

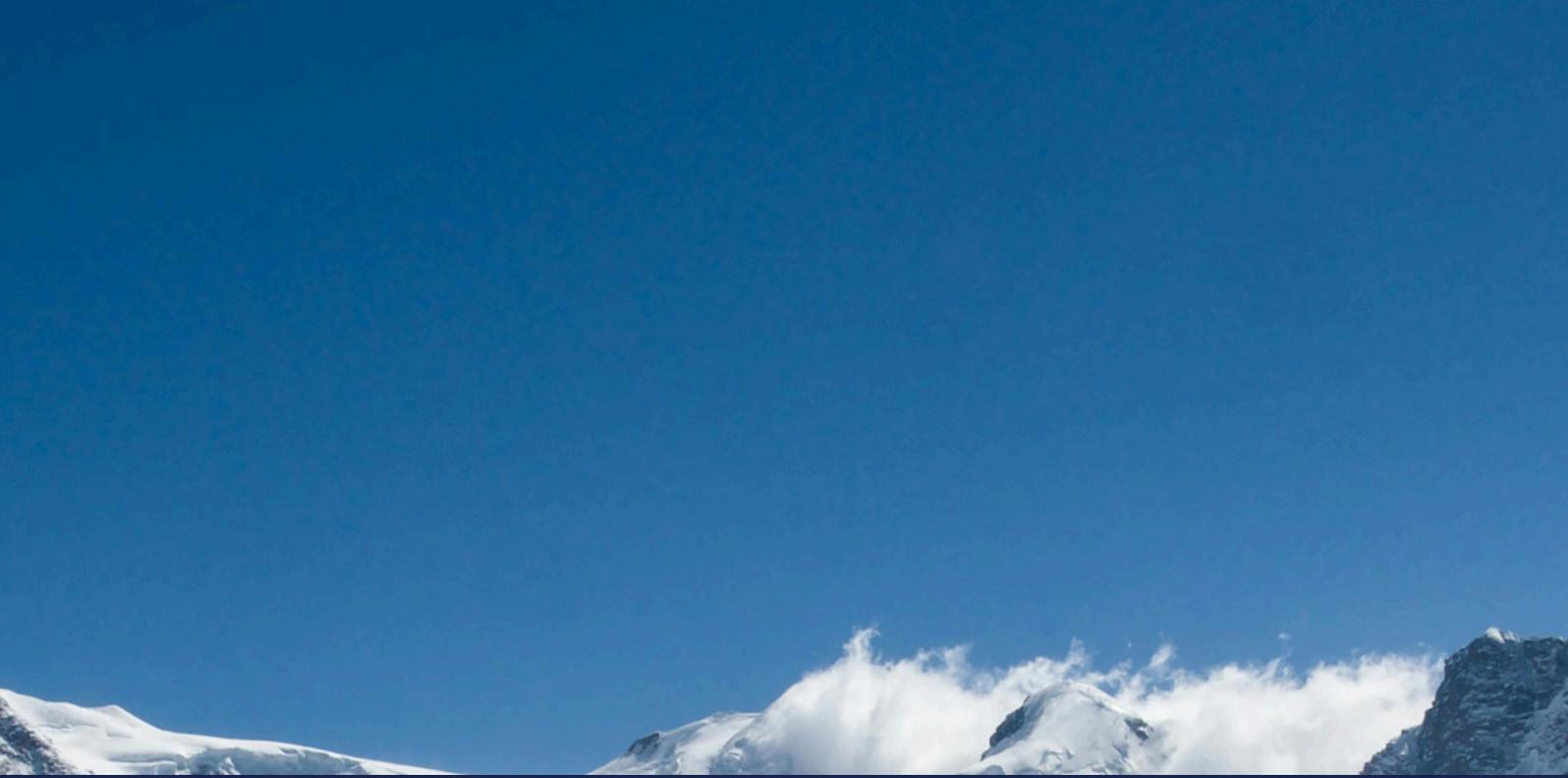
# Whole-body cryo redefined:

prioritize the body's response rather than exposing it to extreme cold

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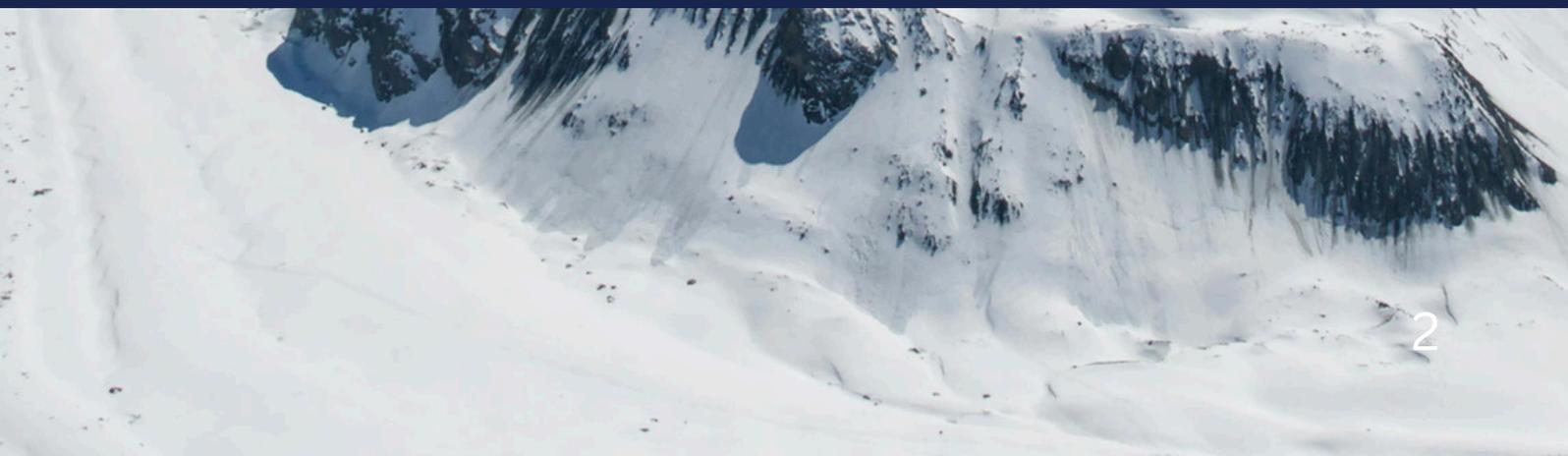
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For years, whole-body cryo (WBC) has pursued **extreme cold room temperatures**. We thought it was the only way until we asked a simple but powerful question: **What if it didn't have to be so complicated?** What if the key wasn't simply reaching extreme cold, but activating the body's optimal biological response in a precise, safe, and efficient way? Isn't that what science tells us? Clinical benefits but with a revolutionary approach: achieving physiological results while reducing complexity, costs, and risks. That's reinventing the essential. That's best practice! **Because real change isn't about doing more, but doing the essentials better.**

This e-book is your definitive guide to understanding, implementing, and profiting from this revolutionary approach. It cuts through the hype and provides a clear, science-backed roadmap for making informed decisions.



# For who is this E-book?

Inside, you'll uncover the science behind the chill, demystifying how WBC triggers robust physiological responses that drive recovery, enhance performance, and promote overall well-being. We'll delve into the key benefits, from pain relief and reduced inflammation to improved sleep and enhanced mood, showcasing the broad appeal and market potential of WBC.

Prepare to unlock the immense potential of WBC and transform your business with a technology that's changing the way people recover, perform, and thrive. Let's step into the cold together!

## ATHLETE

Professional or recreational



## PRACTITIONER

Rehab & health care



## COACH

Sport, strength or performance



## ENTREPRENEUR

Fitness, Biohackingsauna or wellness



## TRAINER

Condition, personal or Wim Hof



## ORGANIZATION

Professional or collegial



## MANAGER

Club, corporate or HR



## ANYONE

Interested in health, longevity...



# WBC Redefined — Key Points

## **Main Objective**

Whole-Body Cryo (WBC) aims to improve health, support specific conditions, enhance sports recovery, and accelerate injury rehabilitation through precise physiological stimulation.

## **Controlled Cold Stimulation**

WBC is not about extreme cold shock. It delivers a safe, regulated cold trigger that activates biological systems without inducing dangerous involuntary reactions.

## **Effective Pain & Inflammation Management**

When correctly applied, WBC reduces pain, decreases inflammation, accelerates recovery, enhances performance, and contributes to overall health optimization.

## **Thermoreceptor Activation**

Cold exposure activates thermoreceptors and the sympathetic nervous system, signaling the hypothalamus to initiate targeted adaptive responses.

## **Endorphin Release**

A controlled cold stimulus triggers a natural surge of endorphins—providing analgesia, increased well-being, and immediate revitalization.

## **Vagus Nerve Impact**

WBC significantly stimulates the vagus nerve, contributing to parasympathetic activation, stress reduction, emotional regulation, and holistic healing.

## **Safety & Expertise**

WBC is safe when applied by trained, certified professionals who understand technology, protocols, and individual physiological responses.

## **Personalized Approach**

A "one-size-fits-all" method is ineffective. WBC requires individualized protocols tailored to body type, goals, age, sensitivity, and symptom severity.

## **Temperature Precision**

It's not about achieving cryogenic temperatures — it's about creating a specific, safe, and meaningful drop in skin temperature to activate therapeutic effects.

## **Principles of Hormesis**

WBC adheres to the principle of hormesis: small doses of controlled stress produce positive adaptive effects, while excessive stress may reduce benefits.

