



**GLOBAL WELLNESS  
INSTITUTE™**

**CRYOTHERAPY INITIATIVE**



# **Provider's Guide to Whole Body Cryotherapy**

All You Need to Know to Offer  
Cryotherapy Effectively, Safely, and  
Profitably

**GW I CRYOTHERAPY INITIATIVE | 2023**

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# Provider's Guide to Whole Body Cryotherapy

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# FOREWORD

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As popularity of cold therapies is rapidly growing along with the public interest in holistic wellness practices that boost the immune system, prevent illness, slow down aging, improve physical performance and appearance of the body and make people's lives not only longer but also better, whole-body cryotherapy as the most powerful of them is getting under the radar of more and more policy makers, governments, educational institutions, and businesses.

Cryotherapy is now offered not only in sports facilities and narrowly specialized rehabilitation or wellness centers. It has made its way into clinics, spas and med spas, hotels, office buildings, and even public facilities such as airports. The growing interest means a need for educating the audience and spreading knowledge and best practices to better equip the current and future service providers.

Whole-body cryotherapy has a wide range of researched applications and benefits, but it also involves risks that come with generating and applying extremely low temperatures.

There are different equipment solutions on the market, and picking the right one for the business is a key to its success.

The related investment is considerable.

Treatment outcome may differ with different technologies.

The build-out is unique and presents challenges that need to be understood and proactively eliminated.

The ambient environment, especially humidity, must be managed to prevent frosting of the evaporators and fogging of the treatment rooms.

In other words, there is a lot to know to provide whole-body cryotherapy effectively, safely, and profitably.

## MEET THE AUTHORS



Initiative Chair  
Rainer Bolsinger  
CSO & CMO  
Art of Cryo



Initiative Vice-Chair  
Antra Getzoff  
Founder  
Get Results Co

The Guide is a fruit of our collaborative effort with the initiative members – accomplished and distinguished business owners, researchers, and educators, including Prof. Dr. Harald Stossier, Prof. Dr. med. Hc Günther Amman-Jennson, Dr. Julien Louis, Oliver Kasper and Jag Chima.

## THE GLOBAL WELLNESS INSTITUTE

The Global Wellness Institute (GWI) is a 501(c)(3) nonprofit organization with a mission to empower wellness worldwide by educating public and private sectors about preventative health and wellness. GWI's research, programs and initiatives have been instrumental in the growth of the \$4.4 trillion wellness economy—and in uniting health and wellness industries. Through its five pillars— [Research](#), [Initiatives](#), [Geography of Wellness](#), [Wellness Evidence](#) and [The Wellness Moonshot](#)—the GWI informs and connects key stakeholders capable of impacting the overall wellbeing of our planet and its citizens. The GWI makes all of its valuable information and resources available at no cost, which allows anyone, anywhere, access.

## ABOUT GWI INITIATIVES

The GWI supports a wide range of important industry initiatives that further the growth of the various sectors of the wellness economy. Led by Initiative Chairs who are renowned thought-leaders in their field, GWI Initiatives have been instrumental in powering the growth of the multi-trillion-dollar wellness economy and uniting the health and wellness industries.

## ABOUT CRYOTHERAPY INITIATIVE

We strongly believe that whole-body cryotherapy has the potential to become THE TREATMENT of the 21st century, due to its versatility of applications, vast array of benefits, ease of application, high tolerability, safety, low risk of negative side effects or adverse reactions, and endless combination potential with other wellness practices and lifestyle choices. We are committed to making it happen.

The Global Wellness Institute's Cryotherapy Initiative was formed to boost awareness and spread knowledge about all aspects of offering whole-body cryotherapy. Today we present you with the initiative's first contribution – the Provider's Guide to Whole Body Cryotherapy.

This first version will be regularly updated and complemented with additional publications on specific topics which you will find on our homepage.

Over time, we will provide education on do-s and don't-s regarding the cryotherapy treatment, combinations with other wellness services, protocols and procedures, versatile spa menus, winning architectural set-ups, business models, environmental sustainability practices, and much more.

We will be building bridges to and with other Initiatives of the Global Wellness Institute, so that we can synergize in providing the best results to wellness businesses and improving overall well-being of the public.

To learn more about the initiative, its members and contributions, please visit:  
<https://globalwellnessinstitute.org/initiatives/cryotherapy-initiative/>



# INTRODUCTION

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“The Future of Wellness 2023 Trends” by Global Wellness Institute clearly illustrate that wellness has become a common theme on the agendas of not only businesses serving the public but also governments, city planners, workplace wellness experts, scientists, healthcare professionals and social workers.

It is understood that preventative wellness saves public and corporate money, and that incorporating science and technology into it can generate much better outcomes than natural remedies alone. It is also understood that systemic low-grade inflammation is the culprit of developing numerous health conditions, aging, and age-related physical and cognitive decline.

Major wellness trends include seeing physical, mental, and social health as equally important components of wellbeing and defining longevity as not only living longer but living longer better. Rightfully so, as increasing lifespan does not matter if health span lags behind.

On the technical side, we witness growing number of wellness treatments that rely on smart technologies, integration of care with diagnostics and monitoring and use of artificial intelligence (AI), raise of wellbeing apps, and combining multiple treatment technologies into one device to minimize treatment time while maximizing the outcome. Also, formerly strictly medical practices become lifestyle choices and pro-level wellness comes in demand at hotels and resorts.

Another important trend is embracing a more evidence-based view on non-medical treatments offered by the wellness industry, thus improving their credibility, and ensuring better results for the guests.

The growing popularity of whole-body cryotherapy is linked to most of the just mentioned trends. The treatment requires quality technology. It has many evidence-based applications and benefits, out of which reduction of systemic inflammation is among the most researched. Studies also support balancing physical and mental state through cryotherapy. Hence the potential that whole-body cryotherapy may become THE TREATMENT of the 21st century, just like sauna bathing conquered the world during the 20th century. These practices seem to have a long lifecycle, as cryotherapy was successfully introduced more than 40 years ago, but only now it has reached the growth stage. The knowledge of cryotherapy benefits is spreading, and the treatment is being offered in different environments, from workplaces and exercise facilities to hotels and spas, gradually becoming an integral part of the modern lifestyle.

This Guide is meant to be a comprehensive resource for decision makers, business owners and operators who want to learn more about whole-body cryotherapy or are doing a feasibility study of adding it to their services.

Although this document contains important information about cryotherapy and its potential, it should only be seen as a clarifying framework. It cannot substitute working with the suppliers to explore your technology of choice in detail, training the staff, or developing specific to your business treatment protocols.

If you have any questions or are looking for additional resources, please feel free to reach out to the members of the Cryotherapy Initiative.



## TESTIMONIALS FOR CRYOTHERAPY



### **Vivea Hotels, leading health hotel provider with eight sites Austria**

In modern spa and preventative medicine, the cryo chamber is used to reduce pain, regenerate, and increase vitality. In 2014, Ziemann et.al was able to show in randomized studies that short exposure to cold significantly reduces immunomodulatory parameters such as IL 10 and IL1 $\beta$  after such therapy.

This explains the pain-relieving effect.

In Austria – based on an extrapolation from other EU countries – around 1.7 million people suffer from chronic pain. This should certainly also be viewed as an important economic aspect. Discover this interesting potential of the body in a natural way in 8 cold chambers at the Vivea hotels in Austria and Germany. The care is provided by experienced spa doctors. From a scientific point of view, prophylaxis and therapy are the challenge for future.



### **Paula Kasper, CEO & owner Cryodukt x Coolzoone AG Switzerland**

Whole body cryotherapy is at the heart of our treatments because it works on so many levels and with our big system we can have up to six guests at the same time. Pain patients experience pain relief and anti-inflammation.

Athletes get back on track faster thanks to improved blood circulation and thus a faster recovery.

People with burnout, exhaustion, or depressive moods, quickly get energy and new motivation for everyday life. It is always nice to see that it helps in so many areas. Every customer who comes in, leaves with a smile.

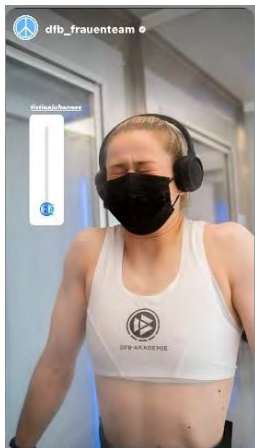


### **Franz-Josef Pirktl, CEO & owner of Alpenresort Schwarz Austria**

Since cryotherapy is a part of our menu, we experience outstanding feedback from our guests and golfers.

Basically, we respond to each guest's individual needs finding versatile use of WBC to optimize outcomes. Cryotherapy adds value to our customized treatment combinations, whenever the topic is recovery, pain management, sleep or a cool head for the next round on our 18-hole championship course or 9-hole parkland course.

The recommended application times for our cryo chamber are calculated to the second by the Remedi-Cool software based on a detailed anamnesis and individually for each user.



### German women's national soccer team using mobile cryo chamber for world cup preparation.

In the preparation camp for the women's soccer World Cup in Australia, we accompanied the team for three weeks with our mobile cryo chamber. The effects of the world's first mobile electric -85°C cold chamber are outstanding:

- Significantly accelerated rain formation after hard training
- Anti-inflammatory
- Greater ability to concentrate and focus
- Strengthened immune system
- Improved sleep behavior
- Good mood and reduced stress levels

Photos: [https://instagram.com/kaelteglueck\\_telgte](https://instagram.com/kaelteglueck_telgte)



### Coolzoone Cologne - Cryo Center, Cryotherapy, Longevity, Reverse Aging and Slow Aging

With 2 high-performance cryochambers from Art of Cryo, cryotherapy is the focus of all applications in our Center for Longevity, Performance and Experience. We now combine our cryo sessions with many other combination applications such as the Gravity Flow System and the Multi Cryo-Hacking System. Thanks to our strategy and overall concept, we now provide more than 200 treatments per day and pioneer in Longevity, Experience and Performance.



### Eden Concept – Health & Sport Clubs, France

The use of whole-body cryotherapy in France is actually not usual. To popularize the treatment, we have organized regular meetings with doctors from different fields – sports medicine, surgeons, rehabilitation, aesthetics, and others – to present the Eden concept and cryotherapy to them and their patients. We also propose cryotherapy for general well-being and to manage daily life.

Customers who use whole-body cryotherapy in our Eden concept center are very satisfied with the results. They feel better, sleep better, perform better, are energized, and manage pain more easily.

Our best customer is a French trailer who have made more than 400 cryotherapies. He makes trails, long runs (more than 100km), and the routine of cryotherapy helps him breaking the limits, recuperation, and promotes general well-being.

# CHAPTER 1

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## WHAT IS CRYOTHERAPY

### INTRODUCTION TO THE CONCEPT

The word “cryotherapy” is often misunderstood and misused. It is likely that two people talking to each other about cryotherapy mean either slightly or sometimes totally different things.

The term originates from the Greek words, “cryo” = cold, and “therapeia” = cure, and simply means “cold cure” or “cold therapy”. It does not refer to any particular source of cold (like ice, cold water, or air). It does not imply any specific temperature, either. As per Susan Kwiecien, Ph.D., a clinical research manager at the Nicholas Institute of Sports Medicine and Athletic Trauma in New York City, cryotherapy is reduction of tissue temperature by withdrawing heat from it, using something that is cold and applying it to the selected area of the warm body, thus transferring its temperature from warm to cold. So, in general terms, every application of cold for therapeutic purposes, from use of an ice pack on an achy joint to taking a plunge in a tub filled with ice for muscle recovery or performing a cryosurgery, is cryotherapy. Hence the numerous reports, not distinguishing between types of cryotherapies and measuring the size of the cryotherapy market in billions of US dollars.

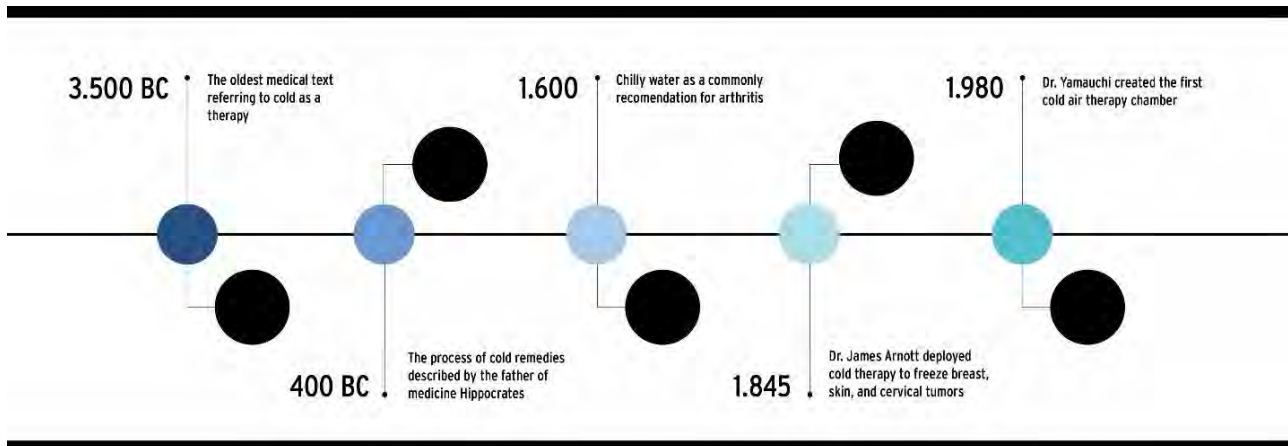
The sole subject of this Guide is the modern-day whole-body cryotherapy (WBC), also referred to as air cryotherapy (ACT), by which we mean a SUBSET of cold applications – the use of only extremely cold air and applying it to the entire body at once.

This approach is rooted in the practice of Dr. Toshio Yamauchi of Japan who started using brief whole-body exposures to extreme cold for rheumatoid arthritis pain management purposes in 1970-s and introduced the first whole body cryotherapy device in 1980.





## BRIEF HISTORY OF CRYOTHERAPY AND MILESTONES



Every trend has an origin, no matter how new or innovative it may seem. Most health-enhancing therapies of today can be traced throughout history, improving in line with accumulation of knowledge and technological advancements. Cold (water, ice) to strengthen immune system, reduce inflammation and swelling and minimize pain, and as an ally in the fight against skin aging has been used for millennia, including localized applications and full body immersions. Understanding of the benefits of cold has been accumulating accordingly - for more than 5,000 years.

The oldest medical text referring to cold as a therapy was written in about 3500 BC. Medical schools in ancient Greece, Persia, and Rome all propagated cold remedies for a range of diseases and conditions, including relief of physical suffering, and the process was well described by the father of medicine Hippocrates as early as 400 BC. It is interesting that he also understood and insisted that wounds, exposed nerves, and acral areas (hands, feet) should be insulated from cold rather than subjected to it; so, some of the cryotherapy safety requirements that we use today were formulated almost 2500 years ago.

By the mid-1600s, people having arthritis were commonly recommended to treat the affected joints with very chilly water.

In the 1800s, applications expanded. Cold was used as an anesthetic to facilitate amputations during the Napoleonic era. In 1845, James Arnott, the father of modern cryosurgery, deployed cold therapy to freeze breast, skin, and cervical tumors. A few years later, he also launched a device to combat acne and neuralgia. Unfortunately, this apparatus was not getting cold enough for his intentions.

Already then it was apparent that it was not just any cold that helped but specific types of cold. It was also observed that the temperature of cold application was a significant “make or break” factor. For example, Bavarian priest Sebastian Kneipp who lived in the 19th century and wrote intensively about hydrotherapy was suggesting that shorter and colder baths worked better than longer and milder, and there was a need to expose to the cold as many thermoreceptors as possible: “The cold stimulus acts all the more intensely at the sensitive nerve endings in the skin if the cold water covers the whole body surface in large quantities.”

But no matter how many therapeutic applications of cryotherapy were discovered, till the late 19th century they all involved water, snow, or ice, used either locally or as baths to immerse the entire body. The lowest temperatures available were determined by what could be achieved naturally.

The concept could only evolve when humans learned how to liquify gases. Their close to absolute zero boiling temperatures enabled numerous technological advancements, including the first cryosurgeries performed in the late 1800s and early 1900s. Then, the mid-20th century came with invention of the freezer and many more uses of cold.

The first attempts to expose the entire human body to specially generated low temperatures date back to late 1970-s and early 1980-s when Dr. Yamauchi discovered the effects of extreme cold on his rheumatoid arthritis patients and created the first cold air therapy chamber, thus opening a new chapter in evolution of cryotherapy. His team’s arthritis related findings were first published in 1981 and sparked interest in medical professionals in other parts of the world.

