

# Effects of Partial Body Cryotherapy on DOMS in Hamstrings of Elderly Adults

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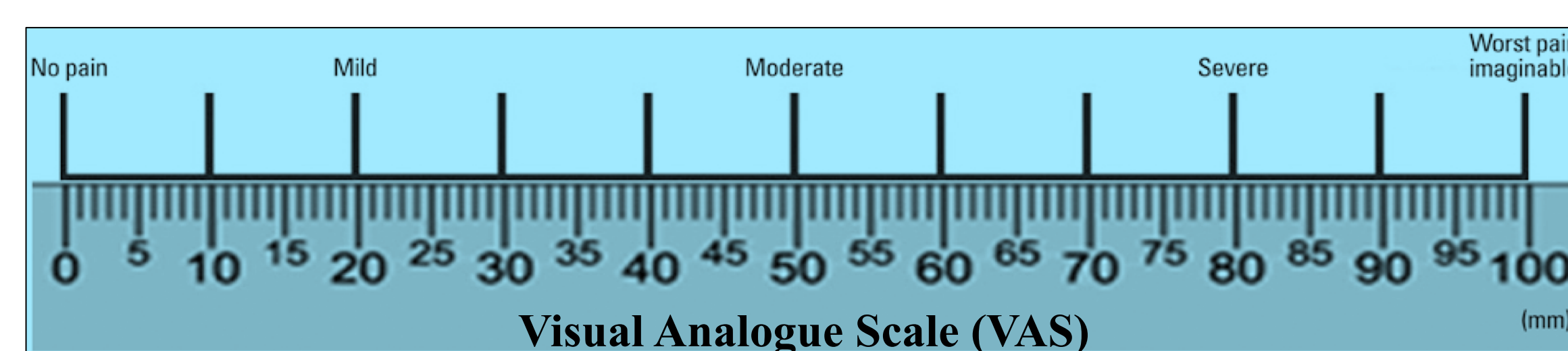


## Abstract

Cryotherapy has become a prominent method of recovery after exercise to reduce muscle soreness and fatigue. Studies have shown diminished signs of delayed onset muscle soreness (DOMS) after one session of partial body cryotherapy (PBC). Most literature examines the effects of cryotherapy after DOMS in young athletes, neglecting a still active but older population who could benefit from cold therapy. Minimal research has studied the effects of PBC on the hamstrings of elderly adults (65-85) after exercise-induced DOMS.

## Introduction

- Due to recent increases in activity levels of elderly adults, recovery methods for this population have become a necessity, but there is a gap in the literature regarding this concept (Walker, 2002).
- Two exercises, walking forward lunges (WFL) and leg press contractions, elicited significant impacts on muscle soreness, resulting in DOMS immediately after exercise for up to 72 hours (Fell et al., 2008; Jönhagen et al., 2009; Vaile et al., 2007).
- Hausswirth et al. (2013) found a higher reliability in PBC compared to other methods of cryotherapy. Results showed that the PBC group did not experience the same degree of uncomfortable pain sensations after treatment as other groups, supporting the use of PBC for elderly adults (Hausswirth et al., 2013).
- Measuring DOMS required the Visual Analogue Scale (VAS), given its .97 intraclass correlation coefficient (ICC) that strengthened the test-retest reliability (Bijur et al., 2001).



- The double-leg jump squat test also measured DOMS, establishing a test-retest reliability with an ICC of .97 (Doma et al., 2015).

## Operational Definitions

- **Cryotherapy**- the use of any cold therapy modality in order reduce inflammation and enhance recovery (Hausswirth et al., 2013).
- **Partial Body Cryotherapy (PBC)**- a short exposure to cold air in the form of liquid nitrogen from inside a chamber where temperatures range from  $-160^{\circ}\text{C}$  to  $-195^{\circ}\text{C}$  (Ferreira-Junior, et al., 2014a).
- **Eccentric Exercise**- lengthening contractions that cause mechanical factors, such as tension and strain in the musculoskeletal system, to elicit delayed-onset muscle soreness (Fell et al., 2008).
- **Delayed Onset Muscle Soreness (DOMS)**- fatigue or painful muscular sensations detected within 24 to 72 hours after intense, eccentric exercises (Fell et al., 2008).

## Purpose & Hypothesis

**Purpose:** The purpose of this study was to determine whether PBC reduces the symptoms of DOMS, specifically muscle soreness and a decrease in squat jump height, in the hamstrings of elderly adults aged 65-85.

**Hypothesis:** It is hypothesized that one session of PBC will aid in hamstring recovery in the elderly, ultimately decreasing the inhibiting effects of DOMS elicited by eccentric exercises.

## Methods

### EFFECTS OF PARTIAL BODY CRYOTHERAPY ON DOMS IN HAMSTRINGS OF ELDERLY ADULTS

This study took place at One on One Physical Therapy in Atlanta, Georgia. 40 residents of Deaton Creek - A Del Webb Community participated.

#### DAY 1

##### INFORMED CONSENT & PAR-Q+

All participants signed an informed consent form and completed a PAR-Q+, providing clearance to exercise.

##### PROTOCOL BRIEFING

Researchers explained the experimental protocol and demonstrated each exercise. Participants were randomly assigned to either the CRYO group or CON group.

#### DAY 2

##### BASELINE DATA & DOMS EXERCISES

Participants conducted the VAS and double-leg jump squat tests for baseline data. Next, they completed WFL and leg press contractions to induce DOMS.