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# Beyond the extreme, a targeted stimulation

Commonly, WBC is associated with frigid temperatures (-90°C to -160°C (-130°F to -256°F). A deeper examination reveals **a more nuanced practice than simply chilling the body. The core principle of WBC involves applying a short-term, extreme cold stimulus to the whole body's surface, triggering a cascade of physiological adaptations** intended to promote healing, recovery, and enhanced well-being. This approach should be distinguished from cold water immersion (see extra later in text), local cryotherapy, or thermotherapy, which target specific sites. The literature distinguishes between whole-body cryotherapy and whole-body cryostimulation, in which cryotherapy is used to treat particular pathologies. However, both are forms of stimulation, and to avoid confusion, we **use whole-body cryo (WBC) in the remainder of this e-book.**

## Precision over extremes: redefining effective WBC

Unlike cryosaunas (nitrogen-controlled units) that isolate the head, WBC encompasses the entire body for a more comprehensive response. Hausswirth and colleagues (2013)<sup>1</sup> suggest that whole-body cold exposure induces a greater stimulation of the autonomic nervous system compared to partial-body cold exposure. A follow-up study by Louis and colleagues (2015)<sup>2</sup> suggests that head exposure to cold during WBC stimulation may not be the primary factor responsible for the effects of WBC on the autonomic nervous system. **The cascade of benefits is based on a significant decrease in general skin temperature after exposure.** Therefore, a **homogeneous cold trigger** that does just that is needed. **Including the head and neck** seems logical, **as many of the receptors that perceive cold are located in this area.** This perception is a significant component of the therapy's effect.

**Rather than focusing on absolute temperature values** within a rigid range, the modern perspective on WBC emphasizes the importance **of achieving optimal thermal stimulation for maximum therapeutic benefit**, making it more effective to strike a balance between factors and achieve greater precision during WBC. Still, in achieving optimal stimuli to improve overall health and physiology, the subtle difference in approach means WBC can be precisely targeted to achieve optimal results. **This precise targeting is an art refined through knowledge** of heat and cold principles<sup>3</sup>, expertise in thermoregulation<sup>4</sup>, and a strong understanding of the technology's nuanced applications.<sup>5</sup>



## Busting the myth 1:

WBC aims for controlled stimulus, not a dangerous cold shock

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Although it is a widely used and recurring statement when explaining WBC, it's crucial to differentiate between the uncontrolled "**Cold Shock Response**", which is a dangerous, **involuntary reaction** to sudden cold exposure, and the "**Cold Stimulus**" used in WBC. WBC employs a carefully controlled, short-term cold trigger to initiate physiological adaptations promoting healing and well-being, rather than inducing the harmful effects of an uncontrolled cold shock. While the term "cold shock" is often associated with WBC, the intention is to **elicit a safe, controlled cold stimulus**, not the dangerous and uncontrolled physiological reaction characterized by a gasp reflex, hyperventilation, and potential cardiac arrest.

# Key Benefits of WBC

Here's how WBC can transform your athletes', patients', or clients' lives

WBC is more than just a trend; it's a science-backed methodology primed to deliver transformative results across various facets of health, sports, and wellness. Position yourself at the forefront of innovation by offering your clients the unique advantages of WBC.

This chapter examines the mechanics of WBC, providing the scientific validation you need to capitalize on this booming market confidently.



## Effective Pain Management

WBC numbs nerve endings and reduces inflammation, providing rapid pain relief and improved comfort.

## Accelerated Recovery

Cold exposure limits inflammation and muscle damage, helping the body recover faster after intense exercise or injury.



## Enhanced Performance

By stimulating the nervous system and balancing hormones, WBC enhances physical and mental performance.

## Health & Well-being

WBC promotes overall wellness through mood enhancement, immune support, and improved cognitive clarity.



**Effective Pain Management:**

WBC numbs nerve endings, providing short-term pain relief.

- **Reduced Pain & Inflammation:** WBC triggers a cascade of anti-inflammatory responses, alleviating chronic pain (rheumatoid arthritis, fibromyalgia) and muscle soreness.<sup>6,7</sup>
- **Increased Pain Threshold:** By activating the body's natural pain-relieving mechanisms, WBC raises the pain threshold.<sup>8</sup>
- **Reduced Muscle Spasms:** Cold-induced analgesia eases muscle spasms.
- **Improved Quality of Life:** It improves the quality of life for all those with chronic pain.

**Accelerated Recovery:**

By inducing vasoconstriction and reducing muscle temperature, WBC limits blood flow, inflammation, muscle enzyme activity, and secondary damage following exercise, potentially aiding recovery.

- **Decreased Muscle Soreness:** Reduce discomfort and expedite recovery from strenuous exercise.<sup>6,9</sup>
- **Reduced Muscle Damage:** Diminish markers of muscle damage (e.g., creatine kinase) following intense workouts.<sup>10</sup>
- **Improved joint function:** WBC helps improve joint function.
- **Reduces inflammatory mediators:** It limits the number of white blood cells mobilised to the injured issue.<sup>11,12</sup>

**Enhanced performance:**

By stimulating the autonomic nervous system, modulating hormone release, and potentially enhancing cardiovascular efficiency, WBC may optimize physiological and psychological states to improve performance.