The 1st cryochamber outside Japan was commissioned by German Prof. Reinhard Fricke in 1984. With his seeing of 40 to 60 rheumatoid patients per day, research on the mechanism of action of extreme whole-body cold and its clinical relevance had begun.

## FORMS OF CRYOTHERAPY

Before putting focus on whole-body cryotherapy, which is the topic of this Guide, let us briefly mention a few other popular cold applications and highlight their main differences in line with the reasons why they are complements rather than replacements to WBC.

### ***Localized cryotherapy and cryosurgery***

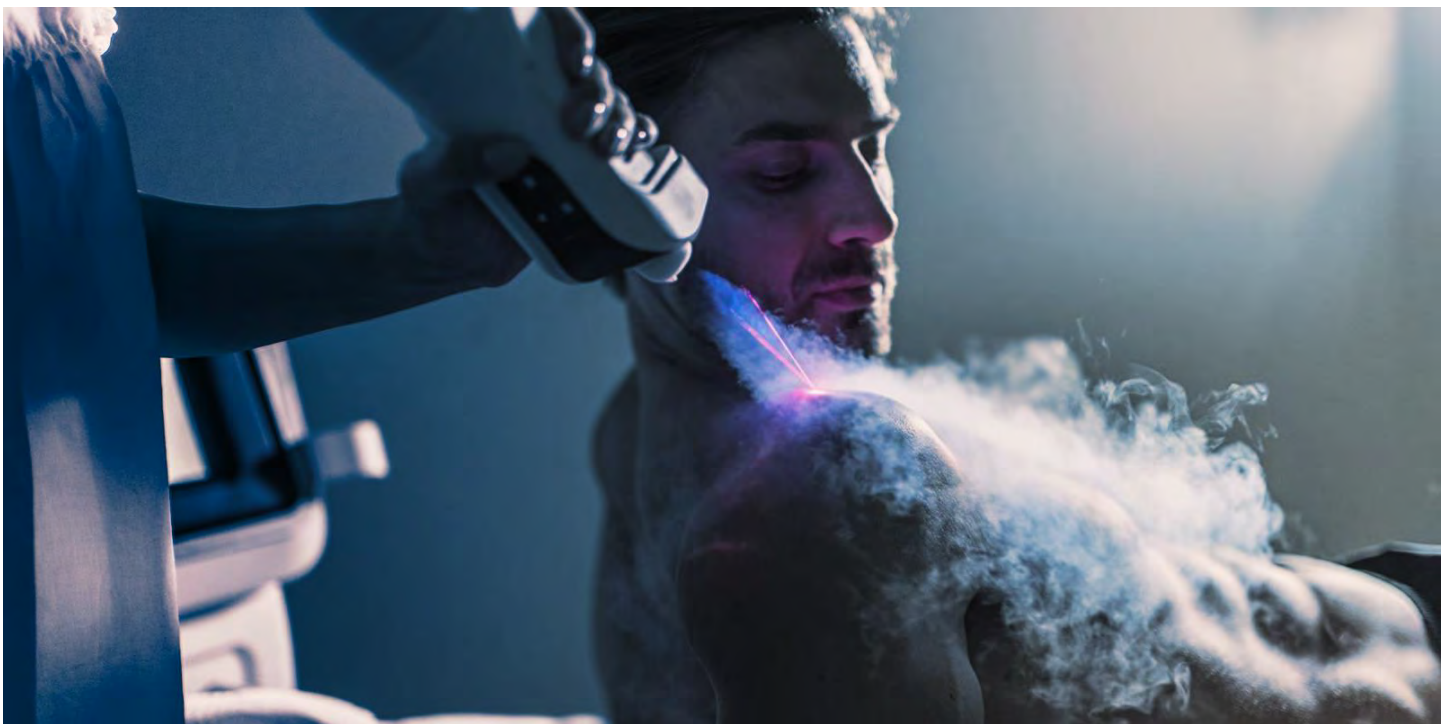
Localized exposure of tissues to cold, the simplest form of which is a cold compress or an ice pack, has been practiced for a very long time, but, regardless of the cooling agent, it only affects the treated area.

By lowering the tissue temperature, constriction of the peripheral blood vessels takes place and blood circulation temporarily slows. The cold also reduces the speed at which nerves transmit pain signals, leading to lower pain sensitivity. Consequently, the main applications of localized cooling are management of pain and swelling. For better results, it is often combined with more impactful manipulations, including but not limited to whole-body cryotherapy.

Localized cold has also proven to be beneficial in medical aesthetics and beauty, causing a rapid increase in the number of specialized devices for face rejuvenation and body shaping. The latter often relies on the process of cryolipolysis – breaking down the temperature-sensitive subcutaneous fat cells.

By lowering the treatment temperature even more and narrowing the cold impact, it is possible to kill and isolate abnormal and diseased tissue, such as tumors. This approach, cryoablation, is increasingly widely used in surgical interventions and referred to as cryosurgery.

In many cases, targeted cooling is a perfect tool for the goal. The many forms of it also fuel the overall growth of the cryotherapy market, now worth billions of US dollars. But in many other situations, exposing the entire body to cold delivers more results. As we will discuss in this Guide, the rise of whole-body cryotherapy should be attributed to its systemic multifaceted effect on the body which cannot be reached by local applications.



## ***Cold water immersion***



Plunging in icy water has a history as long as localized cooling. Already the ancient Roman baths featured cold rooms called frigidariums. In the 21st century, with the rise of biohacking movement and thanks to influential promoters like the Ice Man Wim Hof, winter swimming and ice bathing have regained worldwide appeal, fueling overall popularity of cold applications and increasing willingness to also try whole-body cryotherapy.

There are many benefits to cold-water immersion (CWI), from improving cardiovascular and immune health to muscle recovery and mental resilience, but the approach has one major limitation in comparison with air cryotherapy. It is the minimum temperature of the cold application.

While it is proven that over time of exposure cold from water penetrates the tissue deeper than in case of an air cryotherapy session and may have more pronounced impact on muscle recovery, the reaction to it is slower and comes with a higher risk of harm (hypothermia) if used incompetently.

In water, the body feels considerable physical discomfort and loses heat fast, yet the ambient temperature is higher and the engaged coping mechanisms are less powerful than the “fight or flight” reaction initiated right after entering the easier to bear dry cold of a cryochamber. As a result, whole-body cryotherapy using extremely cold air can achieve a major impact on all organs and systems that begins immediately and lasts for several hours post exposure, but initiating a comparable reaction in a tub filled with icy water takes 12 to 15 minutes, depending on its temperature. Baths this long require gradual adaptation, and most users never develop the needed resilience and endurance, thus limiting the effects and shrinking the audience. Short plunges, yet generally beneficial, lack the therapeutic properties of “true” ice baths or, even more so, air cryotherapy.

Although whole-body cryotherapy is often presented as “ice bath on steroids”, such comparison is inaccurate because the physiological reactions to the two differ, especially in the beginning of the cold exposure. Both modalities are beneficial but can only partially replace one another. The following chapters will explain why.



### ***Air cryotherapy***

As mentioned earlier, using ultra-low temperatures only became possible thanks to the technological advancements in cooling that took place in the 20th century, and utilization of them for therapeutic purposes only began with the findings of Dr. Yamauchi and his associates in the late 1970s and early 1980s. The first discovered application was arthritis pain management. Since then, many more uses have been studied and benefits have been identified. Air cryotherapy (most often called whole-body cryotherapy or WBC) has been becoming increasingly mainstream since 2010 when it was introduced to the United States market.

We now know that the temperature, the duration of cold exposure and the area of its impact not only matter but also change the mechanisms of the body's reaction to the cold stimuli. No local cold application or immersion even into the coldest water can initiate the instant and systemic reaction that we experience when exposing all thermoreceptors at once to air cooled to temperatures near or below the lowest ever registered on earth. The benchmark record low is  $-89.4^{\circ}\text{C}/-128.9^{\circ}\text{F}$ , reported from the Russian Antarctic Station Vostok in 1983.

When the environment is this cold, all systems and resources get mobilized to keep the body warm, resulting in a cascade of beneficial effects unattainable in any other circumstances. To maintain a proper function of the vital organs, the body must maintain the core temperature (also called body temperature) within a safe, narrow range between  $36.2^{\circ}\text{C}$  and  $37.7^{\circ}\text{C}$ . It gets achieved through a series of involuntary physiological reactions, such as drawing more blood to the core and increasing heat production, while decreasing its dissipation and reducing energy supply to the processes that are not critical.





So, the PURPOSE of exposing the entire body to extreme cold is to force protection of the vital organs and functions, and it is achieved through a brief but powerful thermal shock which results in a strong signal sent from the thermoreceptors in the skin to the body temperature control center in the brain. The reaction we help the body initiate is called “fight or flight”.

To achieve it, both the severity of the environment and the level of exposure matter. The cold must affect the entire body and cause rapid cooling of the skin, but it must also be applied in a safe, controlled environment. Hence the special cryotherapy equipment that can generate and sustain temperatures under  $-75^{\circ}\text{C}/-103^{\circ}\text{F}$ .

The temperature requirements for a full-fledged session of whole-body cryotherapy are still being investigated. It is generally agreed that temperatures under  $-100^{\circ}\text{C}/-148^{\circ}\text{F}$  are therapeutically effective, as most of the published studies were conducted in such environments. But it is also known, just not yet scientifically proven, that less cold temperatures such as  $-85^{\circ}\text{C}/-121^{\circ}\text{F}$  generate comparable results.

This Guide focuses solely on air cryotherapy at extremely low temperatures around  $-100^{\circ}\text{C}/-148^{\circ}\text{F}$  applied to the entire body at once. Its purpose is to shine light on the involved physiological mechanisms, applications, benefits, required precautions, and the available equipment to provide treatments effectively and safely, thus helping existing and prospective cryotherapy providers make better choices when setting up the practice, developing it, and ensuring exceptional efficacy and customer care.



Image: Cryo Race Center, Kirchberg, Austria

## TERMINOLOGY

Before proceeding to a detailed explanation of the aspects of air cryotherapy, there is a need to clarify the terminology. For simplicity's sake, as explained in this section, we will purposefully narrow the use of a few generally broader terms and apply them only to the context of the Guide.

### ***Cryotherapy***

While cryotherapy is an umbrella term that includes any application of cold for therapeutic purposes, in this document we will use it to ONLY imply whole-body cryotherapy.

### ***Whole-Body Cryotherapy***

When talking about whole-body cryotherapy (WBC), we will ONLY mean air cryotherapy at extreme temperatures below  $-75^{\circ}\text{C}$  in enclosed walk-in chambers. In many other sources, the term is used more broadly and also includes head-above-the-edge cryosaunas or even cold-water immersions, but we must be specific to be accurate.

The first reason is that extreme cold initiates physiological mechanisms that either do not take place or are considerably less pronounced in response to milder temperatures. CWI must explicitly be excluded.

Secondly, in 2023, an international consortium of scientists published a paper in the European Journal of Medical Research in which they warn against amalgamation of full body exposure in cryochambers filled with breathable air and head outside exposure in cryosaunas filled with liquid nitrogen mist under the same alleged banner of wholebody cryotherapy, referring to different levels of risk and efficacy. We will be following this recommendation. The differences between nitrogen cooled and air-cooled systems will be touched upon in Chapter 6.

### ***Homeostasis***

Homeostasis is the ability of an organism to maintain internal stability and balance in response to external changes. It is a fundamental concept in biology and physiology, ensuring that the internal environment of an organism remains relatively constant despite variations in the external environment.

### ***Thermoregulatory system***

The human thermoregulatory system is a complex physiological mechanism that regulates body temperature within a narrow range to maintain optimal functioning of biological processes. This system is crucial because many biochemical reactions and cellular functions are temperature-dependent, and deviations from the normal body temperature can have significant effects on health.

Key components of the human thermoregulatory system include hypothalamus, peripheral temperature receptors, and effectors such as sweat glands, blood vessels, and skeletal muscles.

The thermoregulatory system works to maintain a core body temperature of around  $98.6^{\circ}\text{F}$  ( $37^{\circ}\text{C}$ ) in humans. Various factors, including environmental conditions, metabolic activity, and the level of physical activity, can influence the body's temperature.

### ***Cryostimulation***

Recently, the term "cryostimulation" has emerged next to "cryotherapy", yet the same process is used for both. The only difference between the two is the treatment subjects discussed. In publications, cryostimulation usually refers to people with no medical conditions and athletes, whereas cryotherapy involves patients and therapeutic use of cold in the management of injuries, disorders, or painful conditions. We may use these terms interchangeably, giving preference to cryotherapy as an umbrella term when discussing universal reactions to low temperatures,

also because the word cryotherapy is already established in lifestyle and all other fields of use and has become generic, not referring specifically to medical indications.

### ***Cryochamber***

As per earlier provided definition applied throughout this Guide, whole-body cryotherapy (WBC) is a short exposure of the entire body, including the head, to very cold and dry air. The required temperatures below  $-75^{\circ}\text{C}$  can only be delivered in specially adapted cryochambers.

We will use the term cryochamber to stress the walk-in aspect, as opposed to cryosauna - shaped like a cylinder open top equipment that is cooled by direct injection of nitrogen vapors. As the concentration of nitrogen inside a cryosauna is too high to be inhaled, the participant's head needs to remain above the cold cloud, leading to only partial exposure of the body, hence the term partial body cryotherapy (PBC).

### ***Single-room cryochamber***

A single-room whole-body cryotherapy (WBC) system is a type of cryotherapy chamber designed to expose the entire body to extremely cold temperatures for a short duration, in which a person enters directly into the treatment room at sub-zero temperatures not lower than -90° C / -130° F, because lower temperatures would generate too much fog and hence snow and icing in the room.

### ***Multi-room system***

A multi-room whole-body cryotherapy system is a type of cryotherapy chamber designed with one or two pre-chambers to apply lower temperatures without a fog and icing problem due to relative air humidity levels. Thanks to the pre-chamber(s) more stable temperatures can be kept in the treatment room. Treatment wise the pre-room helps the customer get rid of the humidity from the skin's surface making the treatment more secure and comfortable. Multi-room systems are designed for one to six guests at a time, exceptional customized installations may offer space for up to twenty guests.

### ***The Reason to Stay Narrowly Focused***

While we are certain that most benefit-related findings presented in this Guide apply to both WBC and PBC, it is important to note that most studies of whole-body cryotherapy have been performed using cryochambers, not cryosaunas. Also, one of the latest publications in the field, "Evaluating safety risks of whole-body cryotherapy/ cryostimulation (WBC): a scoping review from an international consortium" by Fabien Legrand and 11 other leading researchers in the field of cryotherapy, stresses the need to distinguish between cooling of the body using breathable air (cryochamber) versus a gas in which oxygen content is low (cryosauna).

Now, with the terminology and the scope of the Guide clarified, we can discuss the process, the benefits, and the applications of cryotherapy in detail.





## CHAPTER 2

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# HOW AND WHY CRYOTHERAPY WORKS



### THE PURPOSE OF EXPOSING THE ENTIRE BODY TO EXTREME COLD

The human body is a complex self-regulating mechanism designed to always adjust to changes in the external environment and maintain optimal functioning, the main prerequisite of which is a steady core temperature. It needs to stay within a safe narrow range between 36.2° and 37.7° C, and the balance the body maintains to ensure it is called homeostasis.

The embedded self-regulatory mechanisms of the body are often compromised by factors like chronic stress, injury, or illness. In the modern world, they are also affected by abundance of food regardless of the season, always available heating or cooling, and choices of diet and lifestyle. As a result, the body's adaptability and self-care performance declines.

A proven method to boost it is forcing the body into a "fight or flight" mode, and whole-body cryotherapy does just that. When the body gets exposed to an environment perceived as a challenge to survival, keeping all important processes intact becomes the top priority and the most powerful protective physiological reactions get engaged to keep the core temperature from dropping.

The body's response to the low ambient temperatures of cryotherapy is involuntary, and the cold is just an agent to trigger it. But not any cold will do. A brief thermal shock is a prerequisite for whole-body cryotherapy to work.

## HOW COLD IS COLD ENOUGH

Let us answer the question WHY the temperature inside a cryochamber must be so low and what determines how cold is cold enough.

The explanation begins with a need to ensure a RAPID drop in skin temperature during the cold exposure, or the body will not be taking the changes in the environment too seriously and will not engage the beneficial “fight or flight” reaction that we are seeking.

In whole-body cryotherapy, we use air which has a very low heat exchange coefficient compared to water and ice. This is why cold showers feel more uncomfortable than considerably colder air. To compensate for this difference in the speed of cooling, the ambient air temperature needs to be MUCH lower. Only in this case the skin temperature drop will be fast enough for the desired reaction.

