BALANCE RESORT MEDICAL CENTER LENTI

www.balancemedical.hu
8960 Lenti, Táncsics Street 2/a
telephone: +36 20 325 8535 or +36 7785943
email: hbot@balancemedical.hu
Medical Director: Dr Nikolett Szolnoki

Training, the preparation period and HBOT

How to stay in peak condition?

For centuries, athletes have been seeking ways to become faster, stronger and more successful. Often, it is merely a millisecond, a millimetre or a split-second decision that separates victory from defeat. Regardless of the sport, every athlete's ultimate goal is to achieve peak performance. However, the intensive training required to become a champion can lead to injury, exhaustion and overtraining.

The Balance Medical Centre's preparation programme naturally optimises performance during the pre-competition period. Using a scientific protocol linked to hyperbaric oxygen therapy, it helps athletes remain at the peak of their performance, compete to their full potential and fight for the gold medal.

We know that hyperbaric oxygen therapy increases mitochondrial efficiency: as oxygen levels in the tissues fluctuate continuously during treatments, a course of HBOT has a similar effect on mitochondria to interval training, offering the following benefits: **greater strength and endurance** due to an improved anaerobic threshold, **increased maximum oxygen consumption (vO_2max) and greater power output from our muscles**.

Hyperbaric oxygen therapy in optimising athletic performance

1. Enhanced physical performance

- Greater strength and endurance
- Increased mitochondrial efficiency
- Increases maximum oxygen consumption (vO_2max)

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- Speeds up recovery from non-injury-related pain
- Reduces the incidence or recurrence of injuries.
- Breaks the cycle of inflammation often experienced by athletes

2. It's all in the mind – enhancing cognitive performance

- Concentration and planning
- Maintaining focus
- Controlling other impulses
- Inhibiting prepotent (automatically occurring) but incorrect responses
- Sequencing individual elements of behaviour
- Monitoring ongoing execution
- Cognitive flexibility
- Voluntary control of attention
- Stress management

3. Better sleep

After a tough training session, sleep is essential for the body to recover. However, depending on injuries, daily stress and the pressure placed on athletes, getting consistent, good-quality sleep is not always easy.

The good news is that research shows that, in addition to cognitive and physical improvements, HBOT also improves sleep quality. [5]

4. Increased energy

HBOT increases the number and performance of mitochondria and boosts aerobic endurance, including lung capacity and cardiovascular endurance.

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Enhancing cognitive and physical performance with HBOT – detailed effects

During the preparation period, not only muscle strength and endurance but also brain performance and the quality of decision-making are of key importance. Hyperbaric oxygen therapy, when administered according to specific protocols involving the inhalation of 100% oxygen at a pressure of around 2.5 ATA, has been shown to improve both cognitive and physical performance.[1–4]

In randomised, controlled trials, Efrati and colleagues demonstrated that, following a course of HBOT, global cognitive performance in healthy older adults improved significantly, particularly in the areas of attention, information-processing speed and executive functions. These improvements were also confirmed by perfusion MRI: blood flow in the frontal lobe and parietal regions increased significantly following treatment, suggesting that HBOT is capable of substantially modulating cerebral perfusion and network function.[1] A similar HBOT protocol also led to measurable cognitive and functional improvements in patients with chronic brain injury, further reinforcing its effect on brain plasticity.[2]

Efrati's group and other researchers have also demonstrated that HBOT affects energy production at the cellular level: in a double-blind, randomised trial involving middle-aged adults who exercised regularly, following 40 HBOT sessions there was a significant increase in maximal oxygen uptake (VO_2 max), oxygen consumption at the anaerobic threshold and exercise performance during exercise, compared with the group that did not receive treatment.[3] According to muscle biopsy and respirometry studies, HBOT enhanced the oxidative phosphorylation capacity of mitochondria and the levels of markers indicative of mitochondrial mass – essentially acting as 'interval training' for the mitochondria.[3]

In another, extensively documented case study, improvements were reported concurrently following an HBOT protocol in cognitive tests, reaction time, VO_2 max, exercise-induced cardiopulmonary parameters, and muscle strength measurements.[4] Cerebral perfusion and the integrity of white matter tracts also improved on MRI-based imaging, which mechanistically links the increased oxygen supply to improvements in both cognitive and physical performance.[4]

From the perspective of a training programme, this means that a properly tailored HBOT protocol not only 'trains' the athlete's muscles and mitochondrial capacity, but also supports cognitive functions – attention, decision-making, stress tolerance – which, in a competitive situation, can ultimately make the difference between victory and defeat.[1–4]

Get in touch with us

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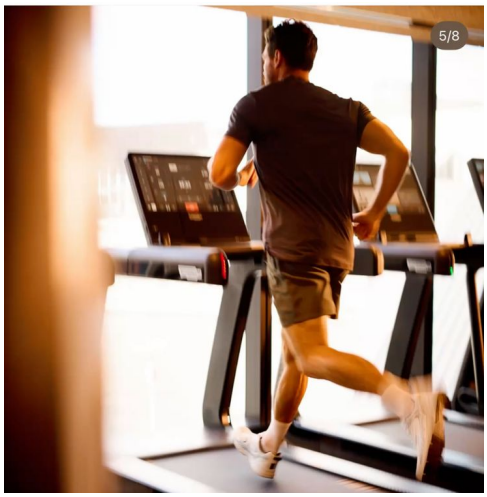
Recommended treatment programme

Basic principle: HBOT is most beneficial when used for recovery purposes following training.



During training, micro-injuries, inflammation and oxidative stress occur; HBOT helps to improve microcirculation, reduce oedema and inflammation, and promote faster recovery.

In practice: do not undergo HBOT in the final minutes of an intense training session, but within 1–3 hours afterwards, when you are already hydrated, your heart rate has stabilised, but the recovery processes are still 'in full swing'.

In theory, pre-workout HBOT increases tissue oxygen stores and may improve comfort during exercise; however, before high-intensity training, some people may experience feelings of fatigue or 'sluggishness' (a relaxing effect, parasympathetic dominance). In such cases, it is recommended to use it on lighter days, before technical training or tactical drills.

You can experiment: occasionally on light days before the FIRST training session, but only if you tolerate it well and do not feel 'too relaxed' afterwards.

On intensive days / during preparation blocks: it is better to have HBOT after the main session of the day, as this is when the 'recovery' benefits are greatest.

Sign up for our programme

Recommended references

1. Hadanny A, Daniel-Kotovsky M, Suzin G, et al.: Cognitive enhancement of healthy older adults using hyperbaric oxygen: a randomised controlled trial. *Aging (Albany NY)*, 2020; 12(13): 13740-13761.pubmed.ncbi.nlm.nih +1
2. Boussi-Gross R, Golan H, Fishlev G, et al.: Hyperbaric oxygen therapy can improve post-concussion syndrome years after mild traumatic brain injury – a randomised prospective trial. *PLoS One*, 2013; 8(11): e79995.pubmed.ncbi.nlm.nih

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3. Hachmo Y, Hadanny A, Kamble S, et al.: Effects of hyperbaric oxygen therapy on mitochondrial respiration and physical performance in middle-aged master athletes: a randomised, controlled trial. *Sports Med Open*, 2022; 8(1): 10.cris.biu +1

4. Efrati S: The effect of hyperbaric oxygen therapy on cognition, performance, brain structure and telomere length: a single-subject study. *Front Neurol*, 2022; 13: 949536.

5. Gottfried I, Schottlender N, Ashery U: Hyperbaric oxygen treatment—From mechanisms to cognitive improvement. Biomolecules, 2021; 11(10): 1520.

Safety and guarantee

Treatments are always carried out using the pressure and oxygen parameters employed in scientific research, i.e. we provide 100% oxygen at 2.5 atmospheres.

Our hyperbaric oxygen therapy chamber complies with the requirements of the European Parliament's Medical Devices Regulation (MDR) (Regulation (EU) 2017/745) for Class IIb medical devices.
Its operation is in accordance with the European Code of Good Practice for Hyperbaric Oxygen Therapy, published by the European Committee of Hyperbaric Medicine (ECHM).

Our staff's training complies with the requirements set out in the ECHM-EDTC Educational and Training Standards for Physicians in Diving and Hyperbaric Medicine and those of the European Baromedical Association for nurses, operators and technicians.
In accordance with these regulations, treatments are always carried out by a team of three staff members working simultaneously, with a qualified hyperbaric medicine specialist present at all times.

The supply of 100 per cent medical-grade oxygen for breathing is provided from liquid oxygen tanks and 200 bar oxygen cylinders supplied to hospitals by a medical gas distributor, not via the generation unit located in the treatment room, which produces compressed oxygen from the ambient air on site.
We are equipped with the prescribed preventive, sensor and fire safety equipment required for high-pressure oxygen treatment.

In Hungary, the operation of healthcare providers offering medical hyperbaric (high-pressure) oxygen therapy is regulated; their equipment and staffing requirements are set out in the National Public Health Centre's professional minimum criteria (Decree No. 2/2004. (XI. 17.)

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EüM), which Balance Medical Centre complies with in every respect and for which it holds an operating licence.

Compliance with all these regulations and adherence to the associated safety standards significantly distinguishes our medical hyperbaric oxygen therapy from the low-pressure hyperbaric treatments available elsewhere, and ensures its suitability for therapeutic purposes.

We recommend that you always seek thorough information and only commence therapy at a certified facility if recovery from an illness is at stake.
Health is precious – let's look after it!

Please contact the Balance Medical Centre to arrange a consultation