



CET CryoSpas

# Research Abstract

A Randomised Controlled Study of the Physiological Effect of Cold Water Immersion using Healthy Human Subjects

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## Objectives:

1. To study the effects of cold water immersion on heart rate, blood pressure, skin temperature, core temperature and subjective tolerance.
2. To compare the effects of cold water immersion in two different water temperatures, applied with and without turbulence.

## Study design:

A double blind randomized controlled trial design was used. N=20 healthy subjects were recruited from the staff and student population at the University of Ulster. Group allocation was concealed using sequentially numbered opaque sealed envelopes.

## Intervention:

After a period of acclimatization, all participants were immersed in a cryotherapy bath (CET Cryo Spa) for a 5 minute period up to waist level. They were randomized to one of the following conditions:

1. Immersion in CET Cryo Spa (2°C) with no turbulence (n=5) and with turbulence (n=5)
2. Immersion in CET Cryo Spa (10°C) with no turbulence (n=5) and with turbulence (n=5)

## Outcomes:

Heart rates (HR), blood pressure (BP), subjective pain response (McGill) were recorded. In addition, the Vital Sense telemetric physiological monitoring system (Minimitter Co. Inc,) were used to assess skin temperature (foot dorsum, anterior thigh) and core temperature.

## Executive summary of results:

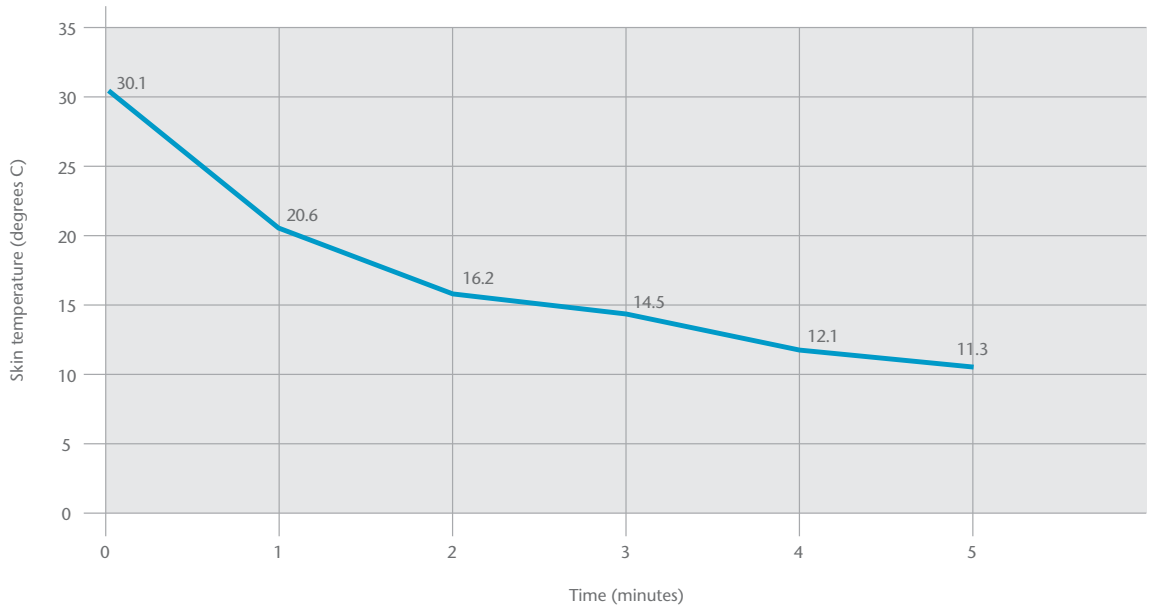
Our initial review of the evidence base in this area showed that few research studies have adequately measured changes to skin temperature during cold water immersion. Based on the most up to date clinical evidence, the optimal recommended skin temperature for treating soft tissue injuries is between 10°C and 14°C.

