

# Postgraduate Diploma

Hyperbaric Medicine. Fundamentals,  
Effects and Indications of HBOT





## Postgraduate Diploma Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-hyperbaric-medicine-fundamentals-effects-indications-hbot](http://www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-hyperbaric-medicine-fundamentals-effects-indications-hbot)

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# 01

# Introduction

Although Hyperbaric Medicine is more than 200 years old, its multiple applications and indications are not known by many health professionals. There is currently a resurgence in the use of hyperbaric oxygenation treatment (HBOT) as an adjuvant tool in different medical specialties.







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*Gaining up-to-date knowledge in this field of medicine is key to improving patient quality of life. Specializing in hyperbaric oxygenation treatment can be help in resolving many different diseases”*

The creation of new generation hyperbaric chambers which are easier to use, more affordable and easier to install in public and private health institutions, has led different professionals to incorporate this tool into their daily practice.

The Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT will allow the healthcare professional to delve into the use of these mechanisms. The program provides solid and up-to-date education in hyperbaric oxygen therapy. This will allow the health professional to develop the skills necessary to identify and adequately solve different cases of pathologies or therapeutic practices, for which hyperbaric oxygenation can be effective and efficient.

The program begins with a brief historical overview of the beginning of Hyperbaric Medicine, the first indications of what would become a hyperbaric chamber and the empirical discovery of the beneficial effects of the combination of increased pressure and oxygen on human physiology. The student will be introduced to the beginning of the scientific period of Hyperbaric Medicine and the development of Underwater Medicine, as well as the accompaniment of diving medicine in the understanding and development of this treatment in clinical applications in different countries.

The basics of HBOT will also be presented in a practical and simple way. The physical laws of Henry, Dalton, and Boyle and Mariotte are explained in order to incorporate the concept of volumetric and solumetric effect. Likewise, the mathematical model of Krogh is presented, which allows to know the effect of oxygen perfusion radius at different treatment pressures. In addition, the different types of hypoxia are detailed so that the student can understand the hypoxic bases of the different pathologies and recognize the therapeutic applications of hyperoxia.

On the other hand, the specialist will learn, through this program, the most relevant physiological effects: vasoconstriction, angiogenesis, collagen synthesis, osteogenesis, neuroprotection, peripheral axonal regeneration, bactericidal effect, anti-inflammatory and antioxidant effect.

Finally, the last module of this Postgraduate Diploma reaffirms and emphasizes the contraindications of HBOT and adverse events, and presents the safety of HBOT. Clinical cases drawn from the experience of different professionals and teachers of this program are also shown.

This **Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications Effects of HBOT** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Hyperbaric Medicine
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ The latest developments in Hyperbaric Medicine
- ♦ Practical exercises where the self-assessment process can be carried out to improve learning
- ♦ Special emphasis on innovative methodologies in Hyperbaric Medicine
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*Hyperbaric oxygenation is re-gaining importance in the medical field, bringing new improvements to healthcare”*

“

*This Postgraduate Diploma is the best investment you can make when selecting a refresher program, for two reasons: in addition to updating your knowledge in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT, you will obtain a qualification endorsed by TECH Technological University"*

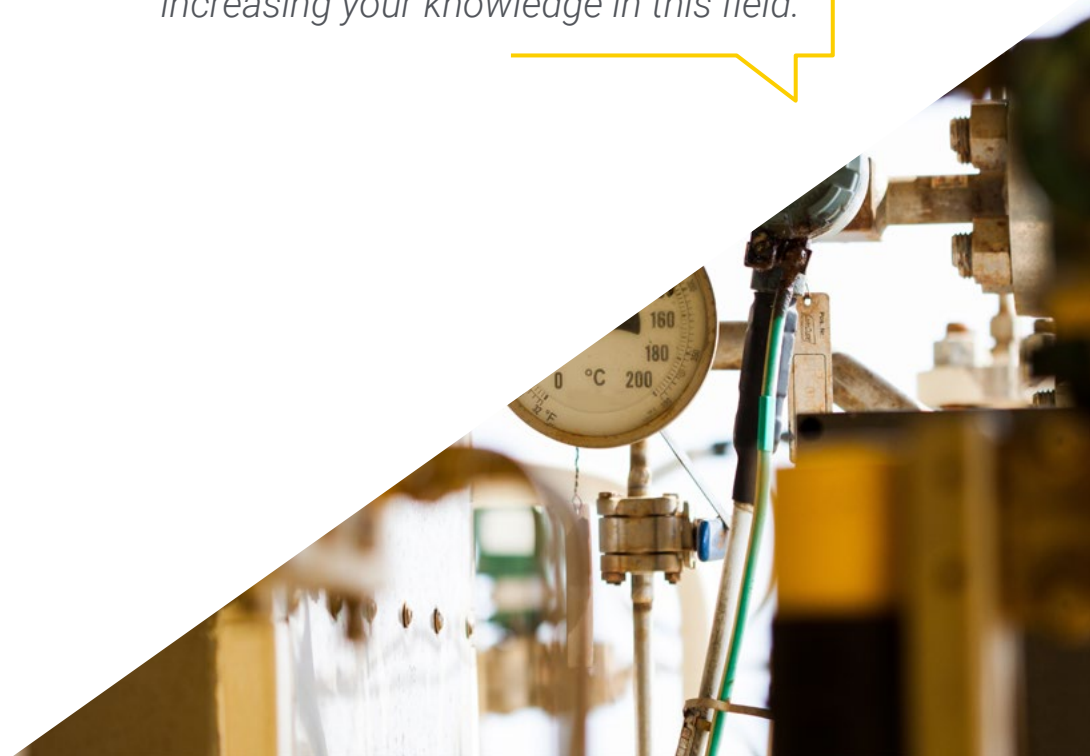
It includes in its teaching staff professionals belonging to the field of Hyperbaric Medicine, who bring into this program their work experience, in addition to recognized specialists from reference societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the specialist must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be supported by an innovative interactive video system created by renowned and experienced experts in Hyperbaric Medicine.

*This program comes with the best educational material, providing you with a contextual approach that will facilitate your learning.*

*This 100% online Postgraduate Diploma will allow you to balance your studies with your professional work while increasing your knowledge in this field.*



# 02 Objectives

The Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT is aimed at providing education on the fundamentals and applications of hyperbaric oxygenation treatment and expose the scientific evidence in the different specialties in the field of health.







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*It is the best option to learn about the latest advances in Hyperbaric Medicine”*





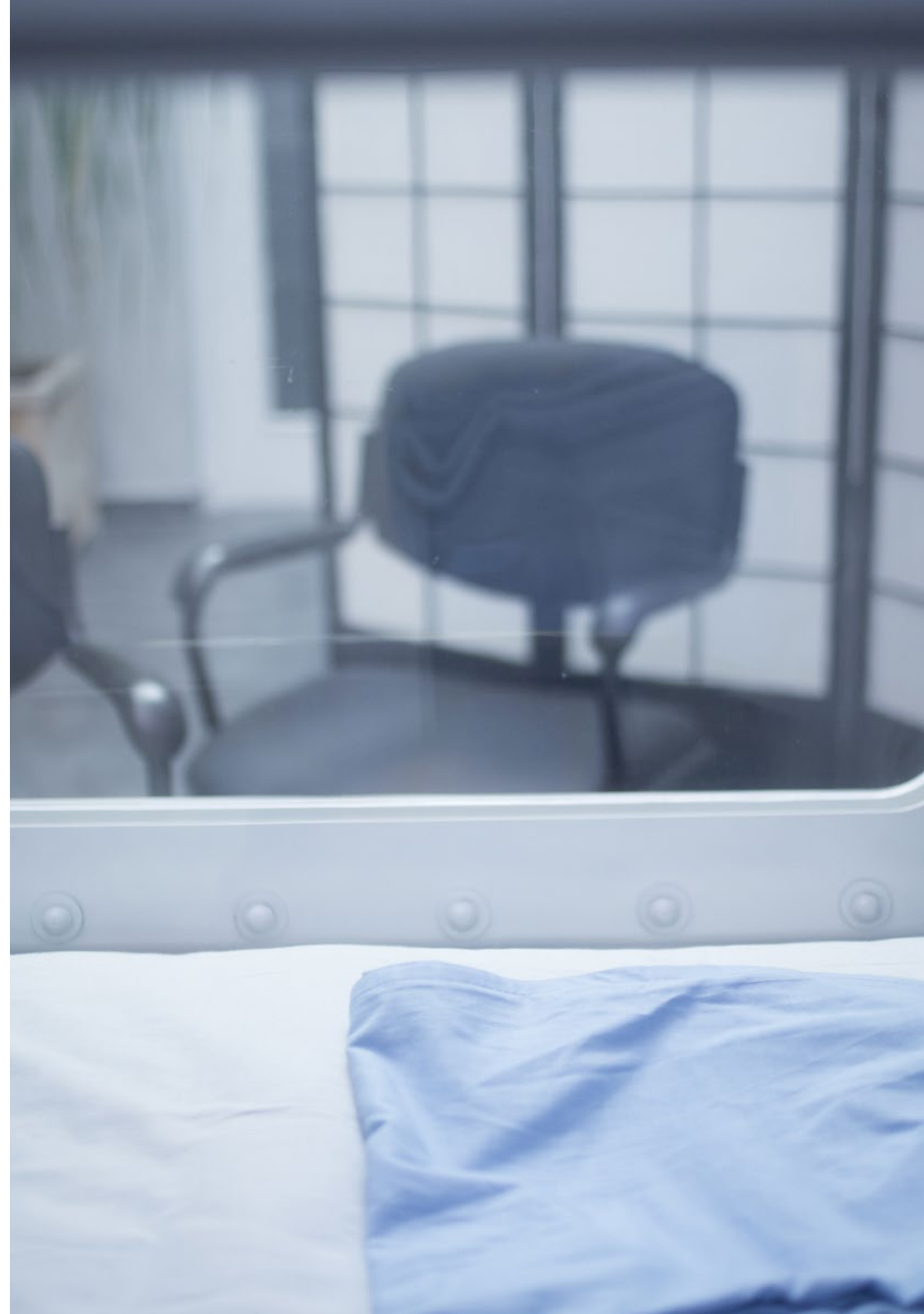
## General Objectives

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- Promote the usefulness of hyperbaric oxygenation treatment in different medical specialties
- Enable health professionals on the foundations, mechanisms of action, indications, contraindications and applications of hyperbaric oxygen
- Delve into the plethora of evidence published and the recommendations and indications of the different scientific societies related to Hyperbaric Medicine
- Recognize the potential applications of hyperbaric oxygen in different clinical cases and the benefits that can be achieved with the treatment, as well as performing the indication and detection of the contraindications



*An intensive program that will allow you to become an expert in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT in a short period of time and with greater flexibility"*





## Specific Objectives

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### Module 1. Introduction to Hyperbaric Medicine

- ♦ Introduce the world history of Hyperbaric Medicine and the operation and differences in the types of hyperbaric chambers that exist today
- ♦ Describe the current state of new indications and applications based on the development of evidence, the evolution of the different models and types of hyperbaric chambers, and the origin of scientific societies related to the specialty
- ♦ Develop the concept of oxygen toxicity, contraindications and adverse effects related to the discoveries of its mechanism of action (e.g., Bert effect)
- ♦ Present the new concept of Hyperbaric Medicine which includes treatment with lower pressure, its indications, limitations and potential future applications

### Module 2. Fundamentals of the Hyperbaric Oxygenation Treatment (HBOT)

- ♦ Study the fundamentals of Hyperbaric Oxygenation Treatment (HBOT) and the mechanisms to achieve hyperoxia
- ♦ Present the intervening physical laws and the Krogh mathematical model which substantiates the effect of the treatment at different pressures
- ♦ Describe the differences between the volumetric and solumetric effect of HBOT and its limitations in the treatment of different diseases
- ♦ Present the types of hypoxia described and the scenarios of hypoxia-related disorders in different pathologies

### Module 3. Physiological Therapeutic Effects of HBOT

- ♦ Study the effects of hyperoxia on a mitochondrial level and the physiological benefits it triggers
- ♦ Describe the importance of mitochondrial reactivation with HBOT and its potential effect on different related pathologies with mitochondrial dysfunction
- ♦ Present the physiological effects that are triggered with HBOT and the production of reactive oxygen species
- ♦ Relate these physiological effects with different indications of HBOT
- ♦ Learn about the analysis of different clinical cases which can benefit from the therapeutic effects of HBOT

### Module 4. Indications and Contraindications - Integration Module

- ♦ Get qualified on the valid indications of HBOT for the different societies of Hyperbaric Medicine and the emerging indications based on the physiological therapeutic effects of HBOT
- ♦ Describe the adverse events that are expected from HBOT with different treatment pressures
- ♦ Present the contraindications of HBOT
- ♦ Discuss different clinical cases based on the integration of validated applications and the potential future applications of HBOT

03

# Course Management

The program's teaching staff includes leading experts in Hyperbaric Medicine who contribute their vast work experience to this training program. Additionally, other recognized specialists participate in its design and preparation, which means that the program is developed in an interdisciplinary manner.







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*Leading professionals in the field have come together to teach you the latest advances in Hyperbaric Medicine”*



## International Guest Director

Dr. Peter Lindholm is an eminence in Hyperbaric Medicine and the approach to Respiratory Disorders. His research has been focused on the Pathophysiology of Lung Diving, exploring topics such as Hypoxia and loss of consciousness.

Specifically, this expert has analyzed in depth the effects of the medical condition known as Lungsqueeze, frequent in divers. Among his most important contributions in this area is a detailed review of how glossopharyngeal breathing can extend lung capacity beyond normal limits. In addition, he described the first case series linking glossopharyngeal insufflation with cerebral gas embolism.

At the same time, he has been a pioneer in proposing the term Tracheal Squeeze as an alternative to pulmonary edema in divers who bleed after deep dives. On the other hand, the specialist has shown that exercise and fasting before diving increase the risk of loss of consciousness, similar to hyperventilation. In this way, he has developed an innovative method to use Magnetic Resonance Imaging in the diagnosis of Pulmonary Embolism. In the same way, he has delved into new techniques for measuring hyperbaric oxygen therapy.

Dr. Lindholm also serves as Director of the Endowed Gurneee Chair of Diving and Hyperbaric Medicine Research in the Department of Emergency Medicine at the University of California, San Diego, United States. Likewise, this renowned expert spent several years at Karolinska University Hospital. In that institution he worked as Director of Thoracic Radiology. He also has vast experience in diagnosis by means of clinical imaging based on radiation, and has even given lectures on the subject at the prestigious Karolinska Institute in Sweden. He is also a regular speaker at international conferences and has numerous scientific publications.



## Dr. Lindholm, Peter

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- Chair of Hyperpathic Medicine and Diving at the University of California, San Diego, United States
- Director of Thoracic Radiology at the Karolinska University Hospital
- Professor of Physiology and Pharmacology at Karolinska Institute in Sweden
- Reviewer for international scientific journals such as American Journal of Physiology and JAMA
- Medical Residency in Radiology at the Karolinska University Hospital
- Doctor of Science and Physiology, Karolinska Institute, Sweden

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*Thanks to TECH, you will be able to learn with the best professionals in the world”*

## Management



### **Dr. Cannellotto, Mariana**

- ♦ Specialist in Hyperbaric Medicine
- ♦ Medical Director from BioBarica - Hyperbaric Systems
- ♦ Clinical Physician at C.E.S.SRL
- ♦ President of Argentina Association of Hyperbaric Medicine and Research
- ♦ President of Ihmera



### **Ms. Jordá Vargas, Liliana**

- ♦ Clinical Biochemistry and Microbiology Expert
- ♦ Scientific Director from BioBarica - Hyperbaric Systems
- ♦ Microbiologist at CRAI Norte
- ♦ Bacteriologist at Vélez Sarsfield Hospital
- ♦ Scientific Director of AAMHEI and AEMHEI
- ♦ Degree in Biochemistry from the National University of Córdoba
- ♦ Biochemistry and Clinical Microbiology, University Institute CEMIC



## Professors

### Dr. Verdini, Fabrizio

- ◆ Clinical Doctor at BioBarica Hyperbaric Systems
- ◆ Director of Health Programs at Camp La Llanada
- ◆ General Practitioner at Doctor Armando Mata Sanchez Hospital
- ◆ Doctor of Medicine from the University of Carabobo
- ◆ Master's Degree in Hyperbaric Medicine from the CEU Cardenal Herrera University
- ◆ Master's Degree of Business Administration healthcare, Polytechnic University of Puerto Rico

### Dr. Ramallo, Rubén Leonardo

- ◆ Attending Physician Specialist in Medical Clinic at the General Hospital of Acute Diseases
- ◆ Physician in Hyperbaric Medicine. Biobarica - Hyperbaric Systems
- ◆ Medical Surgeon School of Medical Sciences, National University of Córdoba, Argentina
- ◆ Specialist in Internal Medicine. Residency in Internal Medicine, Córdoba Hospital
- ◆ Master's Degree in Psychoimmunoneuroendocrinology. Favaloro University
- ◆ Director of the AAMHEI Medical Clinic Commission

### Dr. Emilia Fraga, Pilar María

- ◆ Director of the Scientific and Clinical Research Division at Biobarica
- ◆ Food evaluator at the National Food Institute
- ◆ Professor of Anatomy and Physiology at ADEF
- ◆ Degree in Biochemistry from Arturo Jauretche National University

04

# Structure and Content

The structure of the contents has been designed by the best professionals in the field of Hyperbaric Medicine, with an extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied and diagnosed, and with extensive knowledge of new technologies applied to hyperbaric medicine.







“

*This Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications Effects of HBOT contains the most complete and up-to-date scientific program on the market”*

### Module 1. Introduction to Hyperbaric Medicine

- 1.1. History of Hyperbaric Medicine
- 1.2. First Hyperbaric Chambers
- 1.3. Discovery of Oxygen
- 1.4. Scientific Period of Hyperbaric Medicine
- 1.5. Types of Hyperbaric Chambers. Revitalair Technology Chambers
- 1.6. Technical and Therapeutic Safety of the New Generation Hyperbaric Chambers
- 1.7. Hyperbaric Medicine Societies in the World and the Evolution of the Indications
- 1.8. Introduction to the Basis of Hyperbaric Oxygenation
- 1.9. Introduction to the Adverse Effects and Contraindications
- 1.10. Current Concept of Hyperbaric Oxygenation Treatment Medium Pressure, Micro pressure and Hyperbaria

### Module 2. Principles of Hyperbaric Oxygenation Treatment (HBOT)

- 2.1. Physiological Principles of HBOT
- 2.2. Dalton, Henry, Boyle and Mariotte Physical Laws
- 2.3. Physical and Mathematical Bases of the Diffusion of Oxygen within Tissue in the Different Treatment Pressures. Krogh Model
- 2.4. Physiology of Oxygen
- 2.5. Physiology of Respiration
- 2.6. Volumetric and Solumetric Effect
- 2.7. Hypoxia. Types of Hypoxia
- 2.8. Hyperoxia and Treatment Pressure
- 2.9. Hyperoxia Effective in Wound Healing
- 2.10. Bases of the Intermittent Hyperoxia Model



**Module 3. Physiological Therapeutic Effects of HBOT**

- 3.1. Introduction to the Physiological Therapeutic Effects
- 3.2. Vasoconstriction
  - 3.2.1. Robin Hood Effect
  - 3.2.2. Effect of HBOT on Blood Pressure and Heart Rate
- 3.3. Stem Cells and Oxygen
  - 3.3.1. Liberation of Stem Cells with HBOT
  - 3.3.2. Importance of Stem Cells on Wound Healing
  - 3.3.3. Oxygen in the Differentiation of Stem Cells
- 3.4. Oxygen in the Synthesis of Collagen
  - 3.4.1. Synthesis and Types of Collagen
  - 3.4.2. Oxygen in the Synthesis and Maturing of Collagen
  - 3.4.3. HBOT and Collagen in Healing
- 3.5. Angiogenesis and Vasculogenesis
  - 3.5.1. Degenerative Angiogenesis and Hyperbaric Oxygen
- 3.6. Osteogenesis
  - 3.6.1. HBOT and Osteogenesis and Bone Resorption
- 3.7. Mitochondrial Function, Inflammation and Oxidative Stress
  - 3.7.1. Mitochondrial Dysfunction in the Pathogenesis of Different Pathologies
  - 3.7.2. HBOT and Mitochondrial Function
- 3.8. Oxidative Stress and Hyperbaric Oxygen
  - 3.8.1. Oxidative Stress in Different Pathologies
  - 3.8.2. Oxidative Stress in Hyperbaric Oxygen
- 3.9. Anti-inflammatory Effect in Hyperbaric Oxygen
  - 3.9.1. Hyperbaric Oxygen and Inflammation
- 3.10. Antimicrobial Effect in Hyperbaric Oxygen
  - 3.10.1. Bacterial Effect of Oxygen
  - 3.10.2. Hyperbaric Oxygen and Biofilm
  - 3.10.3. Hyperbaric Oxygen and the Immune Response
- 3.11. Oxygen and Neurone Function
  - 3.11.1. Oxygen and Peripheral Axonal Regeneration
  - 3.11.2. Oxygen and Neuroplasticity

