

# Professional Master's Degree Spine Surgery

Endorsed by:





## Professional Master's Degree Spine Surgery

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

Website: [www.techtitute.com/us/medicine/professional-master-degree/master-spinal-surgery](http://www.techtitute.com/us/medicine/professional-master-degree/master-spinal-surgery)

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# 01

# Introduction

Between 70 and 85% of the adult population suffers from back pain at some time in their lives. For this reason, spine surgery is one of the most demanded in the sector. These include some of the most complex, advanced and delicate interventions. For that reason, it is of vital importance to keep yourself constantly up to date with the latest treatments for the different pathologies of the spine.

Thanks to this exclusive program in Spine Surgery, you will master both the basic aspects of the specialty and the new technical advances in this field.





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*This program in Spine Surgery is one of the most demanded, due to the high percentage of people who suffer from back pathologies"*

There is an increasing trend towards subspecialization within the medical-surgical specialties. There are so many different areas in the human body, that it is difficult to be up to date in the knowledge of a specialty as broad as Spine Surgery. Hence, the need for a complete and quality scientific program to help and guide in this specific and exciting field.

With this Professional Master's Degree, the students will have a complete vision of the knowledge derived from the Pathology of the Vertebral Column. The program will highlight advances in surgical practice that directly affect patient's quality of life and improvement of pain. These will be transmitted so that the students can have the most up-to-date view possible of the knowledge available in the field. For this purpose, leading experts in Spine Surgery will collaborate with us.

The Professional Master's Degree in Spine Surgery will teach both the classic and usual practices used in Specialized Surgery Centers, as well as the surgical techniques that are currently setting trends in the sector. This will allow the students, in addition to broadening their personal knowledge, to be able to apply decision-making with greater confidence and skill in their daily clinical practice.



*All aspects of the practice of Spine Surgery, with a global vision of the care of the affected patient, in the most complete Professional Master's Degree in the online teaching market"*

This **Professional Master's Degree in Spine Surgery** contains the most complete and up-to-date scientific program on the market. Its most notable features are:

- ♦ Theoretical multimedia content throughout the Professional Master's Degree, developed with the latest educational technologies, accessible at all times.
- ♦ Video lessons on the different pathologies, as well as surgeries will be shown.
- ♦ Practical workshops in which clinical cases of daily practice are developed, which will help in decision-making, through diagnostic and treatment algorithms.
- ♦ Practical cases that will serve as self-assessment and will mark the progress of the students' knowledge.
- ♦ Online surgical procedures, performed in the daily practice of these advances, live or previously recorded.
- ♦ Theoretical lessons, via videoconference, with the possibility of participating in a discussion forum to comment and clarify doubts
- ♦ Chats for consultation of doubts about clinical cases with the students participating in the program.
- ♦ Possibility to interact with the teachers of the Professional Master's Degree and to solve in a simulated environment, pathologies that arise in their daily practice.
- ♦ Review of all the classic techniques that have not changed the way they work, and are the basis of the knowledge to come.
- ♦ Approach of the latest trends in Minimally Invasive Surgery; robotics; simulation; new fusion materials, and all those working tools that contribute to the advancement and development of this specialty.

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*You will learn the latest trends in Spine Surgery, which will allow you to advance in the daily practice of this specialty”*

Its teaching staff is made up of prestigious and renowned health professionals with a long career in the sector. The teaching staff of the Professional Master's Degree will include prominent members of the Spanish Spine Society (GEER), who teach at numerous universities throughout the country and work in both public and private hospitals. It will also count with the participation of distinguished specialists in Spine Surgery, who develop their activity in different countries of Latin America.

The methodological design of this Professional Master's Degree, developed by a multidisciplinary team of *e-learning* experts, integrates the latest advances in educational technology in order to create numerous multimedia tools that allow the professional to solve real-life situations in their daily practice. These will enable you to advance by both acquiring knowledge and developing new skills in your future professional work.

The contents generated for this Professional Master's Degree, as well as the videos, self-exams, real cases, and modular exams, have been thoroughly reviewed, up-to-date, and integrated by the professors and the team of experts that make up the working group, in order to facilitate, in a gradual and educational manner, a learning process that allows the objectives of the teaching program to be achieved.

*You will have the latest multimedia tools, designed by experts in Spine Surgery, which will favor the speed of assimilation and learning.*

*This program uses the latest advances in educational technology, based on e-learning methodology.*



# 02 Objectives

The main objective of the Professional Master's Degree is the acquisition of the most up-to-date and innovative scientific knowledge in the area of Spine Surgery, from the hand of leading specialists. This will allow you to develop the skills that will turn your daily clinical practice into a bastion of the standards of the best available scientific evidence, with a critical, innovative, multidisciplinary and integrative sense.





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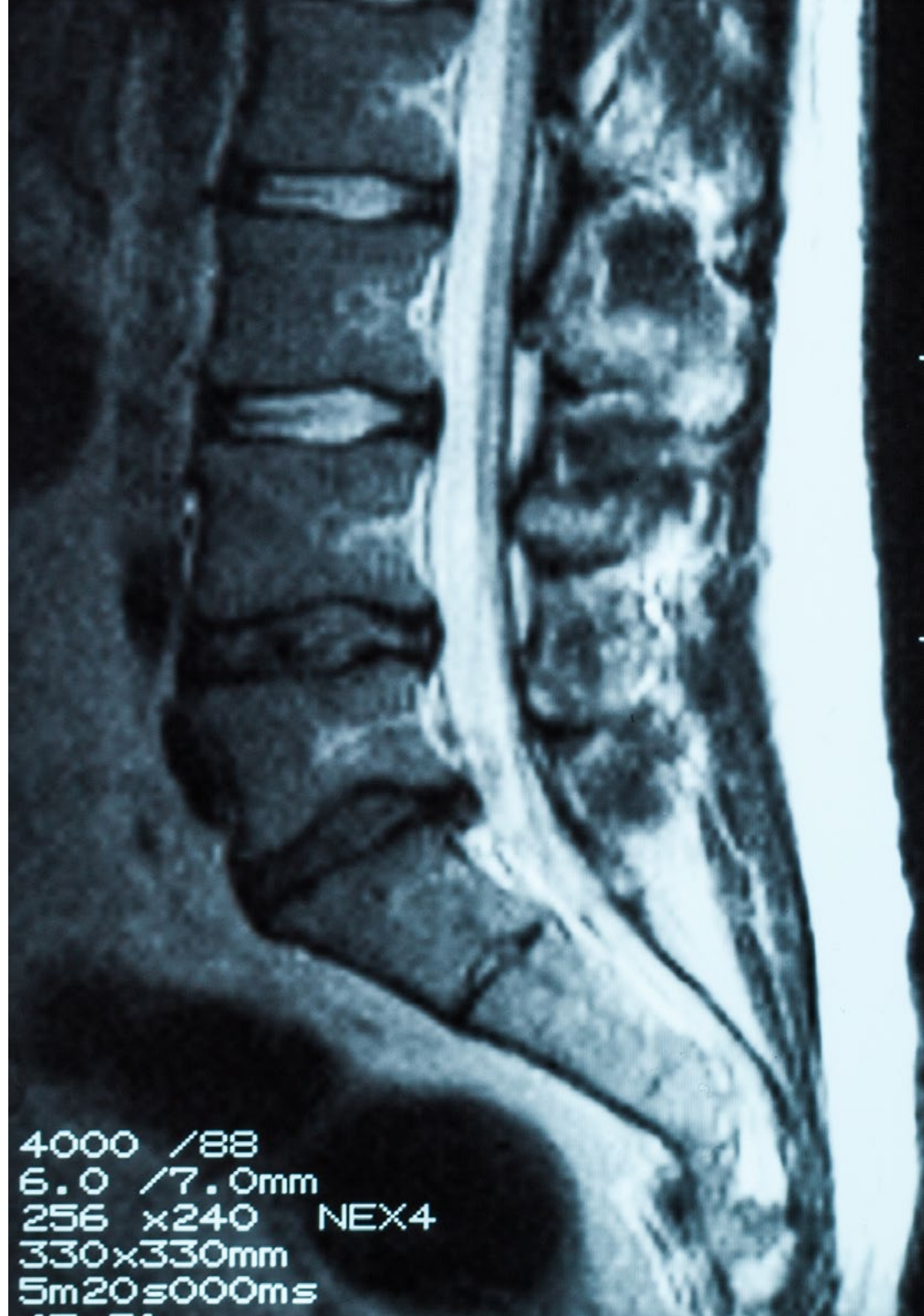
*At the end of this Professional Master's Degree, you will have the necessary scientific skills to perform the tasks of a Spine Surgery specialist"*



## General Objectives

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- ♦ Establish biological, biomechanical, indication, procedural and outcome analysis of results in Spinal Fusion
- ♦ Learn the surgical steps of the cervical surgical procedure
- ♦ Assess the patient's spine correctly and effectively
- ♦ Know how to recognize those pathologies that represent a serious and urgent disease and may compromise the life or functionality of a patient
- ♦ Know the current options in the management of spinal tumor through decision-making processes, therapeutic planning, surgical techniques and perioperative care
- ♦ Analyze the classifications of primary tumors, as well as the importance of obtaining the correct biopsy
- ♦ Get to know about the management of vertebral metastases
- ♦ Correctly select and interpret the most appropriate radiographic, computed tomography (CT) and magnetic resonance imaging (MRI) for the diagnosis of traumatic spinal injuries
- ♦ Analyze the appropriate plan to prevent complications of spinal cord trauma
- ♦ Gain knowledge about the main complications that occur in Minimally Invasive Surgery in elderly patients
- ♦ Learn what are the neurological complications in spine surgery.