While more experimenting should be done to establish the required temperature threshold, it is believed that lowering the skin temperature by 15° C in about 3 minutes is enough to reap the benefits of whole-body cryotherapy. Considering the differences between individuals that we will touch upon shortly; cryotherapy providers usually aim at cooling the skin by 15° to 25° C – a sufficient range that also ensures treatment safety.

Cryochambers are built with this target in mind, yet the ambient temperature varies from one model of equipment to another. Since the speed of cooling in -75° C is not the same as in -110° C, the necessary variation in treatment dose that depends on the participant’s physique, condition, and goal, gets achieved through optimization of the length of exposure.

# CHAPTER 3

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## CRYOTHERAPY BENEFITS AND APPLICATIONS

### PHYSICAL REACTIONS IN RESPONSE TO EXTREMELY LOW TEMPERATURES

Whole-body cryotherapy relies on the principle of Stimulus – Reaction – Adaptation. Extreme cold acts as a powerful stimulus that triggers a reaction in the temperature control center of the brain, leading to adaptation of the body to the new conditions.

The body is capable of withstanding changes in the environment and maintaining an optimal working environment for all essential internal processes – a balance called homeostasis.

The most important parameter for the body to properly function is its core temperature, and our thermoregulatory system ensures that it stays within its safe narrow range.

The thermoregulatory system comprises of:

- Peripheral thermoreceptors - specialized nerve cells found throughout the skin that detect and signal temperature changes in the environment,
- Central thermoreceptors in the hypothalamus - a small area in the brain that acts as a control center,
- And effectors - peripheral blood vessels, skeletal muscles, and sweat glands.

Any discrepancy between the ambient temperature readings coming from the peripheral thermoreceptors and the target temperature induces thermoregulatory responses to stimulate either heat production or heat dissipation. Inside the cryochamber, these responses include:

- Constriction of the cutaneous blood vessels which shuts down heat waste and directs the blood flow towards the core to keep its temperature steady,
- Dilation of blood vessels in heat-generating organs,
- Contraction of the skeletal muscles,
- Metabolism activation to produce heat by brown fat, also called non-shivering thermogenesis.

So, during the cryostimulation, only the skin temperature drops. The body effectively prevents the cold from penetrating. The blood gets drawn to the core, and the core temperature stays intact, as can be seen in a thermal imaging camera, if available.

With higher concentration of blood in the core, systolic blood pressure increases, and the enhanced blood flow delivers extra oxygen and nutrients to the internal organs, improving their health and function.

Post session, as the ambient temperature is normal again, follows restoration. Peripheral blood vessels dilate, improving blood flow to the muscles and to the skin. The body feels an influx of energy and releases “feel good hormones” endorphins.

This is a very simple summary of the physiological reactions involved with whole-body cryotherapy, though. Blood tests demonstrate improved antioxidant status of the organism and simultaneous increase in anti-inflammatory and decrease in pro-inflammatory markers. The hormonal reactions are much more far-reaching, and the parasympathetic activation leads to relaxation and better sleep. Refer to Chapter 3 for a more detailed description of benefits and applications and to the list of publications at the end of this Guide for the respective science.

## OVERVIEW OF WBC UTILIZATION

Investigation and testing of applying extremely cold air to vast parts of the skin surface, not only isolated spots, started more than forty years ago. Whole-body cryotherapy pioneers were medical professionals - first in Japan, then in Germany and some other European countries, as well as in Russia. Their initial focus was pain management, then easing of the symptoms of rheumatic diseases such as rheumatoid arthritis, but over time more and more fields of use were identified.



In this century and particularly after introduction of cryotherapy to the United States market 15 years ago, thanks to rapid adaptations in professional sports and increasing interest from the scientific community, whole-body cryotherapy has emerged as an exciting non-pharmacological treatment impacting inflammation and oxidative stress which can result in improved sleep quality, faster neuromuscular recovery after high-intensity exercise, and chronic pain relief in patients suffering from diseases far beyond arthritis.

The effectiveness of WBC has already been well established in easing symptoms and slowing progression of multiple sclerosis, ankylosing spondylitis, fibromyalgia, and affective disorders. It is also widely used in physical performance and recovery management, and in post-injury rehabilitation.

New applications of systemic cryostimulation are constantly being investigated with sometimes promising results. For example, some evidence now suggests that WBC may have benefits for deteriorating cognitive function in adults and seniors, due to increased levels of brain-derived neurotrophic factor (BDNF). Another recent study links extreme cold exposures with improved circulating lipid profiles and related weight loss benefits in obese and overweight individuals.

One more currently developing field of application is aesthetics medicine.

We have also reached a point of five-star hotels and resorts considering and increasingly incorporating cryotherapy into the spa menus. So far, the hotel industry had been focusing mainly on rehabilitation after medical interventions (KurSpas and KurHotels), off-season sports training camps, and advanced medical wellness.

There is a growing number of cryotherapy and wellness centers, true ambassadors of cryotherapy, building their business models around cold applications. Whole-body cryotherapy presents a great business opportunity, as the uses are so versatile and treatment times - short. Many different groups can be targeted, and many people can be served per day.

But there still is a lot of potential in deepening the understanding of the physiological mechanisms initiated by cryotherapy and incorporating it not only in sports, fitness, wellness, and beauty regimens but also in medical care. While there are cases in which the evidence of clear benefits may lack consistency or statistical significance, the decades of application have demonstrated that the risks of trying whole-body cryotherapy are low. Extreme cold may not suit everybody, a few contraindications have been identified, but, if they are excluded, whole-body cryotherapy is worth a shot. For many users, the outcomes have turned out to be lifechanging. See Chapter 7 for examples.



## GENERAL PROTOCOL

In whole-body cryotherapy, like in any other practice having a major impact on the entire body, one size does not fit all. Customization of a treatment protocol is necessary to achieve the person's goals, and the best recommendation is informed not only by the purpose of the visit, but also by factors like physical condition and medical history, age, gender, susceptibility to cold, and even availability. Depending on these factors, cryotherapy can be utilized as a single session, a series of sessions, or a lifestyle adjustment. In some cases, a consultation with a doctor may be suggested prior to the first cold exposure to prevent any adverse effects.

Not only for safety and satisfaction of the client but also for success of the business providing cryotherapy treatments, there is a general protocol that must be followed during the first visit. The necessary steps include:

1. An intake questionnaire followed by a brief review of the answers,
2. Familiarization of the client with the treatment process and behavior during the cold exposure,
3. A reduced-dose first session to assess thermal responses,
4. A recommendation of the best treatment protocol.

Starting with the intake session, it is imperative to keep records to track perception, progression, and, possibly, protocol adjustments. In most centers, the customer care process is supported by a software solution. While there are numerous software choices on the market, some of them, for example, RemediCool, reflect the specifics of the industry better than others.

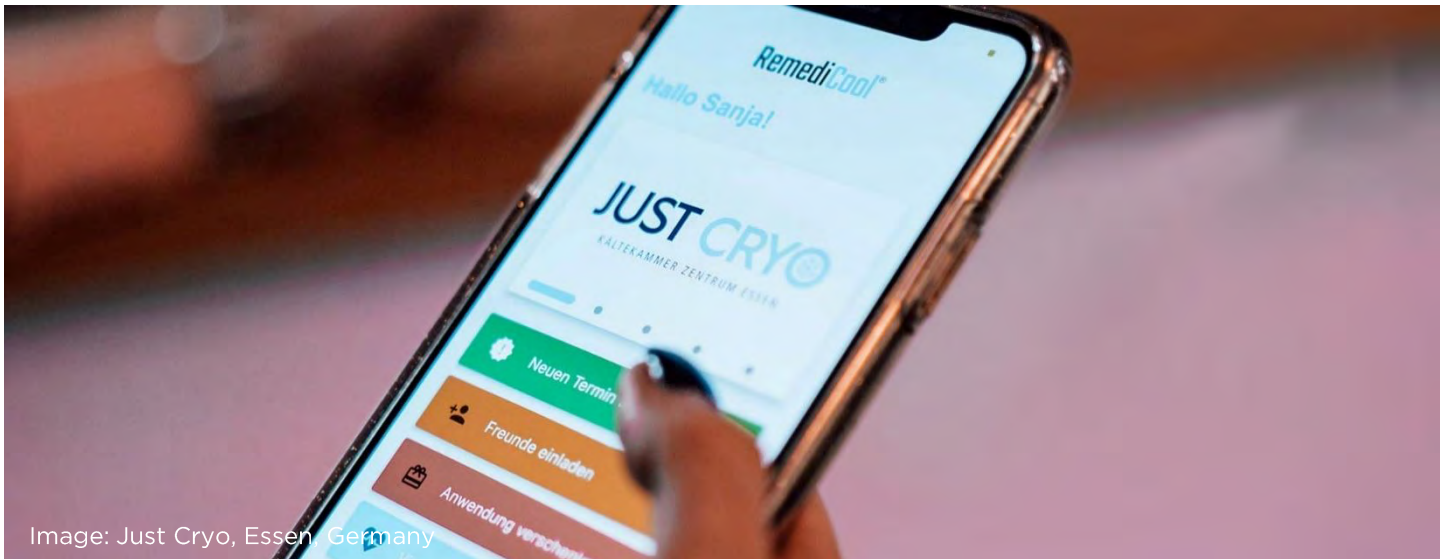


Image: Just Cryo, Essen, Germany

1. The intake questionnaire and the following brief review together with the client is resemblant of a consultation with a doctor and addresses the following:
  - The purpose of the client's visit. Even if it was triggered by curiosity, there must be an underlying cause that sparked the interest. Was it about performance, recovery, pain, sleep, weight, skin benefits?
  - Client's individual profile, including gender, age, skin and body type, physical and skin status, and previous experiences with cold,
  - Exclusion of contraindications, as the client's health condition is a safety, as well as a liability issue. Some people may have low cold tolerance or allergies. For some others, the enhanced blood flow and brief blood pressure spike may cause health complications. Therefore, the health status of the guest must be considered and documented before the first session. In case there are any concerns regarding blood pressure, it shall be measured. It may even be recommended to wait until the client has consulted their doctor for approval.
  - Client's availability. In some cases, the client may only be visiting or able to come a certain number of times per week or during certain hours, regardless of what recommendation you would like to give concerning the optimal treatment regimen

2. Once the intake documentation is completed, before the first treatment can take place, elucidation of what happens during the cryotherapy session must be given. In addition to the specific site, equipment, and intended application, this includes:

- A general description of what happens during a cryotherapy session, including the expected physiological reactions and sensations,
- Instruction to keep breathing relaxed, flat, and slow. Feeling a little pressure in the chest is normal, as air is denser in the cold environment of the cryochamber and expands once inhaled,
- Instruction to stand still or move fluidly. Rapid movements shall be avoided, as they increase air flow and speed up cooling in the affected areas and may lead to overcooling,
- Instruction to cover the area of the body that feel too cold with a gloved hand. It usually applies to the thinner skin around elbows,
- Instruction to step out of the cryochamber at any time if feeling uncomfortable,
- Warning to watch the step when coming out of the cryochamber to avoid slipping, as shoe soles may have hardened in the cold environment and there may be some frost on the ground.

Preparation for the session includes routine steps, such as:

- Making sure that the guest feels well,
- Making sure that the skin is dry,
- Making sure that there are no uncovered metal parts on the skin,
- Making sure that the guest is using all necessary protective gear and has put it on correctly, including shoes, socks covering the ankles, underwear or swimsuit without metal parts touching the skin, soft gloves, a headband or a hat covering ears and parts of the head without hair, and a face mask.

3. Length of the first session depends on the temperature and windchill inside the cryochamber and the guest's individual characteristics, including gender, age, skin type, physical status, and experience. It is always recommended to provide a lower dose (shorter and with less windchill) intake session to assess the new guest's reaction to cold and to reduce thermal discomfort, as the first experience will determine the client's willingness to continue with more cryotherapy. Depending on the equipment in use, the purpose, and the client's physique and tolerance to cold, duration of the cold exposure can be between 1.5 and 5 minutes. It can be gradually increased, as the client's body adapts, and cold tolerance improves. The safe upper limit will be informed by the feedback, but also the operator's experience, and may be suggested by the software in use.

During and after the session, the operator shall observe the client's behavior and body language. It is recommended that the staff does not leave any session in progress unattended to prevent incidents that are rare yet possible.

4. The recommendation that should be given with regards to the future cryotherapy treatments shall strive to optimize:

- Treatment duration,
- Treatment timing (which is particularly important when performance boost is desired),
- Treatment frequency,
- The total number of treatments within the series of applications.

The total number of applications that the individual should undergo within a series depends mainly on the indication. For example, research suggests that twenty or more treatments will produce better results than a lower number of sessions in people with rheumatoid arthritis. Medical conditions usually require more intense treatment schedules with one or, in some cases, even two or three sessions per day for several straight weeks. For general well-being, the most common approach is 2 to 3 sessions per week for extended periods of time or ongoing, as an integral part of the person's "stay in shape" regimen.

## CONTRAINDICATIONS

Whole-body cryotherapy is a safe treatment aimed at strengthening the body's embedded protective properties against environmental stressors. Adverse events appear to be rare in relation to the extent to which WBC has grown worldwide. Only isolated cases have been reported to date, usually in combination with triggers such as hormonal imbalances, drugs, or physical stress. Nevertheless, extreme cold exposure may impose health risks for people with certain medical conditions, especially those associated with poor cardiovascular health, acute respiratory problems, blood clotting, or allergies.

The person undergoing cryotherapy needs to be able to cope with blood pressure and blood flow increase during and just after the treatment. Hence absolute contraindications such as:

- untreated high blood pressure above 160/100 mm Hg,
- a heart attack that occurred less than six months ago,
- congestive diseases of the cardiovascular and respiratory systems,
- unstable angina pectoris,
- cardiac pacemaker,
- peripheral circulatory disorders,
- acute phlebitis,
- venous thrombosis,
- severe anemia,
- acute kidney/urinary tract diseases,
- tumors,
- seizures,
- skin infections, and
- cold allergies.

In all these cases, cryotherapy should only be administered if specifically prescribed by a doctor.

Relative contraindications that require caution and for which undergoing cryotherapy should be overseen by a medical professional include cardiac arrhythmias, heart valve defects, ischemic heart disease, Raynaud's syndrome, polyneuropathies, immunosuppression, vasculitis, and claustrophobia.

Proper intake plays a crucial role in identifying and minimizing the risks prior to the first cryotherapy session. Not every condition has been researched, and every person has a unique set of individual characteristics, medical history, and tolerance limits. For these reasons, before admitting a client with ANY serious illness, a non-medical operator shall refer to the attending physician to evaluate if cryotherapy is safe to perform.



Image: Apex Medical Center, Phuket, Thailand



## APPLICATIONS IN HEALTH CARE AND REHABILITATION

Based on theoretical knowledge, clinical studies and experience, the indication list for whole body cryotherapy has been increasingly justified and expanded over the last few decades to include a variety of health disorders.

Some of the medical conditions for which whole-body cryotherapy has been adequately proven include inflammatory rheumatic diseases (rheumatoid arthritis), degenerative rheumatic diseases (osteoarthritis) and chronic pains of various causes. Based on the available evidence, German Statutory Pension Insurance has listed whole body cryotherapy in its “Classification of therapies used for medical rehabilitation” with the indications of “Inflammatory joint diseases and pain syndromes” for functional improvement and to reduce inflammatory activity and pain.

Cryotherapy has also been studied as an adjunct practice to support symptom relief in patients suffering from:

- fibromyalgia,
- Bechterev’s disease (ankylosing spondylitis),
- spinal syndromes,
- multiple sclerosis,
- balance and movement coordination disorders,
- infantile cerebral palsy,
- chronic sleep disorders,
- neurodermatitis,
- psoriasis,
- anxiety and mood disorders,
- tinnitus, and many more.

In some cases, the obtained evidence of benefits has been statistically significant and explicit recommendation to consider cryotherapy as one of the treatment options has been given. Some other conditions have been responding to whole-body cryotherapy in a less consistent manner, leaving more room for experimentation. But even in these cases, the probability that regular cold exposures may help is quite high.

Speedier recovery has been witnessed when using WBC in post-injury care, including but not limited to overuse injuries like tennis elbow, golfer’s elbow, and other tendinopathies, as well as post-operative care.

Nevertheless, regardless of the available proof of benefits, it must be noted that one needs a medical license to give any medical advice or, moreover, to prescribe a treatment. For this reason, all cryotherapy providers that do not have the credentials to practice medicine must stress that whole body cryotherapy is an option that must be considered in every individual case by a doctor.



Image: Rehazentrum Junge, Göttingen, Germany

## APPLICATIONS IN MEDICAL AESTHETICS

Medical aesthetics is one of the newest fields in which applications of whole-body cryotherapy are being discovered.

Although localized cryotherapy and cryosurgery equipment is more common in skin treatments (think removal of warts and skintags, lightening of dark patches, or even treating low grade skin cancer), whole-body cryotherapy steps in as an aid in recovery after invasive procedures that cause bruises, swelling, and tissue scarring, and plastic surgeries, thanks to its anti-inflammatory properties and effects on skin appearance.

“I am sure there is potential for further developments in cryotherapy in the aesthetics industry, in promoting the forming of new skin or collagen,” says Dr. Waseem Bakkour, the Dermatological, Laser and Cosmetic Surgeon at The London Clinic.

Whole-body cryotherapy has also proven to be instrumental in lessening skin blemishes and reducing redness, scaling, itching, and scarring caused by various skin conditions.



Image: CoolZooone, Cologne, Germany



## APPLICATIONS IN SPORTS AND FITNESS

The benefits of cold for athletic performance and recovery have been studied more than any other whole-body cryotherapy indication, with publications dating back to early 1990-s.

The earlier discussed principle of stimuli – reaction – adaptation is used to achieve dynamic equilibrium at a higher level of performance and state of well-being. And, thanks to the research findings and because it has been concluded that cold applications do NOT cause any alterations of the blood that might be considered in competitive sports as unethical, cryotherapy has also become the most important form of passive physical therapy in sports medicine.

Two distinctively different applications of cryotherapy in sports and fitness are possible – boost of READINESS and RECOVERY, with or without injury. Clear benefits have been identified for:

- Track and field disciplines, especially running events, from sprint to long-distance,
- Winter sports,
- Cycling, swimming, and rowing, as well as
- Team sports.

Today, most professional sports teams in leagues such as Premiere League in soccer, America's National Basketball Association, National Football League, National Hockey League, and Major League Baseball, their training facilities and stadiums, as well as individual athletes have own whole body cryotherapy chambers. The outspoken cryotherapy advocates include stars such as Cristiano Ronaldo, Novak Djokovic, Usain Bolt, Michael Phelps, and LeBron James.

Whole body cryotherapy applications in sports and fitness go well beyond injury prevention and post-injury recovery. The results of numerous scientific studies support its inclusion in performance enhancing programs, as well as general use for wellness purposes outside training and competition.

The influence of pre-cooling on training or competition performance comes from proven cryotherapy effects such as:

- Muscle oxygenation, resulting from boosted blood delivery to muscles,
- Prevention of overheating and the consequent economizing effect on the cardiovascular system, and
- Alteration of central activity levels.

Intermediate cooling is applied in between workouts to optimize energy levels.

Post-exertion cooling helps ease muscle pain, restore the depleted energy reserves, and recover faster, which is also attributed to better stress and sleep management, especially through intense competition schedules.

It just needs to be remembered that athletic performance is a very complex phenomenon; so, it is essential to talk about differentiations, specializations, and individualizations of approaches, based on the type of sports, level of preparedness, and specific abilities of individuals, among other factors that fall outside the scope of this Guide.



Image: Alpenresort Schwarz, Tyrol, Austria

## APPLICATIONS IN WELLNESS, SPA & BEAUTY

Whole body cryotherapy, initially created as a physical therapy to help people suffering from painful inflammatory medical conditions and then widely adopted in management of athletic performance and recovery, is no longer restricted to these uses. It is increasingly applied as a preventative measure and incorporated in holistic wellness practices and spa-type environments.

Here, we can talk about anti-aging and improved life span and health span, often summarized in one word – longevity. Whole body cold exposure elicits complex responses that affect both the physique and the psyche and involve the central and the autonomic nervous systems, cardiovascular and respiratory systems, hormonal regulation, metabolism, immune function, as well as the skin and skeletal musculature.

Let us provide just a few examples.

Recent research has proven that regular whole-body cryotherapy modulates activity levels in the brain and contributes towards bringing about a balanced mental state, improving sleep patterns, better stress handling, and overcoming overstrain. One of the involved mechanisms is stimulation of the vagus nerve – the longest and most impactful cranial nerve, heavily involved in regulating the “rest and digest” functions of the body. Improved vagal tone is associated with decreased blood pressure and heart rate, calmness, relaxation, digestion, and bladder, bowel, and sexual functions. In addition, it has a scientifically proven ability to control inflammation within the body, thus having a huge impact on its overall physical and mental health.

Another interesting aspect is the behavior of energy metabolism under whole body cold exposure.

On the one hand, the body needs less energy to cool itself, meaning that a greater amount of energy can be allotted towards physical performance.

On the other hand, the oxygen radicals that are an inevitable byproduct of energy metabolism can be rendered harmless more effectively, as multiple studies have demonstrated that cooling brings a modulating effect on the oxidant/ antioxidant balance. The reduction in oxidative stress is important in preventing development and halting symptoms of many health disorders, as well as slowing down aging of the body.

Aging is a complex process, and we now know that subtle but chronic low-grade inflammation is a characteristic of increasing age. Scientists fittingly call the process “inflammaging” – aging promoted by inflammation and oxidative stress, both of which are lessened by regular exposures to extreme cold.

When it comes to appearance, it is important to understand that skin, the body’s largest organ, is a visible reflection and an important indicator of the inner health of the organism. The systemic effect of whole-body cryotherapy, including blood circulation and antioxidant capacity improvement, inflammation reduction, metabolism boost, forced contractions of the smooth muscles that we cannot consciously control or exercise, and mitochondrial biogenesis, does impact appearance in a big way, even if indirectly. All these factors are vital for cell rejuvenation, effective detoxification, and slowing down aging.



Image: Ucryo Wellness, Dubai, UAE



Finally, although whole-body cryotherapy should not be considered a weight loss treatment on its own, it can contribute as a practice, adjacent to other therapies, diet, and lifestyle changes.

It has been proven that exposing the body to cold may help recruit more brown fat cells, richer in mitochondria and easier to burn for energy generation purposes. A group of Italian researchers recently published a study, showing that cryostimulation, if used regularly, “teaches” mitochondria to take extra food and burn it up as heat, leading to improved resting calorie burn over time. For this, brown fat is highly regarded as a possible treatment for obesity and some metabolic syndromes.

It is not a coincidence that out of twelve “The Future of Wellness 2023 Trends” published by Global Wellness Institute, two specifically outline the growing importance of cold applications. Transforming white fat into brown is listed as Trend 6: Wellness + Weight, while pro-athlete level practices like whole-body cryotherapy entering hotels and resorts as spa offerings is Trend 9: Wellness + Sports.

To summarize, whole-body cryotherapy is proving to be an ideal complementary offer to most wellness and fitness practices and leisure activities, even mindfulness, yoga, and meditation. It is also incorporated in programs specifically focusing on sleep, mood improvement, stress reduction, mental wellness, detox, physical activity, lifestyle changes, and many more.



Image: Cryodukt, Zürich, Switzerland

# CHAPTER 4

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## CONSIDERATION FOR USE

Cryotherapy can be applied in different ways, depending on the purpose, condition, and practical considerations such as availability. While even a single use comes with benefits like a boost of energy and mood for several hours following the session, only a series of exposures or continuous commitment generate specific longer lasting effects, especially if symptom improvement of a medical condition is desired.

### SINGLE USE

As with most other therapies and wellness-improving practices, single use, yet beneficial, can only generate short term effects.

A sole whole-body cryotherapy session may ease acute pain, relieve stress or tension, lift mood, or help relax after a long day at work or physical exertion. It could be a nice cool-down on a sweltering hot day, an influx of energy after a sleepless night, a hangover relief, or an aid to overcome jetlag after a long-haul flight. It will also serve the purpose of trying cryotherapy for the first time.

Regardless of the reason for signing up for just a single visit to a cryotherapy location, one can count on the physical reactions associated with “fight or flight” – blood circulation boost, alertness that comes with the initial adrenaline rush followed by calmness from vagus nerve stimulation and happiness from release of endorphins. Cold also acts as powerful analgesic, slowing transmission of pain signals. The effects are often immediate and can last for several hours post-exposure.

Research shows that core temperature reaches the lowest point about one hour after leaving the cryochamber, indicating that the processes initiated during the cryosession take time to deliver all their benefits. For this reason, it is recommended not to plan wellness services that involve heat, especially core-heating infrared sauna, immediately after cryotherapy. Contrast therapies shall only involve topical hot and cold, like altering hot and cold showers.

### MULTIPLE USE

Multiple use refers to undergoing a certain number of cryotherapy sessions within a defined timeframe. The total number of exposures and their frequency depend on the condition and the goal that needs to be achieved. Most often, such concentrated “campaign” of treatments is related to post-injury or post-surgery recovery or improvement of the symptoms of a medical condition.

To accumulate the benefits fast and to ease the inflammation and pain involved in most such cases, research usually supports at least ten days to four weeks of whole-body cryotherapy as often as possible – once daily or, in severe cases, even two times per day. Many studies have led to the conclusion that 20 or more sessions deliver the best results.

Another reason for limiting the number of sessions may be availability – a comparatively short stay at the treatment place which may be a hotel, a rehabilitation center, a KurSpa, or similar. Although at least 5 sessions are usually recommended to start feeling the difference, even a few cold exposures come with certain benefits which should not be neglected.

### CONTINUOUS USE

Continuous use describes integrating cryotherapy into one’s regular wellness regimen. Just like healthy eating or exercise, whole body cryotherapy has most benefits if practiced routinely, from once or twice a week to as often as daily. For the best value for money, committed users typically purchase large packages of treatments or memberships that are offered by most cryotherapy providers.

It needs to be noted that the body’s reaction to extreme cold exposures may lessen over time. Such habituation, if not desired, may be overcome by increasing the treatment dose (time and/or speed of cooling) or taking a few weeks of “vacation” and letting the system reset.

## **BREAK THE RULES CONCEPT**

Common best practice is observing breaks between consecutive sessions.

In a regular treatment environment, they get spaced out to allow the skin temperature to return to normal. This process may take anywhere between 30 and 90 minutes. Not doing so may lead to overcooling of the skin and increases the risk of adverse effects. Physiologists also stress the potential risk of hyperthermia.

This rule gets broken by some biohackers, for example, members of the European Medical Cryo Race Club (MCRC). It is a licensed club concept of events in which only club members are allowed to participate. These events take place in a controlled environment, following software guided treatment sequences under professional oversight. It is important to abstain from experimenting without such informed guidance when doing multiple treatments within a few hours.

## **LIFESTYLE HABITS TO ENHANCE RESULTS**

As stressed by all researchers studying the benefits of whole-body cryotherapy, it can be instrumental in achieving faster progress in many situations, from inflammation and pain management to sleep and mood improvement and beyond, but it should not be seen as an isolated practice to deliver most any results. Cryotherapy will best support one's quest for better health and longevity as a lifestyle adjustment, not as a one-time or short-term practice.

Nutrition, sleep hygiene, exercise, breathwork, mindfulness practices and social life are among the most important aspects to mention, beside lessening the influence of external factors like air quality, noise, light, and electromagnetic "pollution" and spending time in nature.





## COMBINATION OF TREATMENTS TO ENHANCE RESULTS

Today, most wellness centers offer more than one service and often bundle them through combination packages or “pick whatever you like” memberships.

While certain combinations may amplify the results, it is also possible to jeopardize them or even put clients' health at risk. Treatments like whole-body cryotherapy present physiological stress to the body and initiate a cascade of massive systemic effects, meaning that any combinations must be chosen knowingly and carefully.

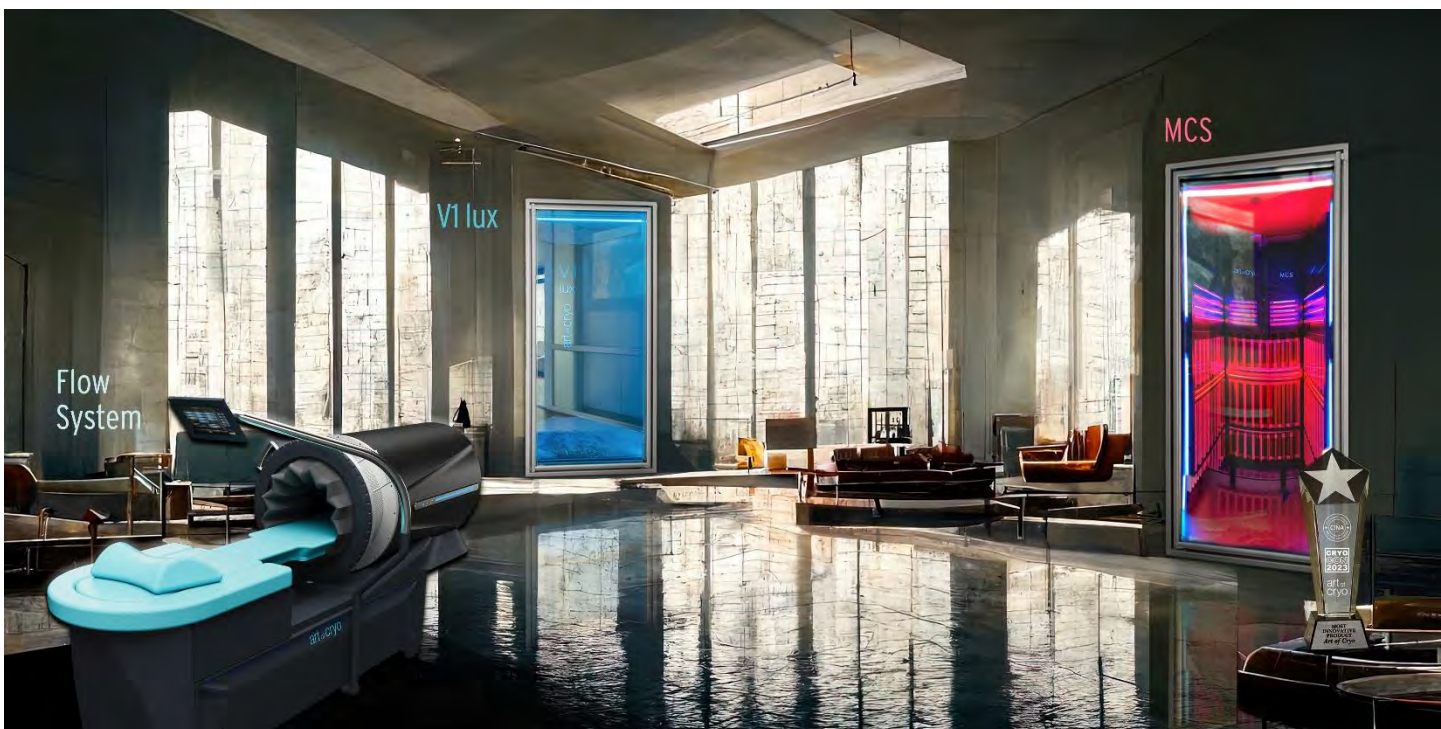
While there is a list of wellness treatments that can be effectively and safely combined with whole-body cryotherapy, including but not limited to light therapy, hyperbaric oxygen therapy (HBOT), halotherapy, and therapies that include heat or warmth, it is suggested to only apply combinations if the operator has the corresponding knowledge. Well defined protocols and/or professional oversight in each case are required to understand implications, manage risks, and maximize the outcomes.

There are several variables to consider, including:

- What is the main aim of the treatment and the reason to stack it with other practices?
- Does the combination make sense? Are there any additional risks?
- Are there any specific considerations regarding the guest's health and individual needs?
- What is the right timing, duration, and sequence of treatments? Needed breaks? Repetition requirements?
- What is the right dose of each treatment within the combination? Duration? Intensity? Set-up?

If risks are understood and eliminated and synergy potential is exploited, one could use whole-body cryotherapy in addition to or in parallel with all kinds of saunas including infrared, hot tub and hot springs, floating, localized and other forms of cryotherapy, Multi Cryo-Hacking System (MCS), HBOT, salt therapy, hydrotherapy, radon caves, negatively charged oxygen ions (NAIs), mud packages, altitude training, physical therapy (including electric muscle and nerve stimulation, ultrasound, magnetic field therapy etc.), laser treatments, manual therapy, sports and fitness, massage, yoga, meditation and, depending on the purpose, much more.

Some treatments, for example, cryotherapy and compression, could be planned back-to-back, while some other combinations require more consideration – choosing an optimum sequence, spacing them out, or even doing them on alternate days.



# CHAPTER 5

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## CRYOTHERAPY SAFETY

Amongst all other health and wellness enhancing practices, whole-body cryotherapy is considered very safe, since accidents and even adverse effects related to cryotherapy are relatively rare and occur mainly in cases when procedures are not properly followed.

To improve understanding and promote compliance, we will devote this chapter to a brief discussion of cryotherapy-related safety considerations, dividing them into 3 groups:

- Equipment related safety aspects,
- Health related considerations (contraindications),
- Impact of individual characteristics

### EQUIPMENT RELATED SAFETY ASPECTS

Since extremely low temperatures are involved, generation of the cold and maintaining a proper treatment environment is very important. Currently, most cryochambers on the market have built in temperature controls and sensors to ensure that.

To avoid the risks and costly consequences that would come with an old, poorly maintained, or malfunctioning device, cryotherapy equipment should only be purchased from an established, reputable supplier, installed by a trained team of engineers, and kept on a service plan. Product quality and proper set-up must be considered in the early stages of planning for adding whole-body cryotherapy.

If the cryotherapy chamber of choice uses liquid nitrogen rather than electric power as the coolant, additional requirements of safe handling of nitrogen and monitoring oxygen content in the air apply. Refer to Chapter 6 for more detail.

### HEALTH RELATED CONSIDERATIONS (CONTRAINDICATIONS)

Since whole-body cryotherapy relies on thermal shock as the trigger for “fight or flight” reaction of the body, boosts blood circulation and causes a short-term increase in the systolic blood pressure, it may put some individuals suffering from certain health conditions at risk of complications.

The risk group includes people with cardiovascular system impairments, heart disease and uncontrolled hypertension, as well as those prone to seizures or suffering from cold allergies. We already provided a list of identified absolute and relative contraindications in Chapter 3. In addition, physical stress that the body experiences when exposed to extreme cold may be too much if the person feels unwell – weak, dizzy, short of breath, or otherwise sick. To address health related considerations before allowing anybody to step into the cryotherapy chamber, the provider must implement a proper intake, including a health questionnaire and assessment for first-time clients and a pre-treatment preparations checklist for the regulars.

This process shall only be managed by skilled staff members. No person should administer cryotherapy sessions without undergoing at least a basic operator training. It is in the provider’s best interest to provide or refer their employees to such training and to test their knowledge and skills before giving them clearance to attend the clients. Visit [getresultsco.com](http://getresultsco.com) to explore options.

## IMPACT OF INDIVIDUAL CHARACTERISTICS

In addition to health and physical condition, there is another risk factor that plays important role in ensuring compliance and providing whole-body cryotherapy safely and must not be neglected. It is the significant differences in how individuals respond to cold.

Already in 1950-s, it was observed that the stationed in Alaska US troops of African origin had frostbites and other adverse reactions to cold much more often than their Caucasian peers. Researchers have since demonstrated that in the same low temperature environment the variation in skin temperature drop between individuals can be vast. This phenomenon must be considered when offering whole-body cryotherapy.



But the influencing factors include not only the person's race and skin tone. There is also:

- age,
- gender,
- body fat and
- muscle mass,
- physical and skin status, and
- the level of fitness.

For example, women and seniors cool faster, while very fit males require the highest treatment dose, due to their blunted responses to stress and extra heat generated by the muscles in the process of cooling. In addition, the perception of the same treatment differs greatly from one person to another dependent on their individual tolerance limits.

Consequently, the clients' characteristics and thermal comfort level must be assessed and accounted for upon onboarding. Pushing the same approach onto everybody may result in insufficient results for some clients, lack of satisfaction with the therapy, and even compromised treatment safety.

The best practice is offering a shorter, milder in terms of windchill session to those new to whole-body cryotherapy or having experienced it in a different type of equipment. The first session can be as short as 90 seconds, and the main purpose of it is acclimatization and assessment of bodily reactions and changes in skin temperature. The drop must be sufficient yet safe. Based on the outcomes, the treatment duration, frequency, and timing can be customized, and the dose can be increased to optimize the effects of cooling.

# CHAPTER 6

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## AVAILABLE TECHNICAL SOLUTIONS AND SETUP REQUIREMENTS

### GASIFORM NITROGEN VS ELECTRIC COOLING

Today we encounter two major technical solutions to achieve cryogenic temperatures to be applied to the entire human body at once. One relies on evaporation of liquified gas as a coolant, almost always nitrogen. The other is fully electricity driven with closed circuit(s).

There are quite a few differences between the two ways of cooling, and any equipment purchase decision should be made with them in mind. This chapter will cover the considerations to establish which solution is the best fit for the needs of your practice, wellness center, spa, or hotel.

First, there are different sizes of cryochambers using either way of cooling.

Some are designed to serve only one user at a time, others are big enough to provide group sessions for up to 4 guests or more. The smaller chambers usually have only one room with a door leading right into the treatment space and the environment there is less cold, likely warmer than -90° C/ -130° F.

The larger ones have one or more prechambers, less cold than the main chamber. A multi-room design helps prepare users for the experience, but it also plays a major role in isolating the treatment space from the warm ambient air and the water droplets in it, thus protecting the chamber from fogging up and ensuring lower and more stable temperatures.

Another differentiating factor is readiness.

The gas-driven systems are only cooled when there is a client to serve. It can be done in minutes and helps save the coolant and keep the operating cost lower. The electric chambers take much longer to cool down but, once the target temperature has been reached, remain ready for use throughout the day at a low and stable cost. The time to start cooling is usually programmed so that the chamber is ready by the time the center opens.

Although this Guide only concentrates on whole-body cryotherapy solutions, the market, especially in North America, is still full of head-above-the-edge cryosaunas that are cooled by injecting nitrogen vapors directly into the treatment space. To prevent any confusion and to give you a complete overview of available technical solutions, we feel it is important to briefly touch upon the distinguishing factors between the barrel-shaped gas-filled cryosaunas and the walk-in breathable air chambers that also use gas-based cooling.

So, here are the MAIN differences between gas-cooled whole-body and partial body cryotherapy systems:

- A cryochamber is filled with breathable air. The heat exchange technology in use utilizes the cooling power of the liquified gas but prevents its vapors from entering the treatment space. A cryosauna, on the other hand, mixes the vapors with air and injects them into it, hence the need to limit the exposure to below the chin level,
- In a cryochamber, the entire body including the head and neck is exposed to cold evenly. In a cryosauna, the head, neck, and sometimes even shoulders remain above the cold cloud, excluding the vagus nerve and making the physiological response less pronounced,
- Temperature distribution inside a cryochamber tends to be more even, while inside a cryosauna circulation is limited. The temperature is the lowest near the injection site(s) and below them, as gas vapors are heavier than air and sink,
- The need to keep the client's head above the edge imposes minimum height and maximum weight requirements of cryosauna users.

The need to purchase, store, and safely handle liquid nitrogen applies to all gas-cooled devices and will be covered in more detail shortly.



## OVERVIEW OF GAS DRIVEN SYSTEMS

As explained above, cryotherapy devices relying on liquified gas as a coolant can be further divided into direct injection and heat exchange systems. Only the latter solution allows for whole-body cryotherapy.

All *direct injection systems (cryosaunas)* can only handle one person per session and fill the tank with a mixture of gas vapors and air. It must not be inhaled, as the oxygen content in the mix is too low to breathe. Overexposure to it comes with a risk of dizziness and passing out or even asphyxiation, meaning that client's correct placement and behavior during the session are critical and good ventilation of the treatment room is a must to protect not only the clients but also the operators.

The direct injection technology is simple and appeals to providers mainly because of its low initial cost and flexibility. It is the quickest to install, fastest to cool, and easiest to move. Nevertheless, cryosaunas are gradually losing market share for reasons such as much higher overall operating costs and the cost per treatment, gas storage requirements and handling efforts, safety concerns, and efficacy considerations. Vagus nerve that is underexposed due to the need to keep the head above the cold cloud plays an important role in initiating the beneficial physiological reactions to whole-body cryotherapy.

This is not an attempt to lessen the technology, though. Cryosauna is perfectly safe and capable of providing effective cryotreatments if purchased from a quality supplier and used correctly. But the pressure on the providers from the regulators, insurers, and the media is higher and keeps growing. It is because all known serious accidents have happened in direct injection systems while none are accounted for heat exchange or electric cryochambers. One case in particular brought a lot of attention to cryotherapy and somehow discredited all participants of the market. It was in 2015 in Nevada, USA when a cryosauna operator ignored safe operation requirements, administered her own session after business hours when she was in the center alone, and was found dead by her colleagues the following morning. The incident caused waves of new rules and made liquid nitrogen supplies more difficult to arrange and more costly. Some gas companies left the field completely, while the European Industrial Gases Association (AISBL) issued a warning against use of direct injection systems. See "[Nitrogen Hazards in Cryosaunas](#)".



*Indirect (heat exchange) gas-driven systems* require liquified gas to generate cryogenic temperatures but do not expose guests to its vapors. They cool down the air which is then moved within the cryochamber by a fan. The temperatures inside these cryotherapy devices are quite evenly distributed, the air is safe to breathe, and the person's head can be fully exposed to cold.

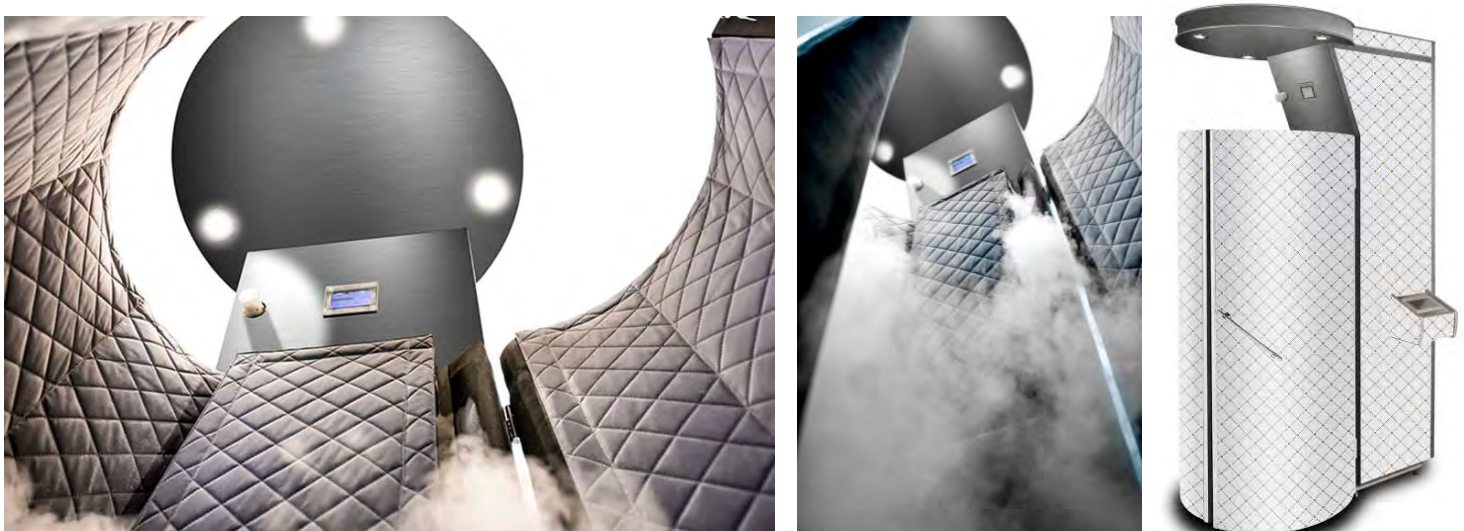
There still is a need for liquid gas and safe handling requirements apply, but the risks of oxygen displacement or cold burns are considerably lower. The main drawback is the cost of cooling. To reach the same temperatures as direct injection systems, significantly higher gas consumption occurs due to an extra step between cooling and cold application. The chamber walls can only remain at cryogenic temperatures and contribute to cooling of the environment if the operator offers back-to-back treatments, but such intensity is hard to achieve. In most cases, the system is pre-cooled for each treatment and radiation between the guest's body and the inner surface of the chamber is limited, as the walls are warmer than the air in the chamber.

Indirect systems are available for single as well as group use. They are more technologically advanced than direct injection systems and provide whole-body, not partial body cryotherapy. The biggest disadvantages compared to electric cryochambers are the extremely high consumption of nitrogen that drives up the cost per treatment, the related efforts of gas storage and handling, and the frequent need for pre-cooling to prepare the chamber for the client.

To summarize, direct injection systems (cryosaunas) require the lowest initial budget but are less reputable and come with higher safety risks that need to be managed with the right care.

Indirect systems are safer and, possibly, more effective thanks to whole-body cold exposure, but also more expensive and costly to run, as gas consumption per session is high.

For economic reasons, gas driven systems are normally cooled down only if customers are already there or kept in standby mode during the busiest hours of the day. The advantage is that cooling only takes a few minutes, making them interesting for sites with low or irregular customer flow, for private use, or at places only serving specific occasions.





## OVERVIEW OF ELECTRICITY DRIVEN SYSTEMS

Electricity driven systems only depend on power supply unless water is also required to cool the machine. They are fully enclosed walk-in chambers that evenly expose the entire body and provide whole-body cryotherapy.

Electric cryochambers have many advantages over gas-driven systems, from ease of use to high capacity and steady, low operating cost. Another important aspect is ongoing readiness, as the chamber can be programmed to turn itself on to reach the target temperature exactly by the time of opening and maintains it throughout the day, allowing for use whenever needed without any extra preparation.

At the same time, these systems are the most technologically advanced and complex, therefore also the most expensive, although the higher initial investment is soon justified by hassle-free operation and much lower cost per treatment, especially as capacity utilization improves. As opposed to nitrogen cooled cryochambers, the marginal cost of adding more treatments is practically nonexistent and the inner walls of the cryochamber that maintain the treatment temperature contribute to the efficiency of heat exchange during each session.

In addition, the heat that is generated by the modern electric cryochambers can potentially be recovered and used, for example, to warm pool water without any additional energy consumption, thus optimizing the ecological footprint of the spa or hotel and lowering the overall cost of operation. The feasibility of investing in such solution depends on the property and the type of business providing cryotherapy treatments.

Electricity driven cryochambers work with a single, double, or triple cold cascades. Single cold cascades are rare because they are difficult to maintain. They only reach cryogenic temperatures if a mixture of refrigerants is used, while double and triple cold cascades require only one refrigerant per circuit. Double cold cascade is the standard in single room cryochambers. Triple cold cascades with three circuits are used in multi-room systems that include one or several pre-chambers before entering the treatment space.

When considering the best electric solution for the location, one needs to weigh factors such as projected client flow, ambient temperature and humidity, not only the cost of the system and the complexity of installation. Single-room chambers are cheaper but have a few objective performance limitations.

First, they are incapable of maintaining cryo temperatures as stable as multi-room solutions in which pre-chamber(s) serve as a buffer. In these smaller cabins, cold is lost every time the door gets opened to enter or exit the chamber. The busier the business, the more likely it is that the chamber may need a little break to recover.

Secondly, single-room chambers are less cold by design, as the humid ambient air enters the treatment area with every opening of the door and forms icing on the evaporators, thus limiting the transition of cold into the treatment room. The bigger the delta between the ambient temperature and the treatment room temperature, the more icing is provoked. Prechamber(s) of multi-room solutions help to keep the air dry, prevent frost formation and fogging, and allow for constantly lower temperatures in the treatment space.



To summarize, regardless of the system of choice (gas-cooled or electricity driven, single or multiple-room chamber), it is essential to select a well-established, reputable supplier who can suggest the best solution for the target audience and the environment, ensure quality installation, post-sale customer service and maintenance. It is also essential to promptly follow all recommendations for use and safety requirements.

We must also note that equipment manufacturers often use the target treatment temperature as an argument to convince prospects of advantages of their systems over alternatives, but one must know that there often is a discrepancy between the temperature reading on the panel and the actual temperature surrounding the user's body, especially in nitrogen-cooled devices. Placement of the temperature sensors determines the accuracy. Measurements near the source of cold are always misleading. Besides, the importance of the treatment temperature is often overrated.

European experts agree that exposing the body to  $-100^{\circ}\text{C}$  / $-148^{\circ}\text{F}$  generates the full range of reactions expected from whole-body cryotherapy. Going lower increases the risks more than it adds to efficacy, although cooling of the skin may be faster. On the other hand, it is known that temperatures between  $-75^{\circ}\text{C}$  / $-103^{\circ}\text{F}$  and  $-100^{\circ}\text{C}$  / $-148^{\circ}\text{F}$  also have positive effects yet the extent of them has not been sufficiently studied and may largely depend on individual cold susceptibility.

The systems that generate warmer temperatures tend to compensate for the potentially lost efficacy by increasing air flow and using windchill to speed up cooling. This approach is somehow controversial as it changes perception of the treatment and may also increase the risk of frost bite.

To form your own opinion about the right solution for the type of business and intended applications, test the available systems, and evaluate both the experience during the session as how you feel in the post-session hours.

Overall, electric cryochambers are capturing an increasing share of most markets because their advantages are obvious, although sometimes outweighed by the significant initial investment. Gas-driven systems still dominate in the areas of extremely low nitrogen costs and serve niche markets with low or unregular usage.





## SPACE AND BUILDOUT RELATED REQUIREMENTS

Before making the equipment choice, it is important to not only consider the technical specification, environment related requirements for optimal functioning (temperature on the premises and humidity of the air), capacity, availability of supplies (if a gas-driven system is being considered), overall cost of operation and cost per treatment, but also accessibility, dimensions of the treatment room and size of the doors leading to it, buildout related specifics (including but not limited to power, ventilation, the distance between technical or storage rooms and the treatment room, and piping), as well as the necessary clearances and permits that will have to be obtained before the operation can be launched. Overlooking any of these factors can result in a significant cost increase and/or major delays of the project.

Below, we will discuss the most important aspects for each type of whole-body cryotherapy system, but the list may not be exhaustive. The supplier shall be able to guide you through the general and equipment-specific requirements for secure and efficient installation and proactively inform you of the possible bottlenecks.

### ***Setup of gas-driven systems***

Although whole-body cryotherapy solutions that involve gas cooling are considerably cheaper to purchase, they come with more risks that need to be adequately managed and, due to higher probability of accidents and injuries, have fallen under the radar of regulators. The number of requirements with which you will have to comply is going to be higher than in the case of installing an electric cryochamber. Moreover, the setup and running costs will depend on many factors, not only the choice of the equipment. Our Guide would not be complete without at least mentioning those considerations.

*First, familiarize yourself with the COMPLIANCE requirements.*

If liquified gas will be used as a coolant, it is important to begin with identifying the requirements and inspections that will apply in the permitting process and making sure that supplies could be arranged, the cost and the lead time will be reasonable, and the gas company's qualification criteria for entering an agreement could be met. For example, it is common for the gas suppliers to demand significant insurance coverage that would protect them from any misuse or injury related claims. It can be costly and/or difficult to obtain. To avoid availability and cost roadblocks, you must look for vendors in your area and interview them before ordering the equipment.

Also, since whole-body cryotherapy is comparatively new, often poorly understood and generally underregulated, local municipalities tend to close the gaps in the ways they find it. Consequently, there can be significant differences in administrative burden and cost not only between countries, but also between states, cities, and even types of property. Shopping malls and hotels are known to have the strictest of requirements when it comes to delivery, storage, and handling of liquified gases. Although nitrogen is not flammable, explosive, or poisonous, and it is always delivered in sealed vessels that prevent contact of the people handling them with the substance inside, it is still listed as hazardous. Make sure you know and will be able to clear all requirements that apply.

*Next, understand and project the TOTAL COST of using liquid nitrogen.*

When it comes to the costs of installation, operation, and providing a gas-cooled treatment, the factors that play a major role and can even "make or break" the business, include:

- the nitrogen delivery system in use and the related costs,
- consumption of liquid nitrogen per treatment,
- cost of liquid nitrogen per liter.

Cryo centers that use gas usually receive liquid nitrogen in pressurized cylinders of 200 to 250 liters. There is quite a range in nitrogen delivery vessel sizes. Their standards differ between regions but also between suppliers. The number of treatments that could be provided per such cylinder depends not only on the model of the equipment but also on the treatment schedule. As discussed, while electric chambers get cooled once to maintain the target temperature throughout the hours of operation, gas-driven systems get cooled when there is a client to serve. Pre-cooling consumes extra nitrogen. Consequently, the less predictable the schedule and the longer the breaks between consecutive sessions, the more gas gets wasted on the preparation phase. Back-to-back sessions allow the operator to achieve the lowest cost per treatment while random visits can easily double it. This huge fluctuation requires constant monitoring of consumption and makes planning of nitrogen supplies challenging. One cylinder may be enough to serve 30 clients, but this number could also fall to just 10-15. Running out of nitrogen is possible even in the middle of a cryosession, especially because it is hard to know exactly how much liquid is left in the vessel at any given moment; so, at least one cylinder must always be kept in reserve.



Another factor that requires ongoing attention is the cylinder pressure. To keep the gas liquid, the cylinders must be pressurized, usually between 22 and 50 psi (pounds per square inch). 1 psi equals to 0.068 atmospheres. It is important that the pressure of supply matches the requirements of the equipment, or the system will not work properly. If the pressure is lower than the equipment's standard, it will affect cooling and the target temperatures will be difficult to reach. If the pressure is too high, there is a risk that it will blow the valve and damage the device. Depending on the model, it may also increase the risk of cold burns. Therefore, making sure that the gas always reaches the cryochamber at the specified pressure is an important aspect of training of the involved staff and working with the gas supplier. Even if the gas company is disciplined and always meets the specification at delivery, the pressure fluctuates as the level of the liquid inside the cylinder decreases and the freed space fills with vapors.

Monitoring the always changing nitrogen pressure, tracking consumption, and trying to figure out the right moment of swapping the gas vessels not to run out of nitrogen mid-session is, no doubt, a hassle. Provided that gas-driven walk-in cryotherapy chambers relying on heat exchange for cooling consume up to 17 liters of nitrogen per just one treatment, many providers opt for a microbulk buildout. Microbulk gas tanks hold anywhere between 1,000 and 3,000 liters under high or very high pressure and get filled via a hose directly from the delivery truck. They eliminate the need for continuous pressure monitoring, improve customer satisfaction, save time, reduce gas consumption per session and gas price per liter, but require a major permanent installation that requires extra permits, easy access from outside, and comes with a significant setup cost. Not every property is a good candidate for such adjustment.

To summarize, if nitrogen will be delivered in individual cylinders regardless of their size, the cost will consist of three parts, all of which must be accounted for:

- the cost of nitrogen per liter,
- the cost of the cylinder (usually charged as a rental per day or month),
- the cost of delivery.

In case of a microbulk buildout, the cost per cylinder will be replaced by the cost of the tank and its setup. The cost of nitrogen per liter will reduce significantly. Delivery cost will also likely be much lower.

In addition to the direct costs, additional insurance may have to be added to meet the qualification criteria of the supplier.

In rare cases, a location may consider installing their own on-site nitrogen generator.

*Finally, review these ADDITIONAL CONSIDERATIONS.*

*Make sure the treatment floor is accessible for gas deliveries.*

Liquid nitrogen cylinders are heavy even when empty while a full 250 l vessel weighs more than 700 lbs/ 317 kg. They cannot be moved in and out of the building if there is no ramp and/or elevator. On some properties, deliveries are restricted to only cargo elevators.

A microbulk tank, on the other hand, needs to remain or to be reachable from outside and connectable to the delivery truck.

*Make sure you have enough space for several individual cylinders or a microbulk tank.*

Depending on the client flow and nitrogen delivery schedule, every gas-driven whole-body cryotherapy location stores between 2 and 5 cylinders at any given time. The vessels are not only bulky but also visually unappealing, so they are usually kept out of the guests' sight. The size of the storage space should be about 9 sq ft/ 1 m<sup>2</sup> per cylinder with a large enough door to move the trollies in and out and easy access to the treatment room.

Microbulk containers are typically installed outside or in a room on the ground floor that has a garage-like door for easy access. The size of the required space depends on the dimensions of the tank that will be used.

*Minimize the length of the piping between the nitrogen storage and the cryochamber.*

The farther the nitrogen container from the treatment room, the longer the pipes and higher the loss rate in the transferring process. To improve efficiency and lower the cost, it is recommended to place the nitrogen source as close as possible to the chamber and insulate the pipe or, better so, use a special vacuum-jacketed hose.

*Ensure proper ventilation of the treatment and storage rooms and install oxygen level monitors.*

Although 78% of the air we breathe is nitrogen, increasing its concentration in the room is dangerous. Inhaling too much nitrogen can cause headaches, dizziness, passing out, or even asphyxiation, and can affect not only guests whose visit times are relatively brief but also staff who attend them and are constantly exposed to nitrogen vapors. The vapors have no odor and changes in the air quality cannot be seen; so, proper measures must be taken to prevent accidents from happening.

As nitrogen vapors sink to the ground, forced ventilation with suction close to the floor is highly recommended. In addition, oxygen monitors need to be installed. Some regulators and/or nitrogen suppliers require use of only high precision certified measuring devices. Make sure to know and comply with their specifications.

*Control temperature and humidity in the treatment room.*

All devices that produce extreme cold work best in rooms in which temperature and humidity are lower. Air conditioning reduces the strain on the technology and helps ensure stable and low temperature in the cryochamber. Dehumidification reduces fogging and frost formation, improving not only the performance of the equipment but also customer comfort (better visibility lessens claustrophobia) and safety (less frost on the ground reduces the risk of slipping and falling). Every equipment supplier may have a slightly different specification of the ideal environment, but the benchmark is 70°F/ 21°C or less in temperature and below 45% in relative humidity.

*Be aware of the loss of nitrogen.*

Due to the extremely low boiling temperature of liquid nitrogen, it keeps evaporating even inside the closed pressurized vessel. As it happens, pressure builds and, for safety, must be released via a special valve. The releases cause occasional hissing of the tank which is normal but also indicates loss of the gas.

Some gas gets lost already in the delivery process, especially during long drives and in hot climates. Then, in the storage room and while the cryochamber stands idle, the liquid keeps slowly evaporating and reducing in volume by up to 2% per day.

The loss cannot be prevented but can be managed by:

- working with the supplier to optimize the delivery route,
- lowering the temperature in the storage room,
- minimizing motion of the vessels,
- shortening and insulating the pipe between the tank and the cryochamber,
- preventing long storage.

*Get equipped for nitrogen handling.*

All modern systems gas-driven systems that receive gas from pressurized vessels have eliminated the risk of any person getting in contact with liquid nitrogen. But the operator still needs to train the personnel in safe handling, provide the necessary tools and allocate time for replacing the empty cylinders. How much time is needed depends on the setup. Sometimes all that is required is disconnection of the hose from one cylinder and connection of it to the next. Sometimes the cylinders must be moved in the process.

Since the hoses get extremely cold and frosty while the chamber is in operation, the staff needs gloves and appropriate size spanners to perform the cylinder swap and know how to prevent injuries when moving heavy objects.





## ***Set-up of electricity driven systems***

Every electric system consists of three main elements or modules:

- The treatment room or the cryochamber itself,
- Machine room, with cold machine and control cabinet
- Outside unit or cooling water supply.

### *Required space*

When planning for the installation, make sure to follow the manufacturer's specifications, including but not limited to the maximum distances between the modules and the breakthroughs needed for piping and cables. The treatment room in which the cryochamber will be installed must be large enough to provide space for the cell with its given measurements, the defined by the manufacturer extra space above, beside or behind the chamber, and sufficient space in front of it for an adequate customer experience that may include not only getting in and out of the chamber but also changing and putting on the protective gear.

### *Piping and connections*

For piping and cables, follow the specifications of the equipment.

Drainage of the condensed water will be needed to avoid collecting it in a bin and dumping the water frequently.

The machine room can be adjacent to the treatment room or a separate room, as per specifications provided by the manufacturer.

Piping and cables will be connecting the machine to the chamber and to the external unit or cooling water supply. One must also account for refrigerant evacuation, the specified by the manufacturer power supply and, in the case of remote performance control and maintenance, internet supply.

The machine room will also have climate control and maximum temperature requirements, as the cold machine itself generates heat. If there are other machines in the same room or if it has windows letting in sunshine, these heat sources must be considered, too.

The outside unit can be an air-cooled condenser, a glycol-based condenser, or a chiller. For any of these, an outside space will be needed, best in shade and with enough room in front and in the back of the unit.

Most suppliers offer solutions that can be installed on the ground, wall, or flat roof top. In either case, you must follow the maximum distance to cold machine requirement defined by the manufacturer.

Your building may already have cooling water supply. It is a common way to control temperatures in big commercial buildings in hot climates. If so, talk to your equipment supplier - it may be possible to substitute the outside unit with a connection to the existing cold-water supply of the property. The answer will depend on the water flow volume, inlet temperature, and pressure.



### Temperature and humidity in the treatment space

The ambient temperature and humidity levels in the treatment room shall be low, ideally not more than 70°F/ 21°C with a relative humidity of 45% or lower. This will help avoid excessive fogging and icing of evaporators, improving both performance of the chamber and customer experience.

It must be noted that absolute humidity in the air grows exponentially with higher room temperature. For example, 40% relative humidity at 20°C means absolute humidity of 6.9 g/m<sup>3</sup> which doubles to 15,8 g/m<sup>3</sup> if the air temperature is 35°C:

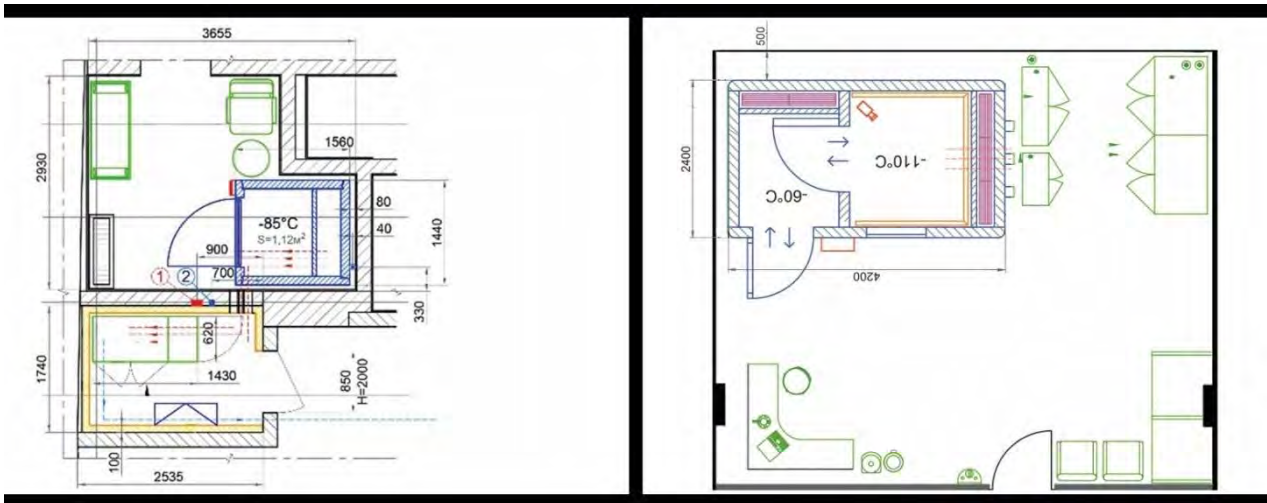
| Absolute humidity in g/m <sup>3</sup> at a given temperature and given relative humidity |     |     |      |      |      |      |      |      |      |      |
|--|-----|-----|------|------|------|------|------|------|------|------|
| relative humidity  | 10% | 20% | 30%  | 40%  | 50%  | 60%  | 70%  | 80%  | 90%  | 100% |
| Air-temperature [°C]   |     |     |      |      |      |      |      |      |      |      |
| 35   | 4   | 7,9 | 11,9 | 15,8 | 19,8 | 23,8 | 27,7 | 31,7 | 35,6 | 39,6 |
| 30   | 3   | 6,1 | 9,1  | 12,1 | 15,2 | 18,2 | 21,3 | 24,3 | 27,3 | 30,4 |
| 25   | 2,3 | 4,6 | 6,9  | 9,2  | 11,5 | 13,8 | 16,1 | 18,4 | 20,7 | 23   |
| 20   | 1,7 | 3,5 | 5,2  | 6,9  | 8,7  | 10,4 | 12,1 | 13,8 | 15,6 | 17,3 |
| 15   | 1,3 | 2,6 | 3,9  | 5,1  | 6,4  | 7,7  | 9    | 10,3 | 11,5 | 12,8 |
| 0  | 0,5 | 1   | 1,5  | 1,9  | 2,4  | 2,9  | 3,4  | 3,9  | 4,4  | 4,8  |



Image: MEDICAL STADIUM Bordeaux-Mérignac, France



## DESIGN



Although no two cryotherapy locations look the same and the design of the space always matches its concept, purpose, and style, there are a few universal principles to follow.

First, the ground floor is always recommended for ease of access, also in the equipment installation phase. Other factors like availability of parking, time to travel from the entrance to the treatment area, and clear navigation to it should be planned for.

Although wellness centers and spas often offer a variety of services, some of which can be combined in one visit, whole body cryotherapy has a value of its own and requires frequent and/or regular returns. Since the treatment is short and requires no time-consuming pre- or post-preparations like showering, it nicely integrates into people's daily routines or into a stay at a hotel. Convenience shall therefore be a major consideration.

Secondly, one should always consider separation between any wet areas and whole-body cryotherapy. As discussed earlier, humidity negatively impacts not only the performance of the equipment but also guest experience and safety.

When it comes to the floor plan, it should be decided between an open space concept versus designated treatment rooms.

Single cryochambers are more likely to be installed behind closed doors for the privacy of the guest. The same room then serves also as a space for changing and should offer things like a chair, a hanger for clothes, a mirror, treatment supplies, and bins for the used socks, gloves, masks, and headbands. It is also useful to always remind the client of the safety requirements and behavior during the session which could be done with a nice poster.

Multi-user cryochambers have the potential to make cryo experience more social or even give it an event character. For this, the treatment space may be open and separated from the changing booths.

It is also increasingly common to integrate sensory experiences like light, color, sound, and aroma. The possibilities to enhance customer experience here are endless.

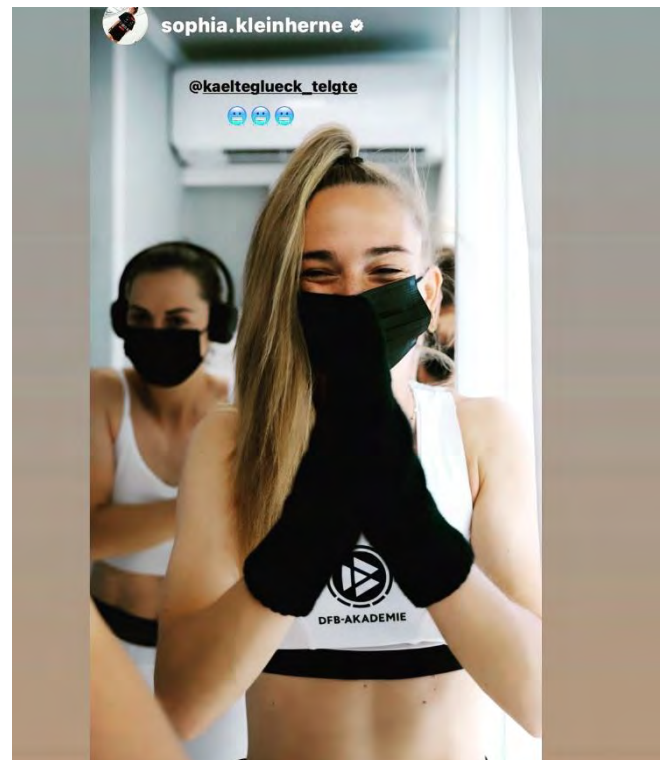
## SUPPLIES

During the whole-body cryotherapy session, sufficient protection of acral areas is very important.

Feet and fingers have a high concentration of nerve endings and are hypersensitive to cold. For this, it is essential to provide socks covering the heels, closed shoes with thick soles and warm soft gloves. Letting the clients use their own socks is not advisable because they may be too thin or slightly damp of sweat, especially during the summer months or in hot climates, increasing the risk of skin damage. Cold and moisture is never a good combination.

For comfort, we also offer a headband to cover the ears or a hat which is a better solution for guests with little or no hair.

A facemask helps minimize the discomfort associated with the warm humid exhaled air freezing around the mouth and on the chin.



It is also recommended to have on site:

- A mat with a rubber or other anti-slip base in front of the cryochamber. The shoe soles harden during the session and get more likely to slip. Padding will ensure a safe first step outside the treatment space.
- Some tape or bandages to cover piercings or devices that have liquid inside, like blood sugar monitors. They could also be put over areas that need special protection during the treatment, such as blisters or wounds.
- An evacuation blanket to keep near to the cryotherapy chamber, especially if it has room for multiple people. The blanket will be handy in an unlikely case of someone feeling unwell and falling during the treatment, to safely evacuate the guest from the cold room.

To summarize, supplies play a crucial role in providing whole-body cryotherapy safely.

All protective gear must be completely dry and warm enough, and the guest's skin must be clean of oils, lotions, and touching metal objects. Any injured area that contains or may be seeping moisture must be well covered. Same applies to wearables that cannot be removed.

# CHAPTER 7

## TRENDS. EXPERIENCES. OUTLOOK.

To conclude the introduction to whole-body cryotherapy that this Guide is intended to provide, we will reference some success stories that demonstrate the power of extreme cold applications, summarize the development trends, and give a brief overview of the latest research findings. You will find a comprehensive list of publications in the Appendixes.



### TOP 5 MARKET TRENDS

**TREND 1:** *Electricity driven systems take market share from gas-driven solutions and whole-body cryotherapy increasingly outcompetes partial body cryotherapy.*

Gas (almost always nitrogen) cooled devices use evaporation of liquified gas to generate the ultra-low temperatures required to provide whole-body cryotherapy, while electricity driven systems rely on multiple stage closed refrigeration circuits without gas consumption. Electric cryochambers, yet more expensive and complex to install, gain appeal due to numerous discussed herein factors, including easier lower-cost operation and improved safety.

In certain markets and applications, electric cryochambers tend to replace nitrogen-driven systems faster than in others. This development is related to local regulations, ease and cost of obtaining liquid nitrogen, as well as capacity requirements, and is more prevalent in Central Europe than in Eastern Europe or the United States where at least 50% of the providers still rely on liquified gases. However, also there most new installations at least consider going fully electric, especially in sports where larger multi-person walk-in chambers present clear advantages. During CryoCon 2023 in Dallas, the third edition of the world's largest international cryotherapy convention, for example, electricity driven systems were three times more showcased than nitrogen cooled devices.

These main distinguishing factors of electric cryochambers include:

- Safety, as they exclude risks of oxygen displacement that can lead to loss of consciousness and even asphyxiation, as well as provide more homogenous temperature distribution around the body, reducing the probability of adverse reactions and burns.
- Convenience, as they only consume electricity yet may also require cooling water setup. Nevertheless, the administrative burden of management of supplies and nitrogen handling is completely eliminated.
- Precision, as they generate more stable treatment environments and achieve target temperatures better than any nitrogen-driven devices.

The main limitation of electricity-driven systems remains the considerably higher upfront investment.



***TREND 2: The number of cryo centers grows exponentially in the US, Europe, the Middle East, and now also Asia.***

Over the past decade, wellness centers, gyms and spas that offer whole-body cryotherapy, but also other cold-powered services have been opening in large numbers, especially in the US and Europe that remain the world's two largest cryotherapy markets. The Middle East and Asia are now following the lead.

The growth of the number of cryo centers can be attributed to several factors, including the increasing popularity of whole-body cryotherapy as a safe holistic wellness and recovery technique, the growing awareness of its potential benefits, and the expanding applications of cryotherapy in sports, fitness, disease prevention, cognitive and mental health, beauty, and longevity. The COVID-19 pandemic also contributed, as many people became more health-conscious and started seeking non-medical ways to boost their immune systems and manage stress.

In addition to standalone cryotherapy centers, the service is being incorporated into the offerings of spas and med spas, sports centers, and clinics, helping to broaden the customer base and increasing demand for whole-body cryotherapy.

According to reports, the market is expected to keep growing in the coming years at a compound annual growth rate (CAGR) of around 7.8%, driven by increasing awareness of cryotherapy benefits, expanding fields of application, and the growing number of cryo centers and other businesses incorporating the service into their offerings.

***TREND 3: Most new-built spas for top class hotels consider offering cryotherapy.***

As cryotherapy is gaining popularity as a wellness treatment and practices embraced by elite athletes keep making their way to spa menus, many top-class hotels now offer cryotherapy as part of their spa services. Its versatility of applications makes WBC a good fit regardless of the spa concept.

The trend began with the cure spas in Europe and got adopted by some of the leading medical spas worldwide. As whole-body cryotherapy is turning from an adjuvant practice to medical care into a lifestyle adjustment, also wellness, fitness, sports, and even business-oriented spas integrate it into their offerings.

Whole-body cryotherapy is a good addition to spas of top-class hotels because it is innovative and trendy. It attracts guests who are interested in trying something new and different. It is also appealing because it takes little time to provide, is naturally hygienic, touchless, and does not require highly qualified therapists to perform.

Moreover, cryotherapy can be a great value-adding complement to a variety of other services. It does not only serve as a great way to recover from skiing, golfing, or playing tennis. It can also enrich programs like detox or slimming and combines well with massages and other body treatments. Even with facials. No wonder whole body cryotherapy has become a topic of interest at most spa congresses and exhibitions, like Global Wellness Summits in Tel Aviv in 2022 and Miami in 2023.

However, it is important to remember that cryotherapy is not suitable for everyone, and it should only be performed by knowledgeable and properly trained staff.



#### ***TREND 4: Hot & cold come together.***

This trend is somehow controversial because the type of hot and cold matter to make the combination truly beneficial.

Contrast therapies that involve alternating between hot and cold temperatures have been practiced for centuries. Forcing the blood vessels to constrict and dilate in response to the environment can improve blood flow and oxygenation to tissues. This, in turn, can help reduce inflammation and support tissue healing, stimulate the nervous system, and promote relaxation. The effect can be reached by going back and forth between a hot sauna and a cold pool multiple times or by taking a contrast shower.

Following the same principle, people often spend a short period of time in a whole-body cryotherapy chamber, then proceed to a hot sauna, steam room, or even infrared sauna. This approach requires more serious consideration of the effects because WBC differs from a cold plunge and infrared sauna deploys different physiological mechanisms than traditional hot saunas.

Use caution because:

- Both whole body cryotherapy and infrared sauna are systemic treatments that involve physiological mechanisms far beyond thermoregulatory responses of shivering or sweating. Both rely on protecting the core temperature from changing, and both keep working in the body for hours post-treatment. To reap the whole range of benefits, it is better not to stack this particular type of hot and cold. Traditional saunas and cold plunges are much better candidates for contrast therapies.
- If combined, the sequence of infrared heat and extreme cold shall be defined by the treatment aim and supervised by knowledgeable staff. In some cases, the combination may offset rather than amplify the benefits of either treatment. In general, it is more advisable to begin with infrared sauna rather than with whole-body cryotherapy.
- Treatment times reflect the person's physical status and health. Both whole body cryotherapy and infrared sauna use thermal shock as a trigger of a cascade of reactions and rely on the person's ability to handle the physiological stress well.
- The combination may impose a risk of skin burns. Heat causes profound head-to-toe sweating that continues post-treatment. To practice whole-body cryotherapy, the skin of the user and all protective gear must be completely dry. Shoes, socks, ear protection, gloves and mask are mandatory.

To summarize, while contrast therapy can offer potential health benefits, it is important to note that it may not be suitable for everyone, and some treatment options may serve the purpose better than others. Individuals with certain medical conditions may be advised to avoid extreme temperatures and consult a healthcare professional before engaging in whole-body cryotherapy, infrared sauna, or, even more so, their combination.

#### ***TREND 5: Education on and knowledge about whole-body cryotherapy evolves.***

Understanding of whole-body cryotherapy has been constantly evolving for more than forty years. More and more studies are being conducted and data becomes available, although the recommendations given by scientists do not always translate into better treatment protocols.

The user base is growing exponentially and, as more people become interested in cryotherapy, there is a growing need for education and training programs for professionals who provide this treatment. This includes proper training on how to use cryotherapy equipment safely and effectively by equipment suppliers, but also education on the potential risks and benefits of cryotherapy that could be better covered by associations, consulting companies, and universities.

While whole-body cryotherapy has many potential health benefits, it is not a "one size fits all" solution and comes with certain limitations and risks. As the understanding of WBC evolves, it is important for the individuals providing it to be well-informed and capable of adjusting to the individual needs and circumstances.

## OUTLOOK

Summarizing the trends and adding our personal insights as long-time industry insiders, we can tell with certainty that the cryotherapy market will keep growing at a high pace for the decades to come and the deepening understanding of the benefits will translate into new improved protocols and impactful combinations of whole-body cryotherapy with other wellness treatments. It will present opportunities for collaboration with other Global Wellness Institute and result in growing popularity of a holistic approach to health, wellbeing, beauty, and longevity.

### *The market will keep growing at a high pace.*

Excluding the market slump which occurred for many businesses during the pandemic, the last two decades have demonstrated a clear ongoing trend of steady growth of the cryotherapy market, impacting equipment suppliers and treatment providers.

The leading cryochamber manufacturing companies have been experiencing continuous double-digit growth rates in many markets with new participants trying to enter. Technological solutions have advanced, efficiency and effectiveness of cryotherapy devices has increased, and customer support has improved thanks to real time performance monitoring and remote troubleshooting capabilities.

Similar if not faster growth has been happening in most markets on the operators' side, as they have been unlocking more and more market segments, experiencing growing numbers of guests, and benefitting from the tremendous upselling potential and cross selling opportunities.

Whole body cryotherapy has become one of the key offers of numerous businesses oriented on Longevity, New Health, Prevention, Performance and Lifestyle, as cryotherapy benefits support all these trends. Many have incorporated the trending IV vitamin drips and NAD+ that help increase turnover and boost profits.

Cryotherapy operators can capitalize on a much higher throughput than a traditional spa where treatment rooms are usually booked in slots of 30 to 120 minutes. A cryotherapy chamber can be booked every 10 to 15 minutes including the turnaround time, as one session does not exceed 5. Thus, with a quality single-room cryochamber, one can easily provide 40 treatments in ten hours. With a larger multi-person chamber, the number of guests that can be served in the same timeframe grows to 160 or more.

For this and several other reasons including the growing overall awareness of whole-body cryotherapy and its positive effects, one can note an increasing availability of cryotherapy in five-star hotels. In the planning phase, almost all distinguished places already at least consider including cryotherapy in their offer. A growing number of travelers search for it when booking their stays, and it will not take long before it is expected to find cryotherapy on the premises of every high-end property.

### *Treatment combinations will keep evolving.*

The number of holistic wellness services that impact the body's health, performance, and appearance keeps increasing, and most every provider builds a portfolio of synergistic offerings rather than focuses on just one. There is compression and lymphatic drainage, light, oxygen, salt therapies, and many more.

One of today's "hot topics" is combining whole-body cryotherapy with hyperbaric oxygen therapy (HBOT) in the context of overcoming chronic fatigue and long Covid and improving longevity, but this is just one example. New powerful combinations will steadily be discovered and employed on a bigger scale.

The Cryotherapy Initiative will be publishing papers on the synergies of treatments and will keep updating this Guide as new evidence of benefits becomes available. Collaboration with other Global Wellness Institute initiatives will support the development of new scientifically proven combination protocols.

## EXPERIENCES

As millions of whole-body cryotherapy sessions get administered every year, the number of amazing success stories keeps growing. We will provide just a few examples that demonstrate the power and versatility of the treatment.

**Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, the Crown Prince of Dubai**

<https://www.youtube.com/watch?v=uDsXXpaEhRI>

**UAE, Dubai. Cryo helped with a bruise after being kicked by a horse**

When visited by the world-famous UFC boxer Anderson Silva – The Spider, his Highness Sheikh Hamdan showed Silva his rehab facilities including a two-room whole-body cryotherapy chamber and shared the following story about the benefits of using this therapy: "I feel pain, pain, pain, I go in for three minutes and then out. I come out, and I'm super fresh. It is exactly like ice, but times twenty..."

Once I got kicked by a horse, and it was BLACK - I came here for three days. In-and-out, in-and-out, and NOTHING! It is super amazing!"

# Coolzoone

LONGEVITY | EXPERIENCE | PERFORMANCE

**Coolzoone Cologne**

<https://coolzoone.de/>

**Strengthening the immune system for 3 year old patient**

The patient Bruno K., just 3 years old, was sent to Coolzoone Cologne by the Cologne University Hospital for cryotherapy to strengthen the very weak immune system. Coolzoone Cologne started the first 20 cryotherapy sessions with the mother holding Bruno in her arms.

Together, mother and child have cryotherapy for 2 minutes 54 seconds 3 times a week at -85°C in the high-performance cold chambers from Art of Cryo. The optimal length of session was established by the software in use, Remedi Cool, that considers individual characteristics and the treatment purpose of each user and customizes the recommendation accordingly. After just a few weeks of treatment, there was a significant improvement in Bruno's immune system. For the first time he had an illness-free period of 6 months. Bruno is now 4 years old and has been a customer of Coolzoone for 18 months. He is still free of any infections or serious illnesses and has immune system a strong enough to attend public facilities such as school.