- **Improved muscle recovery:** Improves muscle recovery and strength, allowing muscles to get back to performing better.<sup>9</sup>
- **Enhanced Endurance:** Improves glucose production due to enhanced BMR and fat production due to its effect on Brown Adipose Tissue.<sup>13</sup>
- **Increased readiness:** Helps the body prepare for intense training.<sup>14</sup>
- **Improved sleep:** Improve sleep and wake cycles to enhance quality of life.<sup>19,20</sup>

## Health and Well-being:

Within the biohacking framework, WBC offers a powerful method for enhancing mental and emotional resilience by modulating mood-regulating chemicals and stress responses to achieve a balanced, optimized state.<sup>15,16</sup>

- **Boost immune system:** Boost white blood cell counts as a means to fight off inflammation.<sup>17</sup>
- **Elevated Mood & Reduced Stress:** Stimulates the release of endorphins (your body's "feel-good" chemicals), promoting feelings of well-being, relaxation, and symptoms of depression.<sup>18</sup>
- **Decrease fat tissue and improve skin with cellulite:** Allows clients to remove fat tissue, in turn increasing blood flow for healthy cell repair.
- **Cognitive function:** observed enhancements in mental processes, improved focus, attention span, and overall mental clarity.



## Busting the myth 2:

An appropriate cooling dose is essential

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Environmental stressors such as cold and heat can enhance biological performance through the principle of hormesis: a small, controlled stimulus strengthens the body, while excessive exposure may become counterproductive.

### The effectiveness of WBC depends on several key factors:

- **Biphasic response:** Low doses help; excessive doses may harm.
- **Adaptive effect:** The right dose activates repair and resilience.
- **Cellular impact:** Cold can stimulate antioxidant and recovery processes.
- **Context:** The response varies with stressor type, timing, and individual traits such as age, gender, body composition, skin type, and conditioning.

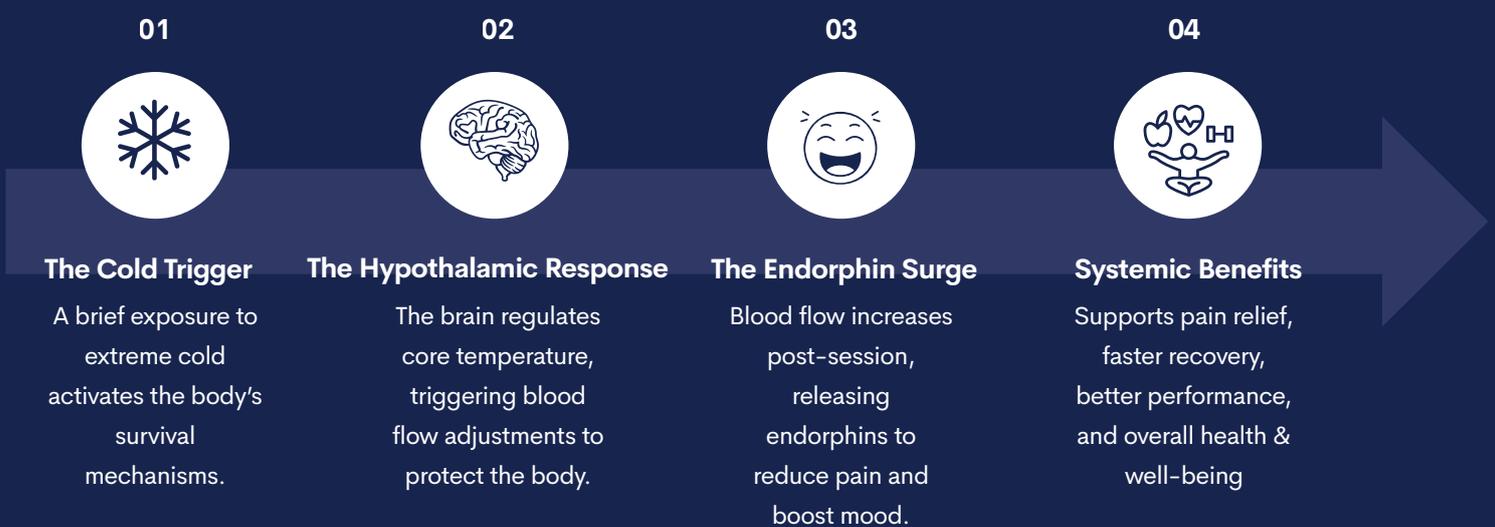
In short:

WBC is not about how cold you can go — it's about applying a precise dose that safely stimulates the desired physiological response, ensuring consistent and meaningful results.

# How does it work?

WBC isn't just a wellness trend – it's a sophisticated, research-backed technology poised to revolutionize the health and performance industries. Understanding the science behind WBC is crucial for recognizing its investment potential.

Here's a concise breakdown of the physiological mechanisms that make WBC a game-changer<sup>23</sup>:



**1. The cold trigger:** A brief exposure to extreme cold activates the body's natural survival mechanisms, stimulating thermoreceptors and the sympathetic nervous system.