## Specific Objectives

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### Module 1. Surgical Approaches to the Spine

- ♦ Gain knowledge about the anatomical areas of the cervical, thoracic, lumbar and sacral spine, as well as their surgical approaches
- ♦ Know the anatomy of the usual sites of access to the spine by Minimally Invasive Techniques

### Module 2. Cervical Spine Pathologies

- ♦ Describe the surgical steps of the surgical procedure
- ♦ Establish the surgical differences between box fusion and the use of prosthetic discs
- ♦ Get to know the tricks and risks of decompression of the spinal canal and foramina
- ♦ Identify tricks and risks in the installation of anterior plates
- ♦ Know the techniques of cervical total disc replacement, posterior to lumbar
- ♦ Knowledge of vertebral fractures, which in the cervical territory involve great danger to the patient's life, and are sometimes difficult to detect
- ♦ Differentiate Posterior Fixation Systems (screws to lateral masses and screws to C1 and C2 or posterior craniocervical fusions)

### Module 3. Herniated Discs, Diagnosis and Treatment of Radicular Pain.

#### Emerging Technologies for the Treatment of Low Back Pain

- ♦ Explain the impact of spinal disorders and problems on each individual in particular and on society in general
- ♦ Assess the spine of patients in a correct and effective way, for a better understanding of the problems they suffer and to favor their better resolution
- ♦ Know how to recognize those pathologies that represent a serious and urgent disease for the patient and may compromise their lives or functionality

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- ◆ Know how to formulate appropriate action plans for early and simple management of these serious spinal problems in the emergency department, based on sound treatment principles
- ◆ Demonstrate solid clinical judgment in the therapeutic management of these patients based on selected cases
- ◆ Discuss multidisciplinary approaches and the role of conservative treatment in patients with chronic low back pain
- ◆ Explain the role of Evidence-Based Medicine and the different registries and diagnostic tests
- ◆ Discuss the use of clinical outcome rating scales
- ◆ Explain the application and limitations of biomechanics of the lumbar spine in vitro and in finite element models
- ◆ Be aware of the advances in Molecular Medicine in the regeneration of the Intervertebral Disc

#### **Module 4. Degenerative Dorsolumbar Pathology Advances**

- ◆ Learn what lumbar canal stenosis is and its clinical features
- ◆ Identify key structures and assess risks related to local vascular and neurological anatomy
- ◆ Identify by fluoroscopy the targets for posterior and lateral approaches to the lumbar spine
- ◆ Perform a minimally invasive lateral approach to the L2-L3, L3-L4 and L4-L5 discs
- ◆ Address the disc using Neuro-monitoring and tubular system
- ◆ Know how and when to perform laminectomies and foraminotomies
- ◆ Identify entry points for insertion of the pedicle screw
- ◆ Prepare the pedicles for insertion of the lumbar pedicle screws
- ◆ Learn and review the neural anatomy of the lumbar spine

- ◆ Convert the approach to a mini lumbotomy and access to the disc by resection of the psoas muscle
- ◆ Perform a facetectomy, prepare the intervertebral disc and vertebral plates
- ◆ Performance of discectomy
- ◆ Insert Intersomatic Boxes
- ◆ Gain knowledge about the advances in the design of new fixation and interbody implants

#### **Module 5. Advances in Vertebral Deformities Treatment**

- ◆ Learn the diagnosis and treatment of coronal and sagittal spinal deformities
- ◆ Know the types of scoliosis depending on the age of onset
- ◆ Identify risk factors and know the diagnostic tests and evolutionary patterns
- ◆ Learn conservative therapies for the treatment of scoliosis. The use of corsets and functional therapies
- ◆ Gain knowledge about the surgical treatment algorithms of the different scoliosis, taking into consideration the new technologies
- ◆ Understand surgical principles and how they apply to each patient's needs and expectations
- ◆ Know the frequent complications and postoperative management of these patients

#### **Module 6. Spine Tumors**

- ◆ Gain knowledge about the current options in the management of spine tumors through decision-making processes, therapeutic planning, surgical techniques and perioperative care through knowledge based on scientific evidence
- ◆ Attain an understanding of the different primary benign spinal tumors
- ◆ Analyze the different current therapeutic options in benign primary tumors of the spine, using the development and presentation of different clinical cases

- ♦ Learn about the use of denosumab in giant cell tumors
- ♦ Learn the current management of low-grade primary malignant tumors, especially chondrosarcoma and chordoma
- ♦ Know the therapeutic options and indications in acute spinal cord compression
- ♦ Know the management of vertebral metastases
- ♦ Learn the treatment and approach to spinal tumors

#### **Module 7. Advances in Vertebral Fractures Treatment**

- ♦ Correctly select and interpret the most appropriate radiographic, computed tomography (CT) and magnetic resonance imaging (MRI) for the diagnosis of traumatic spinal injuries
- ♦ Correctly classify upper cervical C 0-2, cervical subaxial spine, thoracolumbar spine and sacral fractures
- ♦ Compare surgical and conservative treatment alternatives for different levels including upper cervical spine C 0-2, subaxial and thoracolumbar and sacral
- ♦ Define the special features including vertebral fractures of patients with Ankylosing Spondylitis (AS), vertebral osteoporotic fractures and fractures of the immature pediatric spine
- ♦ Analyze the appropriate plan to prevent complications of spinal cord trauma
- ♦ Describe the characteristics of spinal cord shock and the different spinal cord injury syndromes

#### **Module 8. Advances in Minimally Invasive Surgery**

- ♦ Learn the minimally invasive techniques by reviewing all of them, from video-assisted surgery and microsurgery to XLIF techniques, including the most implemented TLIF interbody fusion techniques
- ♦ Gain knowledge about the need for the assistance of neurophysiology for the guaranteed performance of this type of techniques
- ♦ Apply grafting contribution, learning curve or approach to complications
- ♦ Know the use of all Minimally Invasive Techniques, anterior, posterior, percutaneous, mini-open
- ♦ Know the main complications that occur in Minimally Invasive Techniques

#### **Module 9. Spine Surgery in the Elderly**

- ♦ Gain knowledge about the surgical complications in minimally invasive surgical procedures in elderly patients
- ♦ Learn the problems with instrumentation, such as the consequences of combining weak bone with rigid instrumentation

#### **Module 10. Complications in Spine Surgery Miscellaneous**

- ♦ Know the advances in the use of new instrumentation, in the improvement of manufacturing materials and in the use of new grafts
- ♦ Use the advances in antibiotherapies and in the use of vacuum devices.
- ♦ Gain knowledge about the problems of the sacroiliacs

# 03 Skills

Once all the contents have been studied and the objectives of the Professional Master's Degree in Spine Surgery have been achieved, the professional will have superior skills and performance in this area.





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*Thanks to the Professional Master's Degree in Spine Surgery, you will learn the approach routes to adopt in the cervical surgical procedure"*



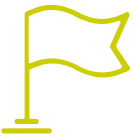
## General Skills

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- ♦ Gain knowledge about the different pathologies of the spine specific to each anatomical area, starting with the cervical spine, passing through the dorsal spine, up to the lumbar and sacral spine.
- ♦ Apply acquired knowledge and problem-solving skills in new or unfamiliar environments, within broader (or multidisciplinary) contexts related to the area of study.
- ♦ Integrate knowledge and face the complexity of making judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments
- ♦ Communicate its conclusions, knowledge and the ultimate reasons that support them, to specialized and non-specialized audiences, in a clear and unambiguous manner.
- ♦ Acquire the learning skills that will enable further studying in a self-directed or autonomous manner.
- ♦ Develop within the profession in terms of working with other health professionals, acquiring skills to work in a team.
- ♦ Recognize the need to maintain your professional skills and, keep them up to date, with special emphasis on autonomous and continuous learning of new information.
- ♦ Develop the capacity for critical analysis and research in your professional field.







