Master's Degree

Update on Neurophysiological Diagnosis and Treatment

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Master's Degree

Update on Neurophysiological Diagnosis and Treatment

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Accreditation: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/medicine/master-degree/master-update-neurophysiological-diagnosis-treatment**

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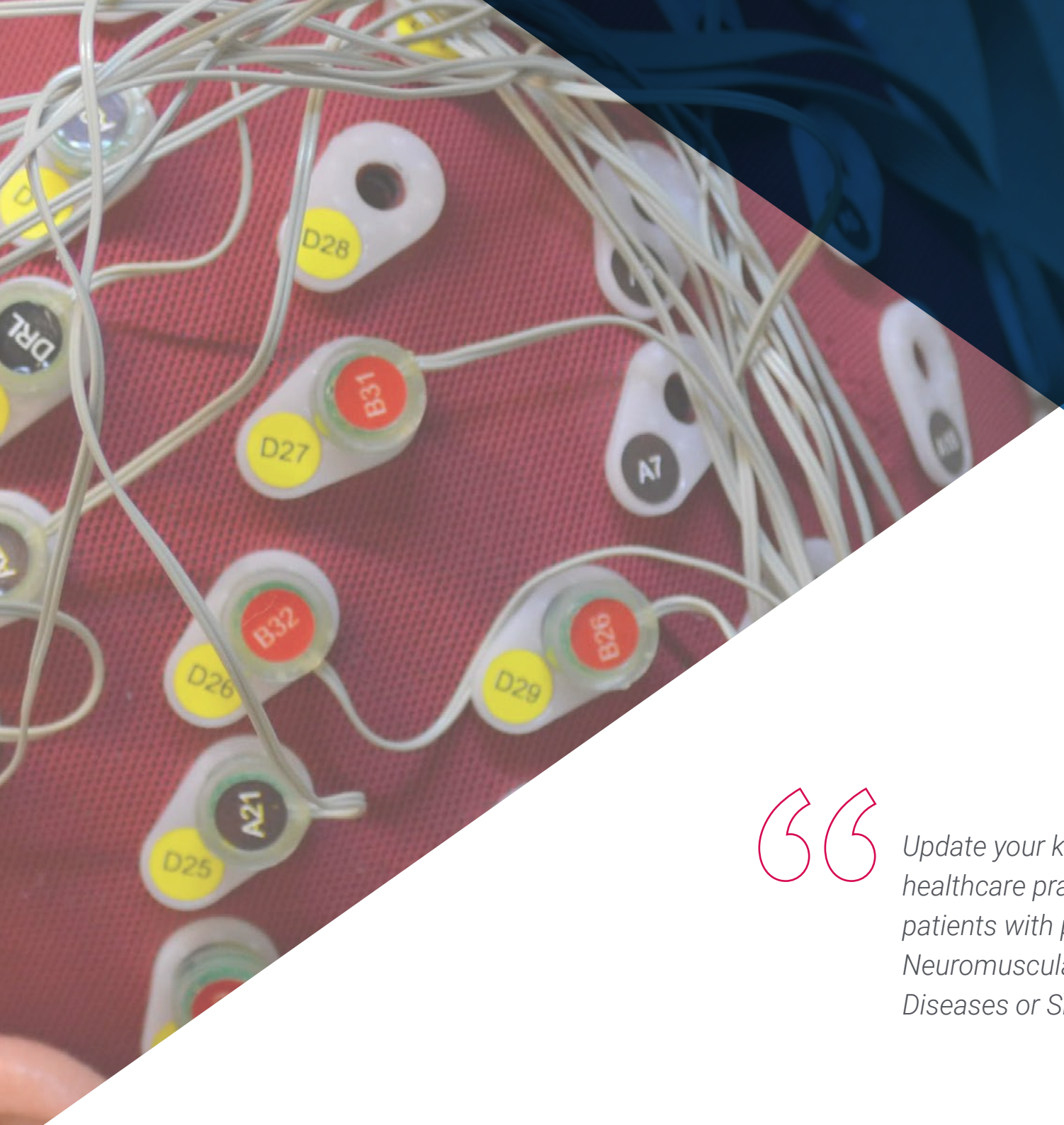
01

Introduction

Clinical Neurophysiology has experienced an exponential advance in recent years thanks to the advent of new diagnostic and therapeutic technologies, and to the interdisciplinary collaboration among different medical areas. This unavoidable fact obliges specialists to keep up to date with the latest scientific findings in this area. As such, this program was created with the aim of meeting this need and offers students a completely updated body of knowledge on a variety of neurophysiological diagnostic techniques, addressing their indications, utilities and clinical applications in depth. Furthermore, thanks to the contents included in the program, students will also have a better understanding of neurophysiological methodology. This will help them develop a critical spirit when assessing results, always integrated within a clinical context. All this, condensed in a program that stands out for its 100% online modality, for the quality of its contents and for its first-class academic staff.



Update your knowledge and improve your healthcare practice in the approach to patients with pathologies such as Epilepsy, Neuromuscular Disorders, Neurodegenerative Diseases or Sleep Disorders"

Neurophysiological diagnosis has undergone remarkable evolution in recent years thanks to the inclusion of new technologies and the application of multiple and varied diagnostic techniques. All of them, with a wide spectrum of indications, becoming the fundamental axis of numerous diagnostic protocols that are increasingly used by interdisciplinary teams. For this reason, the potential of this specialty is now higher than ever.

That is why it is essential for specialists to possess up-to-date knowledge that integrates the latest scientific findings in the different standards, guidelines and national and international consensus, and that homogenize criteria, maintaining high quality standards in the different sections of this extensive specialty.

It is in this context that this Master's Degree arises, which was created with the aim of meeting these needs. With a highly practical approach, known techniques will be reviewed and updated, while several new and promising fields of application will be explored. To achieve this, TECH provides students with a teaching staff composed of a group of experts who will contribute their knowledge, practical tips and examples to support the learning process. All of this is accompanied by complementary material that will enrich the learning experience while making it more effective.

In addition to an exhaustive review of the latest guidelines and consensus, topics of great practical utility will be included, such as the use of different neurophysiological techniques in critical pediatric patients or intraoperative neurophysiological monitoring, which is increasingly requested by specialists during surgical interventions. Moreover, the program will not leave out the study of new technologies and mathematics used for signal analysis.

Given the 100% online format, students will be guided through a complete and enriching path on which they will learn all the latest developments in the profession to bring to their daily practice the most pioneering techniques in neurophysiological diagnosis. All this without giving up their personal activities, in a comfortable way and with the reliability of the most reputable academic method in the online teaching market, specialists will be able to get up to date in Neurophysiology, increasing their opportunities for personal and professional growth.

This **Master's Degree in Update on Neurophysiological Diagnosis and Treatment** contains the most complete and up-to-date scientific program on the market. Its most notable features are:

- Practical cases studies are presented by medical experts in neurophysiology
- 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
- Practical exercises where the self-assessment process can be carried out to improve learning
- Its special emphasis on innovative methodologies
- 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

Incorporate the latest developments in Neurophysiological Diagnosis and Treatment into your healthcare practice and place yourself at the forefront of your profession only by studying at TECH"

Through a unique educational methodology and a 100% online format, you will be able to get up to speed in the new clinical diagnostic methods"

The program's teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading 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 specialization programmed to learn in real situations.

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

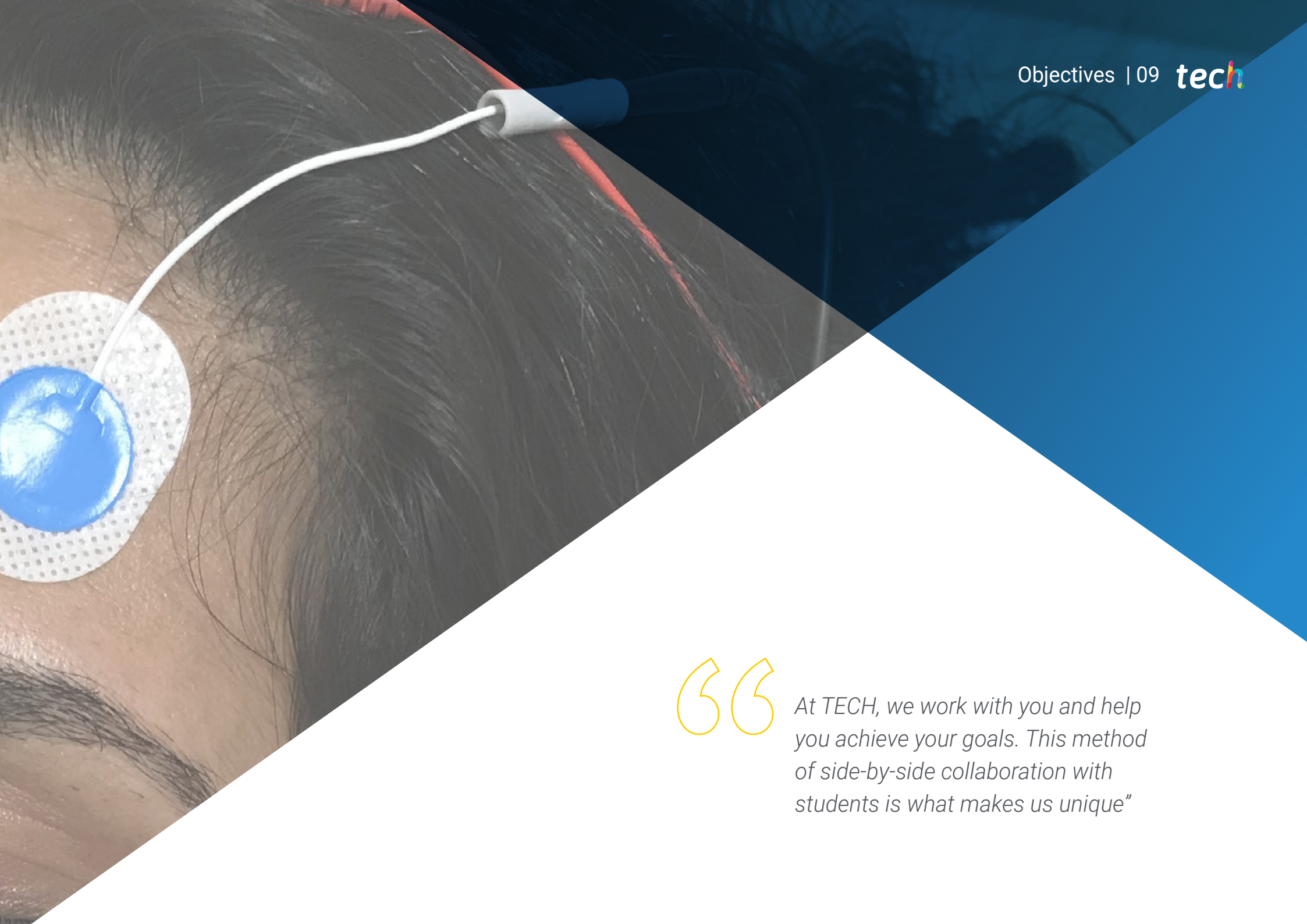
What is the best and most reliable way to learn and update your knowledge? Without a doubt, the answer is online learning, and you have the best method here at TECH.

Thanks to this Master's Degree, you will develop a critical spirit when assessing results, always integrated within a clinical context.

02

Objectives

In taking this program, students will achieve their main goal: to acquire up-to-date and practical knowledge of the wide variety of neurophysiological diagnostic techniques available, which will be of maximum utility in the exercise of their healthcare practice or research projects. This will enable them to offer more complete, detailed and precise care to patients with neurophysiological symptomatology by detecting their pathology and adequately treating it.

