

Whole-body cryotherapy as a recovery technique after exercise: effects and practical application in athletes

About

The following summary aims to provide basic evidences and practical insights on the effects of whole-body cryotherapy (WBC) for recovery after exercise. This novel form of cold therapy has gained popularity with athletes after its initial introduction as an anti-inflammatory therapy treatment in chronic inflammatory conditions.

Following high-intensity sport activities, a player often experiences a dull aching pain, stiffness, tenderness and prolonged loss of muscle strength, which can last for up to 5–7 days. The physiological consequence on structural muscle cell damage is then followed by a sustained reduction in optimal force production, the delayed onset of muscle soreness (DOMS), and an acute inflammatory response.

The extreme temperature of WBC may magnify the effect of cold therapies such as cold-water immersion, thus potentially shortening recovery time. Generally, during a WBC session the athlete is standing in a chamber that fills with a safe, but extremely cold gas. The subject enters a vestibule chamber at -60°C , where he stays for about 30s of body adaptation and then passes to a maintained at temperatures of between -110° and -190°C for a period of 2-to-5 minutes (ideally 3 minutes).

Effects of whole-body cryotherapy on physiological and sport performance measures

Evidences suggest that WBC has several implications in four fields: pain measures, sport performance indicators, immune and inflammatory response and markers of muscle damage. Subjective muscle pain levels are reduced when the therapy is executed immediately after the exercise. Moreover, muscle function and sport performance can be optimized if athletes increase the exposure during bouts of intensified training. Data from inflammatory markers and cortisol concentrations indicate with reasonable consistency that WBC may dampen the inflammatory cytokine response, which may suggest less secondary tissue damage in the regeneration process, thus accelerating recovery. At the end, a higher number of exposures to WBC may magnify the effects with an accentuated decline of circulating blood creatine kinase after multiple exposure. A single session is probably not sufficient to exert any significant effect. These findings may suggest a connection between WBC reducing pain and promoting a faster return to peak functional capacity, both important factors in sport-specific recovery.

Limitations and contraindications

Despite the consistent effects, there is a lack of standardized treatment protocols regarding temperature ranges, timing and frequency of exposure to WBC, which is likely to elicit different responses of recovery to the therapy.

When performed in the appropriate and controlled conditions, WBC is a safe procedure, which was demonstrated to be deleterious neither for lung nor heart function; however, recorded observation of a very slight, clinically irrelevant increase in the systolic blood pressure justifies precautions indicated for patients affected by cardiovascular conditions.

Practical application

- In addition to its therapeutic effects, whole-body cryotherapy has been demonstrated to be a preventive strategy against the deleterious effects of exercise-induced inflammation and soreness.
- Multiple exposures of 3 or more sessions for a 3-minute period conducted immediately after and in the two to three days post exercise have presented the most consistent results.
- Temperatures colder than the average of -140° have similar effects comparing to temperatures in the range of -110 and -140° C.

Main References:

Rose, C., Edwards, K. M., Siegler, J., Graham, K., & Caillaud, C. (2017). **Whole-body Cryotherapy as a Recovery Technique after Exercise: A Review of the Literature.** *International Journal of Sports Medicine*, 38(14), 1049–1060

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