## Specific Skills

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- ◆ Know and identify cervical myelopathy and know how to choose which attitude to take and which approach to adopt.
- ◆ Delve into the debate between anterior fusion and cervical disc prosthesis and the controversy of their possible relationship in adjacent segment appearance.
- ◆ Perform indications for anterior fixation or corpectomy. Make a correct posterior fixation with C1-C2 screws or fixation to the lateral masses.
- ◆ Define current controversies, complications, risk analysis and clinical outcomes, with a broad spectrum of lumbar spine conditions, including lumbar spondylolisthesis, lumbar degenerative disc disease and lumbar spine deformities
- ◆ Understand the latest trends in emerging technologies targeting low back pain.
- ◆ Identify the latest surgical trends in degenerative pathology in the lumbar spine.
- ◆ Identify any type of dorsolumbar spine deformity and know the classifications that will lead to correct treatment decisions
- ◆ Apply the knowledge of the different vertebral osteotomies (pedicular subtraction, Ponte) and know which are the indications to perform, what correction each one provides and what other alternatives we have today.
- ◆ Get knowledge about the spinal fractures and their different classification systems, both cervical and thoracolumbar or sacral.
- ◆ Apply the correct surgical techniques and know when to perform them.
- ◆ Know how and when percutaneous treatment of thoracolumbar vertebral fractures is performed according to the latest recommendations.
- ◆ Identify all primary and secondary spinal tumors in the spine. Gain knowledge about the surgical and adjuvant treatment alternatives, following the classic classifications of great masters such as Tomita or Karnofsky, as well as the latest advances. Also, determine the multidisciplinary approach to this pathology of the spine.
- ◆ Delve into the latest trends in minimally invasive approaches, either anterior or posterior.
- ◆ Identify the possible complications that may arise during spine surgery, in order to know what solutions can be given to each of them.
- ◆ Understand the complications that may arise in the evolution over time, such as vertebral instability, either iatrogenic or degenerative evolutionary or pseudarthrosis, and how to solve them in the most efficient way for the patient's quality of life.

04

# Course Management

For our program to be of the highest quality, we are proud to work with a teaching staff of the highest level, chosen for their proven track record in the field of education. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.



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*An impressive teaching staff, made up of professionals from different areas of expertise, will be your teachers during your training: a unique occasion not to be missed"*

## International Guest Director

Awarded by the American Association of Neurological Surgeons for his advances in this clinical field, Dr. Jeremy Steinberger is a renowned physician specialized in the treatment of various spinal disorders. His philosophy is based on developing individualized therapeutic plans according to the specific needs of each patient, using minimally invasive techniques.

In this way, he has carried out his work in health institutions of international reference such as the Mount Sinai Health System in New York. Among his main contributions, he has led a wide range of surgical interventions that have managed to significantly reduce patients' chronic pain and, therefore, their quality of life. At the same time, he has developed different clinical protocols that have contributed to reduce the risks associated with post-surgical complications.

On the other hand, he has balanced these functions with his facet as a Scientific Researcher. In this sense, he has written numerous specialized articles on subjects such as preserving the mobility of individuals affected by spinal cord injuries, the use of emerging technology tools such as Robotics to guide operations and even the use of Virtual Reality to optimize precision during procedures. Thanks to this, he has managed to consolidate himself as a reference that has driven innovation in his field of work.

Committed to excellence, he has actively participated as a speaker at various international scientific congresses. In these events, he has shared his vast experience and the results of his research on Minimally Invasive Spinal Surgery; in addition to exposing the advantages of the use of cutting-edge instruments such as Augmented Reality in the treatment of diseases. This has allowed professionals to optimize their daily clinical practice, increasing the quality of care services and also improving the health of multiple people in the long term.



## Dr. Steinberger, Jeremy

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- Director of Minimally Invasive Surgery at Mount Sinai Health System, New York, United States
- Specialist in Neck and Spinal Pain Management
- Clinical Researcher with an extensive scientific production
- Internship in Orthopedic Spinal Surgery at Hospital for Special Surgery, New York
- Residency in Complex Spinal Surgery at Mount Sinai School of Medicine, New York
- PhD in Medicine from Yeshiva University
- Awarded on different occasions for his advances in the area of Spinal Surgery
- Member of: American Association of Neurological Surgeons, Society of Lateral Access Surgery and AO Spine



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

## Management



### **Dr. Losada Viñas, José Isaac**

- ◆ Coordinator of the Spinal Unit of Alcorcón Foundation University Hospital
- ◆ PhD in Medicine and Surgery from the Universidad de Navarra
- ◆ Member of the Communication Committee of GEER (Raquis Diseases Study Group)
- ◆ National Basic Research Award SECOT 1995
- ◆ Numerous national and international articles and books



### **Dr. González Díaz, Rafael**

- ◆ Head of the Spine Surgery Unit at Niño Jesús University Children's Hospital. Madrid
- ◆ Former President of the Spanish Spine Society (GEER Study Group of Spine Diseases)
- ◆ SILACO Executive Committee Member. Ibero-Latin American Spine Society
- ◆ Doctor in Orthopedic Surgery and Traumatology, Extraordinary Doctorate Award. University of Salamanca
- ◆ Master's Degree in Medical Management and Clinical Management by the School of Health/UNED

## Professors

### Mr. Badia, Pablo

- ♦ Spinal Unit. Orthopedic Surgery and Traumatology service. General Hospital of Valencia

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### Dr. Bas Hermida, Paloma

- ♦ Spine Unit. La Fe University Hospital (Valencia).

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- ♦ PhD in Medicine and Surgery Autonomous University of Madrid. Unanimous Cum Laude Award
- ♦ Spine Unit, University Hospital Complex of Santiago de Compostela
- ♦ Professor. Assoc. USC (University of Santiago de Compostela)

### Ms. García de Frutos, Ana

- ♦ Spinal Unit of the Vall d'Hebron Hospital in Barcelona and in the ICATME Spine Unit at the Quirón-Dexeus Clinic in Barcelona

### Dr. Hernández Fernández, Alberto

- ♦ Specialist in Spine Surgery at Gipuzkoa Polyclinic - Quirónsalud
- ♦ Specialist in the Spine Surgery Unit of the Orthopedic Surgery and Traumatology Service at the University Hospital of Donostia.
- ♦ Graduate in Medicine and Surgery from the Navarra University
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- ♦ Orthopedic Surgery and Traumatology service. Reus Hospital

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- ♦ Specialist in Orthopedic and Trauma Surgery
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- ♦ Pain Unit. Department of Anaesthesiology and Resuscitation. General Hospital of Valencia

**Ms. Gemma Vilà, Canet**

- ♦ Graduate in Medicine and Surgery from the Autonomous University of Barcelona (1999-2005)

**Dr. González Jiménez, Raquel**

- ♦ Medical specialist in the treatment of pain, exercising her usual activity in the Pain Unit of the Alcorcón University Hospital Foundation of Madrid (HUFA)

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- ♦ Doctor in Medicine and Surgery Medical specialist in Orthopedic Surgery and Traumatology. Director of the Orthopedic Surgery and Traumatology Department.
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**Dr. Rodríguez de Lope Llorca, Ángel**

- ♦ Physician specialized in Neurosurgery

**Mr. Romero Muñoz, Luis María**

- ♦ Degree in Medicine from the University of Navarra, 1999 - 2005

- ♦ Orthopedic Surgery and Traumatology Assistant. Medical Assistant Orthopedic Surgery and Traumatology Service. Paraplegic National Hospital of Toledo

**Mr. Rodríguez Gimillo, Pablo**

- ♦ Specialist in Traumatology and Orthopedics with extensive teaching experience.

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05

# Structure and Content

The structure of the contents has been designed by a team of expert surgeons, which encompasses all the updates in spinal pathology.




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*This Professional Master's Degree has a quality program adapted to the latest trends in the field of spine surgery"*

## Module 1. Surgical Approaches to the Spine

- 1.1. Cervical Spine Approaches
  - 1.1.1. Cervical Anatomy
  - 1.1.2. Muscles and Anatomical Limits
  - 1.1.3. Neurological Structures and Their Location
  - 1.1.5. Anterior Approaches to the Cervical Spine
  - 1.1.6. C1-C2 Transoral Approach
  - 1.1.7. Lateral Approaches to the Cervical Spine
  - 1.1.8. Which Approach to Perform: Right or Left?
  - 1.1.9. Approaches to the Cervicothoracic Junction
  - 1.1.10. Posterior Approaches to the Cervical Spine
  - 1.1.11. Posterior Approach to the C1-C2 Joints
  - 1.1.12. Posterior Cervical Foraminotomy
  - 1.1.13. Complications of Cervical Spine Surgery
  - 1.1.14. Bleeding
  - 1.1.15. Durable Lesions
  - 1.1.16. Alterations of Pharynx
  - 1.1.17. Esophageal Injuries
  - 1.1.18. Postoperative Management of Cervical Surgery Patients
- 1.2. Thoracic Spine Approaches
  - 1.2.1. General Indications
  - 1.2.2. Absolute and Relative Contraindications
  - 1.2.3. Preoperative Planning
  - 1.2.4. Anterior Approaches to Thoracic Spine
  - 1.2.5. DIV-DXI Transthoracic Approach
  - 1.2.6. Transpleural Anterior Approach DIII-DXI Louis
  - 1.2.7. Thoracolumbar Junction Approaches
  - 1.2.8. Transpleural-Retroperitoneal Approach
  - 1.2.9. Extrapleural Approaches
  - 1.2.10. Video-endoscopic Approach to the Thoracic Spine
  - 1.2.11. Posterior and Posterolateral Approaches to the Thoracic Spine  
Thoracic Disc Access
  - 1.2.12. Costotransversectomy
  - 1.2.13. Post-Operative Care