**Module 4. Indications and Contraindications Integration Module**

- 4.1. Absolute and Relative Contraindications of HBOT
- 4.2. Adverse Effects of Hyperoxia
- 4.3. Neuronal and Pulmonary Oxygen Toxicity
- 4.4. Neurotoxicity/Neuroexcitability
- 4.5. Objective and Subjective Barotrauma
- 4.6. Special Care for Patients who Receive HBOT at Different Pressures
- 4.7. Indications by Consensus of the European Committee of Hyperbaric Medicine
- 4.8. Emerging Medical Applications. Off-Label and Medicare Indications
- 4.9. Management in Hyperbaric Medicine Centers: HBOT in Public and Private Health
- 4.10. Cost-Benefit Relationship of the Application of HBOT: HBOT Cost Efficiency



*This program will allow you to advance in your career comfortably”*

# 05 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*



## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*





At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.







**Expert-Led Case Studies and Case Analysis**

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



**Testing & Retesting**

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



**Classes**

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



**Quick Action Guides**

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



# 06 Certificate

The Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.



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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This program will allow you to obtain your **Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

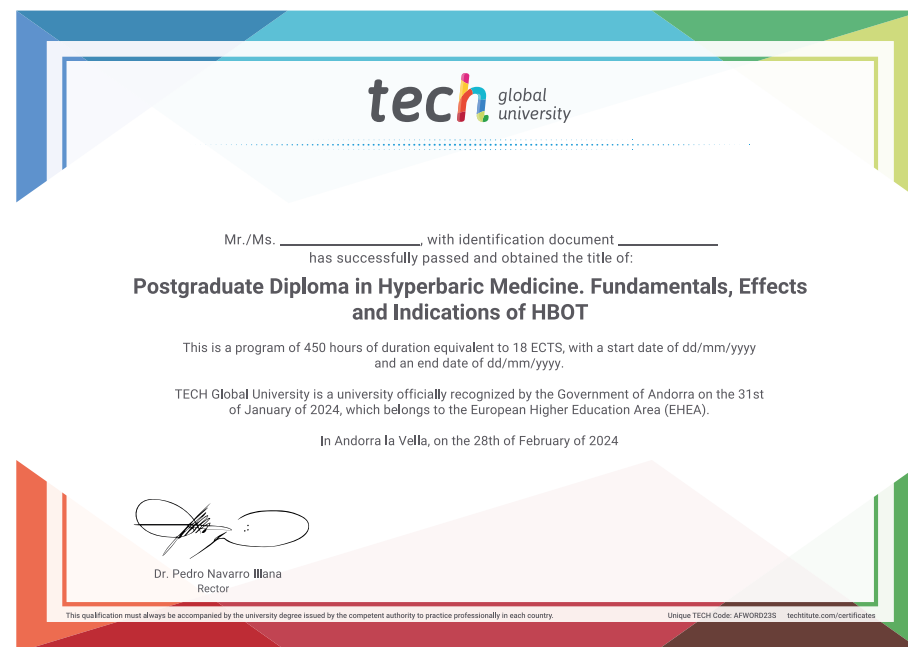
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Hyperbaric Medicine. Fundamentals, Effects and Indications of HBOT**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**





future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present online training  
development language  
virtual classroom



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