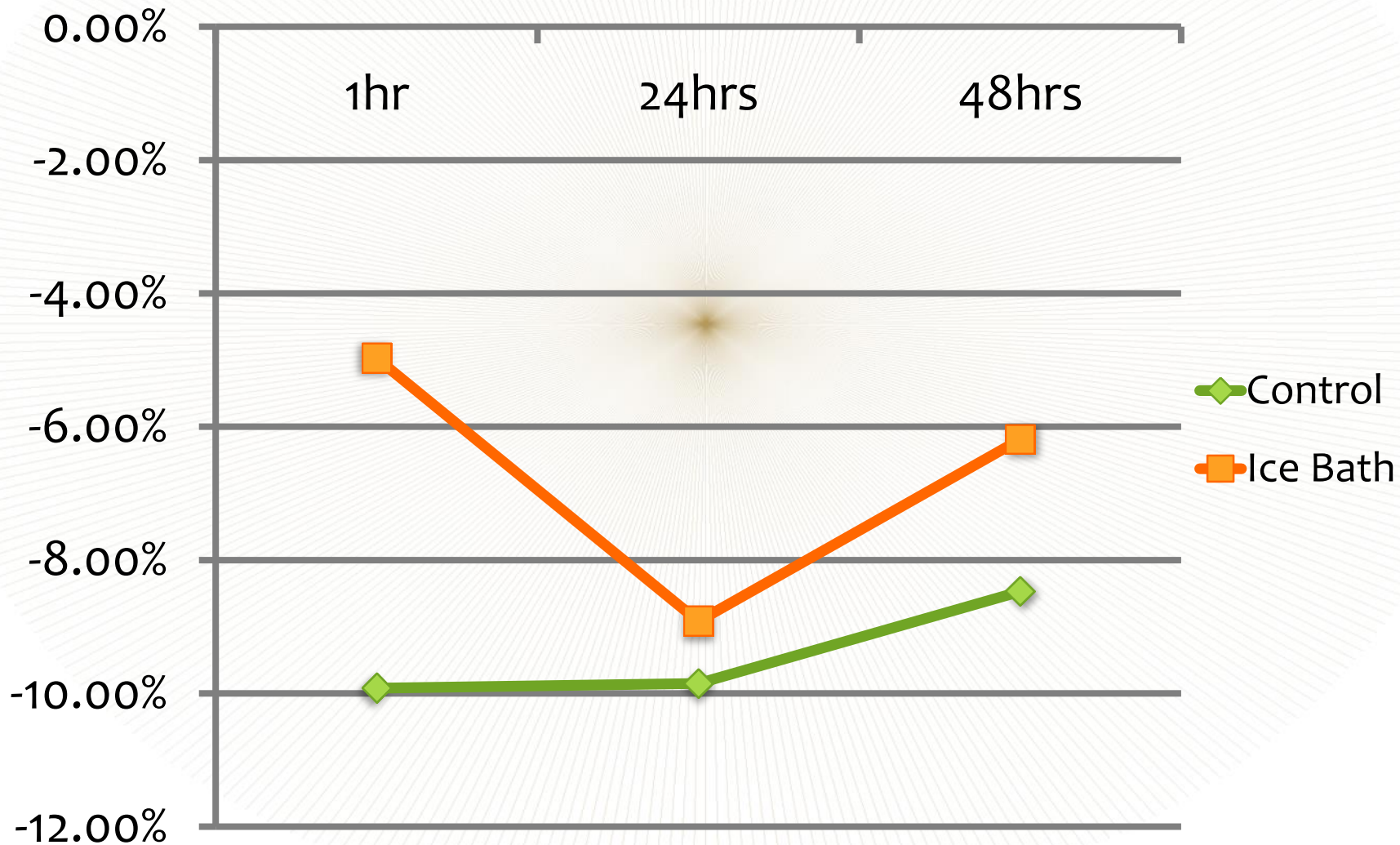
REACTIVE STRENGTH INDEX



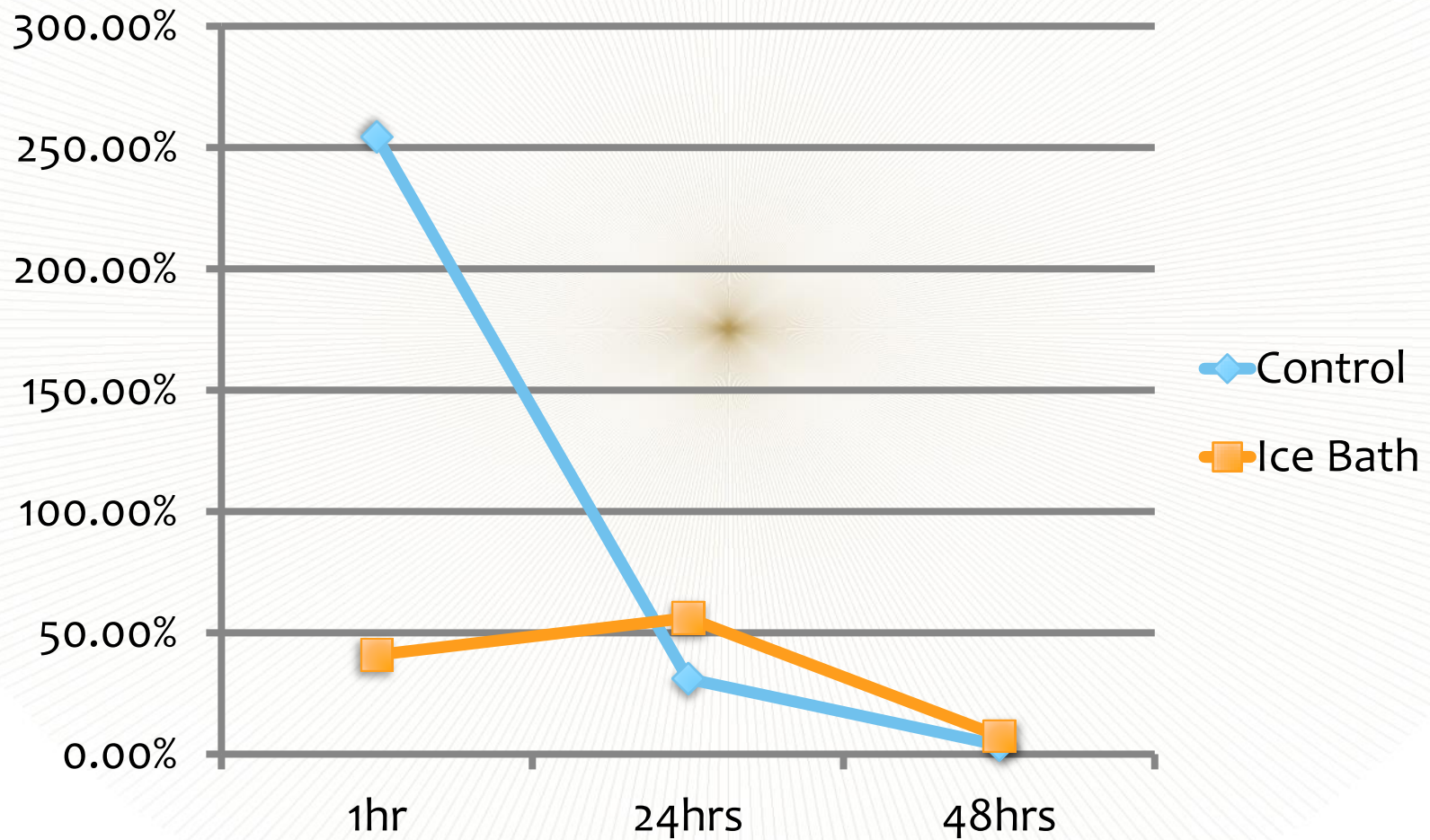
ANALYSIS OF RESULTS

- Generally, RSI of athletes in the ice bath group had a smaller decrease on average
- Most significant difference recorded 1h post-workout
 - Ice bath group: -11.25%
 - Control group: -20.17%
- Minimal differences 24h and 48h post-workout

POWER



PERCEIVED SORENESS LEVELS



CONCLUSION

Limitations, concluding thoughts, applications

LIMITATIONS

- Time constraints – subjects could not undergo both ice bath and passive recovery
- Training programme did not cater to the varying fitness levels of our subjects
- Could not measure creatine kinase, hence used RSI as a substitute

IN CONCLUSION,

- Ice baths may be effective
- BUT only within the 1h-24h time frame

THANK YOU!