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- 1.3. Lumbar Spine Approaches
    - 1.3.1. Anterior Approach
    - 1.3.2. L2-L5 Retroperitoneal Anterior Approaches
    - 1.3.3. Extraperitoneal Anterior Approach with Median Incision for L2-L Levels
    - 1.3.4. Anterior Pararectal Approach Retroperitoneal to L5-S1
    - 1.3.5. Laparoscopic Transperitoneal Approach to L5-S1
    - 1.3.6. Lateral Oblique Approach of the Lumbar Spine to L2-L5
    - 1.3.7. En Bloc Sacrectomy
  - 1.4. Lateral Approaches
    - 1.4.1. Lateral Approach for Discectomies, Foraminotomies or XLIF Lateral Fusions
    - 1.4.2. Microscopic or Minimally Invasive Lumbar Discectomy
  - 1.5. Posterior Approach
    - 1.5.1. Posterior Approaches to the Cervical Spine
    - 1.5.2. Lumbar Paraspinal Spinal Cord Approaches
    - 1.5.3. Foraminal Approach to the Lumbar Disc
  - 1.6. Complications of Thoracolumbar and Lumbar Spine Approaches

## Module 2. Cervical Spine Pathology

- 2.1. General Aspects. Cervical Pain Diagnosis
  - 2.1.1. Anatomy and Biomechanics of the Cervical Spine, Applied to the New Surgical Techniques
  - 2.1.2. Biochemical and Cellular Bases of Intervertebral Disc Degeneration
  - 2.1.3. Advances in Diagnostic Imaging of Cervical Spine Diseases
  - 2.1.4. Assessment of Neurological Compromise. Clinical and Neurophysiology
  - 2.1.5. Posterior Access to the Craniovertebral Junction: Importance of Developing a Very Meticulous Technique
- 2.2. Therapeutic Overview Cervical Pain
  - 2.2.1. Cervical Pain, Radiculopathy and Cervical Myelopathy. Pathophysiology and Natural History
  - 2.2.2. Outcome Measurement Scales in Cervical Pathology
  - 2.2.3. Semi-Invasive Treatment of Cervical Pain and Cervicobrachialgia
  - 2.2.4. Role of Rehabilitation in the Treatment of Cervical Degenerative Processes. Different Protocols

- 2.3. Cervical Radicular Pain Surgery
  - 2.3.1. Analyze the Causes and Incidence of Radicular Pain in the Cervical Spine
  - 2.3.2. Justify the Different Indications for Surgery
  - 2.3.3. Role of Posterior Approach and Microsurgery in Cervical Radiculopathy
  - 2.3.4. Evidence on Conservative versus Surgical Treatment of Cervical Radiculopathy. Literature Review
  - 2.3.5. Herniated Cervical Disc. Anterior or Posterior Approach
  - 2.3.6. Fusion Techniques or Disc Prosthesis
  - 2.3.7. Identify Factors Influencing the Regression of Cervical Hernia Symptoms
  - 2.3.8. Assess the Surgical Options
  - 2.3.9. Anticipate Possible Complications and Find a Return to Work Plan and Activity
  - 2.3.10. Formulate a Plan for When Problems Arise at the Adjacent Level
- 2.4. Whiplash Syndrome. Whiplash
  - 2.4.1. Pathophysiology, Anatomopathologic Alterations
  - 2.4.2. Initial Assessment of the Patient. Prognostic Factors
  - 2.4.3. Acute Phase Treatment. Treatment in the Sequelae Phase
  - 2.4.4. Socioeconomic Impacts of Whiplash Syndrome
- 2.5. Cervical Degenerative Pathology
  - 2.5.1. Multilevel Cervical Spondylosis
  - 2.5.2. Anterior Approach
  - 2.5.3. Posterior Approach
  - 2.5.4. Adjacent Segment Degeneration. How To Act
  - 2.5.5. Cervical Spine Deformities
- 2.6. Cervical Myelopathy
  - 2.6.1. Manifestations, Causes and Natural History of Myelopathy
    - 2.6.1.1. Compare the Clinical and Functional Presentation of Spondylotic Myelopathic Syndromes
    - 2.6.1.2. Degrees of Disease Using Validated Scales
    - 2.6.1.3. Anticipate Appearance of Clinical Signs and Consider Differential Diagnoses
    - 2.6.1.4. Describe the Natural History of the Disease
    - 2.6.1.5. Identify the Particular Clinical Presentation of Cervicocranial Myelopathy
  - 2.6.2. Clinical and Surgical Decision Making in Myelopathy
    - 2.6.2.1. Define a Treatment Plan for Patients with Myelopathy
    - 2.6.2.2. Identify the Absolute and Relative Indications for Surgery in Spondylotic Myelopathy
    - 2.6.2.3. Compare the Different Surgical Approaches in Myelopathy and Define a Rational Treatment Plan
    - 2.6.2.4. Justification of the Anterior Route
    - 2.6.2.5. Discuss the Role of Intraoperative Neuromonitoring in Cervical Myelopathy
    - 2.6.2.6. Cervical Spondylotic Myelopathy Updating and Therapeutic Guidance
    - 2.6.2.7. Management of Cervical Myelopathy Anterior Route. Multilevel Pathology
    - 2.6.2.8. Use of Corpectomy or Boxes
    - 2.6.2.9. Management of Cervical Myelopathy Posterior Route. Multilevel Pathology
    - 2.6.2.10. Thoracic Scalene Gorge Syndrome
- 2.7. Cervical Spine Trauma
  - 2.7.1. Imaging in Cervical Trauma
    - 2.7.1.1. Selection of Appropriate Imaging to Detect Cervical Fracture
    - 2.7.1.2. Evaluate Radiological Imaging Options
    - 2.7.1.3. Select Appropriate CT or MRI Images
    - 2.7.1.4. Differentiate Between Major and Minor Trauma of the Upper Cervical Spine
  - 2.7.2. Occipito-Cervical Instability
    - 2.7.2.1. Anatomy and Biomechanics of the Upper Cervical Spine
    - 2.7.2.2. Types of Instabilities
    - 2.7.2.3. Post-Traumatic
    - 2.7.2.4. Congenital
  - 2.7.3. Fractures of the Upper C0-C2 Region: Classification and Management
    - 2.7.3.1. Define the Role of Ligaments in the Stability of the Cervical Spine
    - 2.7.3.2. Classify in Relation to Subsequent Treatment
    - 2.7.3.3. Occipital Condyle Fractures
    - 2.7.3.4. Occipito-Cervical Dislocation, Occipito-Atlas Dislocation, or Atlas-Axoid Instability. Atlas or C1 Fractures
    - 2.7.3.5. Atlas or C2 Fractures
    - 2.7.3.6. Traumatic Spondylolisthesis of C2.

- 2.7.4. Subaxial Cervical Spine Traumas.
  - 2.7.4.1. Subaxial Cervical Spine Trauma. Classification and Management
  - 2.7.4.2. Estimate Incidence and Classify using AO Classification
  - 2.7.4.3. Use Other Classifications to Determine Treatment
  - 2.7.4.4. Anticipate Errors in Diagnosis
  - 2.7.4.5. Evaluate Non-Surgical Treatment Options and When They Are Appropriate
  - 2.7.4.6. Recognize the Indications for Surgical Treatment
  - 2.7.4.7. Recognize those Fractures that Require Urgent Treatment
  - 2.7.4.8. Justify the Different Fracture Approaches, Anterior or Posterior Approach or Combined Anterior and Posterior Approaches
- 2.8. Inflammatory and Infectious Pathology in Cervical Spine
  - 2.8.1. Current Treatment of Cervical Spine Infections
  - 2.8.2. Rheumatoid Arthritis of the Cervical Spine
  - 2.8.3. Cervical Instability in Down Syndrome
  - 2.8.4. Pathology of the Craniocervical Region. Anterior Surgical Treatment

### Module 3. Herniated Discs, Diagnosis and Treatment of Radicular Pain. Emerging Technologies for the Treatment of Low Back Pain

- 3.1. Epidemiology, Natural History and Imaging Findings in Radicular Pain
  - 3.1.1. Use of the Usual Epidemiological Terms to Define and Prevalence Factors of Radicular Pain
  - 3.1.2. Knowledge of the Natural History of Radicular Pain
  - 3.1.3. Identify Contributing Fractures
  - 3.1.4. Diagnosis of the Causes of Radicular Pain
  - 3.1.5. Assess Why Disc Herniations Occur
  - 3.1.6. Differentiate the Role of Diagnostic Imaging between Computerized Axial Tomography (CT) and Magnetic Resonance Imaging (MRI) for Radicular Pain
  - 3.1.7. Interpretation of Images Using the Correct Nomenclature
- 3.2. Non-Surgical Action in the Treatment of Radicular Pain
  - 3.2.1. Evaluate Non-Surgical Treatment Options for Radicular Pain
  - 3.2.2. Explaining These Options to Patients
  - 3.2.3. Identify Patients who are Susceptible to Non-Surgical Treatment
  - 3.2.4. Differentiate Between Types of Analgesia. Analgesic Scale

