Department of Biomedical Sciences
Physiotherapy Degree Programme

Mechanical conditions of knee hyperextension: hyposthenia, spasticity, other causes

8) Functional activities in the presence of spasticity

Pathophysiology and mechanical characteristics of spasticity. Locomotor activities and functional utilisation of the upper limb in the presence of spasticity of the plantar flexor muscles of the foot, quadriceps, hip adductors, finger flexors, pectoralis major and biceps humerus muscles

9) Functional activities in the presence of balance disorders

Different biomechanics of balance disorders depending on the pathophysiological disorder. Balance disorders and sensory deficits. Relationship between mechanical characteristics of balance disorders and pathophysiology of sensory impairment. Locomotor activities with balance disorders: use of aids and braces.

10) Video 3

Presentation and discussion of a patient presented in a vidst2f1 0 nBT/F2 12 Tf1 0 0 1 4[illegible]Tm0 g0 C

Static lung volumes. Thorax-pulmonary dynamics depending on the level of injury

5) Mechanics of breathing in the surgical patient
Effects of anaesthesia, paralysis and mechanical ventilation on breathing mechanics. Mechanics of breathing in the surgical patient: cardiac surgery, abdominal surgery

INSTRUMENTAL ANALYSIS OF MOVEMENT (1 ECTS)

Dr

stimulation to test spinal circuits. Use of transcranial stimulation to activate corticospinal pathways.

6) Ultrasound
Illustration of the principles behind the ultrasound. Muscle architectural parameters that can be measured under static conditions. Muscle architectural parameters that can be measured under dynamic conditions. Use of elastography to estimate muscle forces. Practical demonstration.

7) Force, moment, pressure
Illustration of the differences between force, moment and pressure. Measurement of moment in isometric, isotonic, isokinetic conditions. Evaluation of voluntary activation using electrical stimulation and force measurements. Use of devices to measure pressure as descriptors of force or muscle activity (e.g. craniocervical flexion test).

8) Combined use of various techniques
Examples of application of the techniques examined in the previous lessons. Examples could be: studying fatigue (force, electromyography, reflexes); studying the effect of experimental pain (force, electromyography, stimulation).

9) Kinematics
Overview on the analysis of joint kinematics (fluoroscopy, magnetic resonance imaging). Methods for kinematic analysis: comparison between goniometers, cameras, inertial sensors. Kinematic evaluations using low-cost technologies.

10) Kinetics and combined use of various techniques
Force platforms. Measurement of centre of pressure. Measurement of reaction forces and inverse kinematics. Examples of the application of techniques examined in previous lessons: gait analysis (kinematics, kinetics, electromyography); estimation of internal knee adduction moment (kinematics, kinetics).

PRESENTATION OF CLINICAL CASES (1 ECTS)

Dr Federico Temporiti

Graduated in Physiotherapy from the University Vita-Salute San Raffaele of Milan in 2014. Temporiti currently works at the Physiotherapy Service and the Movement Analysis Laboratory of the Istituto Clinico Humanitas, as well as at Humanitas University as a Tutor supporting the Physiotherapy degree.

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Teaching material	Lecture slides, available for physiotherapy students on LMS, multimedia material and scientific articles presented during the course

Content

1) Functional assessment of the patient

Functional assessment of the patient, using the elements and steps that characterise the assessment and assigning them a correct order. The lecture will use slides and interactive multimedia material (video illustrating how to conduct a functional assessment).

2) Clinical cases - Videos 1 and 2

Examples of real functional assessments of patients, with emphasis on the logical sequence of what is being assessed. The student is stimulated to grasp the link between the observed deficit and its repercussion in the main activities of daily life (getting up and sitting down from a chair, walking, taking the stairs, etc.).

3) Kinesiology of functional activities performed with the upper limb

Kinesiological analysis of daily life activities performed with the upper limb in the healthy subject (putting a hand on the head/combing, putting a hand in the back pocket of the trousers, putting on a jacket, washing the shoulder with the contralateral upper limb).

4) Pathokinesiology of functional activities performed with the upper limb

Analysis and interpretation of the pathokinesiology of daily life activities analysed in the previous lesson in patients with upper limb problems.

5) Clinical case - Video 3

Clinical case of a patient with an upper limb problem, stimulating the ability to make clinical links between the aspects revealed during the physical assessment and the disability observed in functional activities.

Examination for the Clinical Kinesiology Course. Oral examination for all modules of the Course (Chairman of the Examination Committee: Prof. Roberto Gatti)