

# Advanced Master's Degree Anesthesia and Orthopedic Surgery in Large Species





## Advanced Master's Degree Anesthesia and Orthopedic Surgery in Large Species

- » Modality: online
- » Duration: 2 years
- » Certificate: TECH Global University
- » Credits: 120 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/veterinary-medicine/advanced-master-degree/advanced-master-degree-anesthesia-orthopedic-surgery-large-species](http://www.techtute.com/us/veterinary-medicine/advanced-master-degree/advanced-master-degree-anesthesia-orthopedic-surgery-large-species)

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# 01

# Introduction

Veterinarians face new professional challenges every day, so specialization in this sector is essential. The owners of these animals are looking for trained professionals who are able to provide a service and care with full guarantees. This training is aimed at experienced veterinarians who wish to specialize in the field of Anesthesia and Orthopedic Surgery in Large Species to provide complete and high quality care to patients, meeting the current demands for highly specialized training in veterinary medicine.

*Veterinarians must continue their training to adapt to new advances and specialize in areas of high demand.*







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*Become one of the most demanded professionals of the moment thanks to the completion of this very complete Advanced Master's Degree online”*

In the last 20 years, veterinary anesthesia in large species has experienced great progress thanks to the introduction of new techniques and drugs, as well as the development of specific anesthetic monitors and machines.

Additionally, the introduction of new surgical techniques has created the need to develop new anesthetic protocols, and there is a growing concern about the impact of anesthesia and analgesia on animal welfare and on the final outcome of surgical procedures.

High skills in anesthesia management are essential for veterinary surgeons, since anesthetic techniques are closely linked to surgical interventions.

Therefore, in this Advanced Master's Degree the main contents related to anesthetic techniques and the main tools for diagnosis, treatment and orthopedic intervention in large species, such as ruminants (cattle and sheep), camelids (camels, alpacas and llamas), swine (pigs and wild boars) and equids (horses, donkeys and mules), including the description of the main musculoskeletal and rehabilitation surgical interventions, are united in this Advanced Master's Degree.

It's necessary to take into account that this specialized course is aimed at professionals who generally have long working days, which prevents them from being able to continue with their specialization in face-to-face classes and who cannot find high quality online courses adapted to their needs. In this context of the need for competent and quality online specialization, we present this Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species, which has come to revolutionize the world of veterinary specialization, both for its contents, as well as for its teaching staff and its innovative teaching methodology.

Furthermore, as it is a 100% online specialization, the student decides where and when to study. Without the restrictions of fixed timetables or having to move between classrooms, this course can be combined with work and family life.

This **Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The latest technology in online teaching software
- ♦ A highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- ♦ Practical cases presented by practising experts
- ♦ State-of-the-art interactive video systems
- ♦ Teaching supported by remote education
- ♦ Continuous updating and retraining systems
- ♦ Self-organised learning which makes the course completely compatible with other commitments
- ♦ Practical exercises for self-evaluation and learning verification
- ♦ Support groups and educational synergies: Questions to the expert, discussion forums and knowledge
- ♦ Communication with the teacher and individual reflection work
- ♦ Content that is accessible from any, fixed or portable device with an Internet connection
- ♦ Databases of supplementary materials are permanently available, even after the completing the program



*A specialization created for professionals who aspire to excellence and that will allow you to acquire new skills and strategies in a fluent and efficient way”*

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*We give you the opportunity to take a deep and complete dive into the strategies and approaches in anesthesia and orthopedic surgery in large species”*

Our teaching staff is made up of working professionals. In this way we ensure that we deliver the educational update we are aiming for. A multidisciplinary staff of trained and experienced professionals from a variety of environments, who will develop theoretical knowledge in an efficient manner, but above all, will bring their practical knowledge from their own experience to the course.

The efficiency of the methodological design of this master's degree, enhances the student's understanding of the subject. Developed by a multidisciplinary team of e-learning experts, it integrates the latest advances in educational technology. In this way, you will be able to study with a range of easy-to-use and versatile multimedia tools that will give you the necessary skills you need for your specialization.

The design of this program is based on Problem-Based Learning, an approach that sees learning as a highly practical process. To achieve this remotely, we will use telepractice learning. With the help of an innovative interactive video system, and learning from an expert, you will be able to acquire the knowledge as if you were actually dealing with the scenario you are learning about. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

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

*This 100% online Advanced Master's Degree will allow you to combine your studies with your professional work while increasing your knowledge in this field.*



# 02 Objectives

Our objective is to prepare highly qualified professionals for the working An objective that is complemented, moreover, in a global manner, by promoting human development that lays the foundations for a better society. This objective is focused on helping professionals reach a much higher level of expertise and control. A goal that you will be able to achieve thanks to a highly intensive and detailed course.







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*If your goal is to improve in your profession, to acquire a qualification that will enable you to compete among the best, then look no further: Welcome to TECH”*



## General Objectives

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- ♦ Examine the anatomy and physiology of the cardiovascular system and the functioning of the respiratory system
- ♦ Establish the normal functioning of the digestive and renal systems
- ♦ Develop specialized knowledge about the functioning of the nervous system and its response to anesthesia
- ♦ Analyze the particularities of the different species (ruminants, swine, camelids and equids)
- ♦ Examine the requirements of a pre-anesthetic assessment and develop expertise in interpreting anesthetic risk
- ♦ Establish the pre-anesthetic preparation required for large species
- ♦ Analyze the pharmacological properties of injectable drugs
- ♦ Determine available sedative and tranquilizing drugs
- ♦ Delve into the available protocols for deep sedation
- ♦ Gain advanced knowledge of pharmacology and clinical maneuvers in the induction and intubation period in small and large ruminants, swine and camelids
- ♦ Provide safe options of current and new combinations of these agents for safe and effective induction of general anesthesia in the equine patient
- ♦ Detail the procedure of endotracheal intubation in the equine patient
- ♦ Examine the main physiological, anatomical and clinical needs related to the different types of decubitus and limb positioning of the equine patient
- ♦ Determine the components and operation of anesthetic machines, respiratory systems, oxygen delivery systems and artificial ventilation
- ♦ Generate specialized knowledge of the pharmacology of halogenated inhalation anesthetics, injectable anesthetics, sedative adjuvants, as well as the most recent TIVA and PIVA techniques described for ruminants, swine and camelids, and for equine species.,
- ♦ Develop advanced knowledge on mechanical ventilation to recognize the need for mechanical ventilation and the most effective and safe settings for ruminants, swine and camelids, as well as for equine species
- ♦ Determine the pharmacology and clinical application of neuromuscular blocking agents
- ♦ Build specialist knowledge on the anesthetic recovery phase in ruminants, swine, camelids and equine species
- ♦ Determine the vital importance of the correct use of the anesthetic record during general anesthesia
- ♦ Examine and gain an in-depth understanding of the vital signs that should be monitored during general anesthesia or sedation of the equine patient
- ♦ Establish the technical characteristics of the main monitoring equipment used in the equine patient
- ♦ Develop the main peculiarities of monitoring in ruminants, swine and camelids
- ♦ Analyze the pathophysiological principles governing pain processes
- ♦ Determine the characteristics and correct use of pain scales specific to the equine species
- ♦ Generate specialized knowledge of the pharmacology of the main families of analgesic agents
- ♦ Examine the pharmacological peculiarities of analgesic agents in ruminants, swine and camelids
- ♦ Examine the anatomy relevant to the loco-regional techniques to be performed



- ◆ Generate specialized knowledge on the clinical pharmacology of the local anesthetics to be used
- ◆ Determine the equipment necessary to perform the different loco-regional techniques
- ◆ Detail how to perform the different loco-regional techniques on large ruminants, small ruminants, swine and camelids
- ◆ Establish how to perform the different loco-regional techniques on horses
- ◆ Identify, prevent and resolve complications during the perianesthetic period in the horse
- ◆ Establish the appropriate clinical approach to cardiorespiratory resuscitation in the adult horse and neonatal foal
- ◆ Identify, prevent and resolve complications during the perianesthesia period in small and large ruminants, swine and camelids
- ◆ Establish the basis of body fluid and electrolyte physiology in the equine patient
- ◆ Determine the acid-base balance and interpret the most common alterations in the equine patient
- ◆ Examine the techniques and skills required for venous catheterization in the equine patient
- ◆ Establish the clinical and laboratory parameters important for monitoring fluid therapy in the equine patient
- ◆ Establish the special physiological considerations related to fluid therapy for ruminants, swine and camelids
- ◆ Examine the main characteristics of crystalloid and colloid solutions frequently used in ruminants, swine and camelids



- ♦ Acquire specialized knowledge related to the therapeutic applications of fluid therapy for ruminants, swine and camelids
- ♦ Analyze the types of fluids available to the equine patient
- ♦ Get to know the main characteristics of the most frequently performed procedures in the station under sedation
- ♦ Detail the most relevant characteristics related to the anesthetic management of the most frequent diagnostic and therapeutic procedures
- ♦ Generate specialized knowledge for the correct anesthetic management of animals destined for human consumption
- ♦ Become an expert on the legislation related animals for human consumption as, well as experimental animals
- ♦ Detail the main logistical, pharmacological and clinical requirements for the correct anesthetic management of wild animals
- ♦ Specify the most characteristic peculiarities of the anesthetic management of the most frequent diagnostic and therapeutic procedures in foals
- ♦ Perform euthanasia protocols that respect the physical and mental well-being of the horse
- ♦ Establish the basic system and procedures in a lameness examination
- ♦ Identify the means available to locate an anatomical site as the cause of a claudication
- ♦ Establish the indications for the use of the different imaging techniques in the presence of an orthopedic problem
- ♦ Examine the main therapeutic options currently available on the market
- ♦ Examine the main pathological entities of the musculoskeletal system
- ♦ Analyze the main lesions of the axial skeleton
- ♦ Define the etiology of palmar hoof pain or podotrochlear pathology
- ♦ Compile the main findings in the diagnosis of bone, joint and soft tissue pathologies
- ♦ Present the different therapeutic options in the management of these pathologies
- ♦ Evaluate the equipment and instruments used in synovial cavity surgery
- ♦ Fundamental knowledge of arthroscopy, tenoscopy and bursoscopy techniques
- ♦ Develop synovial cavity exploration techniques
- ♦ Establish endoscopy as a method of surgical treatment of synovial pathologies
- ♦ Gain fundamental knowledge of musculoskeletal injuries and infections
- ♦ Establish an appropriate methodology for its exploration, diagnosis and treatment
- ♦ Generate specialized knowledge of the different materials and techniques used for the treatment of these pathologies
- ♦ Propose therapeutic strategies in wound management alternative to the conventional ones
- ♦ Gain advanced knowledge of the angular deformities, flexural deformities, osteochondrosis, and subchondral cysts
- ♦ Determine the different treatments for angular and flexural deformities
- ♦ Establish an appropriate methodology for the identification, treatment and prognostication of osteochondral lesions
- ♦ Generate specialized knowledge on the etiopathogenesis, identification, treatment and prognosis of subchondral cysts
- ♦ Propose therapeutic strategies to limit the negative consequences of these pathologies
- ♦ Gain advanced knowledge of the angular deformities, flexural deformities, osteochondrosis, and subchondral cysts
- ♦ Determine the different treatments for angular and flexural deformities
- ♦ Establish an appropriate methodology for the identification, treatment and prognostication of osteochondral lesions



- ♦ Generate specialized knowledge on the etiopathogenesis, identification, treatment and prognosis of subchondral cysts
- ♦ Propose therapeutic strategies to limit the negative consequences of these pathologies
- ♦ Develop specialized knowledge to correctly plan surgery
- ♦ Examine the necessary general pharmacological, anesthesia and equipment to deal surgically with the different pathologies
- ♦ Analyze the most frequent anesthetic complications in the Large Animals clinic, particularly those related to orthopedic surgery
- ♦ Examine the most frequent surgical complications in orthopedic surgery and provide useful protocols to solve or avoid them
- ♦ Develop the fundamentals of bone physiology and bone healing
- ♦ Systematically approach the care of an animal with a fracture
- ♦ Present the implants and materials used for fracture fixation
- ♦ Present the different fracture reduction and fixation techniques
- ♦ Establish surgical methodology for the resolution of musculoskeletal problems in large animals
- ♦ Examine each surgical technique in detail for each commonly occurring muscle and tendon pathology
- ♦ Determine each surgical technique in detail for each commonly occurring bone pathology
- ♦ Establish survival, sports and productive prognoses for the pathologies described
- ♦ Establish the most appropriate surgical methodology for the resolution of musculoskeletal problems in large animals
- ♦ Examine each surgical technique in detail for each commonly occurring forelimb and hind limb bone pathology and for each commonly occurring axial skeletal bone pathology
- ♦ Establish survival, sports and productive prognoses for the pathologies described
- ♦ Examine the importance of musculoskeletal injury rehabilitation in horses
- ♦ Establish the basis of the techniques used in rehabilitation
- ♦ Analyze the main musculoskeletal rehabilitation techniques in sport horses
- ♦ Present rehabilitation plans based on the location of the injury



## Specific Objectives

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- ♦ Examine the anatomical and physiological peculiarities of large and small ruminants that are relevant to the design of a safe anesthetic protocol in these species
- ♦ Examine equine cardiac anatomy, the basis of electrophysiological behavior of the heart and the stress response produced by anesthesia in the equine patient
- ♦ Develop the anatomical and physiological peculiarities of swine and camelids that are relevant to the design of a safe anesthetic protocol for these species
- ♦ Determine the cardiac mechanical processes related to blood circulation
- ♦ Establish the hormonal and neuronal mechanisms involved in the control of the cardiovascular system
- ♦ Develop processes related to ventilation and gas exchange
- ♦ Analyze the clinical implications of respiratory alterations in anesthetized patients
- ♦ Determine the normal anatomy and physiology of the digestive system and the consequences of anesthesia on the digestive system
- ♦ Establish the excretion and hormonal processes related to the renal system
- ♦ Generate specialized knowledge on the anatomy and physiology of the nervous system
- ♦ Analyze the alterations produced by anesthetic drugs in the nervous system
- ♦ Determine the physical examination and common findings in the equine pre-anesthetic assessment
- ♦ Strengthen the basics of pre-anesthesia laboratory assessment
- ♦ Analyze, identify and interpret the patient's anesthetic risk
- ♦ Establish the necessary actions in the preparation of the patient for anesthesia
- ♦ Detail the pharmacological particularities of the main sedative drugs in ruminants, swine and camelids
- ♦ Develop expertise in pharmacokinetics and pharmacodynamics of drugs in horses
- ♦ Know the pharmacological properties and clinical implications of sedative and tranquilizing drugs
- ♦ Establish the most common station procedures and protocols in the equine patient
- ♦ Generate specialized knowledge on the pharmacology of dissociative agents and barbiturates given the side effects and the main contraindications for their administration
- ♦ Examine the pharmacology of propofol, alfaxalone and etomidate, given the side effects and major contraindications for their administration
- ♦ Develop advanced knowledge of the pharmacology of muscle relaxants such as benzodiazepines and guaifenesin
- ♦ Examine the anatomical, physiological and pharmacological considerations necessary to perform effective and safe induction of general anesthesia and endotracheal intubation in small and large ruminates, swine and camelids
- ♦ Determine the physiological and anatomical considerations necessary to perform an effective and safe take-down for patients and staff in the equine population
- ♦ Compile the clinical and anatomical knowledge necessary for the safe performance of endotracheal intubation in the equine patient
- ♦ Develop anatomical and physiological knowledge essential for the correct positioning of the equine patient in decubitus, in order to avoid the complications associated with decubitus
- ♦ Analyze the most frequent problems in the anesthetic machine and the circular circuit, in order to identify and solve them
- ♦ Gain knowledge and understand the operation of oxygen delivery systems and artificial ventilation during general anesthesia of large species
- ♦ Know the pharmacology of halogenated inhalation anesthetics and their adverse effects in large animals



- ◆ Gain an in-depth knowledge of injectable sedative and hypnotic agents that can be used as adjuvants or general anesthetics, as well as the latest techniques described for equine PIVA and TIVA
- ◆ Detail the techniques of general anesthesia, both inhalable and injectable, described in large and small ruminants, swine and camelids
- ◆ Recognize the need for mechanical ventilation during anesthesia, know the positive and negative consequences of mechanical ventilation, and know the appropriate ventilatory parameters for its safe application
- ◆ Expand knowledge about specific particularities of mechanical ventilation in large and small ruminants, swine and camelids
- ◆ Detail the mechanism of action of neuromuscular blocking agents as well as their pharmacology
- ◆ Become familiar with the techniques for monitoring neuromuscular blockade and the agents used to reverse this blockade
- ◆ Recognize the importance of recovery from general anesthesia in equines. Expand knowledge related to the techniques that can be used and the necessary preparation of the patient and the box
- ◆ Detail the specific particularities of anesthetic recovery in large and small ruminants, swine and camelids
- ◆ Detail the correct and regular use of the anesthetic record during general anesthesia
- ◆ Determine the importance and the most characteristic clinical signs of anesthetic depth monitoring in the equine patient
- ◆ Generate specialized knowledge on blood oxygenation monitoring and with the monitoring of proper ventilation



- ♦ Analyze the importance and main technical features related to the monitoring of cardiovascular and hemodynamic constants
- ♦ Develop the leading role of arterial blood gases in the clinical monitoring of the equine patient during general anesthesia
- ♦ Detail the peculiarities of monitoring other types of vital parameters, such as glucose, lactate, temperature or the degree of neuromuscular blockade
- ♦ Examine the main peculiarities of anesthetic monitoring in other species such as ruminants, swine and camelids
- ♦ Examine the definition of pain, as well as the different types of pain in relation to their pathophysiology and evolution over time
- ♦ Determine the main physiological components associated with pain sensation
- ♦ Generate specialized knowledge related to the nociception pathway
- ♦ Determine the main pathophysiological consequences of untreated pain
- ♦ Analyze the knowledge of the use of pain scales in the equine patient
- ♦ Gain advanced knowledge of the pharmacology of opioids, NSAIDs, alpha-2 agonist agents, ketamine, lidocaine and other co- analgesic drugs
- ♦ Establish the main side effects of opioids, NSAIDs, alpha-2 agonist agents, ketamine, lidocaine and other co- analgesic drugs
- ♦ Determine the main contraindications to the administration of opioids, NSAIDs, alpha-2 agonist agents, ketamine, lidocaine and other co- analgesic drugs
- ♦ Examine the clinical uses of opioids, NSAIDs, alpha-2 agonist agents, ketamine, lidocaine, and other co- analgesic drugs
- ♦ Establish the main pharmacological peculiarities of analgesic agents in ruminants, swine and camelids
- ♦ Determine the drugs to be administered
- ♦ Establish the equipment to be used
- ♦ Examine the anatomy of the head in relation to the nerve blocks performed
- ♦ Generate specialized knowledge on local head, forelimb and hind limb techniques
- ♦ Examine the anatomy of the forelimb and hind limb in relation to nerve blocks
- ♦ Detail the anatomy of the abdomen relevant to the nerve blocks performed
- ♦ Generate advanced knowledge on local abdominal techniques
- ♦ Examine the anatomy of the vertebral canal
- ♦ Develop the epidural technique
- ♦ Determine the main loco-regional techniques in other large animal species
- ♦ Know the published studies on mortality and perianesthetic morbidity in horses
- ♦ Know the risk factors and causes for perianesthetic mortality
- ♦ Identify, anticipate and resolve complications that occur in the premedication phase
- ♦ Identify, anticipate and resolve complications that occur in the induction phase
- ♦ Identify, anticipate and resolve complications that occur in the maintenance phase
- ♦ Identify, anticipate and resolve complications that occur in the recovery and postoperative phase
- ♦ Early recognition of life-threatening cardiorespiratory emergencies in horses
- ♦ Develop effective cardiorespiratory resuscitation protocols
- ♦ Be aware of the complications related to improper positioning of the ruminant, swine or camelid patient
- ♦ Recognize the main cardiovascular complications in ruminants, swine and camelids
- ♦ Identify and know the main arrhythmias in ruminants, swine and camelids
- ♦ Recognize the main respiratory complications in ruminants, swine and camelids
- ♦ Gain knowledge about the complications related to endotracheal intubation in swine
- ♦ Recognize the complications related to the digestive tract of ruminants
- ♦ Study the complications associated with the gastrointestinal system in camelids



- ◆ Recognize complications associated with intravenous catheter placement in ruminants, swine and camelids
- ◆ Broaden knowledge of the pathophysiology of malignant hyperthermia
- ◆ Identify the complications that can occur during anesthetic recovery in ruminants, swine and camelids
- ◆ Detail the physiology and movement of body water
- ◆ Delve into the physiology and alterations of the most important electrolytes
- ◆ Determine the acid-base balance and its regulation
- ◆ Interpret pH alterations
- ◆ Reinforce the important factors for catheter and catheterization site selection
- ◆ Detail the most frequent complications of venous catheterization
- ◆ Analyze the most frequent crystalloid fluids
- ◆ Detail the properties of blood derivatives and know their complications
- ◆ Delve into the physiological particularities of ruminants, swine and camelids in relation to fluid therapy
- ◆ Establish the properties of the isotonic, hypotonic and hypertonic crystalloid solutions most frequently used in ruminants, swine and camelids
- ◆ Delve into the study of the use of colloids in ruminants, swine and camelids
- ◆ Clinical fluid therapy applied to the perioperative period, as well as to electrolyte and glucose imbalances in ruminants, swine and camelids
- ◆ Generate specialized knowledge on the most frequent surgical and imaging procedures
- ◆ Establish the most appropriate protocols according to the procedure to be performed
- ◆ Detail the main differences in the anesthesia of foals compared to adults
- ◆ Be aware of the risk factors and complications in colic anesthesia in order to adapt the anesthetic protocol
- ◆ Detail the physiological aspects to be taken into account during anesthesia in geriatric horses
- ◆ Gain in-depth knowledge of the anesthetic management of the main diagnostic and therapeutic procedures in large and small ruminants
- ◆ Detail the anesthetic management of ruminant adnexal organs such as horns, hooves or tails
- ◆ Master the features of anesthesia in swine transplantation models, as well as for laparoscopy in experimental swine
- ◆ Establish basic characteristics of field anesthesia in pigs and castration of piglets
- ◆ Determine the basic principles of field anesthesia in camelids
- ◆ Define the main behavioral, physiological and anatomical characteristics of donkeys and mules
- ◆ Delve into the pharmacology of anesthetic and analgesic agents in donkeys and mules
- ◆ Master the legislation applicable to the anesthesia of animals intended for human consumption
- ◆ Master the veterinary prescription drug cascade
- ◆ Establish waiting times and maximum residue limits applicable to species for human consumption
- ◆ Master the legislation applicable to experimental animals
- ◆ Detail the particularities of anesthesia for ruminants and experimental swine
- ◆ Broaden knowledge of the logistics and pharmacological methods most appropriate for the capture and handling of wild species
- ◆ Master sedation and field anesthesia protocols in wild ruminants
- ◆ Determine protocols for sedation and field anesthesia in wild swine
- ◆ Detailed protocols for sedation and field anesthesia in wild camelids
- ◆ Expand knowledge related to monitoring alternatives in these non-domestic species

- ♦ Determine analgesic techniques that can be applied in these non-domestic species
- ♦ Examine the main physical and chemical methods of euthanasia
- ♦ Specialize the student in the collection of essential data to obtain a complete anamnesis
- ♦ Differentiate between the different conformations that are predisposed to developing injuries in the musculoskeletal system
- ♦ Recognize the symptoms presented by a patient with thoracic limb claudication
- ♦ Recognize the symptoms presented by a patient with pelvic limb claudication
- ♦ Interpret the results of local or regional anesthesia as diagnostic tools
- ♦ Generate criteria that allows for the appropriate selection of imaging diagnostic techniques in each case
- ♦ Assess in detail the indications and considerations of each pharmacological group in the therapeutic management of a musculoskeletal injury
- ♦ Gain specialized knowledge for diagnosing and treating an articular pathology
- ♦ Recognize the symptoms of tendon and ligament injuries
- ♦ Analyze the etiology and pathogenesis of lesions associated with biomechanical maladaptation processes
- ♦ Present the most frequent acute and subclinical myopathies
- ♦ Identify and recognize pathologies of the axial skeleton that are involved in a drop in sports performance
- ♦ Analyze the different differential diagnoses related to podotrochlear pathology and their therapeutic management
- ♦ Examine the different treatment strategies based on biological therapy
- ♦ Develop specialized knowledge of materials used in endoscopy surgery of synovial cavities
- ♦ Specify the indications of endoscopy for the treatment of synovial pathologies
- ♦ Specify the techniques of endoscopic surgery in joint cavities, bursae and synovial sheaths
- ♦ Perform correct endoscopic treatment of synovial pathologies
- ♦ Justify the use of endoscopy in the treatment of joint fractures
- ♦ Expose the possible complications associated with the arthroscopy, bursoscopy and tenoscopy techniques
- ♦ Present the different postoperative care and rehabilitation guidelines
- ♦ Develop knowledge of the different phases of skin healing
- ♦ Specify the different types of wounds that can occur in large animal clinics
- ♦ Indicate the tests to be performed on a patient with a musculoskeletal injury or infection to determine the significance of the injury
- ♦ Determine the techniques of tissue management, hemostasis, suturing, reconstruction and skin grafting
- ♦ Set guidelines for the choice of different types of sutures, needles and drains
- ♦ Select the appropriate dressing or bandage for each clinical situation
- ♦ Expose the importance and application of the fiberglass technique
- ♦ Apply the different therapeutic guidelines in acute and chronic wounds
- ♦ Carry out a correct diagnosis and treatment of synovial and bone infections
- ♦ Specify the use of the different tenorrhaphy techniques
- ♦ Present the different causes of exuberant granulation and its treatment
- ♦ Apply the different therapeutic guidelines in burns

- ♦ Develop specialized knowledge on the etiopathogenesis of angular deformities, flexural deformities, osteochondrosis and subchondral cysts
- ♦ Carry out a correct diagnosis of the different alterations presented
- ♦ Specify the techniques for delaying and stimulating bone growth used in the surgical treatment of angular deformities
- ♦ Determine the medical treatments and application of resins, splints and orthopedic tools used in the treatment of angular and flexural deformities
- ♦ Specify the demotomy and tenotomy techniques used in the treatment of flexural deformities
- ♦ Establish the specificities in the treatment of deformities according to the age of the patient and the anatomical area affected
- ♦ Determine the prevalence, predisposing factors, diagnosis, localization, treatment and prognosis of osteochondral lesions and subchondral cysts
- ♦ Analyze the importance of patient acceptance for surgery, operative risks and pre-surgical evaluation of the patient
- ♦ Fundamentals of the basic principles of general anesthesia and sedation for orthopedic surgical procedures
- ♦ Recognize the general material necessary for general orthopedic surgery in Large Animals
- ♦ Establish correct disinfection protocols for surgical material
- ♦ Differentiate the diagnostic imaging techniques available as an intra-surgical aid
- ♦ Establish a scheme of work for the preparation of the patient, the surgeon and the surgical field
- ♦ Develop post-operative treatment protocols for major orthopedic surgeries in the large animal clinics
- ♦ Gather the necessary information in order to develop knowledge of the physiology of bone metabolism and its healing
- ♦ Analyze the biomechanics of the bone and classify the fractures
- ♦ Stabilize a patient with a fracture
- ♦ Generate specialized knowledge on how to reduce fractures
- ♦ Specify the most common materials for the manufacturing of implants
- ♦ Establish the instruments and implants used to fix fractures
- ♦ Determine the use of screws and the use of plates and screws
- ♦ Analyze the technical complications in the use of implants
- ♦ Discuss the surgical techniques for each particular problem
- ♦ Analyze the surgical techniques related to the common muscle-tendon injuries of the forelimb and hind limb
- ♦ Determine the surgical techniques related to common bone injuries of the forelimb and hind limb including hoof, phalanges and metacarpo-metatarsus
- ♦ Justify surgery for each particular problem described
- ♦ Propose surgical alternatives for some procedures
- ♦ Specify the equipment needed for each procedure
- ♦ Examine the prognosis of each procedure
- ♦ Provide a rationale for the surgical techniques to be described for each particular problem
- ♦ Determine the surgical techniques related to common bone injuries of the forelimb and hind limb including and adjacent to the carpus and tarsus
- ♦ Examine the surgical techniques related to bone injuries of the axial skeleton in large animals

- ♦ Justify surgery for each particular problem described
- ♦ Propose surgical alternatives for some procedures
- ♦ Specify the equipment needed for each procedure
- ♦ Examine the prognosis of each procedure
- ♦ Analyze the significance of musculoskeletal injuries and the correct recovery needed
- ♦ Gain knowledge of the basic principles of physiotherapeutic examination in horses
- ♦ Evaluate the physical restrictions and physiological adaptations that occur as a consequence of an injury
- ♦ Examine the different physiotherapeutic techniques available to the equine veterinarian
- ♦ Determine the physical properties of each one of the therapies available in veterinary medicine
- ♦ Create prevention plans for equine athletes
- ♦ Propose rehabilitation plans depending on the musculoskeletal injury







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*Quality specialized training for outstanding students. At TECH, we offer the perfect education for high level specialization in your field”*

# 03 Skills

Once all the contents have been studied and the objectives of the Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species have been achieved, the professionals will have superior competence and performance in this area. A very complete approach, in a high-level Advanced Master's Degree, which makes the difference.







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*Achieving excellence in any profession requires effort and perseverance. But, above all, the support of professionals, who will give you the boost you need, with the necessary means and assistance. At TECH, we offer you everything you need”*

After completing this training, the professional will be able to:



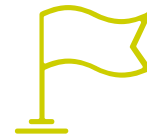
## General Skills

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- ♦ Acquire the necessary knowledge to be able to carry out a previous anesthetic approach
- ♦ Elaborate a specific anesthesia plan for each case
- ♦ Know and understand how to use the necessary tools effectively
- ♦ Be familiar with how to implement existing protocols
- ♦ Know and learn how to develop preoperative
- ♦ Know and understand how to develop operative and postoperative management
- ♦ Know and learn how to develop postoperative management
- ♦ Master all aspects of anesthetic care for each patient individually
- ♦ Create finalized plans for a range of specific situations: diseases, intolerances, critical states, etc
- ♦ Diagnose the different traumatological problems in animals and use the necessary techniques for their treatment
- ♦ Assess different traumatological pathologies using audiovisual methods
- ♦ Perform postsurgical care
- ♦ Utilize the most modern methods of Orthopedic Surgery







## Specific Skills

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- ♦ Interpret the results of local or regional anesthesia as diagnostic tools
- ♦ Analyze the etiology and pathogenesis of lesions associated with biomechanical maladaptation processes
- ♦ Specify the techniques of endoscopic surgery in joint cavities, bursae and synovial sheaths
- ♦ Apply the different therapeutic guidelines in acute and chronic wounds
- ♦ Determine the prevalence, predisposing factors, diagnosis, localization, treatment and prognosis of osteochondral lesions and subchondral cysts
- ♦ Differentiate the diagnostic imaging techniques available as an intra-surgical aid
- ♦ Analyze the biomechanics of the bone and classify the fractures
- ♦ Discuss the surgical techniques for each particular problem
- ♦ Determine the surgical techniques related to common bone injuries of the forelimb and hind limb including and adjacent to the carpus and tarsus
- ♦ Analyze the significance of musculoskeletal injuries and the correct recovery needed

04

# Course Management

For our master's degree 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 comprehensive multidisciplinary team. A unique opportunity to learn from the best.