##### CRYOTHERAPY SESSION & DATA COLLECTION

The CRYO group underwent PBC while the CON group waited. All participants completed the VAS and jump squat test for 1hr interval data.

#### DAYS 3-5

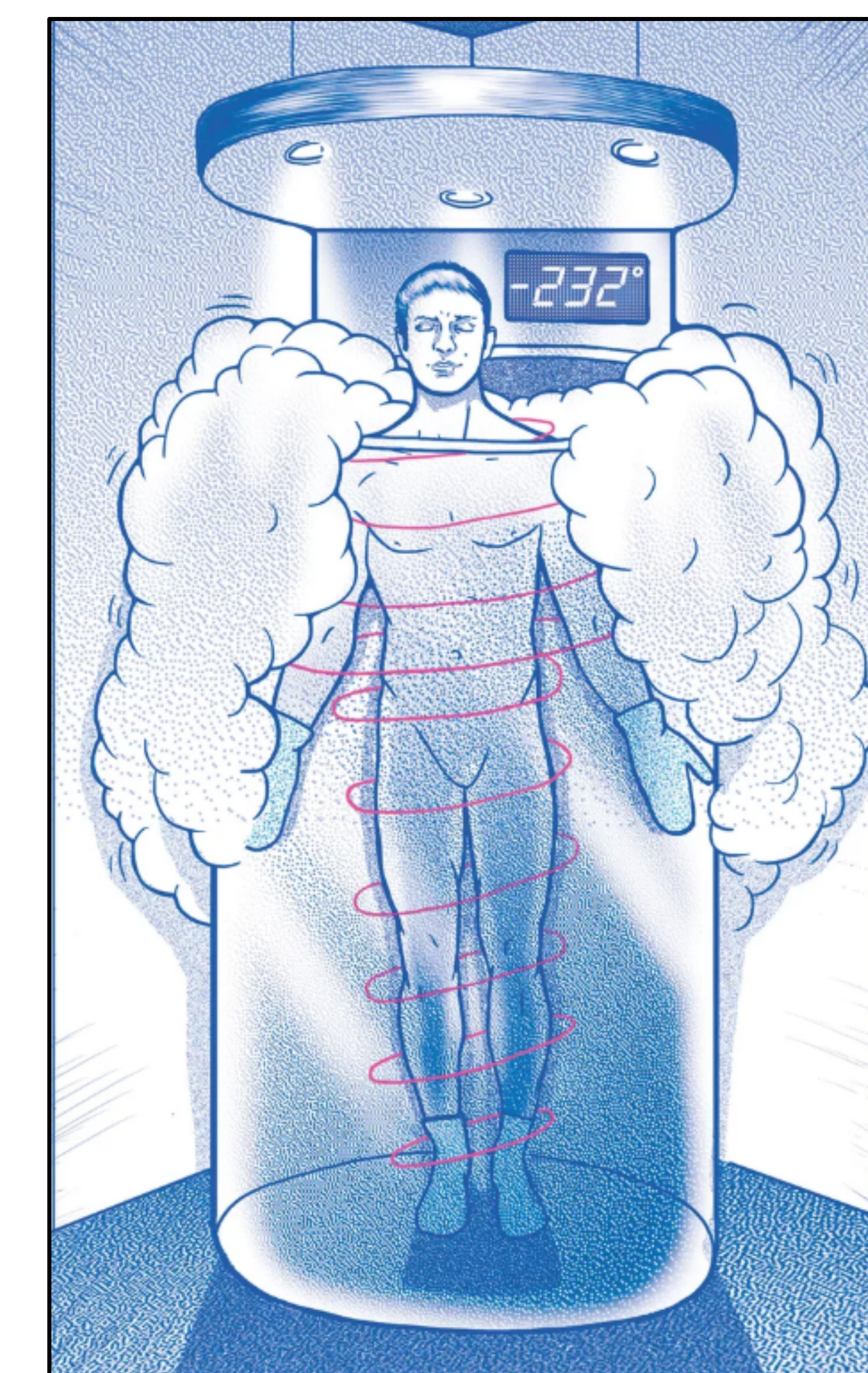
##### DATA COLLECTION

Researchers collected VAS scores and jump squat heights at the 24hr, 48hr, and 72hr intervals.

##### DATA ANALYSIS

The Shapiro-Wilk test and SPSS Software analyzed all data by producing paired and independent t-tests.

## Partial Body Cryochambers



<https://www.sarasotamagazine.com/health-and-fitness/2018/04/we-tried-it-cryotherapy>



<https://utahstories.com/2016/04/stone-cold-cryotherapy/>

## Discussion

- It was assumed that all participants refrained from personal exercise throughout the study. Assumptions were also made that participants reported honest answers for the PAR-Q+ and VAS.
- The most prominent limitation of the study included the small population size. More accurate results and increased reliability would result from including a larger number of participants.
- Further research could be done to examine how varying temperatures in the chamber affect this population. Due to thinning of the skin as people age, studying warmer temperature variations could improve results depending on how elderly adults respond to the previously tested temperatures.

## Acknowledgments

I would like to thank all the participants who volunteered for this study as well as One on One Physical Therapy, who provided the resources necessary to conduct this study. I would also like to thank Dr. Hartman and Dr. Granniss for instilling the knowledge and providing the opportunity to conduct this study.

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