emergencies).
- Discuss the biom pathological joints and recognize them correctly with further investigations (x-R
- Be able to recogn ect therapeutic approach accordin
- Identify the diffe veen a growing and mature skeleton at a basic level.
- Recognise some common congenital deformities.
- Make a different s and select the most appropriate initial investigations.

PATIENT ASSESSM

Proposed outcome
- Perform an accura blem-focused musculoskeletal history.
- Perform a targete keletal physical examination.
- Select the most a nitial investigations
- Communicate fin

Physical Examinati
- Perform a screening examination e.g. GALS (Gait, Arms, Legs, Spine)
- Examine main joints and spine, including specific tests for pathology.
- Examine an acutely injured patient, including a focused neurological examination.
- Interpre

Discuss traumatological complications and emergencies: compartment syndrome, infections, neurovascular compromission.

Regional Traumatology

Spine traumatology: Spinal fracture / spinal trauma, Post-traumatic spinal deformities - Describe region-specific fracture complications,principles of fracture treatment, the most common devicesused in fracture fixation

Wrist and hand traumatology: wrist fractures, hand fractures, scaphoid fractures, Metacarpal/phalangeal fractures. Describe principal fractures of the wrist and hand, region-specific fracture complications, principles of fracture treatment, and the most common devices used in fracture fixation

Shoulder and elbow traumatology: Shoulder dislocation, AC joint separation, Clavicle fracture,

- Sacroiliac (SI) joint dysfunction

- Greater trochanteric bursitis

- Describe common indications for using different imaging modalities in common diseases of the hip and pelvis.

Knee

Describe etiopathogenesis, diagnostic approach, clinical and anatomo-pathologic features and main therapeutic strategies of the following pathologies, with the aim of enabling students to perform a differential diagnosis between common causes of knee dysfunction.

- Degenerative joint disease/osteoarthritis (unicompartmental or pan-compartmental)

- Meniscus tears and inherent treatment options

- Anterior cruciate ligament (ACL) tear and inherent treatment

- Medial collateral ligament (MCL) sprain

- Osgood-Schlatter's disease

- Tendinitis of the knee: Iliotibial band syndrome (ITBS), patellar/quadricipital tendonitis, pes anserine tendinopathy.

- Patellofemoral pain syndrome

- Describe common indications for the use of different imaging modalities in common diseases of

- Describe common indications for the use of different imaging modalities in common diseases of Foot and Ankle

Shoulder and elbow

Describe etiopathogenesis, diagnostic approach, clinical and anatomo-pathologic features and main therapeutic strategies of the following pathologies, with the aim of enabling students to perform a differential diagnosis between common causes of shoulder and elbow dysfunction.

- Rotator cuff pathology (tear/strain/tendinopathy)

- Impingement syndrome/subacromial bursitis

- Adhesive capsulitis

- Degenerative joint disease/osteoarthritis

- AC Joint degenerative joint disease /osteoarthritis

- Biceps tendinopathy

- Lateral epicondylitis

- Medial epicondylitis

- Olecranon bursitis

- Ulnar nerve entrapment (cubital tunnel syndrome)

- Elbow osteoarthritis

orthopaedic surgeons. Students should be able to describe the classification of musculoskeletal tumors and the main clinical features and diagnostic paths of the most common malignant and benign tumors, to understand when to suspect the presence of these challenging pathologies.

Classification of benign and malignant tumors

Most common benign bone and malignant tumors: anatomopathological features, signs, symptoms, diagnostic algorithm and principles of multidisciplinary treatment modalities

Soft tissue tumors: anatomopathological features, signs, symptoms, diagnostic algorithm and principles of multidisciplinary treatment modalities

Discuss the diagnostic pathway of a patient with bone tumors

Describe the main interventional radiology procedures applied to bone and joint diseases

Describe the main indications of interventional radiology for bone and joint diseases

Introduction to bone and joint imaging

Learning goals

Discuss the imaging modalities used to diagnose bone and joint diseases.

Describe and recognize the normal appearance of bone and joints, focusing on X-ray.

Describe and recognize the basic X-ray

Describe the treatment options in terms of bisphosphonates, calcium and vitamin Dsupplementation, and other options, including potential side effects.

Describe the basis of articular cartilage pathology, diagnosis and treatment

Describe the basis of soft tissue (tendons, ligaments, muscles, etc) pathology, diagnosis and treatment

Describe the principles of regenerative medicine

Osteoporosis and Osteopenia

Learning goals:

Describe the mechanisms of bone loss leading to osteopenia and osteoporosis;

Discuss the major imaging (X ray, DEXA) and laboratory (Ca, P, PTH, etc) findings that are helpful in the

management of patients with bone loss;

Describe the treatment options in terms of bisphosphonates, calcium and vitamin Dsupplementation, and other options, including the potential side effects

Introduction to physical and rehabilitation medicine

Learning goals:

Rehabilitation in the future: Rehabilitation 2030

Epidemiology

The role of the Physical and Rehabilitation Medicine Physician, Individual Rehabilitation Plan

Diagnostic, therapeutic, and assessment tools in Rehabilitation

Strength and movement assessment in rehabilitation: Strength assessment and improvement, Gait cycle and terminology, Physics and instrumental GA, Gait phases and observational gait analysis, GA Reporting and common orthopaedic gait pattern

Teaching methods
Lectures, given by the most experienced specialists in the field of orthopaedics, will introduce the students to state of the art theory on the most common orthopaedic problems. Lectures will be associated to comprehensive demonstrations on the semeiotic manoeuvres as well as tests for all joint diseases, thus demonstrating how to approach articular malfunction from a clinical aspect.

Textbook
- Henry Willmott Trauma and Orthopaedics at a Glance

ELECTRONIC AND INFORMATIC BIOENGINEERING

Credits: 4 CFU

Objectives

This course provides a comprehensive summary of the main equipment and technologies used in the assessment of patients, data analysis methods and biomechanical data interpretation for clinical and rehabilitative applications. Students will get an overview of state-of-the-art systems available on the market and learn how to apply them in clinical setting.

The main objectives of the course are:

- Description of the main parameters that characterize the motor human function;
- Recall of the physical principles and description of the main equipment/technologies used to measure the parameters of interest;
- description of the methods adopted for the indirect quantification of parameters that cannot be measured directly;
- description of the experimental set-up

Contents

DIAGNOSTIC IMAGING AND RADIOTHERAPY

Credits: 1

Objectives

Provide students with the necessary knowledge and skills to identify and diagnose various bone diseases using different imaging techniques. By the end of this course, students should be able to:

1. Understand the principles and applications of different imaging techniques used in the diagnosis of bone diseases, such as X-ray, CT scan, MRI, and PET scan.
2. Recognize the different types of bone diseases, including osteoporosis, osteoarthritis, bone tumors, and fractures.
3. Learn how to interpret imaging results and correlate them with clinical findings to make accurate diagnoses.
4. Identify the limitations and potential pitfalls of different imaging techniques and know when to use additional imaging modalities.
5. Develop a comprehensive understanding of the role of imaging in the management and treatment

Prerequisites
Knowledge of physics, and neurophysiology are suggested.

Contents
Acquisition and interpretation of electromyographic signals in subjects with motor impairments. This lesson will present the methodologies for acquisition, analysis, and interpretation of surface electromyographic (sEMG) signals in subjects with motor impairments due to neurologic or musculoskeletal disorders. Moreover, different kinds of myoelectric signals acquisition (bipolar sEMG, array or matrix of electrodes etc..) and their integration with other instrumental devices during the execution of functional tasks will be presented. Finally, the adaptation of rehabilitative exercises based on sEMG data will be underlined.

Instrumental analysis of motor performance 1.
This lesson will present the use of dynamometers for the assessment of joint torques in rehabilitation of subjects with motor impairments. A particular emphasis will be put on the arthrogenous muscle inhibition measurement in patients with articular disorders, and on the relevance of this impairment in clinical practice.

Instrumental analysis of motor performance 2.
This lesson will present the use of optoelectronic systems and force platforms for the assessment of joint kinematic and centre of pressure dispA]TJETQ0.000008866 0 594.96 842.04 reW*nBT/F2 12 Tf1 0 0

will be put on the neurophysiological rationale of this approach, and on the characteristics of videos proposed to subjects with motor impairments.

Teaching Methods

The course is organized with frontal lessons. Moreover, students will exploit the possibility to attend the Physiotherapy Unit of Humanitas Hospital (Laboratory of movement analysis or technologies room) in order to observe the application of contents presented during the lessons.

Texts

Slides of the lessons and selected scientific articles delivered during the lessons period.

ASSESSMENT

The final test will consist of multiple-choice questions (with only one correct answer) on all the topics covered during the course and present in the syllabus. The final mark will be proportional to the number of correct answers.