- 3.2.5. Summarize the Roles of Rehabilitation and Physiotherapy
- 3.3. Surgery of Radicular Pain in the Lumbar Spine
  - 3.3.1. Differences Between the Various Absolute and Relative Indications for Surgery
  - 3.3.2. Identify Appropriate Timing for Surgery
  - 3.3.3. Evaluate the Usual Surgical Techniques with Evidence Support
  - 3.3.4. Compare Both Surgical and Non-Surgical Treatment Options
  - 3.3.5. Formulate an Adequate Surgical Plan
  - 3.3.6. Anticipate Possible Complications and Establish a Plan for Return to Work and Activity
- 3.4. Thoracic Myelopathy
  - 3.4.1. Myelopathic Imaging: Techniques and Prognostic Indicators
  - 3.4.2. Interpret MRI and CT Findings in Spondylotic Myelopathy
  - 3.4.3. Recognize the Change of Signs in Different MRI Sequences and their Significance
  - 3.4.4. Consider the Different Differential Diagnoses in Non-Tumor Pathology of the Spinal Cord
  - 3.4.5. Know the Current Role of Myelography and Mielo-TAC in Myelopathy Imaging
    - 3.4.5.1. Clinical and Surgical Decision Making in Thoracic Myelopathy
    - 3.4.5.2. Management of the Risk-Benefit Balance in the Surgery of Patients with Thoracic Myelopathy
    - 3.4.5.3. Compare the Different Approaches to Thoracic Myelopathy
- 3.5. Axial Low Back Pain
  - 3.5.1. Natural History. Obstacles to Recovery and Aspects of Non-Surgical Treatment of Axial Pain
    - 3.5.1.1. Anticipate Potential Obstacles to Recovery
    - 3.5.1.2. Explain How Mood Can Be Used
    - 3.5.1.3. How to Handle Catastrophic Ideas
    - 3.5.1.4. Differentiate Between Acute and Chronic Low Back Pain
    - 3.5.1.5. Assess the Different Options for the Non-Surgical Treatment of Low Back Pain
    - 3.5.1.6. Summarize the Current State of the Evidence Regarding Surgical and Non-Surgical Management

- 3.5.2. How to Assess a Patient with Axial Pain?
  - 3.5.2.1. Understand the Role of Natural History and Physical Examination in the Assessment of these Patients with Axial Pain
  - 3.5.2.2. Decide on the Need for Imaging Studies
  - 3.5.2.3. Select Patients with Axial Pain in Need of Advanced Diagnostic Techniques
  - 3.5.2.4. Review the Role of Diagnostic Blocks and Discography in Patients with Axial Pain
  - 3.5.2.5. Conservative Treatment of Low Back Pain
  - 3.5.2.6. Opioid Practice and Perspective: Who is at Risk of Addiction?
  - 3.5.2.7. Radiofrequency Ablation in Low Back Pain
  - 3.5.2.8. Stem Cells and Intradiscal Lumbar Procedures
  - 3.5.2.9. Implantable Therapies for Chronic Low Back Pain
- 3.5.3. Axial Lumbar Pain Surgery
  - 3.5.3.1. Promote a Rational Alternative to Surgical Fusion
  - 3.5.3.2. Evaluate Alternative Options
  - 3.5.3.3. Select an Appropriate Approach
  - 3.5.3.4. Check Current Evidence

## Module 4. Degenerative Dorsolumbar Pathology Advances

- 4.1. Spinal Canal Stenosis and Degenerative Spondylolisthesis
  - 4.1.1. Presentation, Clinical and Non-surgical Treatment of Lumbar Canal Stenosis.
    - 4.1.1.1. Knowledge of the Signs and Symptoms of Lumbar Spinal Stenosis (LSS)
    - 4.1.1.2. Know the Clinical Characteristics and Natural History of Neurogenic Claudication
    - 4.1.1.3. Classify Lumbar Spinal Stenosis
    - 4.1.1.4. Assess Surgical and Non-Surgical Treatment Options
    - 4.1.1.5. Know the Alternatives of Rehabilitation
  - 4.1.2. Imaging of Lumbar Spinal Stenosis and Degenerative Spondylolisthesis
    - 4.1.2.1. Describe the Different Imaging Techniques to Identify Lumbar Spinal Stenosis and Degenerative Spondylolisthesis
    - 4.1.2.2. Classification and Degree of Lumbar Spinal Stenosis
    - 4.1.2.3. Appreciate the Role of Complete and Functional Spine Radiographs in the Management of Patients with Lumbar Spinal Stenosis and Degenerative Spondylolisthesis

- 4.1.3. Surgical Treatment of Lumbar Spinal Stenosis
  - 4.1.3.1. Formulate the Principles of Stenosis Surgery
  - 4.1.3.2. Individualize the Surgical Technique for Each Patient
  - 4.1.3.3. Recognize the Indications for Fusion in Patients with Lumbar Spinal Stenosis
- 4.1.4. Surgical Treatment of Degenerative Spondylolisthesis
  - 4.1.4.1. Assess Surgical and Non-Surgical Treatment Options in Degenerative Spondylolisthesis
  - 4.1.4.2. Summarize the Controversies in the Choice of Treatment in Degenerative Spondylolisthesis
- 4.2. Spondylolysis and Low-Grade Isthmic Spondylolisthesis
  - 4.2.1. Spondylolysis and Low-Grade Spondylolisthesis
    - 4.2.1.1. Epidemiological Aspects and Natural History
    - 4.2.1.2. Describe the Signs and Symptoms of Spondylolysis and Low-Grade Spondylolisthesis
    - 4.2.1.3. Formulate the Principles of its Therapeutic Management
    - 4.2.1.4. Assess the Different Therapeutic Options
    - 4.2.1.5. Anticipate Possible Complications of the Instrumentation and its Positioning
    - 4.2.1.6. Analyze the Alternatives of Rehabilitation
- 4.3. Degenerative Deformity
  - 4.3.1. Lumbar Degenerative Deformity
    - 4.3.1.1. Describe the Pathogenesis and Natural History of Lumbar Degenerative Deformity
    - 4.3.1.2. Explain the Concept of Spinal Balance and the Different Spinopelvic Parameters
    - 4.3.1.3. Assess the Risk-Benefit Balance for Surgery and Potential Complications
    - 4.3.1.4. Formulate a Surgical Plan for Degenerative Kyphoscoliosis
    - 4.3.1.5. Pelvis Fixations
- 4.4. Advances in the Design of New Implants
  - 4.4.1. Posterior or Posterolateral Instrumentations
  - 4.4.2. Anterior Instrumentation
  - 4.4.3. Interbody Implants
  - 4.4.4. Disc Prosthesis