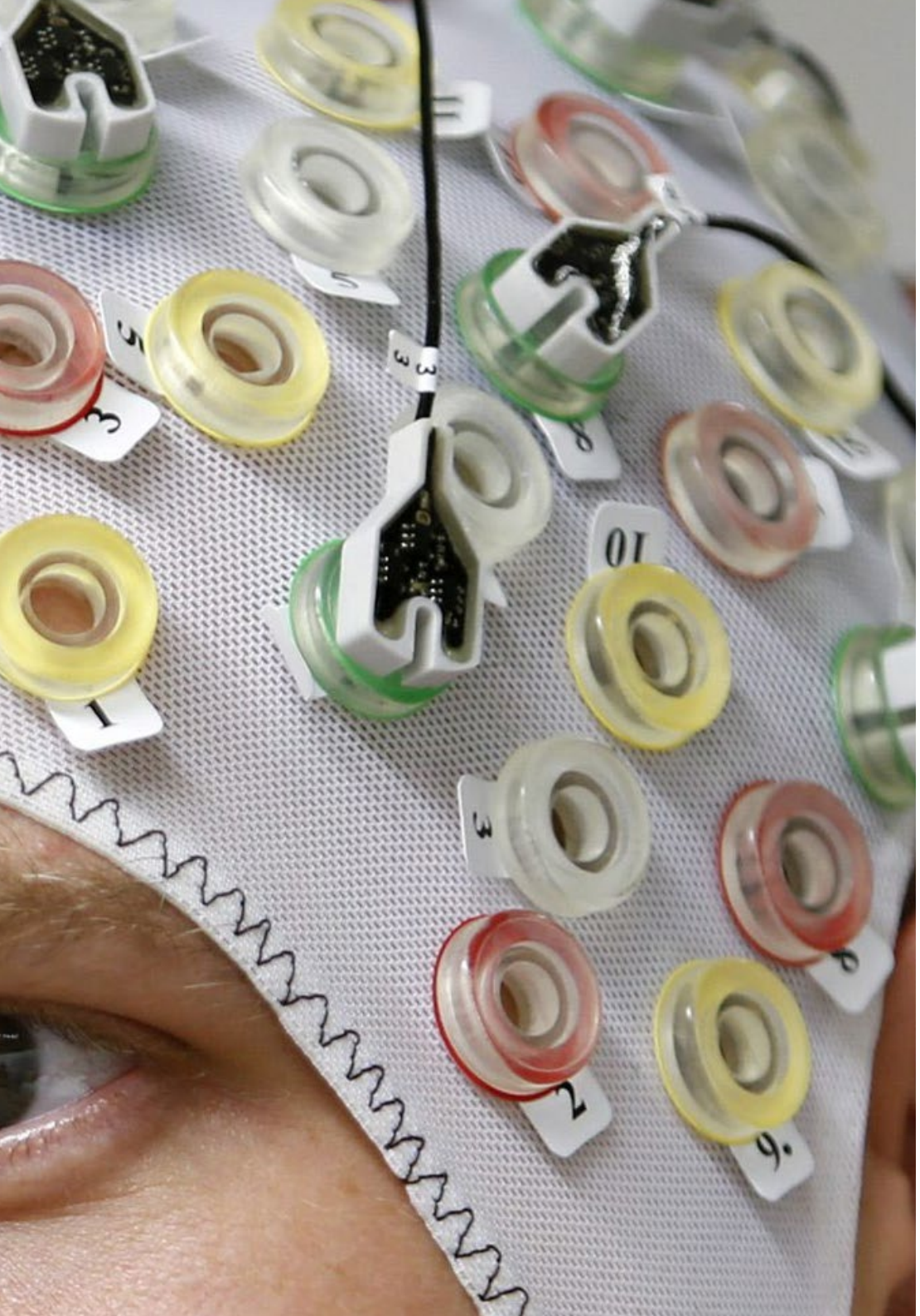


At TECH, we work with you and help you achieve your goals. This method of side-by-side collaboration with students is what makes us unique"

General Objectives

- Obtain a global and up-to-date vision of neurophysiological diagnosis in its different training areas, allowing students to acquire useful and up-to-date knowledge and homogenize criteria following international standards
- Generate within the student the desire to broaden knowledge and apply what has been learned to daily practice, to the development of new diagnostic indications and to research

At TECH, we help you get to the top, offering you a unique and unprecedented way to update your knowledge without having to give up the rest of your activities"



Specific Objectives

Module 1. Brain Electrogenesis: Recording and Analysis Techniques Electroencephalogram Development

- Acquire the necessary knowledge of biophysical, analytical and technical fundamentals as a pillar for learning the genesis of graphoelements found in EEG recordings
- Look deeper into the development and chronobiology of electroencephalograms
- Learn how to identify physiological and pathological EEG patterns, as well as their correlation with age, level of wakefulness/sleep, consciousness, pharmacological interference and clinical significance
- Know how to locate abnormalities, spatio-temporal value, limitations and advantages of the technique. Identify artifacts and normal patterns that may mimic pathological graphoelements
- Become familiar with the methodology and application of quantified EEG

Module 2. Electroencephalogram (EEG) in Electroclinical Syndromes and Neurocritical Patients: Neurophysiological Precision Techniques in the Diagnosis |and Treatment of Epilepsy

- Know how to diagnose electroclinical syndromes in all stages of life (specific patterns)
- Consolidate knowledge of electroencephalography applied to epilepsies, from the diagnostic phase to pharmacological, neuromodulatory and/or surgical therapeutic management
- Update on international guidelines and protocols for electroencephalogram use in ICUs and status epilepticus Learn pattern identification and decision-making
- Delve deeper into the methodology and application of high-density EEG and generator localization

Module 3. Evoked Potentials

- Take a deeper look at the bases for obtaining the different evoked potentials
- Decide upon the most appropriate techniques for the diagnosis of different pathologies
- Interpret the results derived from these techniques
- Have access to the international guidelines for performing evoked potentials
- Delve deeper into the most common programs used in designing appropriate paradigms to obtain cognitive evoked potentials
- Delve into the peculiarities and differences in the use of evoked potentials in pediatric and critical patient settings

Module 4. Neurophysiological Techniques in the Diagnosis of Neuromuscular Diseases

- Review the practical aspects and challenges of neurophysiological examinations: How to optimize equipment for different types of examinations?
- Delve into the different types of nerve conduction studies
- Understand the rationale and technique behind performing rare sensory and motor nerve conduction studies
- Become familiar with the physiological and non-physiological factors affecting the technical aspects of nerve conduction recording
- Learn the different technical aspects and clinical applications of specialized nerve conduction procedures, such as delayed responses and blink reflex
- Recognize normal and abnormal motor unit morphology and recruitment pattern
- Recognize the clinical utility of advanced EMG techniques
- Thoroughly understand the physiology and technical aspects underlying repetitive nerve stimulation (RNS) and jitter studies, single fiber and concentric needles, with hands-on demonstrations
- Ascertain how neuromuscular ultrasound complements conventional neurophysiologic assessment
- Use ultrasound for precise localization during botulinum toxin infiltration
- Review the evidence for instrumental guidance in muscle localization (EMG/stimulation vs. ultrasound)

Module 5. Electroneuromyography (ENMG) Protocols in the Diagnosis of Neuromuscular Diseases

- Develop a logical approach to the conventional Update on Neurophysiological Diagnostic and Treatment techniques in the evaluation of focal or generalized neuromuscular disorders, neuromuscular junction disorders, including single fiber EMG
- Master the clinical and electrodiagnostic findings of focal neuropathies, plexopathies, cervical and lumbosacral radiculopathies
- Use an electrodiagnostic approach for a broad spectrum of neuromuscular disorders, including myopathies, ALS, motor neuronopathies and polyneuropathies of different nature
- Perform a correct orientation to the neurophysiological findings in the diagnosis of motor plaque diseases and their clinical correlates
- Recognize specialized electrodiagnostic modalities
- Gain insight into the peculiarities of electroneuromyographic studies in pediatric patients and intensive care units

Module 6. Intraoperative Neurophysiological Monitoring

- Look deeper into the concepts of intraoperative neurophysiological techniques
- Have the necessary theoretical and practical knowledge of the interpretation of neurophysiological signals applied to surgical settings and anesthetized patients
- Recognize the importance of alarm values and their correlation with postoperative clinical changes
- Update on relevant guidelines and protocols
- Acquire the ability to plan, perform and assess multimodal neurophysiological techniques applied to the different fields in surgical areas

Module 7. Autonomic Nervous System: Pain Other Complex Techniques

- Look deeper into the concepts of anatomy and physiology of the autonomic nervous system and its interconnections with the pathological processes of the central and peripheral nervous system
- Understand the implications of dysfunctions in the autonomic nervous system with respect to the rest of body systems
- Handle the main test batteries to determine the different dysautonomic affectations
- Reach an adequate diagnosis in the different processes of autonomic nervous system involvement
- Update the models of dysautonomia in relation to complex regional pain syndrome or maintained sympathetic dystrophy
- Determine the relation between autonomic nervous system and peripheral and central nervous systems with central sensitization in chronic pain models
- Acquire the ability for the assessment and functional evaluation of painful processes
- Learn different less widespread, little known and novel techniques, emphasizing their use in conjunction with other health professions in the context of interdisciplinary work

Module 8. Neurobiology and Physiology of Sleep: Methodological Aspects

- Expand knowledge of the structure of normal sleep in all stages of life and its increasing number of known functions
- Update on physiological changes during sleep, the neurobiological bases of its cycles and the influence of drugs and substances on sleep
- Update on the chronobiological mechanisms of sleep-wake cycle regulation and methods of monitoring circadian rhythm disturbances in this cycle, including the most novel and emerging ones
- Acquire the fundamental technical, methodological knowledge of suitable recording sensors, quantification and interpretation, and practical and novel aspects in polysomnography
- Update and understand other polygraph tests during sleep and wakefulness with respect to their implementation, management and practical indications

Module 9. Clinical-Instrumental Diagnosis of Sleep Disorders

- Acquire skills for the diagnosis of insomnia, hypersomnias and circadian disturbances, through the integrated management of data and clinical tools and instrumental tests
- Possess the theoretical and practical knowledge essential for the clinical-instrumental diagnosis of respiratory disorders during sleep, from the most prevalent such as Obstructive Sleep Apnea-Hypopnea Syndrome, to the most recently studied, subtle and novel, such as Increased Airway Resistance Syndrome during sleep and other not so prevalent respiratory sleep disorders, but no less important, including the characterization of mixed pictures
- Acquire clinical and instrumental skills in the diagnosis of parasomnias or behavioral disorders during sleep, both in adults and in childred, with a precise update on the latest concepts and pictures in the field (dissociative states, sexsomnias, eating behavior disorders during sleep, etc.)
- Update and know the diagnostic field for prevalent motor disorders during sleep and for epilepsy during sleep, including the implication and practical consequences of the not uncommon occurance two or more coexisting sleep disorders

Module 10. Neurophysiological Techniques for Therapeutic Purposes: Invasive and Non-Invasive Neuromodulation Botulinum toxin