Our research noted that these temperature reductions could be readily achieved after a 5 minute immersion (to waist level) in the CET Cryotherapy Spa [Cryo Spa]. Furthermore, skin cooling to therapeutic levels was enhanced by using the in-built jets on the Cryo Spa, to create water turbulence.

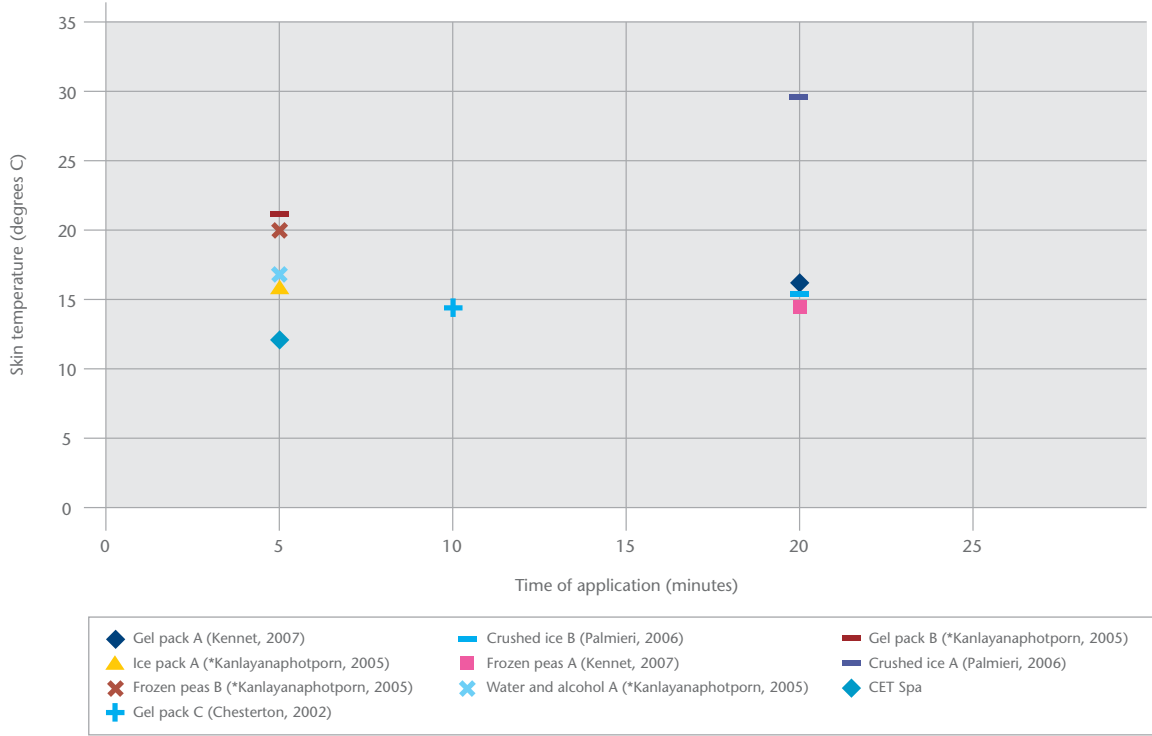
Immersion at 2°C with high water turbulence resulted in the largest skin temperature reductions, followed by immersion in 2°C with no water turbulence. We found no adverse events or side effects associated with using the CET Cryo Spa.

See reverse for Graph of Results.

**CET Cryotherapy Spa – Typical skin temperature reduction (each minute) during immersion at 2°C.**



**Skin temperature reduction recorded using CET Cryotherapy Spa in comparison to other forms of cryotherapy.**



**References:**

- Chesterton LS et al. Skin temperature response to cryotherapy. Arch Phys Med Rehabil. 2002; 83(4): 543-9.
- Kanlayanaphotporn R & Janwantanakul P. Comparison of skin surface temperature during the application of various cryotherapy modalities. Arch Phys Med Rehabil. 2005; 86(7): 1411-5.
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