## Module 5. Advances in Vertebral Deformities Treatment

- 5.1. Neuromuscular Scoliosis. Management and Advances
  - 5.1.1. Classification, Generalities and Preoperative Planning of Neuromuscular Scoliosis
  - 5.1.2. Assessment of Respiratory Function in Neuromuscular Scoliosis. Indications for the use of BiPAP Before or After Surgery
  - 5.1.3. Anesthesia in Neuromuscular Patients
  - 5.1.4. Intraoperative Monitoring
  - 5.1.5. Use of Evoked Potentials in Patients with Non-Ambulatory Neuromuscular Scoliosis
  - 5.1.6. Indication and Contraindication of the Anterior Approach in Neuromuscular Scoliosis
  - 5.1.7. Surgical Treatment by Posterior Approach, Pedicle Screws and Instrumentation with Sublaminar Wires
  - 5.1.8. Techniques and Indications for Lumbosacral Fixation
  - 5.1.9. Indications for Growth Systems in Severe Neuromuscular Infantile Scoliosis
  - 5.1.10. Evolution and Treatment of Neuromuscular Scoliosis in Adulthood
- 5.2. Congenital Scoliosis. Overview and Diagnosis
  - 5.2.1. Classification of Congenital Scoliosis. Surgical Action Protocol
  - 5.2.2. Alterations Associated with Vertebral Deformities. Pr-Operative Assessment
  - 5.2.3. Neurosurgical Performance of Spinal Cord Disorders in Congenital Deformities
  - 5.2.4. Surgical Strategy in Congenital Kyphosis. Classification and Types
  - 5.2.5. Complex Congenital Scoliosis. Indications for Pedicular Subtraction Osteotomies
  - 5.2.6. Hemivertebra Resection by Double Anterior Posterior Approach versus Posterior Approach
  - 5.2.7. Treatment of Rib Malformations Associated with Congenital Malformations, VERTR Indications
  - 5.2.8. Treatment and Evolution of Klippel-Feil Syndrome in Adulthood
- 5.3. Idiopathic Juvenile Scoliosis. Advances
  - 5.3.1. Current State of Knowledge on the Etiology of Idiopathic Scoliosis
  - 5.3.2. Natural History of Idiopathic Scoliosis after Maturation
  - 5.3.3. Clinical Assessment of the Patient with Idiopathic Scoliosis
  - 5.3.4. Cardiopulmonary Assessment
  - 5.3.5. Review of Non-Fusion Techniques in Early Onset Scoliosis. What We Have Done and What's Next
  - 5.3.6. Factors Predicting Progression During Growth
  - 5.3.7. Conservative Treatment
    - 5.3.7.1. Orthotic Treatment of Idiopathic Scoliosis
    - 5.3.7.2. Observation as a Treatment
  - 5.3.8. Surgical Treatment
    - 5.3.8.1. Posterior Arthrodesis and Hybrid Instrumentation: Standard Technique.
    - 5.3.8.2. Posterior Arthrodesis with Thoracic Pedicle Screws
  - 5.3.9. Treatment of Thoracolumbar Curves
    - 5.3.9.1. Instrumented Anterior Arthrodesis
    - 5.3.9.2. Instrumented Posterior Arthrodesis
  - 5.3.10. Systematic Work in the Choice of Fusion Levels
  - 5.3.11. Growth Bar Gradation. When and Which Options?
  - 5.3.12. Are the Current Results of Instrumented Fusion in Adolescent Idiopathic Scoliosis Acceptable?
  - 5.3.13. "Tethering" in Adolescent Idiopathic Scoliosis
  - 5.3.14. Tricks and Errors to Limit Arthrodesis and Avoid Trunk Imbalance in Adolescent Idiopathic Scoliosis
  - 5.3.15. Severe Untreated Deformities
  - 5.3.16. Pediatric Reconstructive Surgery
  - 5.3.17. Building Multidisciplinary Teams in the Care of Patients with Spinal Deformity
  - 5.3.18. Clinical and Functional Results
    - 5.3.18.1. Results of Idiopathic Scoliosis Surgery
    - 5.3.18.2. Radiological Results of the Different Fusion Techniques
- 5.4. Adult Deformities
  - 5.4.1. What is the Evidence for Conservative Treatment of Adult Scoliosis?
  - 5.4.2. Toward a Classification Scheme in Adult Scoliosis that Predicts Quality Outcomes
  - 5.4.3. How Does the Degenerative Process Affect Surgical Decisions/Approach?
  - 5.4.4. Reconstruction of Sagittal Alignment. Lessons Learned over the last 10 Years
  - 5.4.5. Surgical Management of Spinal Deformity in Frail Patients
  - 5.4.6. Value of Databases and Predictive Models for Improving Results in Adult Scoliosis. Risk Calculators
  - 5.4.7. Care of Patients with Adult Scoliosis
  - 5.4.8. Failed Adult Scoliosis Surgery. Reconstruction
  - 5.4.9. Cost-Effectiveness of Surgical Treatment of Adult Scoliosis Deformity

- 5.5. Reconstructive Surgery and Vertebral Osteotomies
  - 5.5.1. Vertebral Osteotomies: Types and Historical Evolution
  - 5.5.2. Reconstructive Surgery in Pediatric Spine: Causes and Prevention
  - 5.5.3. Reconstructive Surgery in Adult Spine: Causes and Prevention
  - 5.5.4. Reconstructive Surgical Strategy. Choice of Osteotomy
  - 5.5.5. Cervical Spine and Cervical/Thoracic Hinge. Surgical Strategy
  - 5.5.6. Reconstructive Surgery of Coronal Imbalance
  - 5.5.7. Reconstructive Surgery of Sagittal Imbalance. Thoracic and Lumbar Osteotomies
    - 5.5.7.1. Tri-Columnar Osteotomies. Pedicular Subtraction.
    - 5.5.7.2. Ponte Osteotomies. Smith-Petersen
    - 5.5.7.3. Other Osteotomies
  - 5.5.8. Lumbosacral Reconstructive Surgery. Spondylolisthesis Sacral/Pelvis Osteotomies
  - 5.5.9. Optimize Safety in Reconstructive Spine Surgery
  - 5.5.10. Outcome of Thoracolumbar Osteotomies in the Adult

## Module 6. Spinal Tumors

- 6.1. General Information of Vertebral Tumors
  - 6.1.1. Pathophysiology of Vertebral Tumors
  - 6.1.2. Prevalence and Incidence
  - 6.1.3. Form of Presentation and Common Symptoms of Spinal Tumors
  - 6.1.4. Physical Examination and Laboratory Studies
  - 6.1.5. Why are Spinal Tumors a Big Problem?
  - 6.1.6. Common Radiotherapy Techniques for Spinal Tumors, their Indications and Special Technical Considerations
  - 6.1.7. Effects of Chemotherapy on the Malignant Cells of These Tumors
- 6.2. Management of the Patient with Suspected Vertebral Tumor
  - 6.2.1. Diagnostic Imaging and Percutaneous Biopsy
  - 6.2.2. Principles and Approaches to Perform Biopsies
  - 6.2.3. Histological Management of the Sample
- 6.3. Benign Primary Tumors
  - 6.3.1. Main Benign Tumors of the Spine
  - 6.3.2. Description and Indications for Percutaneous Surgery
  - 6.3.3. Surgical Treatment

- 6.4. Primary Malignant Tumors of the Spine
  - 6.4.1. Main Primary Malignant Tumors of the Spine
    - 6.4.1.1. Multiple Myeloma and Plasmacytoma
    - 6.4.1.2. Lymphoma
  - 6.4.2. Oncologic and Surgical Staging
  - 6.4.3. Low-grade and High-grade Malignant Tumors
  - 6.4.4. Posterior Surgical Treatment. Technique of Resection in Bloc of Thoracolumbar and Cervical Tumors. Sacral Tumor Resections
  - 6.4.5. Radiotherapy in Malignant Tumors. Indications and Results
  - 6.4.6. Results and Complications of Surgery
- 6.5. Vertebral Metastases
  - 6.5.1. Pathophysiology of Vertebral Metastases and Oncologic Management of the Patients
  - 6.5.2. Main Metastatic Tumors in the Spine
    - 6.5.2.1. Lung, Breast, Genitourinary, Gastrointestinal...
    - 6.5.2.2. Scales of Assessment and Prognosis
    - 6.5.2.3. Oncologic Management. Radiotherapy Indications and Results
    - 6.5.2.4. Pain Management in Patients with Vertebral Metastases
- 6.6. Surgical Management of Metastases
  - 6.6.1. Application of the Treatment Protocol. Indications for Surgery of Vertebral Metastases
  - 6.6.2. Percutaneous Treatment Vertebroplasty and Kyphoplasty
  - 6.6.3. Palliative Versus Radical Treatment in Vertebral Metastases
  - 6.6.4. Complications of Surgery and Medical Care. How to Anticipate and Manage Them

## Module 7. Advances in Vertebral Fractures Treatment

- 7.1. Trauma of the Thoracolumbar Spine and Sacrum
  - 7.1.1. Imaging in Thoracolumbar and Sacral Fractures
    - 7.1.1.1. Use of the AO Classification
    - 7.1.1.2. Selection of the Most Appropriate Images to Identify Major or Minor Trauma
    - 7.1.1.3. Management and Use of Radiological Images
    - 7.1.1.4. Define the Indications for Appropriate Use of CT or MRI
    - 7.1.1.5. Recognize Special Circumstances that Compromise Spinal Cord Function