CryoFit, Austin, TX, USA.

<https://mycryofit.com>

### **Helping a senior client in severe pain to stand upright again and to enable travel to say good-bye to her dying brother**

Patty Sanguily lived in severe pain in her lower back and neck, caused by two injuries: ruptured C2 and the lumbosacral joint. (For reference: C2 is one of the first three cervical nerves that help control the head and neck, including movements forward, backward, and to the sides. The lumbosacral joint, also called L5-S1, is a term used to describe a part of the spine. It is the exact spot where the lumbar spine ends and the sacral spine begins – it's composed of the last bone in the low back, called L5, and the triangularly shaped bone beneath, known as the sacrum.)

When Patty first visited CryoFit, her pain management doctor had cut her off pain medications because the dose required to manage the pain had grown to unsafe levels. She had heard of cryotherapy and said it was her only hope left. Because of the pain, Patty could not stand straight. Brian Balli, the owner of CryoFit, had to do her intake bent over.

The pain was debilitating, but her heart ached, too – Patty's brother in North Carolina had been diagnosed with a terminal illness. She could not go and see him, as her back was too bad to fly or to sit in a car seat for many hours. She thought she would never see him again. Intense daily whole-body cryotherapy helped her manage the pain without the medications and to stand straight again. A few months later, she flew to NC to see her dying brother. In 3 more months, she was able to repeat the trip to say good-bye when her brother passed away.

Patty is forever grateful.

# schwarz

alpenresort · tirol

Alpenresort Schwarz, a 5\* resort with a 27-hole golf course in Schwarz in Mieming, the Austrian Alps

[www.schwarz.at](http://www.schwarz.at)

### **Looking back on two years of experience offering cryotherapy.**

The resort's demanding customers are looked after by our professionally trained staff at the Me Holistic Spa as part of cryo cold therapy.

The guests undergoing cryotherapy differ from curious first-timers who book their first experience to people who are active in sports, like competitive golfers who see the application as a supplement and to optimize their training strategy, to patients suffering from various pains and incorporating cryo in their pain therapy.

Regular use has been shown to reduce pain on a pain scale. A slight and targeted movement in the chamber improves mobility and makes customers feel invigorated and more vital. The staff has also noticed an improvement in general well-being of the guests using cryotherapy and has gained some experience with psychological complaints such as burn-out symptoms. Use of the cryotherapy chamber twice a day over the course of a week leads to a clear, motivating energy boost and structural effect increases daily over the course of the guests' stay at the resort.





## **Chill Cville, Charlottesville, Virginia, USA.**

<https://chillcville.com>

### **Helping a client avoid a major surgery (the story caught media attention and was published in Women's World)**

Claudia Garthwait had been experiencing knee pain for a few years before her doctor diagnosed her with severe arthritis and cartilage wear down. At this point, she could barely walk, and the orthopedic surgeon with whom Claudia consulted said that a total knee replacement was inevitable. But because the technology was constantly improving, she was recommended to first have some cortisone injections.

Cortisone helped for a while, but then the pain returned, and Claudia learned that she had to wait for several weeks to get another shot. There was a limitation to how often it could be done. The doctor prescribed an anti-inflammatory, hoping it would get Claudia to her next shot, but it wasn't enough. The pain was excruciating.

At that time, Claudia's massage therapist Dawn Woodring opened Rivanna Cryotherapy Recovery Center (now Chill Cville) and suggested cryotherapy to ease the pain. Claudia committed to daily sessions and in just one week her pain was almost gone. Now the 70-year-old does cryotherapy once a week to stay pain free and no longer needs cortisone injections. "I don't even worry about surgery anymore," she cheers. "I found my miracle cure!"



## **Cryodukt, Zurich, Switzerland**

<https://cryodukt.ch/>

### **Managing pain and enabling client's return to competitive sports, despite Bechterew's disease**

A client who had been suffering from Bechterew's disease for years has been in cryotherapy treatment with Cryodukt from June 22 till present. Initially, he was doing cryotherapy twice a week. He had typical pain and was sports impaired due to lack of exercise. Based on the center's advice to give a strong stimulus so that the nociceptors permanently erase the pain memory, he started daily sessions in August and September. For four months from October, he increased the frequency of treatments even more – to twice daily.

The client had pain in his lumbar spine and buttocks, and it was getting worse at night, also causing problems with sleep. After coming to cryotherapy, pain decreased sharply, then stopped completely. The sleep improved already in a few weeks. In 2 months, he could sleep through the night without any problems because the pain was gone. The morning stiffness went away in 3 months.

The client used to compete at world champion level in BMX sport. The great success of cryotherapy encouraged him to resume the sport and he was able to train without problems during the phase when he did cryo twice a day. In August 23, he participated in the world championship in his age group and even finished in the top 10. Since September 2023, he has been coming to cryotherapy about twice a week to maintain his health. He is fit and pain-free.



### **Eight Health Hotel, Bad Vöslau, Austria**

[www.vivea-hotels.com](http://www.vivea-hotels.com)

#### **Positive effects of cryotherapy on fibromyalgia nerve pain**

During a study conducted in Bad Vöslau, Austria, test subjects undergoing whole body cryotherapy showed a clear decrease in fibromyalgia pain intensity and thus in sick days or days with impairment in everyday life. They also stated that they had reduced their pain medication by at least 40%. Some were able to get off pain medication completely. The effects lasted for at least 3 months.

The participants received an average of 15 treatments within 3 weeks, with frequency ranging from 2 times per day to 2 times per week. One application lasted from 3 to 5 minutes at -166° F (-110° C).

Cryotherapy was carried out after a medical examination. An experienced spa doctor would also combine cold exposures with heat therapy to increase efficiency.



### **Chenot Palace, Weggis, Switzerland**

[www.chenot.com](http://www.chenot.com)

#### **Whole-body cryotherapy as a part of health-promoting programs**

In Chenot, whole-body cryotherapy is being used since 2016 with a specific focus on promoting the body's ability to recover and energise. It is not a standalone treatment but as an integrated component of health promoting programmes, often prescribing more than one session daily. Chenot has strong empirical evidence of parasympathetic reactivation, improved antioxidant capacity, reduced emotional stress and an increase in general tone and mood following cryotherapy. In addition the skin looks youthful, fresh and glowing.

## **NEXT STEPS**

Thank you for using the Guide!

This is just the very first version of the “Provider’s Guide to Whole Body Cryotherapy”. It will be updated regularly and accompanied by deeper-dive publications on specific topics.

Please also review the list of publications in the Appendixes to learn more about the science behind cryotherapy and reach out to us with any questions.

***Your Cryotherapy Initiative Team***



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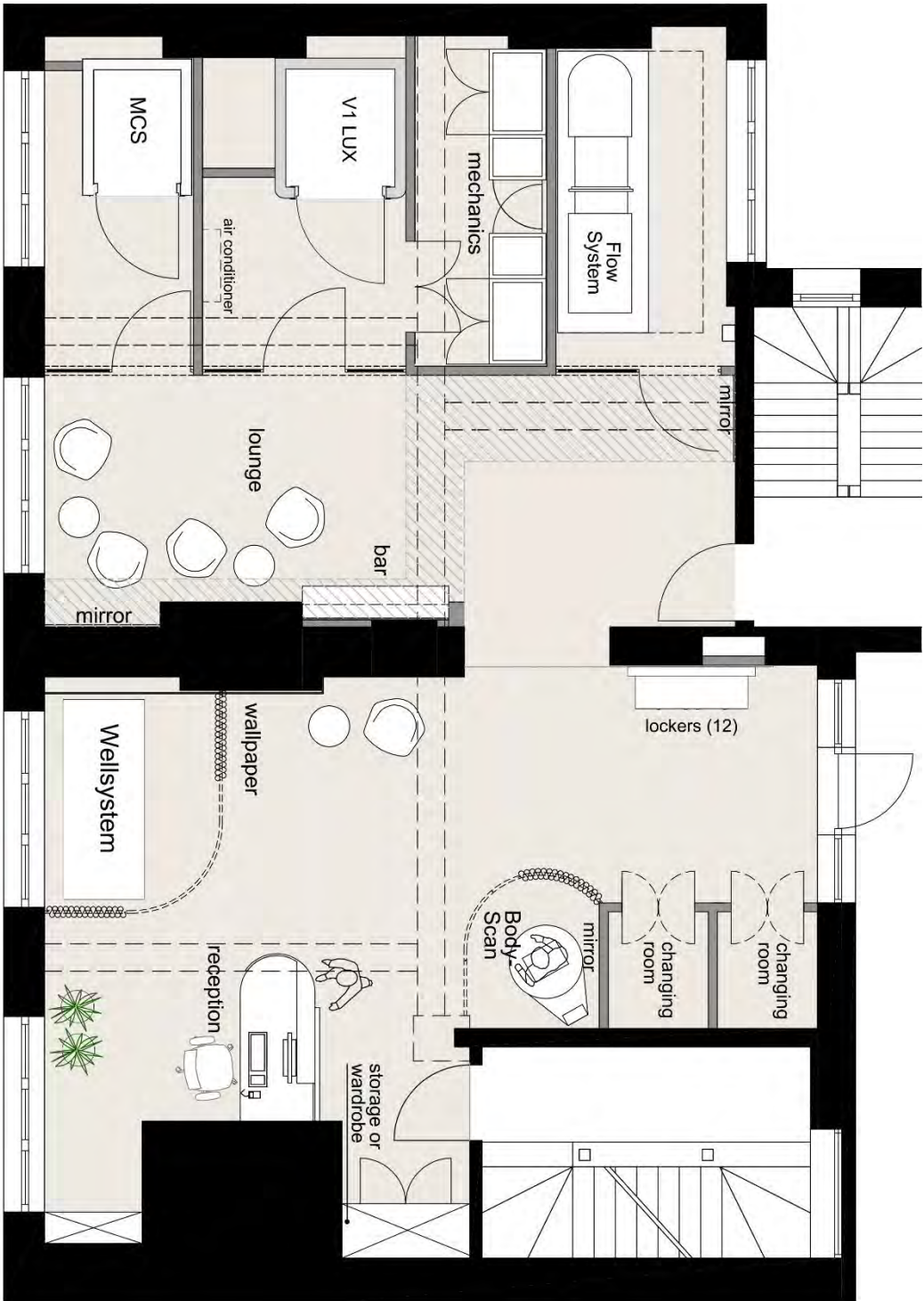
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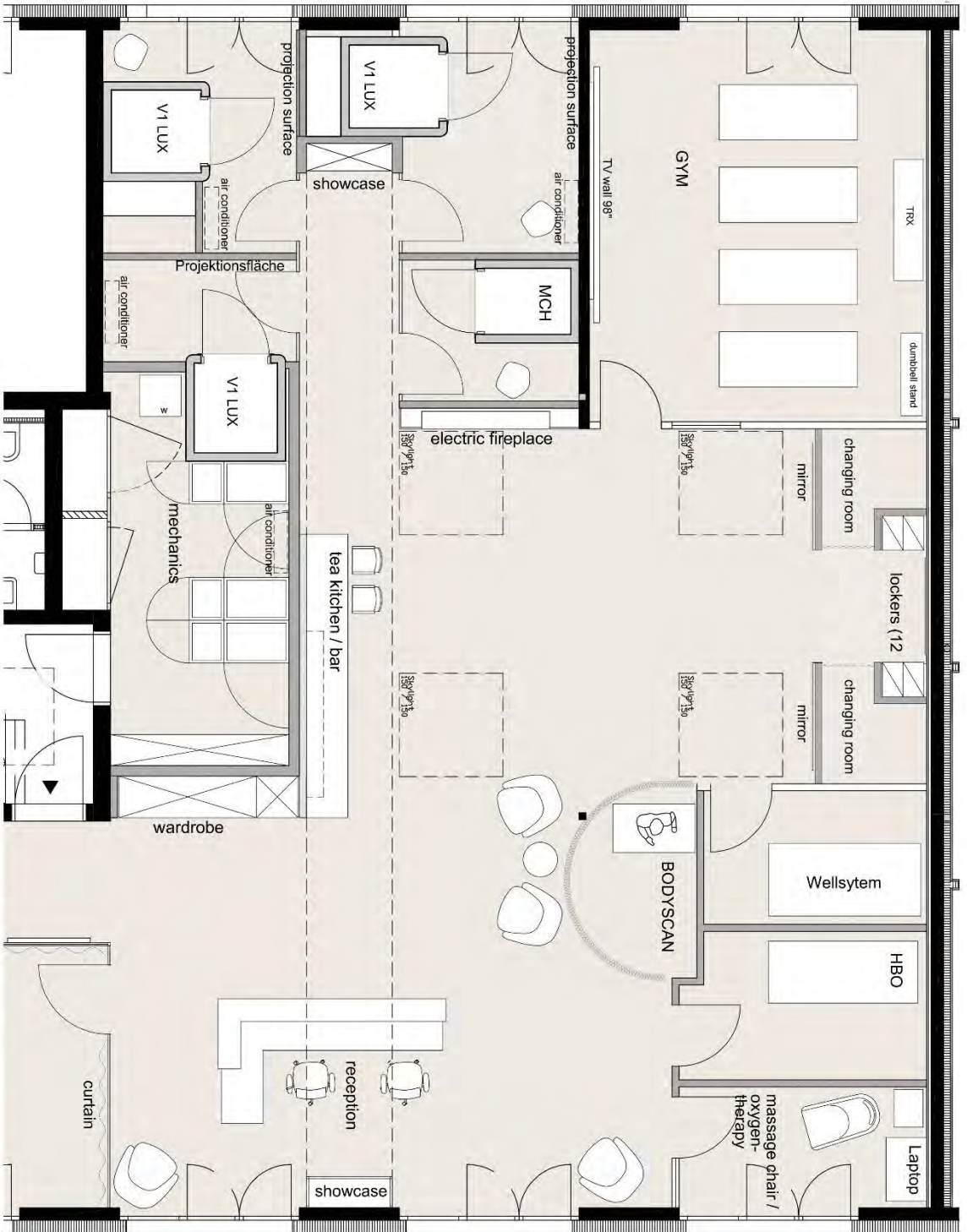
# EXAMPLES OF CENTERS LAYOUT



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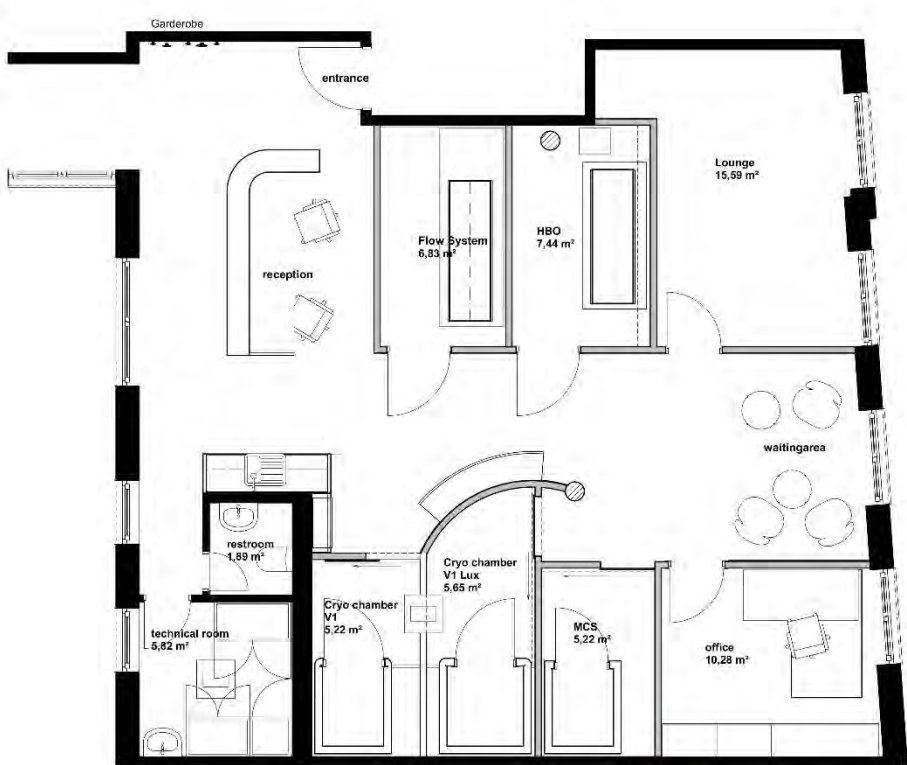


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