**2. The hypothalamic response:** The brain's control centre, the hypothalamus, initiates vasoconstriction to protect core temperature while strategically increasing blood flow to heat-generating tissues.

**3. The endorphin surge:** The "vasodilation rebound" following the session floods the body with oxygen and nutrients, releasing endorphins – natural analgesics and mood boosters offering immediate relief and revitalization.

**4. Systemic benefits:** WBC delivers a wide range of benefits, as illustrated above.



## The vagus nerve: The hidden pathway to cold therapy's holistic healing

In addition to the physiological mechanisms, **the impact of the vagus nerve plays a crucial role.** WBC exerts its positive effects through the vagus nerve by enhancing parasympathetic activity, reducing sympathetic overdrive, and modulating inflammation via the cholinergic anti-inflammatory pathway.



This, in turn, leads to improved heart rate variability, reduced stress, and enhanced mood and psychological resilience, offering a holistic approach to overall well-being.

A single WBC exposure, though short, triggers a multi-phased response. Immediately after, endorphins surge, boosting well-being. **Benefits such as pain relief, soreness, improved metabolism, and restored muscle tone** last up to 2 hours, peaking around the one-hour mark. **Repeated sessions potentially amplify these effects**, extending the impact on pain, inflammation, and parasympathetic activity beyond 2 hours.

Understanding these mechanisms is critical to showcasing the genuine value of WBC. You're not just selling cold; you're offering a science-backed solution with proven results. Unlike other recovery modalities, WBC provides your clients with an instant perception of feeling better. The scientific validation you need to invest in WBC and unlock substantial returns with confidence is here. This knowledge empowers you to market the science behind WBC, attracting a wider range of clients seeking validated wellness solutions

# Cryotherapy redefined: how to apply wbc?

## Mastering wbc: protocols for optimal client outcomes

Are you ready to tap into the burgeoning world of WBC and offer a cutting-edge solution that delivers real results while achieving significant return on investment in the first year?

Investing in WBC technology is only the first step. To unlock its full potential and maximize client satisfaction, you need a **deep understanding of the redefinition of WBC.**

### 01

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#### Technology matters:

- Whole-body cryotherapy (including head exposure) provides a more uniform temperature distribution than partial-body cryosaunas, where the head remains outside. Cooling methods also vary, with electric, indirect nitrogen, and hybrid systems offering distinct physiological and operational effects.

### 02

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#### The Importance of protocol:

Effective protocols are essential for achieving desired outcomes. Consider the following elements:

- Treatment duration and temperature: Sessions typically last 2.5–3 minutes, aiming for a skin temperature drop of more than 10°C (18°F). Colder or longer exposures (up to 5 minutes, depending on the technology) may enhance effects. The goal is a controlled cold stimulus, not a cold shock, and results depend on protocol, equipment, and individual factors such as symptom type and severity.
- Treatment timing: For better recovery, WBC sessions are more effective when performed 2–3 hours before sleep rather than immediately before bedtime.
- Frequency and cycle: Up to three sessions per day, spaced at least three hours apart, and a minimum of 10 sessions per treatment cycle are recommended. Multiple sessions within a short period yield greater skin temperature reductions.
- Habituation: To avoid diminished effects over time, gradually increase treatment intensity in line with the applied technology.

## Customization is key:

- Client objective: Customize protocols according to client needs (e.g., muscle recovery, pain relief, overall wellness). For instance, pain relief depends on individual factors like age, sex, and BMI, requiring tailored protocols as younger, normal-weight men need the most prolonged exposure. In contrast, overweight seniors need the least to reach the analgesic threshold.<sup>25</sup>
- Body composition: Consider factors like body fat percentage and muscle mass when determining treatment parameters; it requires a more severe protocol to stimulate the vagus nerve of a client with a higher body fat percentage.
- Gender: Females generally cool down quicker and therefore need a more moderate protocol.<sup>26</sup>
- Age: Young and older clients need less intense WBC treatments.
- Skin type & sensitivity: Take skin type and cold sensitivity into account to prevent adverse reactions. Individuals with dark skin are more sensitive to cold

## Prioritizing Compliance & Comfort:

- Intake consultation: Assess medical history, goals, and any potential contraindications.
- Managing discomfort: Pay attention to the client's perception and ensure they feel safe and comfortable throughout the session.
- First-time sessions: Begin with a milder exposure to evaluate the individual thermal response.
- Education: Explain the process, expected sensations, and benefits to reduce anxiety and build confidence.

By implementing these easy-to-implement strategies, you can confidently apply WBC technology to achieve exceptional results, build a loyal client base, and establish a thriving WBC business.

# Treatment Frequency Guide

Here is our general guide for whole-body cryotherapy treatment frequency. Individual needs vary depending on goals, recovery demands, and overall health.

## How often should I do whole-body cryotherapy?

<b>Accelerated Recovery</b>	<b>1-5</b> sessions per cycle	Focus: Optimize anti-inflammatory and cytokine responses When: Post-training or competition Frequency: 1-2 sessions daily
<b>Pain Management</b>	<b>5-10</b> sessions per cycle	Focus: Long-lasting relief for chronic pain and immediate support during acute flare-ups When: Before/after rehab sessions or during pain spikes Frequency: 1-2 sessions daily, based on pain level
<b>Enhanced Performance</b>	<b>10-20</b> sessions per cycle	Focus: Multi-day benefits; periodization prevents habituation When: Within monthly training cycles Frequency: 3-5 sessions per week
<b>Health &amp; Well-being</b>	<b>20-30</b> sessions per cycle	Focus: Continuous sessions for long-term well-being; supports thermoregulatory adaptation When: Between daily activities or training Frequency: Daily sessions possible

## General Guide

- Minimum 10 sessions per cycle, 1-3 times daily,  $\geq 3$  hours apart
- Adjust frequency according to condition, stage, severity
- Short-term goals → emphasize thermal shock
- Long-term goals → sustained thermoregulation

*"Guidelines reflect current evidence; further research is needed to establish precise dose-response relationships."*

# Is it safe for everyone?

## prioritizing safety in wbc: ensuring safe operations for every client

Investing in WBC means investing in client well-being. While the benefits of WBC are extensive, safety is paramount. Understanding and mitigating potential risks is crucial for building trust and ensuring the long-term success of your WBC business. Here's a **summary of the key safety considerations** regarding risk management:

### **1. Understanding the risks:**

While generally safe when administered correctly, WBC involves cold temperatures that can potentially lead to adverse events like skin damage, hypothermia, or, in rare cases, more severe complications if safety protocols are ignored. The temperatures used largely depend on the technology employed.

### **2. Question whether it is safe for IWBC right for everyone**

While WBC offers a range of potential benefits, it's crucial to understand that it's not suitable for everyone. For the safety of your clients, it's essential to be aware of specific contraindications and take appropriate precautions.

### **3. Essential safety measures**

Strong safety measures are vital to minimize risks in whole-body cryotherapy. Each client should be screened for contraindications through medical history checks and, if needed, physician consultation. Only trained and certified practitioners should conduct sessions, following strict protocols for duration, temperature, and preparation. Clients must be informed about the procedure, risks, and safety instructions, including suitable clothing and dry skin before treatment. Continuous monitoring ensures early detection of discomfort or adverse reactions, while regular equipment maintenance guarantees proper function and safety.

### **4. Minimizing Risks, Maximizing Benefits:**

By prioritizing safety, you can significantly minimize the risks associated with WBC while maximizing its potential benefits. This commitment to client well-being will not only protect your clients but also enhance the reputation and success of your business.

### **5. Technology and safety: a balanced approach**

While overall skin temperature responses to WBC are typically safe, localized areas (lower legs, triceps) may occasionally dip below the accepted safety threshold (8°C/46°F), potentially leading to skin damage (see below "extra" on cryosaunas). However, this is infrequent. This individualized response underscores a critical need for awareness, knowledge of technology and the benefit of newer technologies using less cold temperatures, and careful monitoring.



## Busting the myth 3:

Whole-body cryo is NOT about reaching cryogenic room temperatures

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In fact, **the key is to create an effective "cold trigger" that significantly decreases skin temperature**, initiating the beneficial physiological adaptations detailed in "Whole-Body Cryostimulation - Clinical Applications" (Capodaglio, 2024).<sup>33</sup> Achieving this cold trigger hinges on **two core principles: cooling efficiency**, which expresses how effectively a system removes heat to reduce skin temperature across a large surface area, and **energy efficiency**, which refers to achieving the best results with minimal energy expenditure. Therefore, rather than fixating on absolute room temperatures, the modern **WBC perspective emphasizes a safe and balanced approach, prioritizing optimal thermal stimulation** and precision to maximize therapeutic benefit through efficient cooling and energy use.

By adhering to these recommendations, you invest in a system designed to generate dependable, safe, and transformative client experiences, thereby securing the long-term success and profitability of your WBC venture.

# Maximize your wbc investment: best practices for consistent, impressive results

*Unlock the full potential of your WBC chamber by following these curated best practices*  
**Investing in a WBC chamber is a strategic move**, but its full value is realized through informed clinical decision-making. This summary outlines the essential steps to ensure your WBC practice is both practical and client-centered:

01

## Prioritize Safety First

Meticulously exclude absolute and relative contraindications before any exposure. Train yourself and your staff to recognize hazardous symptoms. Ensure Thorough Client Preparation: must educate clients thoroughly about the method and safety precautions. This education is crucial in establishing trust and fostering the client's confidence in the process.

02

## Tailor the approach

Recognize that a "one-size-fits-all" approach does not work. Customize protocols based on the client's unique characteristics and objectives. Optimize treatment protocols tailored to individual athletes or patients, taking into account their unique body type, age, and personal needs. Adapt exposure protocols to match the distinct symptoms and severity.

03

## Establish clear objectives

Align treatment goals with the appropriate WBC solution. To customize the approach and uncover specific objectives, consider a personalized intake consultation.

04

## Client best practices

The type, severity, and stage of the symptoms determine the treatment temperature and duration, with more acute, severe symptoms requiring larger skin temperature drops.

05

## Assess and Adapt

Monitor and document client responses throughout the treatment cycle. Begin with a mild first exposure to assess each client's physiological response. Use their feedback — including thermal comfort, blood pressure, and pain levels — to fine-tune the protocol, and be prepared to adjust treatment parameters based on individual reactions and progress.

06

## Understand the cycle

The WBC cycle should be integrated into the existing regimen as part of a comprehensive approach, with repeated exposure three times per week for two weeks at a lower dose for habituation. Mastering these principles ensures client safety, maximizes WBC benefits, and achieves consistent, standardized results with a client-centered approach.



## Busting the myth 4:

WBC and cold water immersion aren't interchangeable.

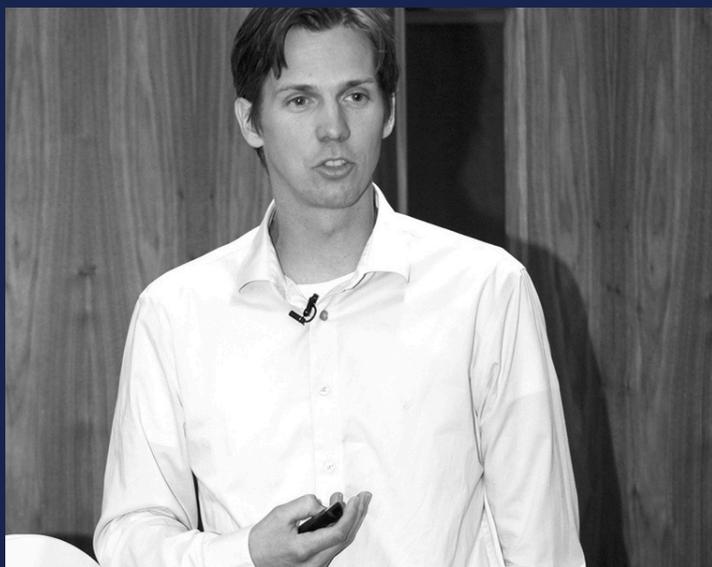
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WBC employs brief, dry cold exposure to trigger systemic responses via thermoreceptors and vasoconstriction (see section on how it works). At the same time, cold-water immersion (CWI) uses longer-duration water contact for conductive heat extraction. Both aim to **stimulate the vagus nerve and reduce muscle temperature, leading to parasympathetic reactivation, reduced enzyme activity, and inflammation.**

WBC tends to lead to more parasympathetic reactivation, while CWI often exhibits greater reductions due to water's higher heat transfer coefficient. Moreover, while WBC allows shorter exposure times, dry clients, a more comfortable start of the exposure (compliance!), and more acceptance for a broader range of applications (recovery, performance, health, and well-being), the scientific foundation for CWI is more significant, more easily accessible, and cheaper. It is more commonly used during the early stages of rehabilitation. Both techniques are considered safe.

# Authors

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## PAT VIROUX

### **Sports Physical Therapist & Recovery Expert**

Pat Viroux is a distinguished sports physical therapist with over 40 years of experience in athlete rehabilitation and injury management. He has worked with elite tennis players and professional teams in football and basketball, specializing in tailored recovery solutions. Pat is dedicated to advancing sports recovery practices through innovative equipment and educational initiatives.

# Final Insights & Next Steps

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Thank you for exploring the principles and practical foundations of modern whole-body cryotherapy.

You now have the essential knowledge to begin implementing WBC with confidence, precision, and a focus on safety and client outcomes.

If you want personalized guidance or wish to deepen your understanding of how WBC can be integrated into your facility or practice, feel free to reach out to our experts.

Scan the QR Code to Connect With Us



We're here to support you with evidence-based insights, protocol development, and practical advice tailored to your goals.

Together, we can help you unlock the full potential of precision-driven WBC.

## REFERENCES — Scientific Evidence Base

1. Hausswirth, C. et al. Parasympathetic activity and blood catecholamine responses following single partial-body and whole-body cryostimulation. *PLoS ONE*, 8, e72658 (2013).
2. Louis, J. et al. Head exposure to cold during whole-body cryostimulation: Influence on thermal response and autonomic modulation. *PLoS ONE*, 10, e0124776 (2015).
3. Horvath, S. M., Menduke, H. & Piersol, G. M. Oral and rectal temperatures of man. *JAMA*, 144, 1562–1565 (1950).
4. Bongers, C. C. W. G. Thermophysiological responses and fluid balance under exercise. Radboud Institute for Health Sciences (2018).
5. Jutte, L. S. et al. Skinfold Thickness at 8 Common Cryotherapy Sites in Various Athletic Populations. *J Athl Train*, 47, 170–177 (2012).
6. Costello, J. T. et al. Whole-body cryotherapy for preventing and treating muscle soreness after exercise in adults. *Cochrane Database Syst Rev*, 9, CD010789 (2015).
7. Guillot, X. et al. Cryotherapy in inflammatory rheumatic diseases: a systematic review. *Expert Rev Clin Immunol*, 10, 281–294 (2014).
8. Costello, J. T. et al. Muscle, skin and core temperature after  $-110^{\circ}\text{C}$  cold air and  $8^{\circ}\text{C}$  water treatment. *PLoS ONE*, 7, e48190 (2012).
9. Bouzigon, R. et al. Cryostimulation for post-exercise recovery in athletes: a consensus and position paper. *Front Sports Act Living*, 3 (2021).
10. Fonda, B. & Sarabon, N. Effects of whole-body cryotherapy on recovery after hamstring-damaging exercise. *Scand J Med Sci Sports*, 2013, 270–278.
11. Lombardi, G., Ziemann, E. & Banfi, G. Whole-Body Cryotherapy in Athletes: From Therapy to Stimulation. *Front Physiol*, 8, 258 (2017).
12. Jun He, Zhang X. et al. Whole-body cryotherapy reduces inflammatory response in humans: meta-analysis of 11 RCTs. *Sci Rep*, 15(1): 7759 (2025).
13. Krüger, M. et al. Whole-body cryotherapy enhances acute recovery of running performance. *Int J Sports Physiol Perform* (2015).
14. Klimek, A. T. et al. Influence of ten sessions of whole-body cryostimulation on aerobic and anaerobic capacity. *Int J Occup Med Environ Health*, 23, 181–189 (2010).
15. Jdidi, H. et al. Effects of cold-exposure methods on cardiovascular autonomic control: systematic review and meta-analysis. *J Therm Biol*, 121 (2024).
16. Capodaglio, P. Whole-body Cryostimulation: Clinical Applications. Springer (2024).
17. Lubkowska, A. et al. Influence of cryostimulation on IL-6, oxidative and antioxidative status in healthy men. *Eur J Appl Physiol*, 109, 67–72 (2010).

18. Doets, J. J. R. et al. Whole-body cryotherapy and mental health: systematic review & meta-analysis. *Complement Ther Med*, 63 (2021).
19. Douzi, W. et al. Evening whole-body cryotherapy improves sleep quality in physically active men. *Eur J Sport Sci* (2018).
20. Arc-chagnaud, C. et al. Effects of repeated cryostimulation exposures on sleep quality in swimmers. *Experimental Physiology* (2025).
21. Abaïdia, A.-E. et al. Recovery from exercise-induced muscle damage: cold water immersion vs whole-body cryotherapy. *Int J Sports Physiol Perform*, 1–23 (2016).
22. Mawhinney, C. et al. Cold-water mediates greater reductions in limb blood flow than whole-body cryotherapy. *Med Sci Sports Exerc*, 1252–1260 (2017).
23. Westerlund, T. Thermal, circulatory and neuromuscular responses to whole-body cryotherapy. Academic Dissertation, University of Oulu (2009).
24. Jdidi, H., Bisschop C. et al. Optimal duration of whole-body cryostimulation exposure to achieve target skin temperature: influence of BMI. *J Physiol Anthropol*, 43:28 (2024).
25. Jdidi, H., de Bisschop C. et al. Optimizing WBC exposure duration: effects of age, sex and BMI. *Temperature (Austin)*, 12(3):264–280 (2025).
26. Pitera, P. et al. Sex and BMI differences in skin temperature changes after repeated WBC sessions. *J Clin Med*, 13, 7365 (2024).
27. Bleakley, C. M. et al. Whole-body cryotherapy: empirical evidence and theoretical perspectives. *Open Access J Sports Med*, 5, 25–36 (2014).
28. Bouzigon, R., Grappe, F., Ravier, G. & Dugue, B. Whole- and partial-body cryostimulation/cryotherapy: technologies and practical applications. *J Therm Biol*, 61, 67–81 (2016).
29. FDA. WBC: a cool trend that lacks evidence and poses risks. [https://www.fda.gov/...](https://www.fda.gov/)
30. Whole-Body Cryotherapy Caused Cold Burn Injury. *MedPage Today* (2018).
31. Casady, M. Cryotherapy Co. sued over Texas woman's 2nd-degree burns. *Law360* (2019).
32. Ellis, R. C. et al. A case series of 3 patients. *J Burn Care Res*, 43(3):746–748 (2022).
33. USA Today. 2 Missouri State players injured after cryotherapy treatment. (2018).
34. Capodaglio P. Whole body cryostimulation: Clinical applications. Springer.
35. Stanek A. et al. Oxidative stress changes in subjects undergoing WBC + kinesiotherapy. *Oxid Med Cell Longev* (2019).
36. Calabrese, E. J. Hormesis: Fundamental concept in biology & applications. Univ. of Massachusetts (2014, 2015).
37. Schirmmayer, V. Less Can Be More: Hormesis theory of stress adaptation. Biomedics Germany (2021).
38. Volker Schirmmayer. Stress adaptation in the global biosphere. (2021).



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