“

*Our professors bring their vast experience and their teaching skills to offer you a stimulating and creative specialized educational program”*

## Management



### Dr. Salazar Nussio, Verónica

- ♦ D. in Medicine from the Complutense University of Madrid (Spain) in 2005.
- ♦ Degree in Veterinary Medicine from the Complutense University of Madrid (Spain) in 2001.
- ♦ Diplomate of the American College of Veterinary Anesthesia and Analgesia (ACVAA) in 2010.
- ♦ Diplomate recognized by the European College of Veterinary Anesthesia and Analgesia (EVCAA) in 2018.
- ♦ Her professional career has been mainly academic as a professor of veterinary anesthesia and analgesia in several Universities and Reference Centers in several countries such as the United States, Spain and the United Kingdom. In these centers she has performed clinical activity in large and small animals, as well as teaching and research activities.
- ♦ In 2019 she becomes a RECOVER Certified Instructor in Basic and Advanced Life Support, a title awarded by the American College of Emergency and Critical Care. Since that same year, she has also been a RECOVER certified Rescuer in Basic and Advanced Life Support.



### Dr. Muñoz Morán, Juan Alberto

- ♦ PhD in Veterinary Science.
- ♦ Degree in Veterinary Medicine from the Complutense University of Madrid
- ♦ Graduate of the European College of Veterinary Surgeons.
- ♦ Professor in Large Animal surgery at the Veterinary University of Pretoria, South Africa.
- ♦ Head of the Equine Surgery residency program at the Veterinary University of Pretoria, South Africa.
- ♦ Head of the large animal surgery service and professor at Alfonso X El Sabio University, Madrid.
- ♦ Surgeon at the Equine Hospital of Aznalcollar, Seville.



## Professors

### Mr. Arenillas Baquero, Mario

- ♦ Graduated in Veterinary Medicine from the Complutense University of Madrid in 2004.
- ♦ She obtained the Diploma of Advanced Studies in 2011 and defended her thesis for the achievement of the Doctorate in Veterinary Medicine in 2020
- ♦ Associate Professor in the Clinical Rotation of the subject "Anesthesiology" in the Veterinary Degree of the Faculty of Veterinary Medicine of the Complutense University of Madrid (UCM). From March 2020
- ♦ Collaborator in practical teaching in the Department of Animal Medicine and Surgery, Faculty of Veterinary Medicine, UCM. Course of 2019/ 20

### Mr. Benito, Javier

- ♦ Degree in Veterinary Medicine from the Complutense University of Madrid (UCM) in 2004
- ♦ He completed a specialized training program through a European residency program (ECLAM) in Laboratory Animal Medicine at the Autonomous University of Barcelona (UAB) from 2006 to 2009. During this period he also completed a Master of Science (MSc) in Laboratory Animal Science and Welfare
- ♦ He then moved to the United States, where he held a fellowship from 2009 to 2012 as a Postdoctoral Research Associate at the Comparative Pain Research Laboratory (CPRL) at North Carolina State University (NCSSU). His professional career as a veterinarian is currently focused on the area of anesthesia and clinical analgesia. He is also currently the coordinator-responsible for the Anesthesia Service at the Hospital Clínico Veterinario for the small animal area

### Mr. Montefiori, Filippo

- ♦ Degree in Veterinary Medicine from the University of Parma (Italy) in 2006
- ♦ Professor in Small and Large Animal Anesthesia and Analgesia at the Veterinary School of the University of Edinburgh (UK) from June 2015 to June 2016
- ♦ Collaborator in practical teaching at the Faculty of Veterinary Medicine of the Complutense University of Madrid from September 2016 to August 2018
- ♦ Honorary collaborator at the Faculty of Veterinary Medicine of the Complutense University of Madrid from September 2018 to the present
- ♦ Since July 2016 he has been working as a Veterinary Anesthesiologist in the outpatient service Anesthesia and Veterinary Surgery in Madrid, he is a collaborator of the Faculty of Veterinary Medicine of the Complutense University of Madrid and speaker of a postgraduate course in small animal anesthesia in this same faculty

### Dr. Rioja, Eva

- ♦ PhD in Veterinary Medicine from the Complutense University of Madrid (Spain) in 2004
- ♦ PhD in Veterinary Science from the University of Guelph (Canada) in 2009
- ♦ Degree in Veterinary Medicine from the Complutense University of Madrid (Spain) in 2000
- ♦ Diplomate of the American College of Veterinary Anesthesia and Analgesia (ACVAA) in 2009
- ♦ Diplomate recognized by the European College of Veterinary Anesthesia and Analgesia (EVCAA) in 2020
- ♦ Her professional career has been mainly academic as a professor of veterinary anesthesia and analgesia at several universities in various countries such as Canada, South Africa and the United Kingdom. In these universities she has performed clinical activity in large and small animals, as well as teaching and research activities

#### **Dr. Santiago Llorente, Isabel**

- ◆ Doctorate in Veterinary from the Complutense University of Madrid
- ◆ Degree in Veterinary Medicine from the Complutense University of Madrid, 1999 Degree in Veterinary Medicine from the Complutense University of Madrid in 1999 After obtaining a Bachelor's Degree Diploma (1999) and a Diploma of Advanced Studies (2003), she completed her PhD at the same university in 2016
- ◆ Professor at Lusofona University of Lisbon (Portugal) in the Department of Medical Clinical Pathology II from 2019 to present
- ◆ Her professional career is focused on equine clinical practice and research, currently as a contract veterinarian in the large animal area of the Complutense Veterinary Clinic Hospital of the Complutense University of Madrid
- ◆ Head of Equine Internal Medicine and member of the Anesthesia Service at the Complutense Veterinary Clinic Hospital of the Complutense University of Madrid

#### **Mr. Troya Portillo, Lucas**

- ◆ Degree in Veterinary Medicine from the Complutense University of Madrid
- ◆ Postgraduate Diploma in Equine Clinic from the Autonomous University of Barcelona
- ◆ Master's Degree in Equine Hospital Clinic at the Complutense University of Madrid
- ◆ Associate Professor, Department of Animal Medicine and Surgery, Autonomous University of Barcelona, teaching equine internal medicine since 2018
- ◆ Professor at the Institute of Applied Studies (IDEA-Madrid) during 2017-2018, in the Equestrian Veterinary Technical Assistant and Equestrian Veterinary Assistant courses
- ◆ Service of Internal Medicine and Anesthesia, Equine Unit, Veterinary Clinical Hospital UAB
- ◆ Associate Professor, Department of Animal Medicine and Surgery, Autonomous University of Barcelona
- ◆ Training stays in various Spanish and European centers
- ◆ Member of the Spanish Association of Equine Veterinarians (AVEE)

#### **Mr. Viscasillas Monteagudo, Jaime**

- ◆ Degree in Veterinary Medicine from the University of Zaragoza (Spain) in 1998
- ◆ Master's Degree in Veterinary Anesthesia from the Complutense University of Madrid in 2003
- ◆ Diplomate of the European College of Veterinary Anesthesia and Analgesia (ECVAA) in 2016
- ◆ Professor in veterinary anesthesia at the Faculty of Veterinary Medicine at CEU- Cardenal Herrera University from 2019 to present
- ◆ He teaches in different graduate and postgraduate courses, university specialization programs and masters, both national and international
- ◆ Conferences in national and international courses
- ◆ Supervisor of residents of the European College of Veterinary Anesthesia and Analgesia and of residents of other European specialty colleges under their anesthesia rotations
- ◆ Professor at the Royal Veterinary College from 2009 to 2019

#### **Dr. Argüelles Capilla, David**

- ◆ PhD in Veterinary Medicine from the Autonomous University of Barcelona (UAB)
- ◆ Degree in Veterinary Medicine, Autonomous University of Barcelona
- ◆ Resident in Sports Medicine and Rehabilitation for the ACVSMR

#### **Dr. Gómez Lucas, Raquel**

- ◆ Doctor of Veterinary Medicine
- ◆ Degree in Veterinary Medicine from the Complutense University of Madrid
- ◆ Graduate of the American College of Veterinary Sports Medicine and Rehabilitation (ACVSMR)
- ◆ Head of the Sports Medicine and Diagnostic Imaging Service of the Large Animal Area of the Clinical Veterinary Hospital of Alfonso X el Sabio University since 2005

**Dr. Iglesias García, Manuel**

- ♦ PhD from University of Alfonso X el Sabio (2017)
- ♦ Degree in Veterinary Medicine from the Alfonso X el Sabio University in Madrid (2010)
- ♦ Surgeon at the Veterinary Hospital of the University of Extremadura, completing an official residency program at the ECVS (European College of Veterinary Surgery)

**Dr. Quinteros, Diego Daniel**

- ♦ Diploma from the American College of Veterinary Surgeons
- ♦ Latin American Board on Equidae AOVET Foundation (2019-2022)
- ♦ Veterinary Surgeon (2015-present) Integral Equine Veterinary Surgeons - Pincen, Cordoba, Argentina

**Mr. Quattrocchio, Tomás Manuel**

- ♦ Veterinarian, Buenos Aires University Center, Argentina. (UNCPBA)
- ♦ Master's Degree in Equine Sport Medicine from the UCO
- ♦ Veterinarian at Ellerston Onasis Polo Club, Scone, NSW, Australia

**Ms. Drici Khalfi, Amel**

- ♦ Degree in Veterinary Medicine from the University of Argel, Algeria
- ♦ Head of Hospitalization, Department of Large Animals, Veterinary University of Pretoria, South Africa

**Mr. Saitua Penas, Aritz**

- ♦ Currently studying a PhD in the Department of Animal Medicine and Surgery at the University of Cordoba
- ♦ Degree in Veterinary Medicine from the University of Santiago de Compostela
- ♦ Internship in an Equine Clinic at the Clinical Veterinary Hospital of the University of Córdoba



*A high-level team for a very high-quality specialization"*

# 05

# Structure and Content

The contents of this Advanced Master's Degree have been developed by the different experts on this course, with a clear purpose: to ensure that our students acquire each and every one of the necessary skills to become true experts in this field. The content of this course enables you to learn all aspects of the different disciplines involved in this field. A complete and well-structured program that will take you to the highest standards of quality and success.







“

*Our syllabus has been designed with teaching efficiency in so that you learn faster, more efficiently and on a more permanent”*

## Module 1. Physiology Applied to Anesthesia in Large Species

- 1.1. Physiology Applied to Anesthesia
  - 1.1.1. Introduction
  - 1.1.2. History of Anesthesia in Large Animals
- 1.2. Cardiovascular System Physiology in the Horse
  - 1.2.1. Cardiac Anatomy
  - 1.2.2. Cardiac Electrophysiology
  - 1.2.3. Mechanic Cardiac Function
  - 1.2.4. Vascular System
- 1.3. Respiratory System Physiology in the Horse I
  - 1.3.1. Anatomy of the Respiratory System
  - 1.3.2. Pulmonary Ventilation
- 1.4. Respiratory System Physiology in the Horse II
  - 1.4.1. Pulmonary Circulation
  - 1.4.2. Gas Exchange
  - 1.4.3. Breathing Control
- 1.5. Digestive System in the Horse
  - 1.5.1. Anatomy of the Digestive System
  - 1.5.2. Nervous and Hormonal Control of the Digestive Function
- 1.6. Renal System in the Horse
  - 1.6.1. Anatomy of the Renal System
  - 1.6.2. Formation of the Urine
  - 1.6.3. Effects of Anesthetics on the Renal Function
- 1.7. Nervous System in the Horse
  - 1.7.1. Anatomy of the Central Nervous System
  - 1.7.2. Anatomy of the Peripheral Nervous System
  - 1.7.3. Neuronal Function
  - 1.7.4. Assessment of Neurological Function During Anesthesia
- 1.8. Autonomic Nervous System and Anesthesia-Related Stress
  - 1.8.1. Autonomic Nervous System
  - 1.8.2. Stress Response Associated with Anesthesia





- 1.9. Anatomy and Physiology of Small and Large Ruminants
  - 1.9.1. Applied Anatomy of Large Ruminants
  - 1.9.2. Applied Physiology of Large Ruminants
  - 1.9.3. Applied Anatomy of Small Ruminants
  - 1.9.4. Applied Physiology of Small Ruminants
- 1.10. Anatomy and Physiology of Swine and Camelids
  - 1.10.1. Applied Anatomy of Swine
  - 1.10.2. Applied Physiology of Swine
  - 1.10.3. Applied Anatomy of Camelids
  - 1.10.4. Applied Physiology of Camelids

## Module 2. Assessment, Preanesthetic Preparation and Sedation in Large Species

- 2.1. Physical Examination and Blood Test
- 2.2. Anesthetic Risk and Preanesthetic Preparation in the Equine Patient
- 2.3. Pharmacology of Injectable Drugs in Horses
  - 2.3.1. Important Pharmacokinetic Concepts
  - 2.3.2. Important Pharmacodynamics Concepts
  - 2.3.3. Physiological and Pathological Factors that Modify Pharmacological Properties
  - 2.3.4. Pharmacological Interventions
  - 2.3.5. Routes of Administration
- 2.4. Phenothiazines
  - 2.4.1. Mechanism of Action
  - 2.4.2. Pharmacology
  - 2.4.3. Clinical Use and Antagonism
  - 2.4.4. Complications and adverse effects
- 2.5. Benzodiazepines
  - 2.5.1. Mechanism of Action
  - 2.5.2. Pharmacology
  - 2.5.3. Clinical Use and Antagonism
  - 2.5.4. Complications and adverse effects

- 2.6. Adrenergic Alpha-2 Receptor Agonists
  - 2.6.1. Mechanism of Action
  - 2.6.2. Pharmacology
  - 2.6.3. Clinical Use and Antagonism
  - 2.6.4. Complications and adverse effects
- 2.7. Opioids
  - 2.7.1. Mechanism of Action
  - 2.7.2. Pharmacology
  - 2.7.3. Clinical Use and Antagonism
  - 2.7.4. Complications and adverse effects
- 2.8. Sedation for On-Station Procedures
  - 2.8.1. Types of Procedures
  - 2.8.2. Clinical Objectives
  - 2.8.3. Methods of Administration
  - 2.8.4. Combinations Described
- 2.9. Assessment and Anesthetic Preparation in Ruminants, Swine and Camelids
- 2.10. Pharmacological Peculiarities of Ruminant, Swine and Camelid Patients
  - 2.10.1. Small Ruminants
  - 2.10.2. Large Ruminants
  - 2.10.3. Swine
  - 2.10.4. Camelids

## Module 3. Induction of General Anesthesia in Large Species

- 3.1. Dissociative Anesthetics (Ketamine)
  - 3.1.1. Pharmacology
  - 3.1.2. Side Effects
  - 3.1.3. Contraindications
  - 3.1.4. Dosages and Protocols
- 3.2. Barbiturates (Thiopental)
  - 3.2.1. Pharmacology
  - 3.2.2. Side Effects
  - 3.2.3. Contraindications
  - 3.2.4. Dosages and Protocols

- 3.3. Propofol, Alfaxalone, Etomidate
  - 3.3.1. Pharmacology
  - 3.3.2. Side Effects
  - 3.3.3. Contraindications
  - 3.3.4. Dosages and Protocols
- 3.4. Benzodiazepines and Guaifenesin
  - 3.4.1. Pharmacology
  - 3.4.2. Side Effects
  - 3.4.3. Contraindications
  - 3.4.4. Dosages and Protocols
- 3.5. Main Knock-Down Techniques in the Equine Patient
- 3.6. Endotracheal Intubation, Nasotracheal Intubation and Tracheostomy in the Equine Patient
- 3.7. Physiological Consequences of Different Decubitus, Padding and Limb Positioning in the Equine Patient
- 3.8. Peculiarities of the Induction Period in Large and Small Ruminants
  - 3.8.1. Pharmacology of Induction Agents
  - 3.8.2. Knock-Down Techniques
  - 3.8.3. Intubation Techniques
- 3.9. Peculiarities of the Induction Period in Swine and Camelids
  - 3.9.1. Pharmacology of Induction Agents
  - 3.9.2. Knock-Down Techniques
  - 3.9.3. Intubation Techniques
- 3.10. Positioning of the Ruminant, Swine and Camelid Patient After Induction

#### Module 4. General Anesthesia and Equipment in Large Species

- 4.1. Anesthetic Equipment (I)
  - 4.1.1. Anesthetic Machine
  - 4.1.2. Circular Circuit
- 4.2. Anesthetic Equipment (II)
  - 4.2.1. Mechanical Ventilator
  - 4.2.2. Demand Valve

- 4.3. General Aspects of Inhalation Anesthesia
  - 4.3.1. Pharmacokinetics of Inhalation Agents (Absorption, Distribution, Metabolism, Elimination, Physical and Chemical Characteristics)
  - 4.3.2. Pharmacodynamics of Inhalation Agents (CNS Effects, Cardiovascular and Respiratory Effects, Other Effects)
  - 4.3.3. Halogenated Inhalation Agents
    - 4.3.3.1. Isoflurane
    - 4.3.3.2. Sevoflurane
- 4.4. Partial and Total Intravenous Anesthesia (PIVA and TIVA)
  - 4.4.1. Injectable Agents Used and Techniques
- 4.5. Neuromuscular Blocking Agents
  - 4.5.1. Mechanism of Action
  - 4.5.2. Pharmacokinetics and Pharmacodynamics
  - 4.5.3. Monitoring
  - 4.5.4. Pharmacology of Reversing Agents
- 4.6. General Anesthesia in Other Species (Small and Large Ruminants, Swine and Camelids)
- 4.7. Mechanical Ventilation
  - 4.7.1. Respiratory Mechanism
  - 4.7.2. Consequences of MV
  - 4.7.3. Ventilatory Parameters
- 4.8. Mechanical Ventilation in Other Species (Small and Large Ruminants, Swine and Camelids)
- 4.9. Anesthetic Recovery
  - 4.9.1. Recovery Techniques
  - 4.9.2. Patient Preparation
  - 4.9.3. Box Preparation
- 4.10. Anesthetic Recovery (Small and Large Ruminants, Swine and Camelids)



## Module 5. Monitoring in Large Species

- 5.1. The Anesthetic Record
- 5.2. Anesthetic Depth Monitoring
- 5.3. Cardiovascular and Hemodynamic Status Monitoring (I)
  - 5.3.1. Clinical Monitoring
  - 5.3.2. Electrocardiogram
- 5.4. Cardiovascular and Hemodynamic Status Monitoring (II)
  - 5.4.1. Indirect Arterial Pressure
    - 5.4.1.1. Oscillometry
    - 5.4.1.2. Doppler
  - 5.4.2. Direct Arterial Pressure
- 5.5. Monitoring of Oxygenation Status (I)
  - 5.5.1. Clinical Monitoring
  - 5.5.2. Arterial Blood Gas (PaO<sub>2</sub>)
- 5.6. Monitoring of Oxygenation Status (II)
  - 5.6.1. Pulse Oximetry
- 5.7. Monitoring of Ventilation Status (I)
  - 5.7.1. Clinical Monitoring
  - 5.7.2. Arterial Blood Gas (PaCO<sub>2</sub>)
- 5.8. Monitoring of Ventilation Status (II)
  - 5.8.1. Capnography
- 5.9. Other Monitoring Types
  - 5.9.1. Temperature
  - 5.9.2. Glucose
  - 5.9.3. Lactate
  - 5.9.4. Ions
  - 5.9.5. Neurostimulation
  - 5.9.6. Others
- 5.10. Monitoring in Other Species (Small and Large Ruminants, Swine and Camelids)
  - 5.10.1. Particularities of Monitoring in Small Ruminants
  - 5.10.2. Monitoring Considerations for Large Ruminants
  - 5.10.3. Particularities of Swine Monitoring
  - 5.10.4. Particularities of Camelids Monitoring

## Module 6. Analgesia in Large Species

- 6.1. Definition of Pain and Pathophysiology of Pain
  - 6.1.1. Definition of Pain
  - 6.1.2. Types of Pain
  - 6.1.3. Pathophysiology of Pain
    - 6.1.3.1. Nociceptors
    - 6.1.3.2. Axons
    - 6.1.3.3. Neurotransmitters
    - 6.1.3.4. Nociception Pathway
- 6.2. Multimodal and Preventive Analgesia
  - 6.2.1. Clinical Analgesia
  - 6.2.2. Multimodal Analgesia
  - 6.2.3. Preventive Analgesia
- 6.3. Consequences of Untreated Pain
- 6.4. Pain Detection Systems
  - 6.4.1. Physiological Signs
  - 6.4.2. Equine Pain Scales
  - 6.4.3. Pain Scales in Other Species
- 6.5. Opioids
  - 6.5.1. Pharmacology
  - 6.5.2. Side Effects
  - 6.5.3. Contraindications
  - 6.5.4. Clinical Use
- 6.6. NSAIDs
  - 6.6.1. Pharmacology
  - 6.6.2. Side Effects
  - 6.6.3. Contraindications
  - 6.6.4. Clinical Use
- 6.7.  $\alpha_2$  Agonists Agents
  - 6.7.1. Pharmacology
  - 6.7.2. Side Effects
  - 6.7.3. Contraindications
  - 6.7.4. Clinical Use

- 6.8. Ketamine and Lidocaine
  - 6.8.1. Ketamine
    - 6.8.1.1. Pharmacology
    - 6.8.1.2. Side Effects
    - 6.8.1.3. Contraindications
    - 6.8.1.4. Clinical Use
  - 6.8.2. Lidocaine
    - 6.8.2.1. Pharmacology
    - 6.8.2.2. Side Effects
    - 6.8.2.3. Contraindications
    - 6.8.2.4. Clinical Use
- 6.9. Other: Gabapentin, Amantadine, Amitriptyline, Tramadol, Paracetamol
  - 6.9.1. Gabapentin
    - 6.9.1.1. Pharmacology
    - 6.9.1.2. Side Effects
    - 6.9.1.3. Contraindications
    - 6.9.1.4. Clinical Use
  - 6.9.2. Amantadine
    - 6.9.2.1. Pharmacology
    - 6.9.2.2. Side Effects
    - 6.9.2.3. Contraindications
    - 6.9.2.4. Clinical Use
  - 6.9.3. Amitriptyline
    - 6.9.3.1. Pharmacology
    - 6.9.3.2. Side Effects
    - 6.9.3.3. Contraindications
    - 6.9.3.4. Clinical Use
  - 6.9.4. Tramadol
    - 6.9.4.1. Pharmacology
    - 6.9.4.2. Side Effects
    - 6.9.4.3. Contraindications
    - 6.9.4.4. Clinical Use

- 6.9.5. Paracetamol
  - 6.9.5.1. Pharmacology
  - 6.9.5.2. Side Effects
  - 6.9.5.3. Contraindications
  - 6.9.5.4. Clinical Use
- 6.10. Pharmacology of Analgesics in Other Species (Small and Large Ruminants, Swine and Camelids)
  - 6.10.1. Pharmacological Peculiarities of Analgesics in Small Ruminants
  - 6.10.2. Pharmacological Peculiarities of Analgesics in Large Ruminants
  - 6.10.3. Pharmacological Peculiarities of Analgesics in Swine
  - 6.10.4. Pharmacological Peculiarities of Analgesics in Camelids

## Module 7. Locoregional Anesthesia in Large Species

- 7.1. Pharmacology of Local Anesthetics
  - 7.1.1. Mechanism of Action
  - 7.1.2. Clinical Differences
  - 7.1.3. Complications
  - 7.1.4. Adjuvants
- 7.2. Instruments and Equipment
  - 7.2.1. Needles
  - 7.2.2. Neurostimulation
  - 7.2.3. Ultrasound
- 7.3. Locoregional Head Blocks (i)
  - 7.3.1. Maxillary Nerve Block
  - 7.3.2. Infraorbital Nerve Block
  - 7.3.3. Mandibular Nerve Block
  - 7.3.4. Mental Nerve Block
- 7.4. Locoregional Head Blocks (ii)
  - 7.4.1. Retrobulbar/Peribulbar Block
  - 7.4.2. Eyelid Block
  - 7.4.3. Auriculopalpebral Block
  - 7.4.4. Ear Block
  - 7.4.5. Cervical Block

- 7.5. Locoregional Forelimb Block
  - 7.5.1. Surgical Blocks
- 7.6. Locoregional Hind Limb Blocks
  - 7.6.1. Surgical Blocks
- 7.7. Locoregional Laparotomy Blocks
  - 7.7.1. Lumbar Paravertebral Block
  - 7.7.2. Inverted "L" Block and Infiltration
  - 7.7.3. Transverse Abdominal Plane Block
- 7.8. Epidural Anesthesia
  - 7.8.1. Realization of a Single Technique
  - 7.8.2. Epidural Catheter Placement
  - 7.8.3. Drugs Used
- 7.9. Locoregional Large Ruminant Anesthesia
  - 7.9.1. Most Common Techniques
- 7.10. Locoregional Small Ruminants, Swine and Camelids Anesthesia
  - 7.10.1. Most Common Techniques

## Module 8. Anesthetic Complications and Cardiopulmonary Resuscitation

- 8.1. Morbidity and Mortality
  - 8.1.1. Mortality
    - 8.1.1.1. General Considerations
    - 8.1.1.2. Mortality Studies
      - 8.1.1.2.1. Comparative Mortality
    - 8.1.1.3. Risk Factors
      - 8.1.1.3.1. Related to the Horse
      - 8.1.1.3.2. Related to the Surgical Procedure
      - 8.1.1.3.3. Related to Anesthesia
    - 8.1.1.4. Anesthesia-Related Causes of Death
      - 8.1.1.4.1. Cardiovascular
      - 8.1.1.4.2. Respiratory
      - 8.1.1.4.3. Others
  - 8.1.2. Morbidity
- 8.2. Complications in Premedication and Induction I
  - 8.2.1. Intra-arterial and Perivascular Injection
  - 8.2.2. Anaphylactic Reactions
  - 8.2.3. Drug-Induced Priapism
  - 8.2.4. Incomplete or Inadequate Sedation/Induction
- 8.3. Complications in Premedication and Induction II
  - 8.3.1. Hypoventilation
  - 8.3.2. Inability to Intubate/Laryngeal Trauma
  - 8.3.3. Hypotension
- 8.4. Complications in Maintenance I
  - 8.4.1. Hypoxemia
  - 8.4.2. Hypercapnia
  - 8.4.3. Inadequate Anesthetic Plan and Alternative Anesthetic Plans
  - 8.4.4. Malignant Hyperthermia
- 8.5. Complications in Maintenance II
  - 8.5.1. Hypotension
  - 8.5.2. Hypertension
  - 8.5.3. Bleeding
  - 8.5.2. Alterations in Heart Rate and Rhythm
- 8.6. Complications in Recovery I
  - 8.6.1. Hypoxemia/Hypercapnia
  - 8.6.2. Nasal Edema
  - 8.6.3. Airway Obstruction
  - 8.6.4. Pulmonary Edema
  - 8.6.5. Fractures and Soft Tissue Damage
  - 8.6.6. Neuropathologies
  - 8.6.7. Myopathies
- 8.7. Complications in Recovery II
  - 8.7.1. Myelopathies
  - 8.7.2. Hyperkalemic Periodic Paralysis
  - 8.7.3. Delay/Excitation in Recovery
  - 8.7.4. Immediate Postoperative Complications
  - 8.7.5. Human Error



- 8.8. Cardiopulmonary Resuscitation (CPR) I
  - 8.8.1. Causes of Cardiopulmonary Emergencies
  - 8.8.2. Diagnosis of Cardiopulmonary Emergencies
  - 8.8.3. Cardiac Massage
  - 8.8.4. CPR Maneuver
    - 8.8.4.1. Foal CPR Maneuver
    - 8.8.4.2. Adult CPR Maneuver
- 8.9. Complications in Small and Large Ruminants
  - 8.9.1. Complications Associated with Poor Patient Positioning
  - 8.9.2. Cardiovascular Complications
  - 8.9.3. Tympanism, Regurgitation, Salivation
  - 8.9.4. Respiratory Complications
  - 8.9.5. Hypothermia
  - 8.9.6. Other complications
- 8.10. Complications in Ruminants, Swine and Camelids
  - 8.10.1. Complications Related to Improper Positioning of Ruminants, Swine and Camelids
  - 8.10.2. Cardiovascular Complications in Ruminants, Swine and Camelids
  - 8.10.3. Respiratory Complications in Ruminants, Swine and Camelids
  - 8.10.4. Digestive Complications in Ruminants and Camelids
    - 8.10.4.1. Anesthetic Recovery Complications in Ruminants, Swine and Camelids
    - 8.10.4.2. Complications Related to Intravenous Catheterization in Ruminants, Swine and Camelids
    - 8.10.4.3. Complications Related to Endotracheal Intubation in Swine
    - 8.10.4.4. Malignant Hyperthermia in Swine Patients



## Module 9. Fluid Therapy in Large Species

- 9.1. Physiology: Bodily Water and Electrolytes:
  - 9.1.1. Physiological Body Spaces
  - 9.1.2. Fluid Equilibrium
  - 9.1.3. Sodium Physiology and Alterations
  - 9.1.4. Potassium Physiology and Alterations
  - 9.1.5. Calcium Physiology and Alterations
  - 9.1.6. Chlorine Physiology and Alterations
  - 9.1.7. Magnesium Physiology and Alterations
- 9.2. Acid-Base Equilibrium I:
  - 9.2.1. Regulation of Acid-Base Homeostasis
  - 9.2.2. Consequences of Acid-Base Disorders
  - 9.2.3. Interpretation of Acid-Base Status
    - 9.2.3.1. Traditional Method
    - 9.2.3.2. New Approaches
- 9.3. Acid-Base Equilibrium II:
  - 9.3.1. Metabolic Acidosis
  - 9.3.2. Respiratory Acidosis
  - 9.3.3. Metabolic Alkalosis
  - 9.3.4. Respiratory Alkalosis
  - 9.3.5. Mixed Disorders
- 9.4. Catheterization in the Equine Patient
  - 9.4.1. Selection of Catheter
  - 9.4.2. Catheterization Placement Points
  - 9.4.3. Catheter Placement and Maintenance
- 9.5. Catheterization Complications
  - 9.5.1. Thrombophlebitis
  - 9.5.2. Catheter Rupture
  - 9.5.3. Perivascular Injection
  - 9.5.4. Venous Air Embolism
  - 9.5.5. Exsanguination
- 9.6. Clinical Examination of Water Status in the Equine Patient
  - 9.6.1. Physical Examination
  - 9.6.2. Laboratorial Parameters
  - 9.6.3. Hemodynamic Parameters
- 9.7. Types of Fluids I
  - 9.7.1. Replacement Fluids
  - 9.7.2. Maintenance Fluids
- 9.8. Types of Fluids II:
  - 9.8.1. Colloids
- 9.9. Transfusion of Blood Products
  - 9.9.1. Plasma
  - 9.9.2. Erythrocyte Concentrate
  - 9.9.3. Whole Blood
  - 9.9.4. Complications
- 9.10. Fluid Therapy in Ruminants, Swine and Camelids
  - 9.10.1. Physiology Applied to Fluid Therapy in these Species
  - 9.10.2. Isotonic, Hypertonic and Hypotonic Solutions Available in These Species
  - 9.10.3. Colloid Solutions Available in These Species
  - 9.10.4. Fluid Therapy for the Perioperative Period in These Species
  - 9.10.5. Imbalances of Glycemia and Ions and their Correction Through Fluid Therapy in These Species

## Module 10. Special Cases and Clinical Situations in Large Species

- 10.1. Special Cases in Station in Equines
  - 10.1.1. Diagnostic Procedures (CT, MRI)
  - 10.1.2. Laryngeal Surgery
  - 10.1.3. Laparoscopy
  - 10.1.4. Dental Procedures
  - 10.1.5. Ophthalmological Procedures
  - 10.1.6. Perineal Surgeries
  - 10.1.7. Obstetric Maneuvers
- 10.2. Anesthesia in Special Cases in Equines (I)
  - 10.2.1. Geriatric Patient

- 10.2.2. Patient with Acute Abdominal Syndrome
- 10.2.3. Cesarean Section
- 10.3. Anesthesia in Special Cases in Equines (II)
  - 10.3.1. Elective Anesthetic Management in Foals
  - 10.3.2. Emergency Anesthetic Management of Foal Emergencies
- 10.4. Anesthesia in Special Cases in Equines (III)
  - 10.4.1. Anesthetic Management of Respiratory Surgery
  - 10.4.2. Anesthetic Management of Diagnostic and Therapeutic Procedures for Nervous System Pathologies
- 10.5. Anesthesia in Special Cases in Ruminants
  - 10.5.1. Anesthetic Considerations and Perioperative Management in Orthopedic Procedures in Ruminants
  - 10.5.2. Anesthetic Considerations and Perioperative Management in for Wounds and abscesses Procedures in Ruminants
  - 10.5.3. Anesthetic Considerations and Perioperative Management in Ruminant Laparotomy
  - 10.5.4. Anesthetic Considerations and Perioperative Management in Obstetrics and Castration Procedures in Ruminants
  - 10.5.5. Anesthetic Considerations and Perioperative Management of Procedures for Distal Extremities, Hooves and Horns in Ruminants
  - 10.5.6. Anesthetic Considerations and Perioperative Management in Udder and Teat Procedures in Ruminants
  - 10.5.7. Anesthetic Considerations and Perioperative Management of Procedures for Eyes and Adjacent Areas in Ruminants
  - 10.5.8. Anesthetic Considerations and Perioperative Management in Surgical Procedures for the Resolution of Umbilical Hernias in Ruminants
  - 10.5.9. Anesthetic Considerations and Perioperative Management of Procedures for Perianal and Tail Areas in Ruminants
- 10.6. Anesthesia and Analgesia in Donkeys and Mules
  - 10.6.1. Anatomical, Physiological and Behavioral Variations
  - 10.6.2. Reference Values Required for Anesthesia
  - 10.6.3. Variations in Responses to Common Drugs Used in Anesthesia
  - 10.6.4. Premedication and Sedation for Foot Procedures in Donkeys and Mules
  - 10.6.5. Induction and Maintenance of Anesthesia: Injectable and Inhalation Techniques
  - 10.6.6. Anesthetic Monitoring
  - 10.6.7. Recovery of Anesthesia
  - 10.6.8. Preoperative, Intraoperative and Postoperative Analgesia
  - 10.6.9. Local Anesthetic Techniques in Donkeys and Mules
- 10.7. Anesthesia in Special Cases in Swine and Camelids
  - 10.7.1. Intraoperative and Perioperative Anesthetic Management in Field Anesthesia in Swine
  - 10.7.2. Castration in Piglets. Analgesic and Anesthetic Considerations
  - 10.7.3. The Vietnamese Pig. Intraoperative and Perioperative Anesthetic Management and Most Frequent Complications
  - 10.7.4. Anesthetic Considerations and Perioperative Management of the Pig as a Model for Transplantation and Cardiovascular Models
  - 10.7.5. Anesthetic Considerations and Perioperative Management of the Pig as a Model for Laparoscopy
  - 10.7.6. Intraoperative and Perioperative Anesthetic Management in Field Anesthesia in Camelids
  - 10.7.7. Castration in Alpaca. Analgesic and Anesthetic Considerations
- 10.8. Anesthesia in Ruminants, Swine and Wild Camelids
  - 10.8.1. Considerations for Chemical Immobilization and Anesthesia for the Bovidae and Antilocapridae Family
  - 10.8.2. Considerations for Chemical Immobilization and Anesthesia in the Subfamily Capridae
  - 10.8.3. Considerations for Chemical Immobilization and Anesthesia in the Cervidae, Tragulidae and Mochidae Families
  - 10.8.4. Considerations for Chemical Immobilization and Anesthesia in the Suidae and Tayassuidae Family
  - 10.8.5. Considerations for Chemical Immobilization and Anesthesia in the Family Camelidae
- 10.9. Special Considerations: Food Animals/Experimental Animals (Ruminants and Swine)
  - 10.9.1. Legislation Applicable to the Anesthesia of Animals Intended for Human Consumption
  - 10.9.2. Anesthetic and Analgesic Considerations for Animals Intended for Human Consumption
  - 10.9.3. Legislation Applicable to the Anesthesia of Animals for Experimental Purposes

- 10.9.4. Anesthetic and Analgesic Considerations in Ruminants and Swine
- 10.10. Euthanasia
  - 10.10.1. General Considerations
    - 10.10.1.1. Geriatric Horse
  - 10.10.2. Mechanisms of action for Hypothermia
  - 10.10.3. Chemical Euthanasia Methods
  - 10.10.4. Physical Euthanasia Methods
  - 10.10.5. Euthanasia Protocol
  - 10.10.6. Confirmation of Death

## Module 11. Diagnosis of Lameness in Large Species: Ruminants, Swine and Equids

- 11.1. Clinical History and Anamnesis
  - 11.1.1. Basic Information
  - 11.1.2. Current Problem
  - 11.1.3. Importance of Conformation
    - 11.1.3.1. Thoracic Limbs
    - 11.1.3.2. Pelvic Limbs
    - 11.1.3.3. Back
    - 11.1.3.4. Digits
- 11.2. Static Physical Examination
  - 11.2.1. Observation
  - 11.2.2. Palpitation
- 11.3. Dynamic Physical Evaluation
  - 11.3.1. Basic Biomechanical Characteristics
  - 11.3.2. Examination Protocol
  - 11.3.3. Lameness of the Thoracic Limbs
  - 11.3.4. Lameness of the Pelvic Limb
  - 11.3.5. Types of Claudication
  - 11.3.6. Compensatory Lameness
  - 11.3.7. Classification
- 11.3.8. Flexion Test
- 11.4. Diagnostic Anesthesia
  - 11.4.1. Types of Local Anesthetics
  - 11.4.2. General Considerations
  - 11.4.3. Perineural Anesthesia
  - 11.4.4. Intrasynovial Anesthesia
  - 11.4.5. Recommended Action Protocols
  - 11.4.6. Interpretation of Results
- 11.5. Analysis and Quantification of Movement
  - 11.5.1. Kinetic Study
  - 11.5.2. Kinematic Study
- 11.6. Radiological Examination
  - 11.6.1. General Considerations
  - 11.6.2. Main Findings and Interpretation
- 11.7. Ultrasound Examination
  - 11.7.1. General Considerations
  - 11.7.2. Main Findings and Interpretation
- 11.8. Advanced Diagnostic Imaging Techniques
  - 11.8.1. Magnetic Resonance
  - 11.8.2. Computerized Tomography
  - 11.8.3. Gammagraphy
- 11.9. Introduction to Treatment
  - 11.9.1. Conservative Medicine Therapies
  - 11.9.2. Surgical treatment
- 11.10. Clinical Examination in Ruminants, Swine and Camelids
  - 11.10.1. Ruminants (Cattle, Sheep) and Camelids (Camels, Alpacas and Llamas)



11.10.2. Swine (Pigs, Wild Boar)

## Module 12. Main Musculoskeletal Pathologies in Large Species: Ruminants, Swine and Equids

- 12.1. Articular Pathology
  - 12.1.1. Classification
  - 12.1.2. Etiology
  - 12.1.3. Main Joints Affected in Sport Horses
  - 12.1.4. Diagnosis
  - 12.1.5. Treatment Management
- 12.2. Maladaptive Bone Pathology
  - 12.2.1. Etiology
  - 12.2.2. Diagnosis
  - 12.2.3. Treatment Management
- 12.3. Tendon Pathology
  - 12.3.1. Etiology
  - 12.3.2. Main Areas Affected in Sport Horses
  - 12.3.3. Diagnosis
  - 12.3.4. Treatment Management
- 12.4. Ligament Pathology
  - 12.4.1. Etiology
  - 12.4.2. Main Areas Affected in Sport Horses
  - 12.4.3. Diagnosis
  - 12.4.4. Treatment Management
- 12.5. Muscular Pathology
  - 12.5.1. Etiology and Classification
  - 12.5.2. Diagnosis
  - 12.5.3. Treatment Management
- 12.6. Head, Dorsum and Pelvis Pathologies:
  - 12.6.1. Cervical Pathology
  - 12.6.2. Thoracic-Lumbar Pathologies:
  - 12.6.3. Lumbo-Sacral Pathologies
  - 12.6.4. Sacroiliac Pathology
- 12.7. Podotrochlear Pathologies. Palmar Hoof Pain
  - 12.7.1. Etiology
  - 12.7.2. Clinical Signs
  - 12.7.3. Diagnosis
  - 12.7.4. Treatment Management
- 12.8. Conservative Therapy and Therapeutic Farriery
  - 12.8.1. Nonsteroidal Anti-Inflammatories
  - 12.8.2. Corticosteroids
  - 12.8.3. Hyaluronic Acid
  - 12.8.4. Glycosaminoglycans and Oral Supplements
  - 12.8.5. Bisphosphonates
  - 12.8.6. Polyacrylamide Gel
  - 12.8.7. Other treatments
  - 12.8.8. Therapeutic Farriery
- 12.9. Regenerative Biological Therapy
  - 12.9.1. Use of Mesenchymal Cells
  - 12.9.2. Autologous Conditioned Serum
  - 12.9.3. Autologous Protein Solution
  - 12.9.4. Growth Factors
  - 12.9.5. Platelet-rich Plasma
- 12.10. Main Musculoskeletal Pathologies in Ruminants, Camelids and Swine
  - 12.10.1. Ruminants (Cattle, Sheep) and Camelids (Camels, Alpacas and Llamas)
  - 12.10.2. Swine (Pigs, Wild Boar)

## Module 13. Arthroscopy, Bursoscopy and Tenoscopy in Large Species: Ruminants, Swine and Equids

- 13.1. Fundamentals and of the Arthroscopy Technique. Arthroscopy Instruments and Equipment
  - 13.1.1. Start of Veterinary Arthroscopy
  - 13.1.2. Arthroscopy Specific Material
  - 13.1.3. Arthroscopy Technique
    - 13.1.3.1. Patient Preparation
    - 13.1.3.2. Insertion and Position of Instruments
    - 13.1.3.3. Triangulation Technique
    - 13.1.3.4. Arthroscopic Diagnosis and Techniques
- 13.2. Arthroscopic Indications and Technique for the Metacarpo/Metatarsophalangeal Joint
  - 13.2.1. Indications
  - 13.2.2. Arthroscopic Exploration of the Dorsal Recess and Palmar/Patellar Recess
  - 13.2.3. Arthroscopic surgery of the dorsal recess
    - 13.2.3.1. Fragmentation and Osteochondral Fragments
    - 13.2.3.2. Use of Arthroscopy in the Treatment of Condylar Fractures and First Phalangeal Fractures
    - 13.2.3.3. Villonodular Synovitis
  - 13.2.4. Arthroscopic Recessopalmar/Plantar Surgery
    - 13.2.4.1. Removal of Osteochondral Fragments
- 13.3. Indications and Arthroscopic Technique of the Carpus
  - 13.3.1. Indications
  - 13.3.2. Arthroscopic Exploration of the Antebrachicarpal (radiocarpal) Joint
  - 13.3.3. Arthroscopic Exploration of the Intercarpal Joint
  - 13.3.4. Arthroscopic Surgery of Antebrachicarpal and Intercarpal Joints
    - 13.3.4.1. Fragmentation and Osteochondral Fragments
    - 13.3.4.2. Ligament Lacerations
    - 13.3.4.3. Biarticular Fractures
  - 13.3.5. Arthroscopic Examination of the Carpal Joint in Ruminants
- 13.4. Arthroscopic Indications and Technique for the the Distal and Proximal Interphalangeal Joint
  - 13.4.1. Indications
  - 13.4.2. Arthroscopic Exploration of the Distal Interphalangeal Joint
  - 13.4.3. Arthroscopic Surgery of the Distal Interphalangeal Joint
    - 13.4.3.1. Removal of Osteochondral Fragments
    - 13.4.3.2. Subchondral Cysts of the Third Phalange
  - 13.4.4. Arthroscopic Examination of the Proximal Interphalangeal Joint
  - 13.4.5. Arthroscopic Surgery of the Proximal Interphalangeal Joint
  - 13.4.6. Arthroscopic Examination of These Joints in Ruminants
- 13.5. Arthroscopic Indications and Technique for the Tarsocrural Joint
  - 13.5.1. Indications
  - 13.5.2. Arthroscopic Examination of the Dorsal Recess and Palmar Recess
  - 13.5.3. Arthroscopic Surgery of the Dorsal Recess and PalmarPatellar Recess
    - 13.5.3.1. Osteochondrosisdissecans
    - 13.5.3.2. Fractures
    - 13.5.3.3. Collateral Ligament Injuries
  - 13.5.4. Arthroscopic Examination of the Tarsocrural Joint Ruminants
- 13.6. Arthroscopic Indications and Technique for the Patellofemoral Joint and Femorotibial Joints
  - 13.6.1. Indications
  - 13.6.2. Arthroscopic Examination of the Patellofemoral Joint
  - 13.6.3. Arthroscopic Surgery of the Patellofemoral Joint
    - 13.6.3.1. Osteochondrosisdissecans
    - 13.6.3.2. Fragmentation of the Patella
  - 13.6.4. Arthroscopic Examination of the Femorotibial Joints
  - 13.6.5. Arthroscopic Surgery of the Femorotibial Joints
    - 13.6.5.1. Cystic Lesions
    - 13.6.5.2. Articular Cartilage Injuries
    - 13.6.5.3. Fractures
    - 13.6.5.4. Cruciate Ligament Injuries
    - 13.6.5.5. Meniscal Injuries
  - 13.6.6. Arthroscopic Exploration of the Patellofemoral Joint and Femorotibial Joints in Ruminants

- 13.7. Indications and Arthroscopic Technique of the Elbow, Scapulohumeral and Coccyofemoral Joints
  - 13.7.1. Indications
  - 13.7.2. Evaluation
  - 13.7.3. Osteochondroscapulohumeral
  - 13.7.4. Fractures and Osteochondrosis Dissecans of the Elbow
  - 13.7.5. Soft Tissue and Osteocartilaginous Lesions of the Coxofemoral Joint
- 13.8. Indications and Arthroscopic Technique of the Flexor Digital Sheath, Carpal and Tarsal Canal
  - 13.8.1. Indications
  - 13.8.2. Evaluation
  - 13.8.3. Tenoscopic Surgery
    - 13.8.3.1. Diagnosis and Debridement of Tendon Lacerations
    - 13.8.3.2. Demotomy of Palmar/Plantar Annular Ligament
    - 13.8.3.3. Excision of Osteochondromas and Exostoses
    - 13.8.3.4. Removal of the Accessory Ligament of the SDFT
- 13.9. Indications and Arthroscopic Technique of the Navicular, Calcaneal, and Bicipital Bursae
  - 13.9.1. Indications
  - 13.9.2. Examinations
  - 13.9.3. Bursoscopic Surgery
    - 13.9.3.1. Laceration at the Calcaneal Insertion of SDFT
    - 13.9.3.2. Fragmentation of the Calcaneal Tuberosity
    - 13.9.3.3. Traumatic Bicipital Bursitis
    - 13.9.3.4. Penetrating Injuries of the Bursapodotrochlea
    - 13.9.3.5. Lacerations of the SDFT in the Bursapodotrochlea
- 13.10. Postoperative Care, Complications and Rehabilitation Plans
  - 13.10.1. Postoperative Care
  - 13.10.2. Complications Associated with Synovial Endoscopy Techniques
  - 13.10.3. Postoperative Management Rehabilitation Plans

## Module 14. Musculoskeletal Injuries and Infections in Large Animals; Ruminants, Swine and Equids

- 14.1. Exploration and Wound Types
  - 14.1.1. Anatomy
  - 14.1.2. Initial Assessment, Emergency Treatment
  - 14.1.3. Wound Classification
  - 14.1.4. Wound Healing Process
  - 14.1.5. Factors Influencing Wound Infection and Wound Healing
  - 14.1.6. Primary and Secondary Intention Wound Healing
  - 14.1.7. Particularities in Ruminants and Swine
- 14.2. Tissue Management, Hemostasis and Suture Techniques
  - 14.2.1. Incision and Tissue Dissection
  - 14.2.2. Hemostasis
    - 14.2.2.1. Mechanical Hemostasis
    - 14.2.2.2. Ligatures
    - 14.2.2.3. Tourniquet
    - 14.2.2.4. Electrocoagulation
    - 14.2.2.5. Chemical Hemostasis
  - 14.2.3. Tissue Management, Irrigation and Suctioning
- 14.3. Suturing Materials and Techniques
  - 14.3.1. Materials Used
    - 14.3.1.1. Instruments
    - 14.3.1.2. Suture Material Selection
    - 14.3.1.3. Needles
    - 14.3.1.4. Drainages
  - 14.3.2. Approaches to Wound Suturing
  - 14.3.3. Suture Patterns
- 14.4. Acute Wound Repair
  - 14.4.1. Wound Treatment Medication
  - 14.4.2. Debriding
  - 14.4.3. Hoof Wounds
  - 14.4.4. Emphysema Secondary to Wounds
- 14.5. Repair and Management of Chronic and/or Infected Wounds

- 14.5.1. Particularities of Chronic and Infected Wounds
- 14.5.2. Causes of Chronic Wounds
- 14.5.3. Management of Severely Contaminated Wounds
- 14.5.4. Benefits of the Laser
- 14.5.5. Larvotherapy
- 14.5.6. Cutaneous Fistulas Treatment
- 14.6. Management and Repair of Synovial Wounds, Joint Lavage and Phytitis
  - 14.6.1. Diagnosis
  - 14.6.2. Treatment
    - 14.6.2.1. Systemic and Local Antibiotic Therapy
    - 14.6.2.2. Types of Joint Lavage
    - 14.6.2.3. Analgesia:
  - 14.6.3. Phytitis
    - 14.6.3.1. Diagnosis
    - 14.6.3.2. Treatment
  - 14.6.4. Particularities in Ruminants and Swine
- 14.7. Bandages, Dressings, Topical Treatments and Negative Pressure Therapy
  - 14.7.1. Types and Indications of the Different Types of Bandages and Dressings
  - 14.7.2. Topical Treatment Types
  - 14.7.3. Ozone Therapy
  - 14.7.4. Negative Pressure Therapy
- 14.8. Tendon Lacerations Management and Repair
  - 14.8.1. Diagnosis
  - 14.8.2. Emergency Treatment
  - 14.8.3. Paratendinous Laceration
  - 14.8.4. Tenorrhaphy
  - 14.8.5. Avulsion and Rupture of Tendons in Ruminants
  - 14.8.6. Ligament Lacerations in Ruminants Swine
- 14.9. Reconstructive Surgery and Skin Grafting
  - 14.9.1. Principles and Techniques of Reconstructive Surgery
  - 14.9.2. Principles and Techniques of Skin Grafts
- 14.10. Treatment of Exuberant Granulation Tissue Sarcoid Burns
  - 14.10.1. Causes of the Appearance of Exuberant Granulation Tissue
  - 14.10.2. Treatment of Exuberant Granulation Tissue

- 14.10.3. Sarcoid Appearance in Wounds
  - 14.10.3.1. Wound Associated Sarcoid Type
  - 14.10.3.2. Treatment
- 14.10.4. Burn Treatment

## Module 15. Developmental Diseases: Angular and Flexural Deformities, Osteochondrosis and Subchondral Cyst in Large Species: Ruminants, Swine and Equids

- 15.1. Angular Deformities Etiopathogenesis
  - 15.1.1. Anatomy
  - 15.1.2. Hormonal Factors
  - 15.1.3. Perinatal and Developmental Factors
- 15.2. Diagnosis and Preserved Treatment of Angular Deformities
  - 15.2.1. Clinical and Radiography Diagnosis
  - 15.2.2. Use of Splints, Resins and Fittings
  - 15.2.3. Use of Shockwaves
- 15.3. Surgical Treatment of Angular Deformities
  - 15.3.1. Bone Growth Stimulation Techniques
  - 15.3.2. Bone Growth Delay Techniques
  - 15.3.3. Corrective Osteotomy
  - 15.3.4. Prognosis
- 15.4. Etiopathogenesis and Diagnosis of Flexural Deformities
  - 15.4.1. Congenital
  - 15.4.2. Acquired
- 15.5 Conservation Treatment of Flexural Deformities
  - 15.5.1. Physiotherapy and Exercise Control
  - 15.5.2. Medical Treatment
  - 15.5.3. Use of Splints and Resins
- 15.6. Surgical Treatment of Flexural Deformities
  - 15.5.1. Distal Interphalangeal Joint
  - 15.5.2. Metacarpal/Metatarsal-Falangeal Joint



- 15.5.3. Carpal Joint
- 15.5.4. Tarsal Joint
- 15.7. Osteochondrosis II
  - 15.7.1. Etiopathogenesis
  - 15.7.2. Diagnosis
    - 15.7.1. Location of Lesions
- 15.8. Osteochondrosis II
  - 15.8.2. Treatment
  - 15.8.3. Prognosis
- 15.9. Subchondral Bone Cyst I
  - 15.9.1. Etiopathogenesis
  - 15.9.2. Diagnosis
  - 15.9.3. Location of Lesions
- 15.10. Subchondral Bone Cyst II
  - 15.10.1. Treatment
  - 15.10.2. Prognosis

## Module 16. Preoperative Aspects in Large Species: Ruminants, Swine and Equids

- 16.1. Preparation for Surgery: Decision Making, Operation Risks, Patient Considerations
  - 16.1.1. Surgical Risk
  - 16.1.2. Preoperative Patient Evaluation
- 16.2. Pharmacological Management for On-Site Procedures
  - 16.2.1. Sedation Drugs
  - 16.2.2. Continuous Infusions
  - 16.2.3. Local anesthetics
  - 16.2.4. Containment Systems, Other Considerations
  - 16.2.5. Selection of Procedures to be Performed On Site
- 16.3. General Anesthesia
  - 16.3.1. Inhalation General Anesthesia
  - 16.3.2. Intravenous General Anesthesia
- 16.4. Recovery from General Anesthesia
  - 16.4.1. Management During Recovery
  - 16.4.2. Factors Affecting Recovery
  - 16.4.3. Different Techniques or Installations for Anesthetic Recovery
- 16.5. General Surgical Technique
  - 16.5.1. General Aspects
  - 16.5.2. Basic Manipulation of Surgical Instruments
  - 16.5.3. Tissue Incision, Blunt Dissection
  - 16.5.4. Tissue Retraction and Handling
  - 16.5.5. Surgical Irrigation and Suction
- 16.6. Preparation of the Surgery, Personnel, Patient and Surgical Area
  - 16.6.1. Presurgical Planning
  - 16.6.2. Surgical Attire, Preparation of Surgical Equipment: Gloves, Gowns etc
  - 16.6.3. Preparation of the Patient and Surgical Area
- 16.7. Use of Diagnostic Imaging in Orthopedic Surgery
  - 16.7.1. Diagnostic Imaging Techniques
  - 16.7.2. Diagnostic Imaging in Preparation for Surgery
  - 16.7.3. The Use of Intraoperative Imaging
- 16.8. Disinfection of Material, Sterilization
  - 16.8.1. Cold Disinfection
  - 16.8.2. Packaging the Material
  - 16.8.3. Different Autoclaves and Sterilizing Products
- 16.9. Orthopedic Surgical Instruments in Large Animals
  - 16.9.1. General Instruments in Orthopedics
  - 16.9.2. Arthroscopic Instruments
  - 16.9.3. Osteosynthesis Instruments
- 16.10. The Operating Room for Large Animals
  - 16.10.1. Basic Installations
  - 16.10.2. Importance of the Design of the Operating Room, Asepsis
  - 16.10.3. Technical Specifications of the Advanced Surgical Equipment

**Module 17.** Repairation of Fractures in Large Species: Ruminants, Swine and Equids

- 17.1. Bone Metabolism and Healing
  - 17.1.1. Anatomy
  - 17.1.2. Histological Structure
  - 17.1.3. Bone Healing
  - 17.1.4. Biomechanics of the Bone
  - 17.1.5. Classification of Fractures
- 17.2. Stabilization of Fractures in an Emergency, Decision Making and Transport
  - 17.2.1. Clinical Examination of a Patient With a Suspected Fracture
  - 17.2.2. Stabilization of a Patient With Fractures
  - 17.2.3. Transport of a Patient With a Fracture
  - 17.2.4. Stabilization of Fractures, Decision-Making and Transport of Ruminants (Cattle, Sheep), Camelids (Camels, Alpacas and Llamas) and Swine (Pigs, Wild Boar)
- 17.3. External Coaptation
  - 17.3.1. Placement of Robert Jones Bandages
  - 17.3.2. Placement of Acrylic Casts
  - 17.3.3. Splints, Bandages With Casts and Combinations
  - 17.3.4. Complications of Acrylic Casts
  - 17.3.5. Removal of Acrylic Casts
- 17.4. Reducing Fractures, Management of Soft Tissue in the Approach
  - 17.4.1. Displacements of Fracture Strands
  - 17.4.2. Objectives of the Fracture Reduction
  - 17.4.3. Reduction Techniques
  - 17.4.4. Evaluation of Reduction
  - 17.4.5. Management of Soft Tissues
  - 17.4.6. Histology and Blood Supply of the Skin
  - 17.4.7. Physical Properties and Biomechanics of the Skin
  - 17.4.8. Planning the Approach
  - 17.4.9. Incisions
  - 17.4.10. Wound Closure



- 17.5. Materials for Implants in Senior Animals
  - 17.5.1. Material Properties
  - 17.5.2. Stainless Steel
  - 17.5.3. Titanium
  - 17.5.4. Material Fatigue
- 17.6. External Fixators
  - 17.6.1. Transfixion Casts
  - 17.6.2. External Fixators
  - 17.6.3. External Fixators of Ruminants (Cattle, Sheep), Camelids (Camels, Alpacas and Llamas) and Swine (Pigs, Wild Boar)
- 17.7. Instruments for Inserting an Implant
  - 17.7.1. Plate Contouring Instruments
  - 17.7.2. Instruments for Inserting Screws
  - 17.7.3. Instruments for Inserting Plates
- 17.8. Implants
  - 17.8.1. Screws
  - 17.8.2. Plates
  - 17.8.3. Placement Techniques
  - 17.8.4. Functions of Each Implant
  - 17.8.5. Tension Band
- 17.9. Bone Grafts
  - 17.9.1. Indications
  - 17.9.2. Removal Sites
  - 17.9.3. Complications
  - 17.9.4. Synthetic Bone Grafts
- 17.10. Complications of Inserting an Implant
  - 17.10.1. Lack of Reduction
  - 17.10.2. Incorrect Number and Size of Implants
  - 17.10.3. Incorrect Position of the Implant
  - 17.10.4. Complications Related to the Compression Screw
  - 17.10.5. Complications Related to Plates

## Module 18. Common Orthopedic Surgeries of the Musculoskeletal System in Large Species: Ruminants, Swine and Equids Part I

- 18.1. Fractures of Distal Phalanx and Navicular Bone
  - 18.1.1. Distal Phalanx
    - 18.1.1.1. Causes
    - 18.1.1.2. Classification
    - 18.1.1.3. Clinical Signs
    - 18.1.1.4. Treatment
  - 18.1.2. Navicular Bone Fracture
    - 18.1.2.1. Causes
    - 18.1.2.2. Clinical Signs and Diagnosis
    - 18.1.2.3. Treatment
  - 18.1.3. Digital Neurectomy
  - 18.1.4. Bovine Distal Phalanx Fracture
  - 18.1.5. Bovine Pedal Osteitis
  - 18.1.6. Sepsis of the Common Digital Flexor Tendon Sheath in Ruminants
    - 18.1.6.1. Tenosynoviotomy With Resection of Affected Tissue
- 18.2. Middle Phalanx Fracture
  - 18.2.1. Etiology
  - 18.2.2. Clinical Signs
  - 18.2.3. Diagnosis
  - 18.2.4. Settings
    - 18.2.4.1. Palmar/Plantar Eminence Fractures
      - 18.2.4.1.1. Uni- and Biaxial Fractures
    - 18.2.4.2. Axial Fractures
    - 18.2.4.3. Comminuted Fractures
- 18.3. Proximal Phalangeal and Proximal Interphalangeal Joints
  - 18.3.1. Osteoarthritis
  - 18.3.2. Subchondral Cystic Lesions
  - 18.3.3. Dislocations and Subluxations

- 18.3.4. Fracture Configurations
- 18.3.5. Clinical Signs
- 18.3.6. Diaphyseal Fractures
- 18.3.7. Incomplete Sagittal Fractures
- 18.3.8. Non-Displaced Long Incomplete Sagittal Incomplete Fractures
- 18.3.9. Displaced Complete Sagittal Fractures
- 18.3.10. Frontal Fractures
- 18.3.11. Comminuted Fractures
- 18.4. Metacarpal- Metatarsal Falangeal Joint
  - 18.4.1. Proximal Sesamoid Bone Fractures
    - 18.4.1.1. Mid-Body
    - 18.4.1.2. Basal
    - 18.4.1.3. Abaxial
    - 18.4.1.4. Sagittal
    - 18.4.1.5. Biaxial
  - 18.4.2. Osteoarthritis
  - 18.4.3. Subchondral Cystic Lesions
  - 18.4.4. Dislocation
  - 18.4.5. Tenosynovitis/Desmitis/Constriction of the Annular Ligament
    - 18.4.5.1. Mass Removal
    - 18.4.5.1. Section of the Annular Ligament
    - 18.4.5.1. Tendon Debridement
- 18.5. Metacarpal/Metatarsal Bones
  - 18.5.1. Lateral Condylar Fractures
    - 18.5.1.1. Signs
    - 18.5.1.2. Diagnosis
    - 18.5.1.3. Emergency Treatment
    - 18.5.1.4. Surgery of Displaced Fractures
    - 18.5.1.5. Surgery of Non-Displaced Fractures
  - 18.5.2. Medial Condylar Fractures
    - 18.5.2.1. Open Approach Surgery
    - 18.5.2.1. Minimally Invasive Surgery
  - 18.5.2.3. Post-Surgery Care
  - 18.5.2.4. Prognosis
  - 18.5.3. Transverse Fractures of the Distal Diaphysis of the Third Metacarpal Bone
    - 18.5.3.1. Non-Surgical Treatment
    - 18.5.3.2. Surgical Treatment
    - 18.5.3.3. Prognosis
  - 18.5.4. Diaphyseal Fractures
    - 18.5.4.1. Non-Surgical Treatment
    - 18.5.4.2. Surgical Treatment
    - 18.5.4.3. Prognosis
  - 18.5.5. Distal Physial Fractures
  - 18.5.6. Proximal Articular Fractures
  - 18.5.7. Dorsal Cortical Fractures
    - 18.5.5.1. Non-Surgical Treatment
    - 18.5.5.2. Surgical Treatment
    - 18.5.5.3. Prognosis
  - 18.5.8. Metacarpal/Metatarsal Bone Fractures in Ruminants (Cattle, Sheep) and Camelids (Camels, Alpacas and Llamas)
- 18.6. Rudimentary Metacarpal/Metatarsal Bones
  - 18.6.1. Fractures
  - 18.6.2. Clinical Examination
  - 18.6.3. Diagnosis
  - 18.6.4. Proximal Fractures
    - 18.6.4.1. Debridement
    - 18.6.4.2. Internal Fixation
    - 18.6.4.3. Ostectomy
    - 18.6.4.4. Complete Removal
    - 18.6.4.5. Prognosis
    - 18.6.4.6. Complications
  - 18.6.5. Mid-Body Fractures
    - 18.6.5.1. Non-Surgical Treatment
    - 18.6.5.2. Surgical Treatment
    - 18.6.5.3. Prognosis
  - 18.6.6. Distal Fractures



- 18.6.6.1. Non-Surgical Treatment
- 18.6.6.2. Surgical Treatment
- 18.6.6.3. Prognosis
- 18.6.7. Exostosis
  - 18.6.7.1. Pathophysiology
  - 18.6.7.2. Clinical Examination
  - 18.6.7.3. Diagnosis
    - 18.6.7.3.1. Treatment
    - 18.6.7.3.2. Non-Surgical Treatment
    - 18.6.7.3.3. Surgical Treatment
  - 18.6.7.4. Prognosis
- 18.6.8. Polydactyly in Ruminants and Equidae
- 18.6.9. Neoplasty
- 18.7. Tendon and Ligament Pathologies That Can Be Resolved Surgically
  - 18.7.1. Carporadic Extensor Carpi Radialis Tendon Rupture
    - 18.7.1.1. Pathophysiology
    - 18.7.1.2. Diagnosis
    - 18.7.1.3. Applied
    - 18.7.1.4. Prognosis
  - 18.7.2. Biceps Brachii Tendon and Infraspinatus Tendon Pathologies
    - 18.7.2.1. Treatment
      - 18.7.2.1.1. Biceps Tendon Transection
    - 18.7.2.2. Prognosis
  - 18.7.3. Surgery for Suspensory Ligament Desmopathy in the Forelimb
  - 18.7.4. Surgery of Suspensory Ligament Branches
  - 18.7.5. Suspensory Ligament Damage in Ruminants
  - 18.7.6. Tenectomy of the Medial Head of the Deep Digital Flexor Tendon
  - 18.7.7. Surgery for Suspensory Ligament Dismopathy of the Hind Limb
  - 18.7.8. Intermittent Patella Fixation in Equidae
  - 18.7.9. Patella Fixation in Ruminants
  - 18.7.10. Tears or Avulsions of Collateral Ligaments in Ruminants
  - 18.7.11. Cranial Cruciate Ligament Rupture in Ruminants
    - 18.7.11.1. Peri-Surgical Planning
    - 18.7.11.2. Imbrication of Stifle Joint
    - 18.7.11.3. Cranial Cruciate Ligament Replacement
      - 18.7.11.3.1. With Gluteobiceps Tendon
      - 18.7.11.3.2. With Synthetic Material
      - 18.7.11.3.3. Post-Surgery and Prognosis
- 18.7.12. Damage to Collateral Ligaments of the Stifle
  - 18.7.12.1. Surgery
  - 18.7.12.2. Prognosis
- 18.7.13. Superficial Digital Flexor Tendon Dislocation
- 18.8. Muscle Pathologies That Can Be Resolved Surgically
  - 18.8.1. Fibrotic Myopathy
    - 18.8.1.1. Pathophysiology
    - 18.8.1.2. Diagnosis
    - 18.8.1.3. Applied
    - 18.8.1.4. Prognosis
  - 18.8.2. Arpeo (Equine Reflex Hypertonia)
    - 18.8.2.1. Pathophysiology
    - 18.8.2.2. Diagnosis
    - 18.8.2.3. Applied
    - 18.8.2.4. Prognosis
  - 18.8.3. Third Peroneal
    - 18.8.3.1. Pathophysiology
    - 18.8.3.2. Diagnosis
    - 18.8.3.3. Applied
    - 18.8.3.4. Prognosis
  - 18.8.4. Rupture and Avulsion of the Gastrocnemius Muscles
    - 18.8.4.1. Pathophysiology
    - 18.8.4.2. Diagnosis
    - 18.8.4.3. Applied
    - 18.8.4.4. Prognosis
  - 18.8.5. Aerophagia
    - 18.8.5.1. Pathophysiology
    - 18.8.5.2. Diagnosis
    - 18.8.5.3. Applied
    - 18.8.5.4. Prognosis

## Module 19. Common Orthopedic Surgeries of the Musculoskeletal System in Large Species: Ruminants, Swine and Equids Part II

- 18.8.6. Spastic Paresis
- 18.9. Arthrodesis
  - 18.9.1. Equine Distal Interphalangeal Joint
  - 18.9.2. Arthrodesis of the Distal Bovine Interphalangeal Joint
  - 18.9.3. Proximal Interphalangeal Joint
  - 18.9.4. Metacarpal/Metatarsophalangeal Joint
  - 18.9.5. Of the Carpus
  - 18.9.6. Of the Shoulder
  - 18.9.7. Of Distal Tarsal Joints
  - 18.9.8. Talo-Calcanea
- 18.10. Laminitis and Amputations in Ruminants, Swine and Equidae
  - 18.10.1. Laminitis
    - 18.10.1.1. Deep Digital Flexor Tendon Tenotomy
      - 18.10.1.1.1. At Pastern Level
      - 18.10.1.1.2. At Mid Metacarpal-Metatarsal Level
    - 18.10.1.2. Prognosis
  - 18.10.2. Amputations in Ruminants, Swine and Equidae
    - 18.10.2.1. Bovine Digit Amputation
    - 18.10.2.2. Bovine Extra Digit Amputation
    - 18.10.2.3. Tail Amputation
    - 18.10.2.4. Limb Amputation
    - 18.10.2.5. Specifics in Swine

- 19.1. Carpus
  - 19.1.1. Pathophysiology
  - 19.1.2. Multifragmentary Fractures
    - 19.1.2.1. Pathogenesis
    - 19.1.2.2. Diagnosis
    - 19.1.2.3. Treatment
  - 19.1.3. Accessory Bone Fracture
    - 19.1.3.1. Pathogenesis
    - 19.1.3.2. Diagnosis
    - 19.1.3.3. Treatment
    - 19.1.3.4. Non-Surgical Treatment
    - 19.1.3.5. Surgical Treatment
    - 19.1.3.6. Prognosis
  - 19.1.4. Carpal Hygroma
  - 19.1.5. Radial Distal Exostosis
    - 19.1.5.1. Clinical Examination
    - 19.1.5.2. Diagnosis
    - 19.1.5.3. Treatment
      - 19.1.5.3.1. Non-Surgical Treatment
      - 19.1.5.3.2. Surgical Treatment
    - 19.1.5.4. Prognosis
  - 19.1.6. Dislocation
    - 19.1.6.1. Pathogenesis
    - 19.1.6.2. Diagnosis
    - 19.1.6.3. Treatment
      - 19.1.6.3.1. Non-Surgical Treatment
      - 19.1.6.3.2. Surgical Treatment
    - 19.1.6.4. Prognosis

- 19.1.7. Coronation
  - 19.1.7.1. Pathogenesis
  - 19.1.7.2. Diagnosis
  - 19.1.7.3. Treatment
- 19.1.8. Synovial Osteochondromatosis
- 19.1.9. Circumscribed Calcinosi
  - 19.1.9.1. Pathophysiology
  - 19.1.9.2. Diagnosis
  - 19.1.9.3. Applied
  - 19.1.9.4. Prognosis
- 19.2. Radio and Ulna
  - 19.2.1. Ulna Fracture
    - 19.2.1.1. Anatomy
    - 19.2.1.2. Pathogenesis
    - 19.2.1.3. Diagnosis
    - 19.2.1.4. Treatment
      - 19.2.1.4.1. Emergency Stabilization
      - 19.2.1.4.2. Non-Surgical Treatment
      - 19.2.1.4.3. Surgical Treatment
    - 19.2.1.5. Prognosis
    - 19.2.1.6. Complications
  - 19.2.2. Radius Fractures
    - 19.2.2.1. Anatomy
    - 19.2.2.2. Pathogenesis
    - 19.2.2.3. Diagnosis
    - 19.2.2.4. Treatment
      - 19.2.2.4.1. Emergency Stabilization
      - 19.2.2.4.2. Non-Surgical Treatment
      - 19.2.2.4.3. Surgical Treatment
    - 19.2.2.5. Prognosis
    - 19.2.2.6. Complications
  - 19.2.3. Radial Osteochondroma
    - 19.2.3.1. Pathogenesis
    - 19.2.3.2. Diagnosis
    - 19.2.3.3. Treatment
    - 19.2.3.4. Prognosis
- 19.2.4. Subchondral Cystic Lesions
- 19.2.5. Enostosis-Like Lesions
- 19.3. Humerus Fractures
  - 19.3.1. Anatomy
  - 19.3.2. Greater Tubercle Fracture
    - 19.3.2.1. Diagnosis
    - 19.3.2.2. Treatment
      - 19.3.2.2.1. Non-Surgical Treatment
      - 19.3.2.2.2. Surgical Treatment
    - 19.3.2.3. Prognosis
  - 19.3.3. Fracture of the Deltoid Tuberosity
    - 19.3.3.1. Diagnosis
    - 19.3.3.2. Tratamiento
    - 19.3.3.3. Prognosis
  - 19.3.4. Stress Fractures
    - 19.3.4.1. Diagnosis
    - 19.3.4.2. Treatment
    - 19.3.4.3. Prognosis
  - 19.3.5. Physiological Fractures
  - 19.3.6. Diaphyseal Fractures
    - 19.3.6.1. Diagnosis
    - 19.3.6.2. Treatment
      - 19.3.6.2.1. Non-Surgical Treatment
      - 19.3.6.2.2. Surgical Treatment
    - 19.3.6.3. Prognosis
  - 19.3.7. Supraglenoid Tubercle Fractures
    - 19.3.7.1. Treatment
      - 19.3.7.1.1. Fragment Removal

- 19.3.7.1.2. Internal Fixation
  - 19.3.7.2. Prognosis
- 19.4. Tarsus
  - 19.4.1. Osteoarthritis of the Distal Intertarsal Joints
    - 19.4.1.1. Surgical Treatment
    - 19.4.1.2. Post-Surgery Care
    - 19.4.1.3. Prognosis
  - 19.4.2. Osteoarthritis of Talocalcaneal Joint
  - 19.4.3. Fractures of the Distal Tibia
  - 19.4.4. Talus Bone
    - 19.4.4.1. Trochlear Ridges
    - 19.4.4.2. Sagittal Fractures
  - 19.4.5. Calcaneus
    - 19.4.5.1. Chip Fractures of the Heel Pad
  - 19.4.6. Small Tarsal Bone Fractures
  - 19.4.7. Tarsal Hygroma in Ruminants
- 19.5. Tibia and Femorotibiorotullary Joint
  - 19.5.1. Enostosis-Like Lesions
  - 19.5.2. Stress Fractures
    - 19.5.2.1. Etiology
    - 19.5.2.2. Signs
    - 19.5.2.3. Diagnosis
    - 19.5.2.4. Treatment
  - 19.5.3. Tibial Fissures
    - 19.5.3.1. Clinical Signs and Diagnosis
    - 19.5.3.2. Treatment
  - 19.5.4. Proximal Physeal Fractures
    - 19.5.4.1. Clinical Signs and Diagnosis
    - 19.5.4.2. Treatment
    - 19.5.4.3. Post-Surgery Care
    - 19.5.4.4. Complications
    - 19.5.4.5. Prognosis
  - 19.5.5. Diaphyseal Fractures
    - 19.5.5.1. Clinical Signs and Diagnosis
    - 19.5.5.2. Treatment
    - 19.5.5.3. Post-Surgery Care
    - 19.5.5.4. Complications
    - 19.5.5.5. Prognosis
- 19.6. Femur and Pelvis
  - 19.6.1. Head and Neck Fractures
  - 19.6.2. Third Trochanter Fractures
  - 19.6.3. Diaphysis Fractures
  - 19.6.4. Distal Fractures
    - 19.6.4.1. Prognosis
  - 19.6.5. Pelvis Fractures
    - 19.6.5.1. Clinical Signs
    - 19.6.5.2. Diagnosis
    - 19.6.5.3. Treatment
    - 19.6.5.4. Of the Coxal Tuberosity
      - 19.6.5.4.1. Clinical Signs
      - 19.6.5.4.2. Diagnosis
      - 19.6.5.4.3. Treatment
    - 19.6.5.5. Of the Wing of the Ileum
    - 19.6.5.6. Of the Body of the Ileum
    - 19.6.5.7. Pubis and Ischium
    - 19.6.5.8. Acetabulum
- 19.7. Luxations and Subluxations in Ruminants and Equidae
  - 19.7.1. Distal Interphalangeal Joint
  - 19.7.2. Proximal Interphalangeal Joint
  - 19.7.3. Metacarpal/ Metatarsal Falangeal Joint
  - 19.7.4. Carpus
  - 19.7.5. Scapulohumeral Joint



- 19.7.6. Coxofemoral Joint
- 19.7.7. Dorsal Defect of the Patella
- 19.7.8. Lateral Patella Dislocation in Equidae
- 19.7.9. Of Patella in Calves and Small Ruminants
  - 19.7.9.1. Lateral Capsule Imbrication
  - 19.7.9.2. Transposition of Tibial Tuberosity
  - 19.7.9.3. Sulcoplasty
- 19.7.10. Of the Tarsal Joint
- 19.8. Head
  - 19.8.1. Temporomandibular Joint
    - 19.8.1.1. Condylectomy
  - 19.8.2. Craniomaxillofacial Fractures
    - 19.8.2.1. Incisors, Mandible and Premaxillary
      - 19.8.2.1.1. Diagnosis
      - 19.8.2.1.2. Surgical treatment
      - 19.8.2.1.3. Post-Operative
  - 19.8.3. Fractures of the Skull and Paranasal Sinuses
    - 19.8.3.1. Clinical Signs and Diagnosis
    - 19.8.3.2. Treatment
    - 19.8.3.3. Post-Surgery Care
    - 19.8.3.4. Complications
    - 19.8.3.5. Prognosis
  - 19.8.4. Periorbital Fractures
    - 19.8.4.1. Clinical Signs and Diagnosis
    - 19.8.4.2. Treatment
    - 19.8.4.3. Post-Surgery Care
    - 19.8.4.4. Complications
    - 19.8.4.5. Prognosis
  - 19.8.5. Paranasal Sinus Fistulas
  - 19.8.6. Dehorning
    - 19.8.6.1. Indications
    - 19.8.6.2. Techniques
    - 19.8.6.3. Complications
  - 19.8.7. Frontal Sinus Trepanation in Ruminants
    - 19.8.7.1. Indications
    - 19.8.7.2. Anatomy
    - 19.8.7.3. Clinical Signs
    - 19.8.7.4. Technique
    - 19.8.7.5. Post-Surgery Care and Complications
  - 19.8.8. Rostral Resection of Mandible, Premaxilla and Maxilla
    - 19.8.8.1. Treatment
    - 19.8.8.2. Post-Surgery Care
    - 19.8.8.3. Complications
    - 19.8.8.4. Prognosis
  - 19.8.9. Campylorhinuslateralis
    - 19.8.9.1. Treatment
    - 19.8.9.2. Post-Surgery Care
    - 19.8.9.3. Complications
    - 19.8.9.4. Prognosis
  - 19.8.10. Upper and Lower Prognathism
    - 19.8.10.1. Treatment
    - 19.8.10.2. Post-Surgery Care
  - 19.8.11. Suture Periostitis
    - 19.8.11.1. Diagnosis
    - 19.8.11.2. Treatment
- 19.9. Spinal Column Surgery in Equidae
  - 19.9.1. Considerations of the Patient and Operating Room
  - 19.9.2. Approaches
  - 19.9.3. Incisions Sutures
  - 19.9.4. Anesthetic Recovery

**Module 20. Rehabilitation of Musculoskeletal Injuries in Sport Horses**

## 20.1. Significance of Musculoskeletal Injuries in Sport Horses

## 20.1.1. Introduction

## 20.1.2. Impact of Musculoskeletal Injuries on the Equine Industry

## 20.1.3. Most Common Musculoskeletal Injuries According to the Equestrian Discipline

## 20.1.4. Factors Associated With the Incidence of Injuries in Sport Horses

## 20.2. Physiotherapeutic Assessment of the Horse

## 20.2.1. Introduction

## 20.2.2. Clinical Evaluation

## 20.2.3. Body Alignment Assessment

## 20.2.4. Static Physical Assessment

## 20.2.4.1. Palpation

## 20.2.4.2. Active Mobility Test

## 20.2.4.3. Passive Mobility Tests

## 20.3. Physiotherapeutic Assessment of the Limbs

## 20.3.1. Physiotherapeutic Assessment of the Thoracic Limbs

## 20.3.1.1. Scapula and Scapulohumeral Joint

## 20.3.1.2. Elbow and Forearm Joint

## 20.3.1.3. Carpal Joint and Shank

## 20.3.1.4. Distal Joints: Metacarpal/Tarso-Falangeal, Proximal Interphalangeal, Distal Interphalangeal

## 20.3.2. Physiotherapeutic Assessment of the Pelvic Limbs

## 20.3.2.1. Coxofemoral and Rump Joints

## 20.3.2.2. Stifle and Leg Articulation

## 20.3.2.3. Tarsal Joint

## 20.4. Physiotherapeutic Assessment of the Head of Vertebral Column

## 20.4.1. Physiotherapeutic Assessment of the Head

## 20.4.1.1. Head:

## 20.4.1.2. Hyoid Apparatus

## 20.4.1.3. Temporomandibular Joint

## 20.4.2. Physiotherapeutic Assessment of the Vertebral Column

## 19.9.5. Post-Operative Care

## 19.9.6. Cervical Fractures

## 19.9.6.1. Atlas and Axis

## 19.9.6.2. Subluxation and Atlantoaxial Dislocation

## 19.9.6.3. From C3 to C7

## 19.9.7. Thoracolumbar Fractures

## 19.9.7.1. Dorsal Spinal Processes

## 19.9.7.2. Vertebral Bodies

## 19.9.8. Traumatic Sacral Injury

## 19.9.9. Traumatic Coccygeal Injury

## 19.9.10. Crushed Tail Head Syndrome

## 19.9.11. Developmental Disorders

## 19.9.11.1. Cervical Vertebral Stenotic Spinal Myelopathy

## 19.9.11.1.1. Surgical Treatment

## 19.9.11.1.1.1. Intervertebral Fusion

## 19.9.11.1.1.2. Laminectomy

## 19.9.11.1.2. Complications

## 19.9.11.2. Oxyphytoatlantoaxial Malformation

## 19.9.11.3. Atlantoaxial Subluxation

## 19.9.11.4. Atlantoaxial Instability

## 19.10. Neurosurgery

## 19.10.1. Cerebral Trauma Surgery

## 19.10.2. Peripheral Nerve Surgery

## 19.10.2.1. General Surgical Repair Techniques

## 19.10.2.2. Suprascapular and Axillary Nerve Damage

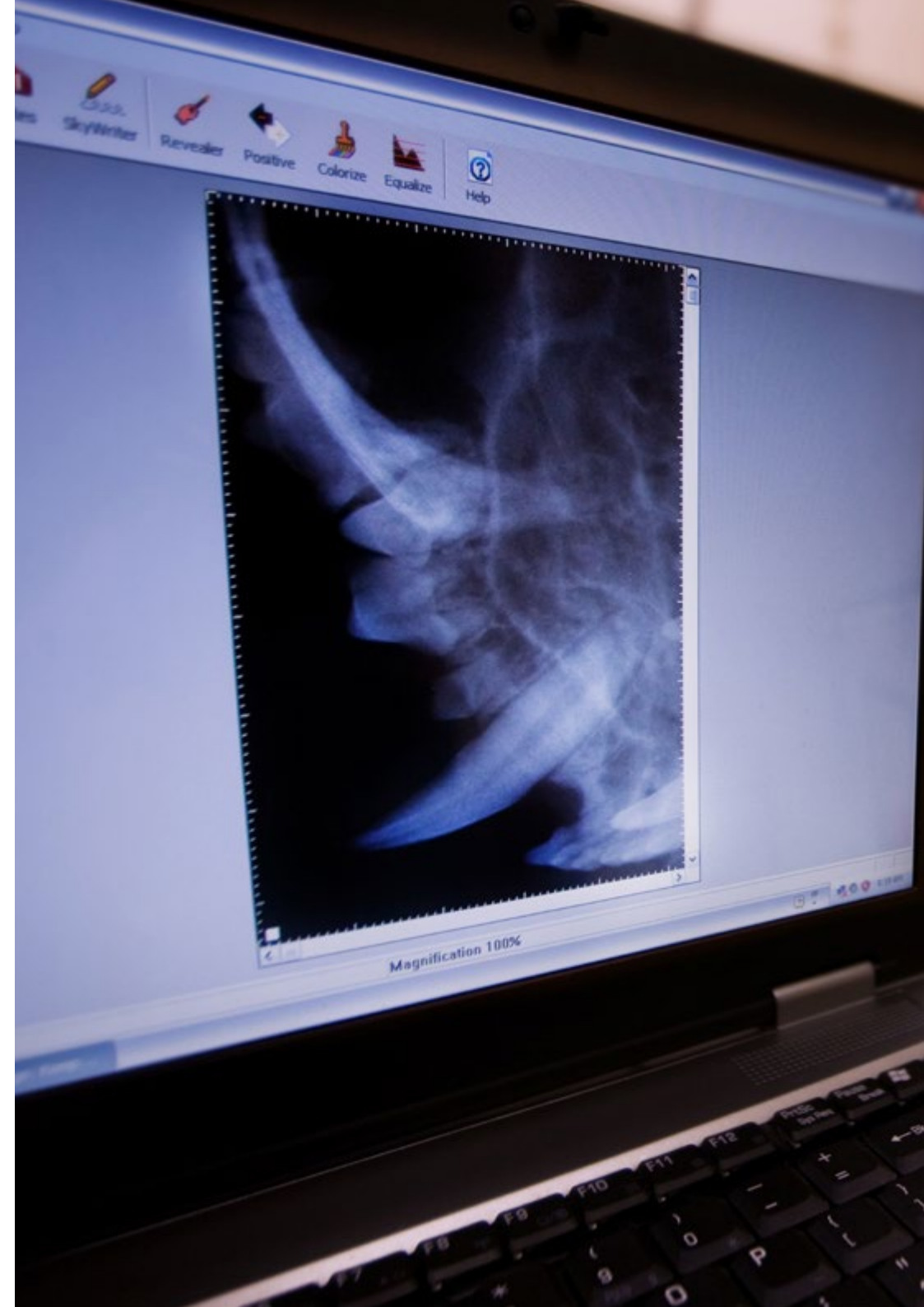
## 19.10.2.2.1. Treatment

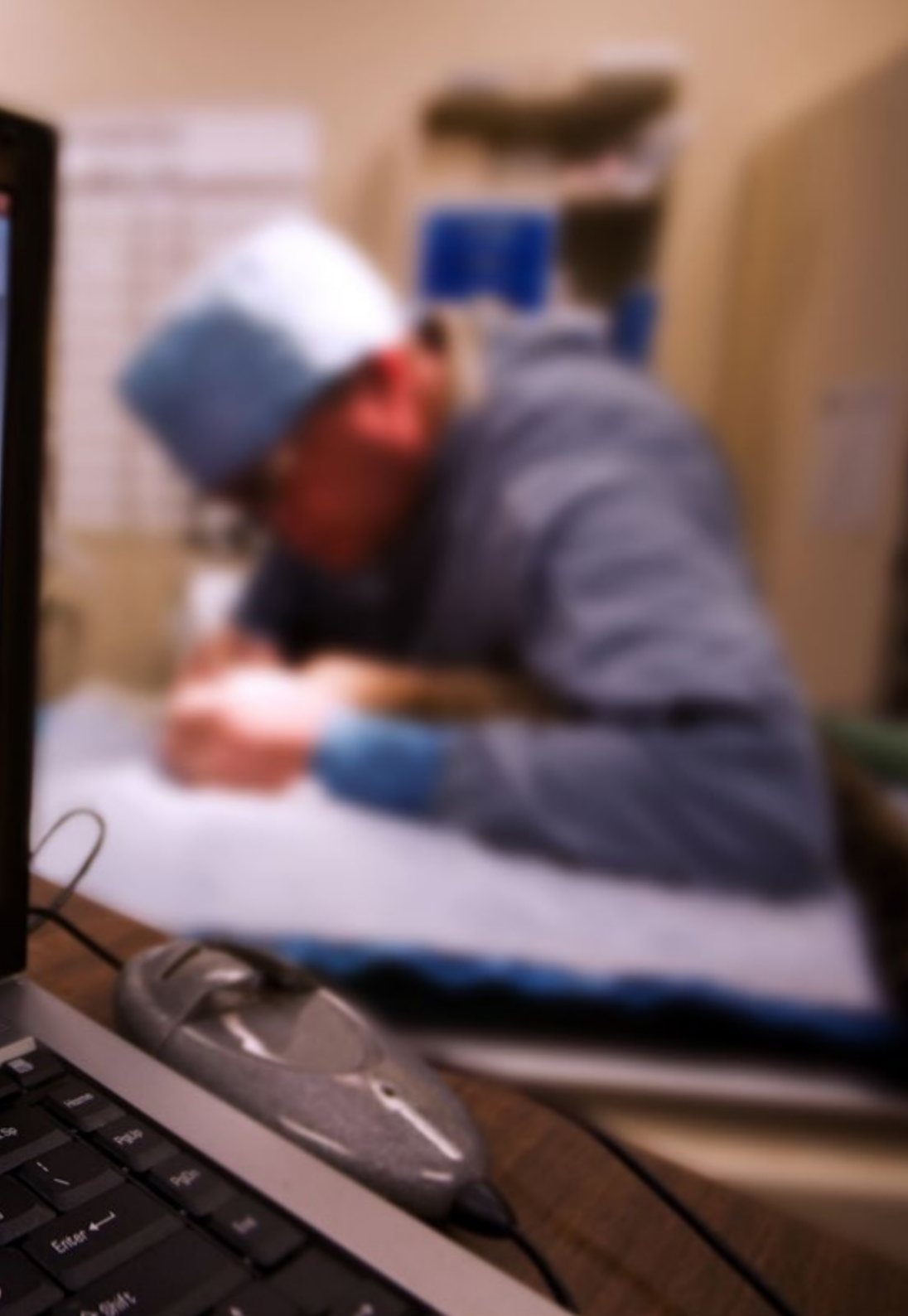
## 19.10.2.2.2. Non-Surgical Treatment

## 19.10.2.2.3. Decompression of the Scapular Nerve

## 19.10.2.2.4. Prognosis

- 20.4.2.1. Cervical Region
- 20.4.2.2. Thoracic Region
- 20.4.2.3. Lumbar Region
- 20.4.2.4. Sacroiliac Joint
- 20.5. Neuromuscular Assessment of the Sport Horse
  - 20.5.1. Introduction
  - 20.5.2. Neurological Evaluation
    - 20.5.2.1. Neurological Examination
    - 20.5.2.2. Evaluation of Cranial Nerves
    - 20.5.2.3. Evaluation of Posture and Gait
    - 20.5.2.4. Assessment of Reflexes and Proprioception
  - 20.5.3. Diagnostic Tests
    - 20.5.3.1. Diagnostic Imaging Techniques
    - 20.5.3.2. Electromyography
    - 20.5.3.3. Cerebrospinal Fluid Analysis
  - 20.5.4. Main Neurological Pathologies
  - 20.5.5. Main Muscular Pathologies
- 20.6. Manual Therapy Techniques
  - 20.6.1. Introduction
  - 20.6.2. Technical Aspects of Manual Therapy
  - 20.6.3. Considerations of Manual Therapy
  - 20.6.4. Main Techniques of Manual Therapy
  - 20.6.5. Manual Therapy in Limbs and Joints
  - 20.6.6. Manual Therapy in the Spine
- 20.7. Electrotherapy
  - 20.7.1. Introduction
  - 20.7.2. Principles of Electrotherapy
  - 20.7.3. Tissue Electrostimulation
    - 20.7.3.1. Activation of Peripheral Nerves
    - 20.7.3.2. Application of Electric Stimulation
  - 20.7.4. Pain control
    - 20.7.4.1. Mechanism of Action





- 20.7.4.2. Indications of Its Use in Pain Control
- 20.7.4.3. Main Applications
- 20.7.5. Muscular Stimulation
  - 20.7.5.1. Mechanism of Action
  - 20.7.5.2. Indications for Use
  - 20.7.5.3. Main Applications
- 20.7.6. Laser Therapy
- 20.7.7. Ultrasound
- 20.7.8. Radiofrequency
- 20.8. Hydrotherapy
  - 20.8.1. Introduction
  - 20.8.2. Physical Properties of Water
  - 20.8.3. Physiological Response to Exercise
  - 20.8.4. Types of Hydrotherapy
    - 20.8.4.1. Aquatic Therapy in Flotation
    - 20.8.4.2. Aquatic Therapy in Semi-Flotation
  - 20.8.5. Main applications of Hydrotherapy
- 20.9. Controlled Exercise
  - 20.9.1. Introduction
  - 20.9.2. Stretching
  - 20.9.3. Core Training
  - 20.9.4. Cavalletti and Proprioceptive Bracelets
- 20.10. Rehabilitation Plans
  - 20.10.1. Introduction
  - 20.10.2. Tendo-Ligament Injuries
  - 20.10.2. Muscle Injuries
  - 20.10.3. Bone and Cartilage Lesions



# 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 you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, 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, in an attempt to recreate the actual conditions in a veterinarian's professional practice.



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

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

1. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
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. The feeling that the effort invested is effective becomes a very important motivation for veterinarians, which translates into a greater interest in learning and an increase in the 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.



*Veterinarians 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 65,000 veterinarians have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. Our teaching method is developed in a highly demanding environment, where the students have a high socio-economic profile and an average age of 43.5 years.

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



#### Latest Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current and procedures of veterinary 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.

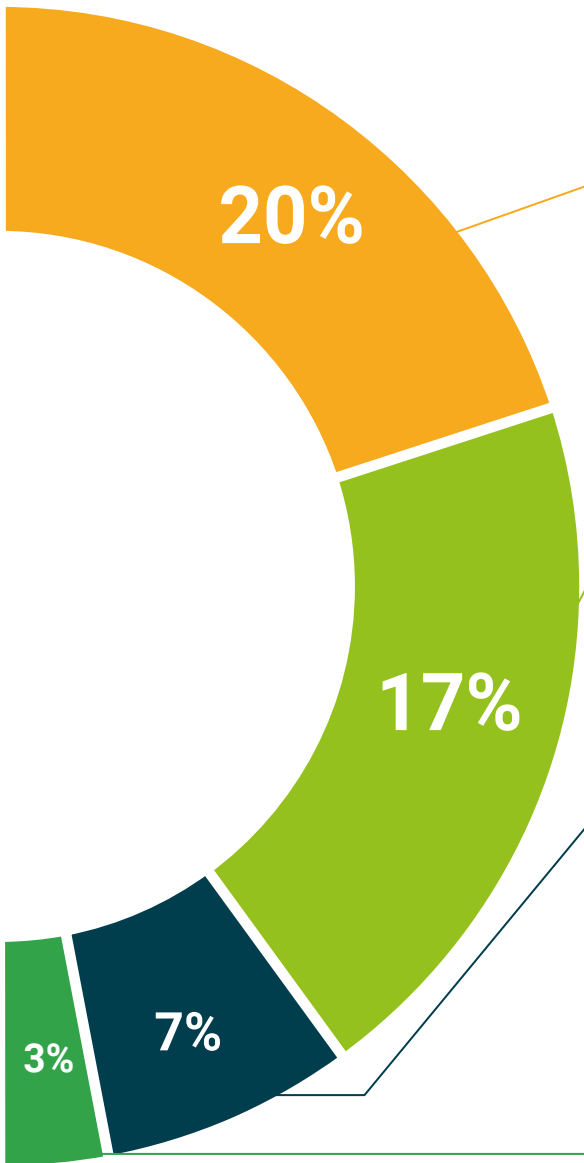
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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 suggesting that observing third-party experts can be useful.

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

This Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species guarantees you, in addition to the most rigorous and up-to-date specialization, access to an Advanced Master's Degree issued by TECH Global University.



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*Include in your education an Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species: a highly qualified added value for any medical professional"*

This program will allow you to obtain your **Advanced Master's Degree diploma in Anesthesia and Orthopedic Surgery in Large Species** 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: **Advanced Master's Degree in Anesthesia and Orthopedic Surgery in Large Species**

Modality: **online**

Duration: **2 years**

Accreditation: **120 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.



**Advanced Master's Degree**  
Anesthesia and Orthopedic  
Surgery in Large Species

- » Modality: online
- » Duration: 2 years
- » Certificate: TECH Global University
- » Credits: 120 ECTS
- » Schedule: at your own pace
- » Exams: online



# Advanced Master's Degree Anesthesia and Orthopedic Surgery in Large Species

