

Does the Application of Temperature Therapy (Hot vs. Cold) Post Exercise Help Prevent and Relieve Delayed Onset Muscle Soreness?

Gianna Di Silvestro, Grace Coler, Maddie Salach, Kate Klein, Cindy Carballada
Dr. Haozhou Pu

INTRODUCTION

This research experiment aims to answer the question, “is hot or cold more efficient at relieving muscle soreness?”. Delayed onset muscle soreness (DOMS) impacts the daily life post workout of many active individuals causing mass discomfort. According to a study done by Eston and Peters (1999), “A decrease in tissue temperature results in a reduction in nerve conduction velocity...which reduces the pain spasm cycle and contributes to the relief of pain”. This study aims to determine the effects of heat and cold on the relief of pain. We hypothesized that cold temperatures through the application of ice will efficiently relieve muscle soreness in the upper leg.

METHODS

The study included 3 males and 3 females evenly divided and randomly assigned into 3 groups: control, heat, and cold. Those in the cold group were tested with the application of ice while heat was given ThermoCare wraps. Control received no treatment post exercise. All subjects performed the same leg workout in order to create soreness. The subjects filled out a survey answering their activity level and soreness/pain level based on a universal scale at various times post workout. Our survey was modeled after a study performed by Petrofsky, Khowailed, and Lee (Petrofsky, Khowailed, Lee, 2015). After exercise and testing was completed, T-test software as well as Anova was used to analyze results.

RESULTS

1

Independent Samples Test 1.1

	Levene's Test for Equality of Variances	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Upper Leg Soreness	Equal variances assumed			-2.58	2	.12	-1.52	.59	-4.062	1.012
	Equal variances not assumed			-2.58	1.059	.22	-1.52	.59	-8.077	5.037

2

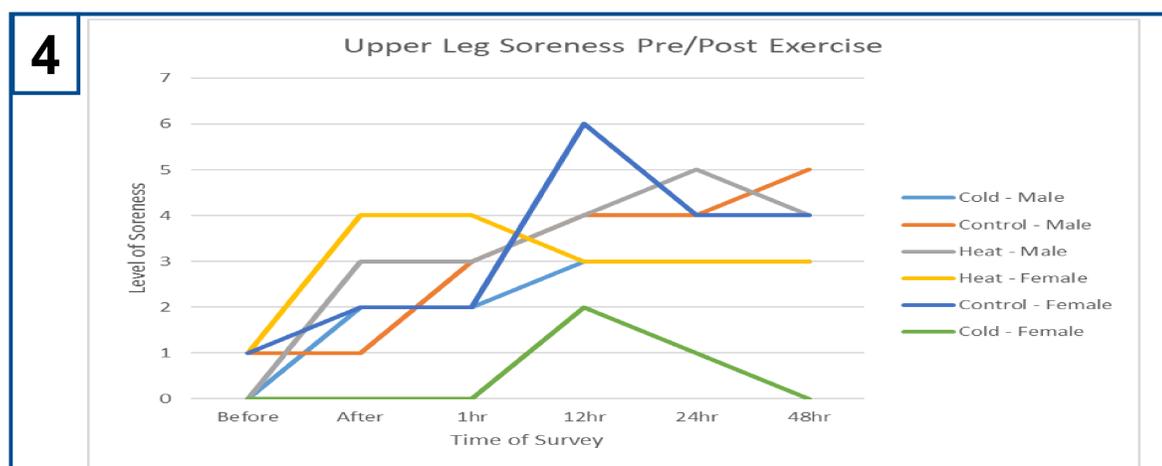
Independent Samples Test 1.2

	Levene's Test for Equality of Variances	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Upper Leg Soreness	Equal variances assumed			.000	2	1.00	.00000	.14	-.61	.61
	Equal variances not assumed			.000	2.00	1.00	.00000	.14	-.61	.61

3

ANOVA

Upper Leg Soreness	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.081	2	1.54	6.48	.081
Within Groups	.71	3	.24		
Total	3.79	5			



DISCUSSION OF RESULTS

As shown in Fig. 1, an independent t-test was run to compare the cold treatment to the control. These results came back showing an insignificance between the two groups. This means that the cold therapy was no more effective than the control treatment post exercise. Similarly shown in Fig. 2 a second independent t-test was conducted between the heat treatment compared to the control. Just as in the first t-test, the significance (2-tailed) was above 0.05 resulting in an insignificance between the heat treatment group and the control. ANOVA testing was used in Fig. 3 in order to compare the three treatment groups: heat, cold, and control. The graph shows a significance of 0.08 which although is still not a significant result, it appears to show a greater difference in the effects of treatment groups. Finally, Fig. 4 is a graphical representation of each of the participants survey results. It compares the level of soreness at each of the survey times, also taking into account the treatment group. Cold male and cold female had shown outliers of high and low levels of soreness. This could be due to the individual participant and their recent fitness activity.

PERSPECTIVES

Based off the collected data and background literature used for this research, it is conclusive that limitations were present and gaps still remain in the realm of muscle soreness therapy. The study was initially limited by a restricted time frame as well as a trivial research population. In addition, the research was comprised of only two methods of temperature therapy, heat and cold, on the localized region of the upper leg. To further expand on the study of post exercise muscle soreness therapy, other methods of treatment need to be investigated. Based off the results and the insignificance of the collected data, it is questioned if a combination of therapies would best benefit individuals post exercise over a longer time period with a larger population size.

REFERENCES

- Petrofsky, J. S., Khowailed, I. A., & Lee H. (2015). Cold Vs. Heat After Exercise – Is There a Clear Winner For Muscle Soreness. *Journal of Strength and Conditioning Research*, 29(11), 3245-3252.
- Petrofsky, J. (2017, July). The Efficacy of Sustained Heat Treatment on Delayed-Onset Muscle Soreness. *Clinical Journal of Sport Medicine*. Retrieved February, 2019, from https://journals.lww.com/cjsportsmed/Fulltext/2017/07000/The_Efficacy_of_Sustained_Heat_Treatment_on_1.aspx
- Yackzan, L., & Adams, C. (1984, March 1). The effects of ice massage on delayed muscle soreness. Retrieved March, 2019, from <https://journals.sagepub.com/doi/abs/10.1177/036354658401200214#articleCitationDownloadContainer>