- 7.1.2. Thoracolumbar Spine Trauma; Classification and Management
  - 7.1.2.1. Recognize the Signs and Symptoms of Thoracolumbar Fractures
  - 7.1.2.2. Differentiate Between Denis, AO and TLICS Classifications
  - 7.1.2.3. Explain the Role of Ligaments in Burst Fractures
  - 7.1.2.4. Assess the Different Surgical Techniques: Anterior Approach including MIS Techniques or Posterior Approach including MIS Technique or Both Approaches
- 7.1.3. Sacral Fractures: Classification and Treatment
  - 7.1.3.1. Description of Important Anatomical Aspects
  - 7.1.3.2. Differentiate the Different Types of Sacral Fractures
  - 7.1.3.3. Use of the AO Classification
  - 7.1.3.4. Recognize the Signs and Symptoms of Sacral Fractures
  - 7.1.3.5. Compare Surgical or Conservative Treatment
  - 7.1.3.6. Assess the Correct Surgical Options
- 7.2. Cementation Techniques via MIS
  - 7.2.1. Explanation of the Steps to Perform a Cementoplasty Technique, Including Correct Patient Positioning
  - 7.2.2. Correct Positioning of the Fluoroscope
  - 7.2.3. Placement of the Jamshidi Needles and their Exchange for the Working Cannula
  - 7.2.4. Fixation with Cemented Screws via MIS. Indications
  - 7.2.5. Explanation of the Steps to Performing a Pedicle Screw Fixation Technique and Performing a Cementoplasty, Including Correct Patient Positioning-
  - 7.2.6. Placement of Jamshidi Needles and Subsequent Tapping and Screw Placement
  - 7.2.7. How the Cement is Injected into the Vertebrae and its Particularities
  - 7.2.8. Placement of Percutaneous Bars
- 7.3. Fractures in Metabolic Spine Disorders and Pediatric Spine Fractures
  - 7.3.1. Fractures in Ankylosing Spondylitis (AS): Characteristics and Treatment
    - 7.3.1.1. Etiology of Ankylosing Spondylitis
    - 7.3.1.2. Determine the Role of the Spine Surgeon in AS
    - 7.3.1.3. Identify what Type of Imaging is Needed for its Diagnosis and Why
    - 7.3.1.4. Formulating an Appropriate Treatment Plan for AS Fractures
    - 7.3.1.5. Anticipate Difficulties in this Patient Population
  - 7.3.2. Vertebral Osteoporotic Fractures. Diagnosis and Treatment
    - 7.3.2.1. Define Osteoporosis
    - 7.3.2.2. Description of the Medical Therapeutic Treatment of Osteoporosis
    - 7.3.2.3. Know the Diagnosis of Osteoporotic Vertebral Fractures
    - 7.3.2.4. Use of the AO Classification for Osteoporotic Vertebral Fractures
    - 7.3.2.5. Assess the Different Surgical Alternatives
    - 7.3.2.6. Recognize the Indications for Cementoplasty Procedures for Osteoporotic Vertebral Fractures
    - 7.3.2.7. Recognize the Indications for Instrumentation of the Spine with or without Cementoplasty
  - 7.3.3. Pediatric Spine Fractures. Characteristics and Treatment
    - 7.3.3.1. Characteristics of Immature Cervical and Thoracolumbar Spine Fractures
    - 7.3.3.2. Define SCIWORA/SCIWORET
    - 7.3.3.3. Explain the Mechanism of Cervical Spine and Lumbar Apophysis Injuries
    - 7.3.3.4. Determine the Appropriate Plan for Diagnosis and Treatment of Injuries
- 7.4. Post-traumatic Kyphosis
  - 7.4.1. Prevention and Treatment of Post-traumatic Kyphosis
    - 7.4.1.1. Discussion of the Reasons for Post-traumatic Kyphosis
    - 7.4.1.2. Formulate Treatment Objectives
    - 7.4.1.3. Explain How to Restore Sagittal Balance
    - 7.4.1.4. Assess the Surgical Options
    - 7.4.1.5. Justify the Approach by a Multidisciplinary Team
- 7.5. Diagnosis of Vertebro-medullary Trauma
  - 7.5.1. General Aspects
    - 7.5.1.1. Vertebral Fractures with Neurological Compromise. Biomechanics. Stability Criteria. Diagnostic Tools
    - 7.5.1.2. Differential Imaging Diagnosis of Vertebral Injury with Neurological Involvement
    - 7.5.1.3. Clinical Assessment of Traumatic Spinal Cord Injury. Spinal Syndromes, ASIA Scale
    - 7.5.1.4. Differentiation with other Spinal Cord Injuries. Determination of the Severity of the Spinal Cord Injury. Current Diagnostic Options in the Acute Phase
  - 7.5.2. Spinal Shock and Incomplete Spinal Cord Injury Syndrome (SCI)
    - 7.5.2.1. Pathophysiology of Traumatic Spinal Cord Injury. Differentiation from other Spinal Cord Injuries

- 7.5.2.2. Define the Different Types of Incomplete Spinal Cord Injury (SCI)
- 7.5.2.3. Classify SCI Using the ASIA Scale and Justify its Clinical and Surgical Relevance. Describe the Clinical Symptoms and Pathophysiology of Central Cord Syndrome
- 7.5.2.4. Initial Surgical Management of Traumatic Spinal Cord Injury: Early vs. Delayed Surgery
- 7.5.2.5. Define why Methylprednisolone Should Not Be Used in SCI (NACIS I-III)
- 7.5.2.6. Treatment of Neuropathic Pain and Spasticity
- 7.5.2.7. Treatment of Post-traumatic Syringomyelia and Late Deformity
- 7.5.2.8. Rehabilitation of the Spinal Cord Injured
- 7.5.2.9. Initial Adaptation to Spinal Cord Injury and Return and Social Participation
- 7.5.2.10. Current Clinical Application of Tissue Regeneration Therapies
- 7.5.3. Initial Management of Traumatic Spinal Cord Injury
  - 7.5.3.1. Immobilization and Transport of the Critically Ill Patient with Traumatic Spinal Cord Injury
  - 7.5.3.2. Timing and Initial Medical Management of Traumatic Spinal Cord Injury. Validity of the NASCIS Protocol. Importance of Specific Units
- 7.5.4. Surgical Management of Vertebro-Medullary Trauma
  - 7.5.4.1. Surgical Treatment of Unstable C1-C2 Fractures
  - 7.5.4.2. Treatment of Thoracolumbar Fractures with Neurological Compromise
  - 7.5.4.3. Advantages of the Previous Route
  - 7.5.4.4. Advantages of the Posterior Route
- 7.5.5. Surgical Management in Special Situations
  - 7.5.5.1. Pediatric Spinal Cord Injury SCIWORA. Diagnosis and Treatment
  - 7.5.5.2. Traumatic Neurological Injury in Patients with Cervical Myelopathy
  - 7.5.5.3. Unstable Fractures in Patients with Ankylopoietic Spondylitis
  - 7.5.5.4. Fractures with Neurological Injury in the Patient with Osteoporosis
  - 7.5.5.5. Natural History of the Spinal Cord Injured. Complications. Prognostic Factors
  - 7.5.5.6. Management of Heterotopic Ossification. Management of Pressure Ulcers

## Module 8. Advances in Minimally Invasive Surgery

- 8.1. Cervical Spine
  - 8.1.1. Minimally Invasive Surgical Techniques for the Treatment of Cervical Disc Herniation
  - 8.1.2. Posterior Cervical Foraminotomy
  - 8.1.3. Intervertebral Disc Replacement by Minimally Invasive Surgery
  - 8.1.4. Posterior Cervical Fixation by Minimally Invasive Surgery
  - 8.1.5. Fixation of Odontoid Fractures by Minimally Invasive Surgery
  - 8.1.6. D-TRAX
- 8.2. Thoracic and Lumbar Spine
  - 8.2.1. Minimally Invasive Surgical Techniques for the Treatment of Thoracic Disc Herniation
  - 8.2.2. Endoscopic Techniques in the Management of Lumbar Disc Herniation
  - 8.2.3. Lateral Extraforaminal Approach
  - 8.2.4. Translaminar Approach
  - 8.2.5. Transforaminal Approach
  - 8.2.6. Nucleus Pulposus Replacement Technology
  - 8.2.7. Translaminar Articular Facet Fusion Techniques with Screw and Other Devices
  - 8.2.8. Microsurgical Decompression of Central and Lateral Canal Stenosis
  - 8.2.9. Pedicle Screw Placement by Minimally Invasive Surgery
  - 8.2.10. Posterior Approach Fusion Techniques. Minimally Invasive TLIF. Advantages and Disadvantages
  - 8.2.11. Laparoscopic ALIF
  - 8.2.12. Lateral Approaches for XLIF Intersomatic Arthrodesis. Technical Anatomy and Results
  - 8.2.13. Sacroiliac Joint Fusion Percutaneous Access
- 8.3. Minimally Invasive Surgery in the Deformities
  - 8.3.1. What are the Limits of Minimally Invasive Surgery in Deformity Correction? Indications
  - 8.3.2. Realignment of the Anterior Spine
  - 8.3.3. Posterior Correction Techniques
  - 8.3.4. Posterior Percutaneous Fixation. Reduction Techniques
  - 8.3.5. Temporary Fixation Technique
  - 8.3.6. Indications for Minimally Invasive Techniques in Revision Surgery

- 8.3.7. Advantages and Disadvantages for Minimally Invasive Techniques in Revision Surgery
- 8.3.8. Complications in Previous Approaches and How to Avoid Them
- 8.3.9. Complications in Posterior Approaches and How to Avoid Them
- 8.4. Interspinous and Interlaminar Devices
  - 8.4.1. Percutaneous Dynamic Stabilization Techniques with Interspinous Implants
  - 8.4.2. Technical and Anatomical Considerations of Interspinous Implant Placement
  - 8.4.3. Advances in Devices
- 8.5. Pain Treatment Techniques for Minimally Invasive Surgery
  - 8.5.1. Radiofrequency Neurotomy of the Lumbar Articular Facets
  - 8.5.2. Spinal Cord Electrostimulation for Chronic Pain
  - 8.5.3. Epiduroscopy
- 8.6. Treatment of Fractures by Minimally Invasive Techniques
  - 8.6.1. Role of Vertebroplasty and its Complications
  - 8.6.2. Role of Kyphoplasty and its Complications
  - 8.6.3. Other Percutaneous Treatment Techniques for Osteoporotic Vertebral Compression Fractures