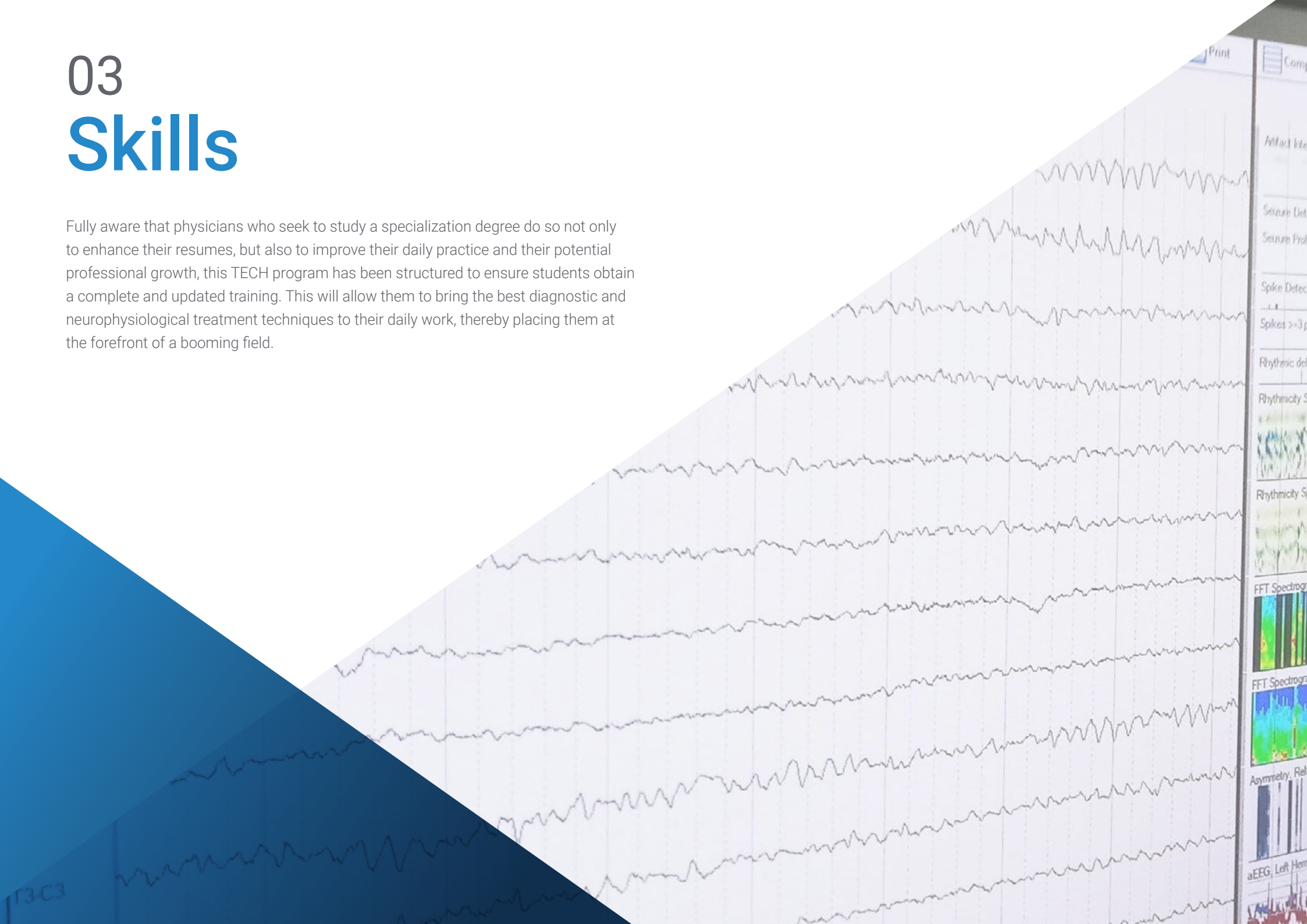
- Provide a detailed understanding of the physiological basis of the different invasive and non-invasive brain stimulation techniques
- Study in depth the most commonly used indications of the different invasive and non-invasive brain stimulation techniques
- Acquire the neurophysiological basis of direct cortical stimulation and its specific indications in the treatment of drug-resistant chronic pain
- Learn the protocols for the application of direct cortical stimulation in the treatment of drug-resistant chronic pain
- Acquire the neurophysiological basis of spinal cord stimulation and its specific indications in the treatment of chronic pain and other applications
- Learn the application protocols of spinal cord stimulation in the treatment of chronic pain
- Know the role of neuromodulation in the field of epilepsy, as well as its diagnostic applications
- Acquire the neurophysiological basis of brain stimulation in the diagnosis of epilepsy
- Acquire the neurophysiological basis of brain stimulation in the treatment of epilepsy
- Know the diagnostic indications of brain stimulation in epilepsy
- Know the therapeutic indications of brain stimulation in epilepsy
- Know the role of deep brain stimulation (DBS) in Parkinson's disease (PD) and other movement disorders

- Learn the physiological basis of deep brain stimulation (DBS)
- Learn the technique and clinical indications for DBS in Parkinson's disease and other movement disorders
- Know the basis and physiological effects of vagus nerve stimulation
- Learn the technique and clinical indications of vagus nerve stimulation
- Know the effect of vagus nerve stimulation in patients diagnosed with epilepsy
- Know the physiological basis and effects of hypoglossal nerve stimulation
- Learn the technique and clinical indications of hypoglossal nerve stimulation
- Know the effect of hypoglossal nerve stimulation in patients diagnosed with OSAS
- Know the basis and physiological effects of stimulation of other peripheral nerves such as the trigeminal, occipital, tibial and sacral nerves
- Learn the techniques and clinical indications of trigeminal, occipital, tibial and sacral nerve stimulation
- Understand the fundamentals and basics of how hearing implants work
- Know the types of hearing implants: cochlear and brainstem
- Learn the indications for hearing implant implantation
- Know the physiological basis of non-invasive brain stimulation
- Learn the types of non-invasive brain stimulation: direct transcranial electrical stimulation (TES) and transcranial magnetic stimulation (TMS)
- Learn the indications for non-invasive brain stimulation
- Know the scientific evidence supporting non-invasive brain stimulation and to learn the most applied therapeutic protocols
- Know the fundamentals, the basis of operation and the modalities of transcutaneous electrical nerve stimulation (TENS)
- Learn the indications, contraindications and effects of TENS
- Know the mechanism of action of botulinum toxin
- Learn the therapeutic and adverse effects of botulinum toxin
- Learn the technique of botulinum toxin application with guidance by neurophysiological techniques in different dystonia such as cervical dystonia, blepharospasm, facial myokymias, oromandibular dystonia, upper extremity dystonia and trunk dystonia
- Acquire theoretical knowledge (definitions, indications and implementation protocols), as well as training for the practical implementation of personalized neuromodulation therapies according to the indication of the clinical case and following clinical protocols
- Understand neuromodulation therapies as an adjuvant treatment that is part of a multidisciplinary whole, and not as a treatment in exclusivity

03

Skills

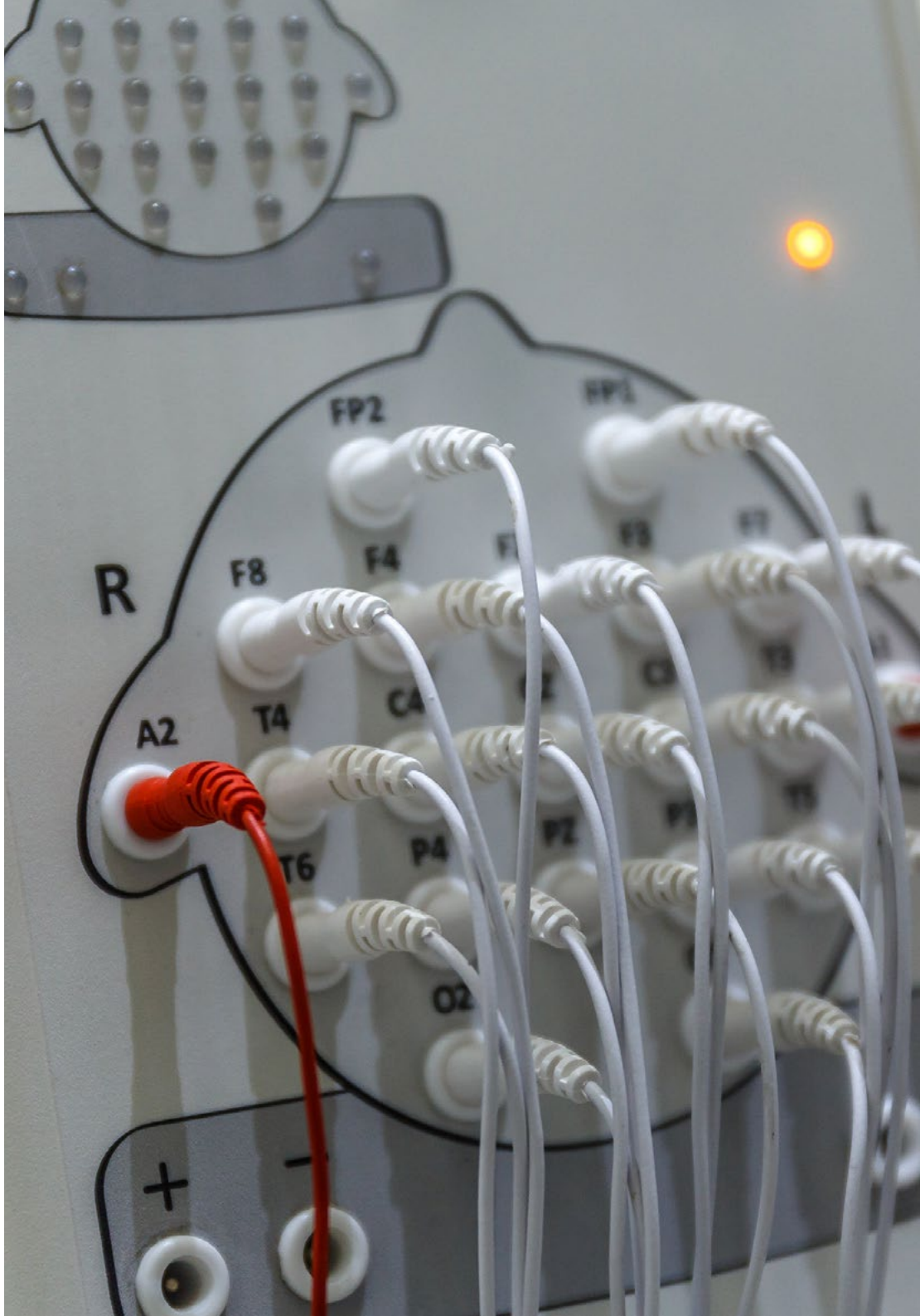
Fully aware that physicians who seek to study a specialization degree do so not only to enhance their resumes, but also to improve their daily practice and their potential professional growth, this TECH program has been structured to ensure students obtain a complete and updated training. This will allow them to bring the best diagnostic and neurophysiological treatment techniques to their daily work, thereby placing them at the forefront of a booming field.



Study at a university that will enable you to acquire the theoretical and practical skills you need to be successful in your healthcare and research practice"

General Skills

- Acquire up-to-date and practical knowledge of the wide variety of neurophysiological diagnostic techniques available, which will be of maximum use in care practice or research work
- Know the indications, usefulness and clinical applications for a better understanding of the methodology involved in developing a critical spirit when evaluating the results, always integrated in a clinical context
- Review and update skills in current techniques and present some of the new, numerous and promising fields of application in neurophysiology
- Make an exhaustive review of the latest guidelines, advice and techniques within the specialty
- Know how to use the different neurophysiological techniques in critical or pediatric patients, or in intraoperative neurophysiological monitoring



Specific Skills

- Gradually acquire the necessary skills to identify different physiological and pathological graphoelements
- Acquire patient management skills from outpatient stages to ICU and surgical patient stages
- Delve deeper into all the diagnostic arsenal available to evaluate the different neuromuscular structures
- Gain theoretical and practical knowledge of the techniques used in the operating room, as well as their particularities when interpreting them in a different working environment such as the operating room and anesthetized patients
- Delve deeper into the theoretical-practical indications for each technique depending on the surgery to be performed, knowing their contributions and limitations
- Know the different useful diagnostic techniques in assessing pain and nociceptive pathways
- Update knowledge of the latest relevant developments in the field of sleep physiology and its functions
- Learn and understand, with the help of practical, graphic and visual material, how to handle and interpret the "gold standard" diagnostic test for sleep disorders, polysomnography, etc.
- Obtain sufficient and essential training in the organizational planning, implementation, evaluation and understanding of diagnostic processes in sleep disorders
- Describe recent advances in the field of neuromodulation therapies, as well as their application in different pathologies such as chronic pain, OSA, epilepsy, Parkinson's disease, fibromyalgia, or tinnitus, among others
- Know how to apply botulinum toxin guided by neurophysiological techniques, mainly indicated for the treatment of dystonia

At TECH we are committed to your future and for that reason we make the effort to bring you the most complete program on the market"

04

Course Management

In order to offer quality education, it is not enough to simply have the best syllabus, as the teaching team is also fundamental in helping students internalize the knowledge in the best possible way. In this Master's Degree, students will have access to a truly outstanding faculty: Active physicians who lead teams working in the area of neurophysiology at the most prestigious hospitals in the world, who are committed to the future of their specialty, and who bring students the most complete and up-to-date content in the field.

Learning from the experience of this teaching team will help you update your knowledge in a much easily and efficiently. Only TECH can offer you a faculty of this caliber”

Management

Dr. Martínez Pérez, Francisco

- Clinical Neurophysiology Service. Puerto de Hierro University Hospital, Majadahonda
- Advanced neurophysiological studies at the MIP Health Clinic - Personalized Integrated Medicine
- Neurophysiology techniques applied at the Vitruvian Institute of Biomechanics and Surgery
- Medical Specialist in Clinical Neurophysiology
- Degree in Medicine and Surgery from the Complutense University of Madrid
- Master's Degree in Sleep: Physiology and Pathology, Pablo Olavide University
- Master's Degree in Neurological Electrodiagnosis by the University of Barcelona
- Researcher, university lecturer, professor of the Master's Degree in Sleep Medicine
- Author of several guidelines and consensuses for different medical societies (SENFC, SES, AEP) and the National Commission of the Specialty
- XXI Century National Prize in Medicine
- European Award in Medicine

Professors

Dr. Balugo Bengoechea, Paloma

- Head of the Electroencephalography and Evoked Potentials areas, Clinical Neurophysiology Service, San Carlos Clinical Hospital, Madrid
- Coordinator of the Patient Safety Process, Neurosciences Institute, San Carlos Clinical Hospital, Madrid
- Doctor Specialist in Neurophysiology, San Carlos Clinical Hospital, Madrid
- Master's Degree in Epilepsy
- Master's Degree in Sleep: Physiology and Medicine
- Diploma in Advanced Studies in Neuroscience
- Member of the Neurological Diseases Research Group, Neuroscience Area, Health Research Institute, San Carlos Clinical Hospital (IdISSC)

Dr. Fernández Sánchez, Victoria

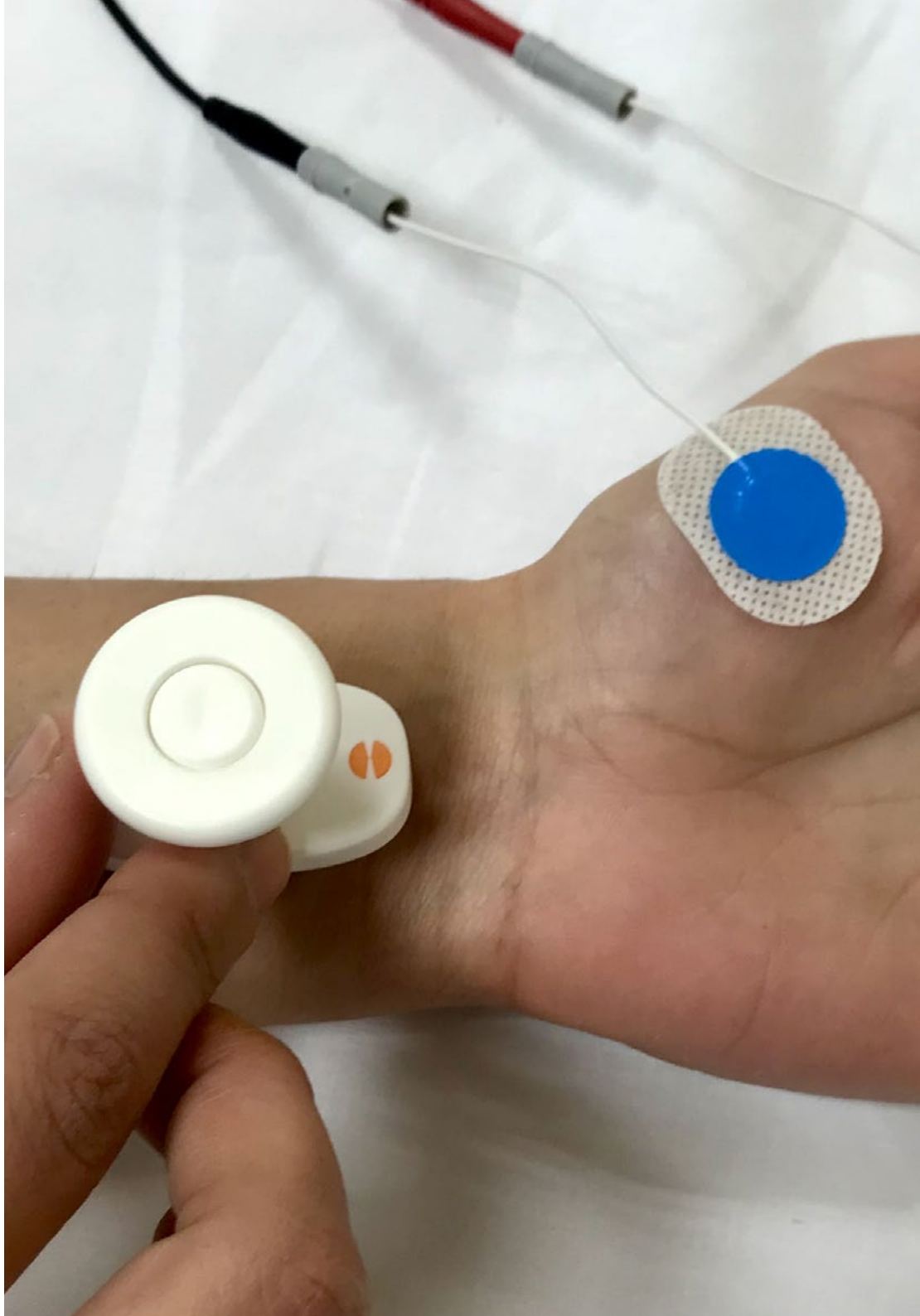
- Head of Section-Clinical Neurophysiology Service, Regional University Hospital, Malaga
- Honorary collaborator in the Department of Human Anatomy, Faculty of Medicine, University of Malaga
- PhD in Medicine, University of Malaga
- Graduate in Medicine and Surgery, University of Malaga
- Specialist in Clinical Neurophysiology
- Master's Degree in Sleep from the Pablo Olavide University
- Master's Degree in Neuroscience, Pablo Olavide University

Dr. Del Sanz de la Torre, Javier

- Assistant Physician, Pain Unit, La Zarzuela University Hospital
- Official Interuniversity Master's Degree in the Study and Treatment of Pain, Universities of Cantabria, Cadiz and Rey Juan Carlos
- TECH Master's Degree in Pain Treatment. University of Seville, Faculty of Medicine and Virgen del Rocio Hospital
- Master's Degree in Research and Specialized Treatment of Pain, University of Valencia
- Master's Degree in Ultrasound Anatomy Applied to Interventionism in Regional Anesthesia and Pain University-Business Foundation, University of Valencia
- Postgraduate Diploma in Musculoskeletal Ultrasound and Interventional Ultrasonography under the auspices of the Spanish Society of Sports Medicine
- Postgraduate Diploma in Ultrasound, Spanish Society of Pain
- Postgraduate Diploma in Radiofrequency Therapy, Spanish Society of Pain

Dr. Larrosa Gonzalo, Óscar

- Specialist Physician in Clinical Neurophysiology, San Rafael Hospital
- Expert in Sleep Medicine (CEAMS accredited, first national exam, 2013)
- Coordinator and founder of the Sleep Medicine Unit, MIPsalud, Madrid
- Specialist and clinical consultant in sleep medicine at the Center of Neurological Diseases in Madrid and at the Multidisciplinary Unit for Sleep Disorders in San Rafael Hospital in Madrid, Spain
- Member of the Spanish Sleep Society (SES), founding member and former coordinator of its working group on Sleep Behavior and Behavioral Disorders



- Member of the Spanish Society of the Neurophysiology Clinic (SENFC), founding member and former coordinator of its working group on sleep disorders
- Honorary Member, medical advisor and recommended specialist of the Spanish Restless Legs Syndrome Association (AESPI)
- Director of the Online Course Restless Leg Syndrome (Willis-Ekbom Disease), (AESPI/ Information without borders) aimed at health professionals

Dr, Lladó Carbó, Estela

- Head of Service of the Neurophysiology Unit of HM Hospitals Catalunya
- Specialist, via MIR, in Clinical Neurophysiology at the Hospital Universitari Vall d'Hebrón
- Founder and Medical Director of Neurotoc
- Degree in Medicine and Surgery from the University of Barcelona
- Postgraduate Certificate in Neurosciences (DEA) by the University of Barcelona
- V Postgraduate Certificate in Magnetic Stimulation and Neuromodulation by the University of Cordoba - Harvard Berenseon Allen Center

Dr. López Gutiérrez, Inmaculada

- Head of the Clinical Neurophysiology Department, Rey Juan Carlos, Infanta Elena, General de Villalba and Jiménez Diaz Foundation Hospitals
- Degree in Medicine from the University of Granada
- Official Master's Degree in Neurosciences from the University of Seville
- Expert in Sleep Medicine by the Spanish Committee of Accreditation in Sleep Medicine (CEAMS)
- Somnologist - Postgraduate Diploma in Sleep Medicine, European Sleep Research Society (ESRS)
- Co-President of the Multidisciplinary Sleep Unit, Rey Juan Carlos University Hospital
- Member of the Spanish Andalusian Society of Clinical Neurophysiology
- Member of the Spanish Sleep Society and its Pediatric Working Group
- Member of the European Sleep Research Society

Dr. Martínez Aparicio, Carmen

- Coordinator of the Clinical Neurophysiology Unit at Hospital Vithas, Almeria and FEA of Clinical Neurophysiology at Torrecárdenas University Hospital, Almeria
- Current president of the Andalusian Society of Clinical Neurophysiology (SANFC)
- Degree in Medicine and Surgery from the University of Granada
- Master's Degree in Sleep from the Pablo Olavide University
- Expert in Musculoskeletal Ultrasound Francisco de Vitoria University

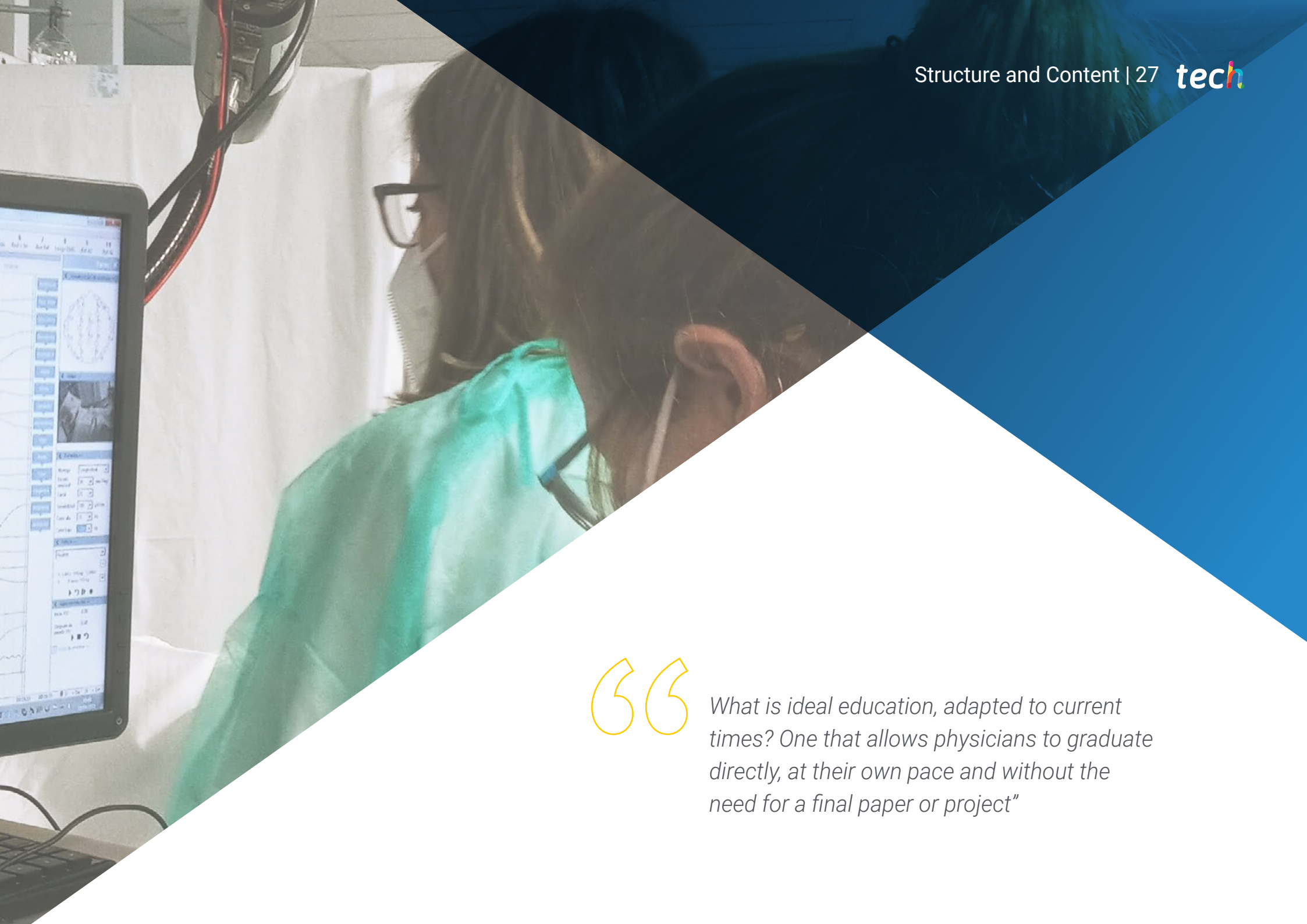
Dr. Sanz Barbero, Elisa

- Assistant Physician in Neurophysiological Diagnosis and Treatment Update, Getafe General University Hospital
- Responsible for Intraoperative Monitoring, Getafe General University Hospital
- MIR: Update in Neurophysiological Diagnosis and Treatment, Gregorio Marañón General University Hospital
- Degree in Medicine and Surgery from the University of Salamanca
- Doctorate Level Courses in Neuroscience, UCM

05

Structure and Content

This Master's Degree has been structured so that professionals can update their knowledge in Neurophysiology over the course of 10 academic modules and 12 months of work, adapted to the pace and needs of practicing physicians. All this in addition to the advantage of offering a direct qualification, i.e., students will not need to do any final work to graduate as an expert in this specialty. A luxury that only TECH, the largest Online University, could offer.



What is ideal education, adapted to current times? One that allows physicians to graduate directly, at their own pace and without the need for a final paper or project"

Module 1. Brain Electrogenesis: Recording and Analysis Techniques Electroencephalogram Development

1.1. Biophysical Fundamentals of EEG Recording
- 1.1.1. Context
- 1.1.2. Brief Mathematical Revision
  - 1.1.2.1. Vector Analysis
  - 1.1.2.2. Determinants and Matrices
- 1.1.3. Brief Introduction to Electromagnetism
  - 1.1.3.1. The Concepts of Field and Potential
  - 1.1.3.2. Maxwell's Equations
- 1.1.4. Cerebral Electrical Fields

1.2. Technical and Analytical Fundamentals of EEG
- 1.2.1. Context
- 1.2.2. Analogue-to-Digital Conversion (ADC)
- 1.2.3. Filters
- 1.2.4. Digital Signal Analysis
  - 1.2.4.1. Spectral Analysis
  - 1.2.4.2. Wavelet Analysis
- 1.2.5. Determining Interaction between Two Signals

1.3. Protocols and Standards for EEG and Video-EEG, Triggering Maneuvers: Artifact Detection
- 1.3.1. EEG and Video-EEG
  - 1.3.1.1. Recording Conditions
  - 1.3.1.2. Electrodes
  - 1.3.1.3. By-Passes and Assemblies
  - 1.3.1.4. Records
- 1.3.2. Video-EEG
  - 1.3.2.1. Technical Aspects
  - 1.3.2.2. Indications
- 1.3.3. Routine Stimulation Maneuvers
  - 1.3.3.1. Ocular Opening and Closure
  - 1.3.3.2. Pulmonary Hyperventilation
  - 1.3.3.3. Intermittent Luminous Stimulation
- 1.3.4. Other Non-Standard Activation Methods
  - 1.3.4.1. Other Visual Activation Procedures
  - 1.3.4.2. Activation by Sleep
  - 1.3.4.3. Other Activation Methods
- 1.3.5. Introduction to Artefacts and Their Relevance
  - 1.3.5.1. General Detection Principles
  - 1.3.5.2. Common Artifacts
  - 1.3.5.3. Artifact Removal
- 1.3.6. Key Concepts

1.4. Normal Adult EEG
- 1.4.1. Normal Wakefulness EEG
  - 1.4.1.1. Alpha Rhythm
  - 1.4.1.2. Beta Rhythm
  - 1.4.1.3. Mu Rhythm
  - 1.4.1.4. Lambda Waves
  - 1.4.1.5. Low-Voltage Work
  - 1.4.1.6. Theta Activity
- 1.4.2. Normal Sleep EEG
  - 1.4.2.1. NREM Sleep
  - 1.4.2.2. REM Sleep
- 1.4.3. Normality Variants/Patterns of Uncertain Significance

1.5. Child EEG, Development and Maturation I
- 1.5.1. Technical Considerations
- 1.5.2. Age-Specific EEG Characteristics
  - 1.5.2.1. Continuity
  - 1.5.2.2. Bilateral Hemispheric Synchrony
  - 1.5.2.3. Voltage
  - 1.5.2.4. Variability
  - 1.5.2.5. Reactivity
  - 1.5.2.6. Age-Specific Waves
    - 1.5.2.6.1. Beta-Delta Complex
    - 1.5.2.6.2. Temporary Theta and Alpha Wave Bursts
    - 1.5.2.6.3. Frontal Sharp Waves

1.5.3. EEG in Wakefulness and Sleep
1.5.3.1. Wakefulness
1.5.3.2. NREM Sleep
1.5.3.3. REM Sleep
1.5.3.4. Indeterminate and Transitional Sleep
1.5.3.5. Stimuli Reactivity
1.5.4. Special Patterns/Normality Variants
1.5.4.1. Bifrontal Delta Activity
1.5.4.2. Temporal Sharp Waves
1.5.5. Key Concepts
1.6. Child EEG, Development and Maturation II: Physiological EEG from Infancy to Adolescence
1.6.1. Technical Considerations
1.6.2. EEG in Infants from 2 to 12 Months Old
1.6.3. EEG in Early Infancy from 12 to 36 Months Old
1.6.4. EEG in Preschool Age from 3 to 5 Years Old
1.6.5. EEG in Older Children from 6 to 12 Years Old
1.6.6. EEG in Adolescents from 13 to 20 Years Old
1.6.7. Key Concepts
1.7. Slow Abnormalities: Description and Significance
1.7.1. Focal Slow Abnormalities
1.7.1.1. Summary
1.7.1.2. Pattern Description
1.7.1.3. Clinical Significance of Slow Focal Waves
1.7.1.4. Disorders Responsible for Slow Focal Waves
1.7.2. Asynchronous Generalized Slow Abnormalities
1.7.2.1. Summary
1.7.2.2. Pattern Description
1.7.2.3. Clinical Significance of Asynchronous Generalized Waves
1.7.2.4. Disorders Responsible for Asynchronous Generalized Waves
1.7.3. Synchronous Generalized Slow Waves
1.7.3.1. Summary
1.7.3.2. Pattern Description
1.7.3.3. Clinical Significance of Asynchronous Generalized Waves
1.7.3.4. Disorders Responsible for Asynchronous Generalized Waves
1.7.4. Conclusions
1.8. Focal and Generalized Intercritical Epileptiform Abnormalities
1.8.1. General Considerations
1.8.2. Identification Criteria
1.8.3. Localization Criteria
1.8.4. Intercritical Epileptiform Abnormalities and Their Interpretation
1.8.4.1. Spikes and Sharp Waves
1.8.4.2. Benign Focal Epileptiform Discharges
1.8.4.3. Wave-Spike
1.8.4.3.1. Slow Wave-Spike
1.8.4.3.2. 3 Hz Wave-Spike
1.8.4.3.3. Polyspike or Polyspike-Wave
1.8.4.4. Hypsarrhythmia
1.8.4.5. Focal Intercritical Abnormalities in Generalized Epilepsies
1.8.5. Summary/Key points
1.9. Ictal EEG: Seizure Types and Electroclinical Correlates
1.9.1. Generalized Onset Seizures
1.9.1.1. Motor Onset
1.9.1.2. Non-Motor Onset
1.9.2. Focal Onset Seizures
1.9.2.1. State of Consciousness
1.9.2.2. Motor/Non-Motor Onset
1.9.2.3. Focal Presenting Progression to Bilateral Tonic-Clonic
1.9.2.4. Hemispheric Lateralization
1.9.2.5. Lobar Localization

1.9.3. Unknown Onset Seizures
1.9.3.1. Motor/Non-Motor
1.9.3.2. Not Classified
1.9.4. Key Concepts
1.10. Quantified EEG
1.10.1. Historical Clinical Practice Use of Quantified EEG
1.10.2. Quantified EEG Application Methods
1.10.2.1. Types of Quantified EEG
1.10.2.1.1. Power Spectrum
1.10.2.1.2. Synchronization Measurements
1.10.3. Quantified EEG in Current Clinical Practice
1.10.3.1. Encephalopathies Classification
1.10.3.2. Epileptic seizures Detection
1.10.3.3. Advantages of Continuous EEG Monitoring
1.10.4. Key Concepts

Module 2. Electroencephalogram (EEG) in Electroclinical Syndromes and Neurocritical Patients: Neurophysiological Precision Techniques in the Diagnosis and and Treatment of Epilepsy

2.1. Electroclinical syndromes in Neonates and Infants
2.1.1. Neonatal Period
2.1.1.1. Ohtahara Syndrome
2.1.1.2. Early Myoclonic Encephalopathy
2.1.1.3. Neonatal Self-Limited Seizures: Self-Limited Familial Neonatal Epilepsy
2.1.1.4. Neonatal-Onset Structural Focal Epilepsy
2.1.2. Infant Period
2.1.2.1. West Syndrome
2.1.2.2. Dravet Syndrome
2.1.2.3. Febrile Seizures Plus and Genetic Epilepsy with Febrile Seizures Plus
2.1.2.4. Myoclonic Epilepsy in Infants
2.1.2.5. Familial and Non-Familial Self-Limited Infant Epilepsy
2.1.2.6. Infant Epilepsy with Migratory Focal Seizures
2.1.2.7. Myoclonic Status Myoclonicus in Non-Progressive Encephalopathies
2.1.2.8. Epilepsy in Chromosomal Disorders

2.2. Electroclinical Syndromes in Childhood
2.2.1. Role of EEG and Video-EEG in the Diagnosis and Classification of Epileptic Syndromes with Onset between 3 and 12 Years of Age
2.2.1.1. Background and Current Clinical Practice
2.2.1.2. Methodological Design and Recording Protocols
2.2.1.3. Interpretation, Diagnostic Value of Findings, Reporting
2.2.1.4. Integration of EEG in Syndrome-Ethiology Taxonomy
2.2.2. Genetic Generalized Epilepsies (Idiopathic, GGE)
2.2.2.1. Typical EEG Characteristics of GGE and Methodological Principles
2.2.2.2. Infant Absence Epilepsy
2.2.2.3. Juvenile Absence Epilepsy
2.2.2.4. Other GGE Phenotypes (3-12 Years Old)
2.2.2.5. Epilepsies with Reflex Seizures
2.2.3. Genetic Focal Epilepsies (Idiopathic, GFE)
2.2.3.1. Typical EEG Characteristics of GFE and Methodological Principles
2.2.3.2. Idiopathic Focal Epilepsy with Centro-Temporal Spikes
2.2.3.3. Panayiotopoulos Syndrome
2.2.3.4. Other GFE Phenotypes (3-12 Years Old)
2.2.4. Non-Idiopathic Focal Epilepsies (FE): Lobar Syndromes
2.2.4.1. Typical EEG Characteristics of EF and Methodological Principles
2.2.4.2. Frontal Lobe Epilepsy
2.2.4.3. Temporal Lobe Epilepsy
2.2.4.4. Posterior Cortex Epilepsy
2.2.4.5. Other Localizations (Insula, Cingulate, Hemispheric Lesions)
2.2.5. Epileptic Encephalopathies (EE) and Related Syndromes (3-12 Years Old)
2.2.5.1. Typical EEG Characteristics of EE and Methodological Principles
2.2.5.2. Lennox-Gastaut Syndrome
2.2.5.3. Encephalopathy with Electrical Sleep Electrical Status Sickness (ESES) and Landau-Kleffner Syndrome
2.2.5.4. Epilepsy with Myoclonus-Atonic Seizures (Doose Syndrome)
2.2.5.5. Epilepsy with Myoclonic Absences

2.3. Electroclinical Syndromes in Adolescents and Adults
- 2.3.1. Role of EEG in the Diagnosis of Epileptic Syndromes in Adolescents and Adults
- 2.3.2. Genetic Generalized Epilepsy in Adolescents and Adults
  - 2.3.2.1. Juvenile Myoclonic Epilepsy
  - 2.3.2.2. Juvenile Absence Epilepsy
  - 2.3.2.3. Epilepsy with Generalized Tonic-Clonic Seizures
  - 2.3.2.4. Other EGI Phenotypes in Adolescents and Adults
- 2.3.3. Non-Idiopathic Focal Epilepsy in Adolescents and Adults: Lobar Syndromes
  - 2.3.3.1. Frontal Lobe
  - 2.3.3.2. Temporal Lobe
  - 2.3.3.3. Other Locations
- 2.3.4. Other Non-Age-Specific Epileptic Syndromes
- 2.3.5. Epilepsy in the Elderly

2.4. ICU EEG Nomenclature
- 2.4.1. Minimum Requirements for Reporting in Neurocritical Patients
- 2.4.2. Background Tracing
- 2.4.3. Sporadic Onset Epileptiform Discharges
- 2.4.4. Rhythmic and/or Periodic Patterns
- 2.4.5. Electrical and Electro-Clinical Seizures
- 2.4.6. Brief Potentially Ictal Rhythmic Discharges (BIRDs)
- 2.4.7. Ictal-Interictal Continuum
- 2.4.8. Other Terminology

2.5. EEG in Altered Level of Consciousness, Coma, and Brain Death
- 2.5.1. EEG Findings in Encephalopathy
- 2.5.2. EEG Findings in Coma
- 2.5.3. Brain Electrical Inactivity
- 2.5.4. Evoked Potentials in Conjunction with EEG in Patients with Altered Level of Consciousness

2.6. Status Epilepticus I
- 2.6.1. Context
  - 2.6.1.1. "Time is the Brain"
  - 2.6.1.2. Pathophysiology
- 2.6.2. Definition and Timing
- 2.6.3. Classification. Diagnostic Axes
  - 2.6.3.1. Axis I: Semiology
  - 2.6.3.2. Axis II: Etiology
  - 2.6.3.3. Axis III: EEG Correlate
  - 2.6.3.4. Axis IV: Age

2.7. Status Epilepticus II
- 2.7.1. Non-Convulsive Status Epilepticus: Definition
- 2.7.2. Semiology
  - 2.7.2.1. Non-Convulsive Status in Comatose Patients
  - 2.7.2.2. Non-Convulsive Status in Non-Comatose Patients
    - 2.7.2.2.1. Dyscognitive Status: Altered Level of Consciousness (or Dialeptic) and Aphasic
    - 2.7.2.2.2. Continuous Aura
    - 2.7.2.2.3. Autonomic Status
- 2.7.3. EEG Criteria to Determine Non-Convulsive Status (Salzburg Criteria)

2.8. Continuous EEG/Video-EEG Monitoring in the ICU
- 2.8.1. Usefulness and Conditions
- 2.8.2. Recommended Indications and Duration
  - 2.8.2.1. Adult and Pediatric Population
  - 2.8.2.2. Neonates
- 2.8.3. Clinical Tools
- 2.8.4. New Devices

2.9. Epilepsy Surgery
- 2.9.1. Preoperative Video-EEG
  - 2.9.1.1. Superficial
  - 2.9.1.2. Invasive
  - 2.9.1.3. Semi-Invasive
- 2.9.2. Intraoperative Monitoring

2.10. High-Density Electroencephalogram: Generator Localization and Source Analysis
- 2.10.1. Signal Acquisition
  - 2.10.1.1. General Aspects
  - 2.10.1.2. Type, Localization and Number of Electrodes
  - 2.10.1.3. The Importance of References
- 2.10.2. Digitalizing Electrode Localization
- 2.10.3. Debugging, Artifacts and Signal Cleaning
- 2.10.4. Blind Source Separation
- 2.10.5. Brain Dipoles
- 2.10.6. Brain Maps
  - 2.10.6.1. Adaptive Spatial Filters
- 2.10.7. Skull and Brain Modeling
  - 2.10.7.1. Spherical Models
  - 2.10.7.2. Surface Element Model
- 2.10.8. Finite Element Model
- 2.10.9. Generator Localization: Inverse Problem
  - 2.10.9.1. Single Current Dipole Model
- 2.10.10. Imaging Methods

Module 3. Evoked Potentials

3.1. Fundamentals of Evoked Potentials
- 3.1.1. Fundamental Concepts
- 3.1.2. Types of Evoked Potentials
- 3.1.3. Techniques and Requirements
- 3.1.4. Clinical Applications

3.2. Neurophysiological Study of the Eye and the Visual Pathway I
- 3.2.1. Electroretinogram
  - 3.2.1.1. Flash ERG
  - 3.2.1.2. Pattern ERG (Checkerboard)
  - 3.2.1.3. Ganzfeld ERG
  - 3.2.1.4. Multifocal ERG
- 3.2.2. Electrooculogram

3.3. Neurophysiological Study of the Eye and the Visual Pathway II
- 3.3.1. Visual Evoked Potentials
  - 3.3.1.1. Pattern Stimulation
    - 3.3.1.1.1. Complete Field Study
    - 3.3.1.1.2. Hemifield Studies: Quadrants
  - 3.3.1.2. LED-Glasses Stimulation
  - 3.3.1.3. Other techniques: Multifocal PEV

3.4. Auditory Pathway
- 3.4.1. Anatomophysiology of the Auditory Pathways
- 3.4.2. Brainstem Auditory Evoked Potentials
  - 3.4.2.1. Short Latency
  - 3.4.2.2. Medium Latency
  - 3.4.2.3. Long Latency
- 3.4.3. Other techniques
  - 3.4.3.1. Otoacoustic Emissions
    - 3.4.3.1.1. Transient Evoked
    - 3.4.3.1.2. Distortion Products
  - 3.4.3.2. Electrocochleography
  - 3.4.3.3. Steady State Auditory Evoked Potentials
    - 3.4.3.3.1. PEAee
    - 3.4.3.3.2. PEAee-MF
  - 3.4.3.4. Audiometry
    - 3.4.3.4.1. Pure Tone Audiometry: Liminal Tonal Audiometry
    - 3.4.3.4.2. Bone Conduction Audiometry

3.5. Vestibular System
- 3.5.1. Vestibular System and the Visual and Proprioceptive Systems
- 3.5.2. Nystagmus
  - 3.5.2.1. Vestibular Tests
    - 3.5.2.1.1. Videonystagmography (VNG)
      - 3.5.2.1.1.1. Oculomotor System Tests
      - 3.5.2.1.1.2. Postural and Positional Tests
      - 3.5.2.1.1.3. Caloric Tests
      - 3.5.2.1.1.4. Additional VNG Tests

3.5.3. Peripheral and Central Vertigo
3.5.3.1. Diagnostic tests
3.5.3.1.1. Electronystagmography
3.5.3.1.2. vHIT
3.5.3.1.3. Posturography
3.5.3.1.4. Vestibular Myogenic Evoked Potentials
3.5.3.2. HINTS Protocol
3.5.3.3. Benign Paroxysmal Positional Vertigo (BPPV)
3.6. Somatosensory Potentials
3.6.1. Anatomophysiological Recall
3.6.2. Technique: Practical Procedures
3.6.3. Interpretation
3.6.4. Clinical Applications
3.6.5. Dermatomal Somatosensory Evoked Potentials
3.7. Motor Evoked Potentials
3.7.1. Electric Stimulation
3.7.2. Transcranial Magnetic Stimulation
3.7.3. Diagnostic Applications
3.8. Evoked Potentials in the ICU
3.8.1. Introduction
3.8.2. Most Used Potentials in the ICU
3.8.2.1. Somatosensory Evoked Potentials (SSEP)
3.8.2.2. Truncal Auditory Evoked Potentials (TAEP)
3.8.2.3. Visual Evoked Potentials (VEP)
3.8.2.4. Long-Latency Evoked Potentials-Mismatch Negativity
3.8.3. Assessing the Use of EPs in Coma Patients or Suffering Altered Consciousness in the ICU
3.8.4. Evoked Potentials in the ICU
3.8.4.1. Olfactory Evoked Potentials
3.8.4.2. Cardiac Beat Evoked Potentials
3.8.4.3. Others
3.9. Cognitive Potentials
3.9.1. Definition of Cognitive Potentials
3.9.2. Types of Cognitive Potentials: General Overview
3.9.3. Measurement Parameters for Cognitive Potentials
3.9.4. Mismatch Negativity: Introduction Recording and Evaluation First Clinical Uses
3.9.5. P300. Introduction Recording and Evaluation Generators Clinical Applications
3.9.6. N400. Introduction Recording and Evaluation Generators Clinical Applications
3.9.7. Other Cognitive Potentials in Research
3.9.8. Conclusions
3.10. Evoked Potentials in Pediatric Patients

Module 4. Neurophysiological Techniques in the Diagnosis of Neuromuscular Diseases

4.1. Anatomy and Physiology of the Peripheral Nervous System
4.2. Sensory and Motor Nerve Conduction Studies
4.3. Reflexology and Late Responses
4.3.1. F Wave
4.3.2. A Wave
4.3.3. H Reflex
4.3.4. T Reflex
4.4. Technical and Quality Considerations in Neuromuscular Electrodiagnosis: Procedural Errors Precautions
4.5. Neurophysiological Assessment of Neuromuscular Junction Function
4.5.1. Repetitive Nerve Stimulation
4.5.2. Jitter Study Using Single-Fiber Needles and Concentric Needles
4.5.2.1. Voluntary Contraction
4.5.2.2. Axonal Stimulation
4.6. Principles of Electromyography: Electromyographic Response in Normal Motor Units Insertion Activity Motor Plate Activity Motor Unit Potential Pathological Muscle Activity
4.7. Techniques for Quantitative Estimation of Motor Units
4.7.1. MUNE
4.7.2. MUNIX
4.7.3. MUSIX

4.8. Neurophysiological Study of the Facial and Trigeminal Nerves
4.9. Neurophysiological Evaluation of the Respiratory System
  4.9.1. Laryngeal Nerves and Muscles
  4.9.2. Phrenic Nerve and Diaphragm Muscle
4.10. Neuromuscular Ultrasound
  4.10.1. Basic Neural Semiology and Physical Basis Adapted to Ultrasound Study
  4.10.2. Normal Anatomy and Ultrasound Correlation
    4.10.2.1. Upper Limbs
    4.10.2.2. Lower Extremities
  4.10.3. Ultrasound Scanning: Peripheral Nerves
    4.10.3.1. Upper Limbs
    4.10.3.2. Lower Extremities
  4.10.4. Ultrasound Diagnosis: Focal Neuropathies
    4.10.4.1. Upper Limbs
    4.10.4.2. Lower Extremities
  4.10.5. Advanced Imaging
  4.10.6. Percutaneous Interventional Techniques

Module 5. Electroneuromyography (ENMG) Protocols in the Diagnosis of Neuromuscular Diseases

5.1. Neurophysiological Study in Pathology of the Cervical Roots and Brachial Plexus
5.2. Neurophysiological Study in Pathology of Roots and Lumbosacral Plexus
5.3. Neurophysiological Examination of Upper Limb Nerve Pathology Mononeuropathies and Focal Lesions
  5.3.1. Median Nerve
  5.3.2. Ulnar Nerve
  5.3.3. Radial Nerve
  5.3.4. Shoulder Girdle Nerves
  5.3.5. Others
5.4. Neurophysiological Examination of Lower Limb Nerve Pathology Mononeuropathies and Focal Lesions
  5.4.1. Sciatic (Ischiatic) Nerve
  5.4.2. Femoral Nerve
  5.4.3. Obturator Nerve
  5.4.4. Others
5.5. Neurophysiological Examination of Polyneuropathies
5.6. Neurophysiological Examination of Myopathies Muscular Dystrophies, Myotonias and Channelopathies
5.7. Neurophysiological Assessment of Motor Neuron Diseases
5.8. Clinical-Neurophysiological Correlation of Neuromuscular Transmission Disorders
  5.8.1. Myasthenia Gravis
  5.8.2. Lamber-Eaton Syndrome
  5.8.3. Botulism
  5.8.4. Others
5.9. Neurophysiological Study of Tremor and Other Movement Disorders
5.10. Neurophysiological Assessment of Neuromuscular Pathology in Pediatrics

Module 6. Intraoperative Neurophysiological Monitoring

6.1. Neurophysiological Techniques Applied to MIO: Monitoring and Mapping
- 6.1.1. Monitoring Techniques
  - 6.1.1.1. Motor Evoked Potentials
    - 6.1.1.1.1. Transcranial
      - 6.1.1.1.1.1. Muscular Recording
      - 6.1.1.1.1.2. Epidural Recording: D Wave
    - 6.1.1.1.2. Direct Cortical Stimulation
  - 6.1.1.2. Somatosensory Evoked Potentials
  - 6.1.1.3. Brainstem Auditory Evoked Potentials
  - 6.1.1.4. Reflexes
  - 6.1.1.5. Peripheral Nerve, Plexus and Nerve Roots: Electromyography
- 6.1.2. Mapping Techniques
  - 6.1.2.1. Phase Reversal
    - 6.1.2.1.1. Central Cortex/Sulcus
    - 6.1.2.1.2. Medullary/Posterior Cords
  - 6.1.2.2. Cortical
  - 6.1.2.3. Sub-Cortical
  - 6.1.2.4. Nerve, Plexus and Nerve Roots: EMG

6.2. Electrodes. Influence of Anesthetics Filters and Artifacts
- 6.2.1. Types of Stimulation and Recording Electrodes: Characteristics and Indications
- 6.2.2. Anesthesia and Monitoring
- 6.2.3. Filters
- 6.2.4. Artefacts
- 6.2.5. Risks. Contraindications

6.3. Intraoperative Neurophysiologic Monitoring in Supratentorial Process Surgery
- 6.3.1. Monitoring and Mapping Indications
- 6.3.2. Techniques Used
- 6.3.3. Alarm Criteria

6.4. Intraoperative Neurophysiologic Monitoring in Infratentorial Process Surgery
- 6.4.1. Monitoring and Mapping Indications
- 6.4.2. Techniques Used
- 6.4.3. Alarm Criteria

6.5. Intraoperative Functional Speech Exploration during Brain Lesionectomies

6.6. Intraoperative Neurophysiologic Monitoring in Spinal Cord Surgery
- 6.6.1. Monitoring and Mapping Indications
- 6.6.2. Techniques Used
- 6.6.3. Alarm Criteria

6.7. Intraoperative Neurophysiologic Monitoring in Cervical and Dorsal Spine Surgery
- 6.7.1. Monitoring and Mapping Indications
- 6.7.2. Techniques Used
- 6.7.3. Alarm Criteria

6.8. Intraoperative Neurophysiologic Monitoring in Lumbar and Sacro Spine Surgery
- 6.8.1. Monitoring and Mapping Indications
- 6.8.2. Techniques Used
- 6.8.3. Alarm Criteria

6.9. Intraoperative Neurophysiologic Monitoring in Peripheral Nerve and Plexus Surgery
- 6.9.1. Monitoring and Mapping Indications
- 6.9.2. Techniques Used
- 6.9.3. Alarm Criteria

6.10. Intraoperative Neurophysiologic Monitoring in Vascular Surgery
- 6.10.1. Monitoring and Mapping Indications
- 6.10.2. Techniques Used
- 6.10.3. Alarm Criteria

Module 7. Autonomic Nervous System: Pain Other Complex Techniques or Other Specialty Partnerships

7.1. Autonomic Nervous System
- 7.1.1. Anatomy
- 7.1.2. Physiology
- 7.1.3. Neurotransmission

7.2. Autonomic Dysfunction
- 7.2.1. Semiology
- 7.2.2. Pathology
  - 7.2.2.1. Cardiovascular Disorders
  - 7.2.2.2. Thermoregulation Disorders
  - 7.2.2.3. Others
    - 7.2.2.3.1. Autonomic Dysfunction in Neurodegenerative Diseases
    - 7.2.2.3.2. Urological Dysfunction

7.3. Neurophysiological Tests for the Study and Assessment of Autonomic Disorders

7.4. Pain
- 7.4.1. Pain Physiopathogenesis
- 7.4.2. Complex Regional Pain: Neuropathic Pain
- 7.4.3. Central Sensitization

7.5. Neurophysiological Techniques for the Evaluation of Painful Processes: Neurophysiological Implications in Diagnosis
- 7.5.1. Thermotest
- 7.5.2. CHEPs
- 7.5.3. Laser Evoked Potentials

7.6. Monitoring Techniques for Special Conditions
- 7.6.1. Bispectral Index (BIS)
- 7.6.2. ANI/NIPE
- 7.6.3. Others

7.7. Neurophysiological Techniques in Dentistry
- 7.7.1. Pathology
- 7.7.2. Techniques and Practical Applications

7.8. Neurophysiological Studies of the Pelvic Floor
- 7.8.1. Combined Techniques in Assessing the Neuromuscular Function of the Pelvic Floor

7.9. Clinical Neurophysiology and Biomechanics I: Gait Biomechanics
- 7.9.1. Instrumental Analysis of Kinetic, Kinematic and Electromyographic Patterns
- 7.9.2. Muscle Activation Sequence in Gait Phases: Muscle Activation Maps

7.10. Clinical Neurophysiology and Biomechanics II
- 7.10.1. Neurophysiological Evaluation of the Foot and Ankle
- 7.10.2. Combined Neurophysiological and Ultrasound Studies

Module 8. Neurobiology and Physiology of Sleep: Methodological Aspects

8.1. Normal Sleep
- 8.1.1. Features
- 8.1.2. Changes with Age
- 8.1.3. Function

8.2. Neurobiology and Physiological Changes during the Sleep-Wake Cycle

8.3. Chronobiology of the sleep-wake cycle

8.4. Polysomnography I: Technical Aspects and Methodology

8.5. Polysomnography II: Recording Sensors and Use

8.6. Polysomnography III: Sleep Structure Quantification and Cardiorespiratory Events

8.7. Polysomnography IV: Motor Event Quantification

8.8. Advanced Automatic Signal Analysis

8.9. Other Polysomnographic Techniques in Sleep-Wakefulness
- 8.9.1. Breathing Polygraphy during Sleep
- 8.9.2. Multiple Sleep Latency Test
- 8.9.3. Maintenance of Wakefulness Test
- 8.9.4. Suggested Immobilization Test

8.10. Actigraphy, Circadian Monitoring and Other Ambulatory Measurements

Module 9. Clinical-Instrumental Diagnosis of Sleep Disorders

9.1. Insomnia and Excessive Daytime Sleepiness Evaluation
9.2. Sleep-Wake Circadian Rhythm Disorder Evaluation
9.3. Breathing Disorder Evaluation during Sleep I
9.4. Sleep-Disordered Breathing Evaluation during Sleep II
9.5. NREM and Mixed REM-NREM Parasomnias Evaluation
9.6. REM Parasomnias Evaluation
9.7. Wake-Sleep Dissociative States: Status Dissociatus Evaluation
9.8. Movement Disorder Evaluation during Sleep I
  9.8.1. Restless Leg Syndrome or Willis-Ekbom Disease
  9.8.2. Periodic Limb Movement Syndrome during Sleep
9.9. Movement Disorder Evaluation during Sleep II
9.10. Epilepsy Evaluation during Sleep: Sleep in Neurodegenerative Diseases

Module 10. Neurophysiological Techniques for Therapeutic Purposes: Invasive and Non-Invasive Neuromodulation Botulinum toxin

10.1. Invasive Brain Stimulation: Physiological Basis
  10.1.1. Definition and Physiological Basis of Invasive Brain Stimulation (ICS)
  10.1.2. Main Indications at the Present Time
10.2. Direct Cortical and Medullary Stimulation
  10.2.1. Neurophysiological Basis of Direct Cortical Stimulation in the Treatment of Pain. Indications and Practical Examples
  10.2.2. Neurophysiological Basis of Spinal Cord Electrical Stimulation in the Treatment of Pain. Indications and Practical Examples
10.3. Neuromodulation in Epilepsy. Brain Stimulation for Diagnosis and Treatment
  10.3.1. Basis and Rationale of Neuromodulation for the Diagnosis of Epilepsy
  10.3.2. Neuromodulation Applied to the Treatment of Epilepsy. Indications and Practical Examples
10.4. Deep Brain Stimulation (DBS)
  10.4.1. Use of DBS in Parkinson's Disease (PD)
  10.4.2. How Does DBS Work?
  10.4.3. Clinical Indications for DBS in PD and Other Movement Disorders
10.5. Vagus Nerve Stimulation (VNS) and Hypoglossal Nerve Stimulation (VNS). Stimulating Other Peripheral Nerves (Trigeminal, Tibial, Occipital, Sacral)
  10.5.1. VNS in Treating Epilepsy and Other Indications
  10.5.2. Stimulation of the Hypoglossal Nerve for the Treatment of OSAHS
  10.5.3. Stimulation of Other Peripheral Nerves (Trigeminal, Occipital, Tibial and Sacral)
10.6. Hearing Implants
  10.6.1. Definition and Fundamentals of Hearing Implants
  10.6.2. Types of Hearing Implants: Cochlear and Brain Stem Implants
10.7. Non-Invasive Brain Stimulation (NIBS): Physiological Basis
  10.7.1. Physiological Basis of ECNI
  10.7.2. Types of NCTS: Transcranial Electrical Stimulation (TENS) and Transcranial Magnetic Stimulation (TMS)
10.8. Non-Invasive Brain Stimulation: Indications and Therapeutic Protocols
  10.8.1. Indications for NCDI
  10.8.2. Scientific Evidence and Therapeutic Protocols
10.9. TENS
  10.9.1. Definition, Mechanism of Action and Modalities
  10.9.2. Indications, Contraindications and Effects
10.10. Botulinum Toxin Infiltration with Guidance by Neurophysiological Techniques
  10.10.1. Botulinum Toxin Therapeutic and Adverse Effects
  10.10.2. Botulinum Toxin Use: Cervical dystonia, Blepharospasm, Facial Myokymia, Oromandibular Dystonia, Upper Limb and Trunk Dystonia
  10.10.3. Case Studies

06

Methodology

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

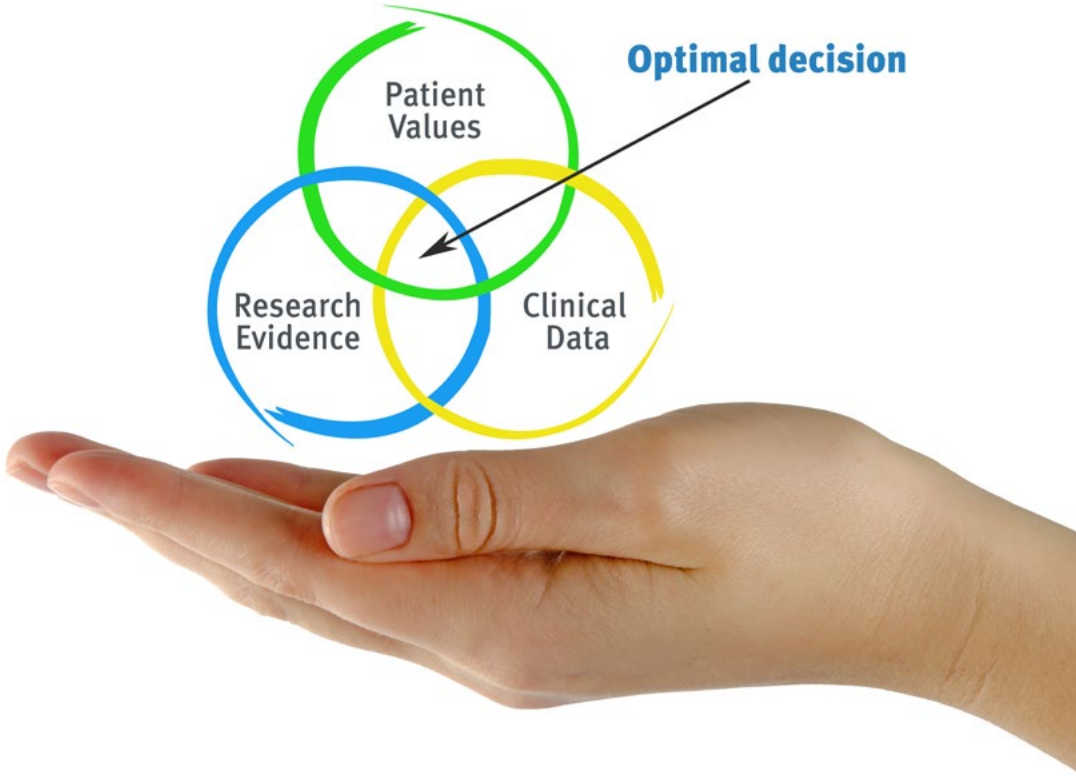
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

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.

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:

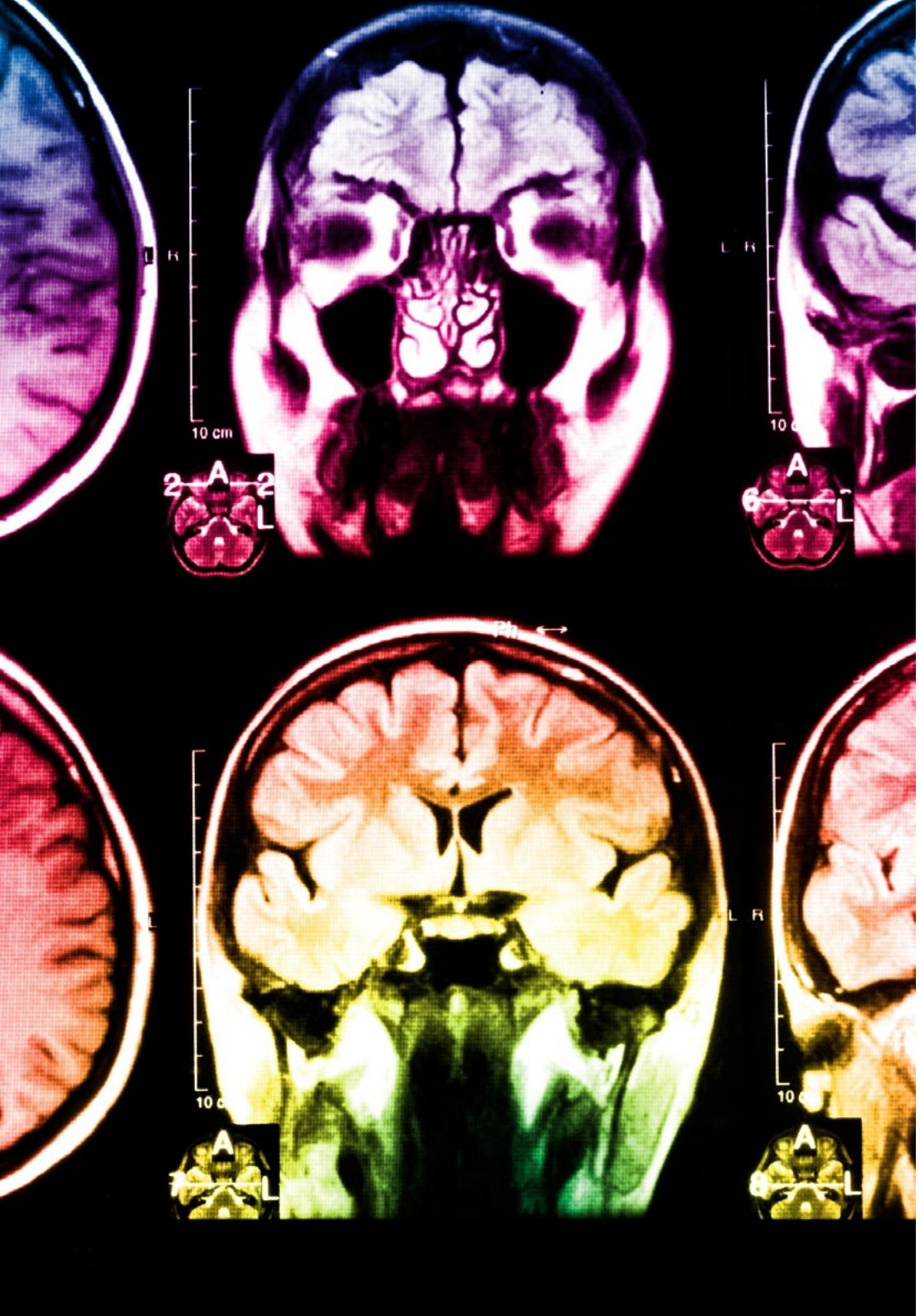
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better 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.

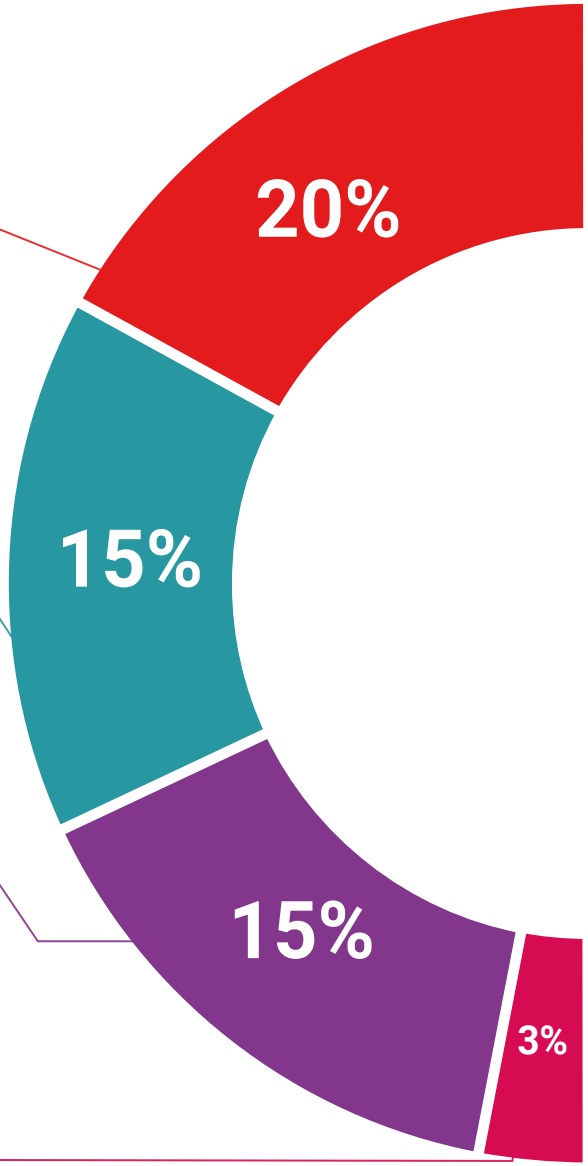
Interactive Summaries

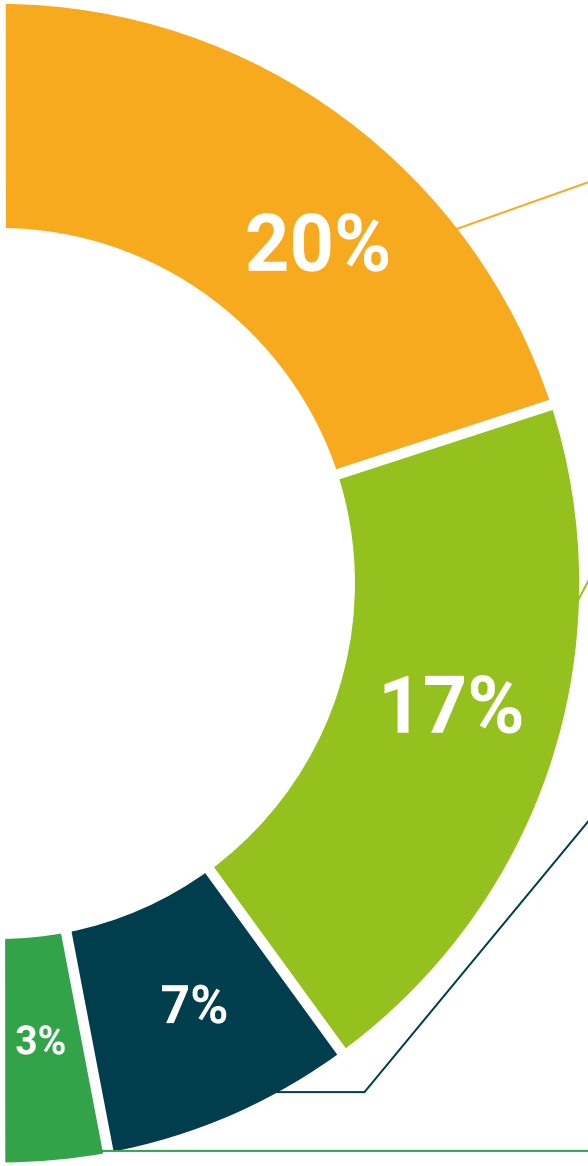
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.

07

Certificate

The Master's Degree in Update on Neurophysiological Diagnosis and Treatment guarantees you, in addition to the most rigorous and updated training, access to a Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university degree without travel or laborious paperwork”

This program will allow you to obtain your **Master's Degree diploma in Update on Neurophysiological Diagnosis and Treatment** 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: **Master's Degree in Update on Neurophysiological Diagnosis and Treatment**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**


tech global university

Mr./Ms. _____ with identification document _____
has successfully passed and obtained the title of:

Master's Degree in Update on Neurophysiological Diagnosis and Treatment

This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

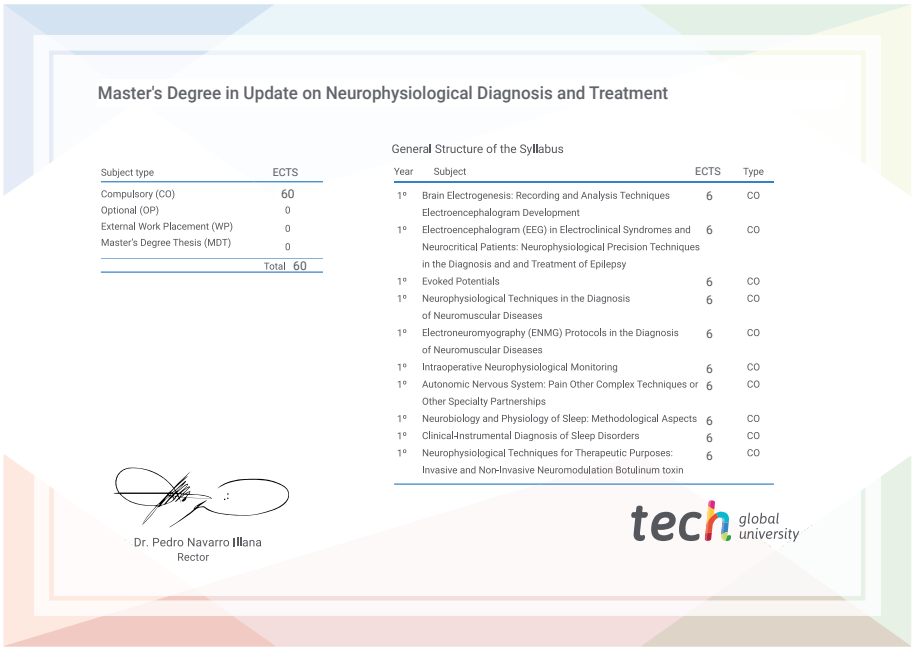
TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.

Unique TECH Code: AFWORD23S techtitute.com/certificates


Master's Degree in Update on Neurophysiological Diagnosis and Treatment

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
Total	60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Brain Electrogenesis: Recording and Analysis Techniques Electroencephalogram Development	6	CO
1º	Electroencephalogram (EEG) in Electroclinical Syndromes and Neurocritical Patients: Neurophysiological Precision Techniques in the Diagnosis and and Treatment of Epilepsy	6	CO
1º	Evoked Potentials	6	CO
1º	Neurophysiological Techniques in the Diagnosis of Neuromuscular Diseases	6	CO
1º	Electroneuromyography (ENMG) Protocols in the Diagnosis of Neuromuscular Diseases	6	CO
1º	Intraoperative Neurophysiological Monitoring	6	CO
1º	Autonomic Nervous System: Pain Other Complex Techniques or Other Specialty Partnerships	6	CO
1º	Neurobiology and Physiology of Sleep: Methodological Aspects	6	CO
1º	Clinical-Instrumental Diagnosis of Sleep Disorders	6	CO
1º	Neurophysiological Techniques for Therapeutic Purposes: Invasive and Non-Invasive Neuromodulation Botulinum toxin	6	CO

Dr. Pedro Navarro Illana
Rector

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*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

Master's Degree
Update on Neurophysiological Diagnosis and Treatment

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Accreditation: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Master's Degree

Update on Neurophysiological Diagnosis and Treatment

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