## Module 9. Spine Surgery in the Elderly

- 9.1. General Aspects of the Elderly Spine
  - 9.1.1. Medical Aspects to be Taken into Consideration in the Elderly Patient Undergoing Spine Surgery
  - 9.1.2. Anesthetic Aspects to be Taken into Consideration in the Elderly Patient who is Undergoing Spine Surgery
- 9.2. Management of Vertebral Fractures in Elderly Patients
  - 9.2.1. Conservative Treatment of Fractures in the Elderly
  - 9.2.2. Odontoid Fractures in Elderly Patients: Functional and Quality of Life Outcomes of Patients With and Without Surgery
  - 9.2.3. Fractures in Elderly Patients with Ankylopoietic Spondylitis
  - 9.2.4. Quality of Life in Elderly Patients with Fractures
  - 9.2.5. Surgical Treatment of Osteoporotic Compression Fractures in the Elderly
    - 9.2.5.1. Role of Vertebroplasty
    - 9.2.5.2. Kyphoplasty Role

- 9.2.5.3. Structural Osteoplasty Role
- 9.2.5.4. Vesselplasty
- 9.2.5.5. Use of Biologicals
- 9.3. Conservative Treatment of Spinal Pain in the Elderly
  - 9.3.1. Rehabilitation in the Elderly Patient
  - 9.3.2. Alternative Therapies. Yoga, Acupuncture. Aquagym, Pilates
  - 9.3.3. Use of Spinal Injections in Spinal Pain
  - 9.3.4. Use of Oral Medication. NSAIDs, Morphic. In Low Back Pain in the Elderly
- 9.4. Treatment of Tumors in Elderly Patients
  - 9.4.1. Treatment of Bone Metastases in the Spine of the Elderly Patient
  - 9.4.2. Minimally Invasive Approaches
- 9.5. Surgical Aspects of Scoliosis in Elderly Patients
  - 9.5.1. The Sagittal Profile People Over 65 Years of Age: Characteristics and Radiographic Analysis.
  - 9.5.2. Clinical Evaluation of the Sagittal Plane: How to Integrate Sagittal Balance into Clinical Practice?
  - 9.5.3. Scoliosis in Elderly Patients: Prevalence. Pathophysiology. Classification. Indications and Objective of the Surgery
  - 9.5.4. Levels of Fusion in Scoliosis of Elderly Patients. Spinal Instrumentation.
  - 9.5.5. Dual Approach Versus All Posterior Approach in Scoliosis in the Elderly
  - 9.5.6. Vertebral Osteotomies. How to Choose the Correct Surgical Approach
- 9.6. Specific Surgical Complications in the Elderly Patient
  - 9.6.1. Coronal and Sagittal Imbalance. Flat Back Prevention. Treatment
  - 9.6.2. Pseudarthrosis and Infection After Deformity Surgery in the Elderly Patient
  - 9.6.3. Adjacent Disc/Segment Syndrome (Proximal and Distal)
  - 9.6.4. Surgical Complications. How to Minimize Postoperative Complications. Who is at Risk and What is the Risk?
  - 9.6.5. Proximal Junctional Kyphosis and Progressive Deformity. How to Minimize and Manage it
- 9.7. Other Degenerative Pathologies
  - 9.7.1. Cervical Myelopathy in the Elderly
  - 9.7.2. Degenerative Kyphosis: Influence of Osteoporotic Fractures
  - 9.7.3. Lumbar Degenerative Stenosis and Spondyloisthesis
  - 9.7.4. Thoracolumbar Spinal Cord Compression in the Elderly
  - 9.7.5. Minimally Invasive Surgery in Patients Over 65 Years of Age

## Module 10. Complications in Spine Surgery Miscellaneous

- 10.1. Neurological Complications in Spine Surgery
  - 10.1.1. Dura Mater Tears
    - 10.1.1.1. Conservative Management of Dural Tears
    - 10.1.1.2. Primary Repair
    - 10.1.1.3. Secondary Actions
  - 10.1.2. Nerve Root Injuries
    - 10.1.2.1. Direct Injury to Nerves During Surgery
    - 10.1.2.2. Peripheral Neuropathies due to Patient Positioning
  - 10.1.2. Neurological Complications related to Bone Grafts
- 10.2. Vascular Complications
  - 10.2.1. Vascular Injuries in Spine Surgery
  - 10.2.2. Anterior Cervical Vascular Injuries
  - 10.2.3. Thoracic Vascular Complications
    - 10.2.3.1. Anterior Approach
    - 10.2.3.2. Posterior Approach
  - 10.2.4. Lumbar Vascular Complications
    - 10.2.4.1. Anterior Approach
    - 10.2.4.2. Posterior Approach
  - 10.2.5. Other Vascular Complications
- 10.3. Spinal Infections
  - 10.3.1. Main Pathogens in Spine Surgery
  - 10.3.2. Causes of the Infections. Risk factors
  - 10.3.3. Diagnostic and Imaging Tests
  - 10.3.4. Spondylodiscitis
  - 10.3.5. Post-Surgical Infections
  - 10.3.6. Treatment Planning
    - 10.3.6.1. Antibiotic Medical Treatment
    - 10.3.6.2. Treatment of Surgical Wounds Vacuum Systems





- 10.4. Complications Derived from the Surgical Procedure
  - 10.4.1. Failed Back Syndrome. Classification
    - 10.4.1.1. Reasons for Failure of Surgical Instrumentation
    - 10.4.1.2. Post-Operative Vertebral Instability
    - 10.4.1.3. Post-Operative Deformities
    - 10.4.1.4. Pseudarthrosis
  - 10.4.2. Adjacent Level Diseases. Therapeutic Approach
  - 10.4.3. Revision Surgery. Strategies
- 10.5. Evaluation and Treatment of Sacroiliac Pathology
- 10.6. Navigation and Robotics in Thoracolumbar Spine Surgery
- 10.7. Use of Bone Grafts in Spine Surgery
  - 10.7.1. Autograft and Allograft
  - 10.7.2. Demineralized Bone Matrix and Osteoconductive Ceramics
  - 10.7.3. Biological Substitutes
  - 10.7.4. Grafts in Revision Surgeries
  - 10.7.5. Stem Cells and Cellular Bone Matrix
- 10.8. Evaluation and Monitoring Tools in Spine Surgery
  - 10.8.1. Neurological Assessment Scales
  - 10.8.2. SF-36, VAS, Oswestry



*A unique, key, and decisive training experience to boost your professional development"*

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. Gervas, 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 Professional Master's Degree in Spine Surgery guarantees you, in addition to the most rigorous and updated training, access to a Professional Master's Degree issued by TECH Global University.





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

This private qualification will allow you to obtain a **Professional Master's Degree diploma in Spine Surgery** 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.

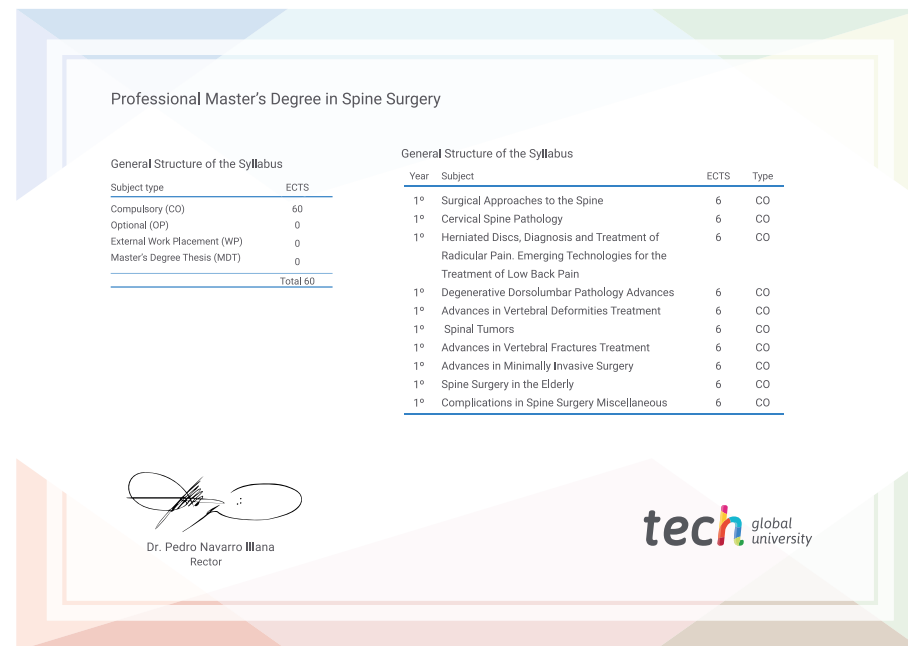
This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Professional Master's Degree in Spine Surgery**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**



\*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.

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

**tech** global  
university

## Professional Master's Degree

### Spine Surgery

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

# Professional Master's Degree

## Spine Surgery

Endorsed by:

