Faculty of Health Sciences

Final State Examination Topics

Department: **Clinical Rehabilitation Dept. Study**

Programme: **Physiotherapy – Bachelor study FSE**

Subject: **Medical Rehabilitation and Physiotherapy**

Kinesiology

1. General Kinesiology:

Muscle strength. Definition. Physiology and pathophysiology. Biomechanics. Possibilities of objective assessment and measurement – theoretical, clinical and instrumental.

2. General Kinesiology:

The importance of joint range of motion (ROM) for motor function. Evaluation of active and passive ROM. Factors influencing the quality of measurement and the actual ROM in joints. Determination of angular movements. Relative insufficiency of multi-joint muscles. Practical applications for clinical diagnosis and kinesiotherapy.

3. General Kinesiology:

Basic functions of skeletal muscle. The importance of different modes of muscle involvement for physiological movement - in single muscle (types of contraction) and in muscular synergies (co-contraction, antagonism, synergism, etc.). The contribution of skeletal muscle function in neuromuscular stabilization of the movement segment.

4. General Kinesiology:

The effect of gravity on the human body, including the importance of antigravity muscles. Postural activity and reactivity. Physical and functional (neurophysiological) aspects influencing posture. Possibilities of objective assessment of posture.

5. General Kinesiology:

Muscle tone – kinesiological and pathokinesiological content of hypotonus, hypertonus, spasticity, rigidity. Possibilities of functional coordination (co-activation) of muscles. Explain the concept of "synergistic antagonism" of muscles in a movement segment, examples.

6. General (Patho)Kinesiology:

Theoretical and clinical-empirical categories of joint function disorders. The *barrier* phenomenon. Joint play. Joint blockage and possibilities of its influence. Joint-muscle functional patterns.

7. General (Neuro)Kinesiology:

Functional control of movement on the spinal level. The importance of α-motoneurons, γ-motoneurons, interneurons and autonomic neurons in the motor activity of an individual.

8. Applied Kinesiology:

Principles, execution and interpretation of the myotatic (proprioceptive) reflex. Explanation of the "gamma loop". Practical applications for clinical functional diagnosis and kinesiotherapy.

9. Applied (Patho)Kinesiology:

Functional (reversible) muscle pathology (functional muscle hypertonia, trigger points, muscle shortening, functional hypotonia, inhibition of muscle function).

10. Special Kinesiology:

The human gait. Temporal and spatial characteristics of the main moments of the standing and swing phase. Interpretation of clinical gait analysis results. The most common locomotion disorders.

11. Special Kinesiology:

Bipedal stance. Kinesiological characteristics of kinetics and kinematics of the lower limbs (hip joints), pelvis and trunk. Description of movement strategies in solobalance. Evaluation and examination of stance (Romberg). Pelvic tilt and other relevant parameters in the examination of stance. Trendelenburg/Duchenne symptom.

12. Special Kinesiology:

Structural and functional components of the spinal motion segment (disc, intervertebral joints, ligaments, muscles). Disc hydrodynamics – influence of static and dynamic load. Pathologies of the intervertebral disc.

13. Special Kinesiology:

Chest movements. Kinesiology of the thoracic spine, sternum, individual ribs, diaphragm and other ventilation muscles. Classification of respiratory movements.

14. Special Kinesiology:

Kinesiology and patho-kinesiology of the cervical spine (dynamics of cervical spine and its disorders, function of deep and superficial muscles).

15. Special Kinesiology:

Movements of the functional complex of the shoulder. Mechanics of individual connections of the brachial plexus. Description and significance of the so-called scapulo-humeral rhythm in shoulder plexus mobility. Kinesiology and pathokinesiology of m. biceps brachii.

16. Special Kinesiology:

Static (stabilizing) and dynamic functions of the hip joint. Interpretation of the collodiaphyseal angle and femoral neck anteversion. Muscular and ligamentous components contributing to hip joint stabilization. Kinesiology of hip flexion, extension, and abduction. Trendelenburg test**.**

17. Special kinesiology:

Knee joint motor skills. Muscular stabilization of the knee, functional co-activation of periarticular muscles. Involvement of major muscle groups in knee flexion and extension in open and closed kinematic chain movement. Definition and significance of the so-called knee joint lock.

18. Special Kinesiology:

Basics of elbow and wrist kinesiology. Kinematics of pronation and supination of the forearm, dorsiflexion and duction movements in the wrist. The role of radius, interosseous membrane, proximal and distal radioulnar connections in the mechanics of the upper extremity periphery.

19. Special Kinesiology:

Basics of hand kinesiology. Kinematics of functional connections of carpus and hand, thumb and individual fingers. Importance of interosseal and lumbrical muscles. Basic classification of grips and their characteristics in the most common clinical disorders. Functions of the human thumb. The concept of stereognosia. Ideomotorics of the hand.

20. Special Kinesiology:

Basics of the ankle joint and foot kinesiology. Kinesiology of the talocrural and subtalar joint. Kinesiological content of individual movements: dorsal flexion, plantar flexion, pronation and supination. The importance of different functional groups of the tibial muscles for gait. Functional interpretation of individual foot arches for overall posture and locomotion.

21. Special Kinesiology:

Kinesiology and pathokinesiology of the lumbar spine. Dynamics of lumbar spine and its disorders, function of deep and superficial muscles, stabilization system of the spine.

22. Special Kinesiology:

Kinesiology and pathokinesiology of pelvis. Dynamics and statics of the pelvis, SI joints, pelvic floor muscle function.

23. General (Neuro)Kinesiology:

Functional control of movement at the supraspinal level. The importance of brainstem structures for motor function. Function of the reticular formation. Vestibular system – structure and function.

24. General (Neuro)Kinesiology:

The function and influence of the cerebellum on the motor skills of the individual. The importance of the cerebellum under physiological and pathological conditions in the control of functional movement (neocerebellar syndrome, paleocerebellar syndrome).

25. General (Neuro)Kinesiology:

Functional control of movement at the subcortical level (basal ganglia, thalamus, limbic system). Contribution of each system to the motor activity of the individual. Functional control subcortical circuits. The importance of neurotransmitters – the influence of dopamine on the motor system.

26. General (Neuro)Kinesiology:

Functional control of movement at the cortical level (importance of the primary motor cortex). Pyramidal and extrapyramidal pathways. Ideokinetic motor control.

Physiatry – Balneology

1. Physiatry:

Physiotherapy, physical therapy - definition and division. General indications and contraindications for physical therapy (PT). Indications according to the effect of PT on different stages of musculoskeletal diseases (specify peracute, acute, subacute and chronic stages).

Electrotherapy. Classification of electrotherapy according to the frequency of electric current.

Galvanotherapy. The nature of the effect of galvanic current on tissues, the most commonly used applications, use in modern rehabilitation practice. Iontophoresis - its principles, possibilities and problems of use.

2. Physiatry:

Thermotherapy. Basic categorization and forms of thermotherapy used in practice. The physiological basis of the effect of heat. Indications and usefulness of different forms of positive thermotherapy in patients. Physiology of local and general effects of cold on the human organism. Indications and contraindications. Therapeutic forms of cold application in rehabilitation practice.

3. Physiatry:

Low-frequency electrotherapy. The most common forms of low-frequency currents used in clinical practice. Indications and effect of therapy.

Diadynamic currents. Classification of electrotherapeutic procedures. Biophysical and biological effects. Different forms of these currents, their indications and therapeutic use.

Transcutaneous electroneurostimulation (TENS). Classification of electrotherapeutic procedures and physical definitions and indications. Biophysical and biological effects. Different forms of TENS, their indications and therapeutic use.

4. Physiatry:

Medium-frequency electrotherapy. Basics of biological and clinical effect. The most commonly used forms of medium-frequency currents in rehabilitation. Indications, contraindications, advantages and disadvantages compared to other forms of electrotherapy.

5. Physiatry:

High-frequency electrotherapy. Physical definitions and commonly used high-frequency currents. Biological effect on the tissues of the human body. Indications and use of high-frequency electrotherapy. Short-wave and microwave diathermy. Physical nature, biological effects, indications, contraindications and therapeutic usefulness.

6. Physiatry:

Electrodiagnostics and electrostimulation. Hoorweg-Weiss curve (I/t). The importance of the curve in electrotherapy. Use of the obtained I/t curve data in specific conditions of clinical pathology (denervation - pseudoparesis, reinnervation, etc.). Practical procedure for electrodiagnostics and electrostimulation of denervated muscle (axonal damage of peripheral nerve- axonotmesis and neurotmesis). The importance and use of electrostimulation. Accommodative quotient (AQ) and its use in diagnostics and electrotherapy. Electrostimulation of healthy (non-denervated) muscle. Electrogymnastics of striated muscles. Basic types of currents used, indications, contraindications, therapeutic use.

7. Physiatry:

Mechanotherapy. Physical and biological aspects of the effect of mechanical energy on the tissues of the human body (musculoskeletal system, ligaments) with regard to its applicability in rehabilitation. Different types of mechanotherapy. Therapeutic effect of traction (distraction) on the joints and tissues. Forms of tractions used.

8. Physiatry:

Ultrasound in rehabilitation. Physical-chemical and biological (cellular) nature of ultrasound on human tissues. Main indications and contraindications. Therapeutic use.

9. Physiatry:

Classical massage. Biological basis of the effect of massage as mechanotherapy. Principle and therapeutic significance of individual techniques referred to as classical massage. Indications, contraindications, therapeutic usefulness.

Segmental reflexology massage. Physiological nature and clinical effects of reflex massages in individual segments (sectors) of the human body. Types and forms of reflexive massages used. Description of individual sequences, indications and contraindications, therapeutic use.

10. Physiatry:

Balneotherapy. Division and definition of balneotherapy and its relation to rehabilitation. Physiological and psychosomatic effects of balneotherapy, therapeutic significance in individual (most common) diseases.

Climatotherapy - principle and effects, indications. Therapeutic spas using climatotherapy.

11. Physiatry:

Hydrotherapy. Basic division of hydrotherapy procedures. Physical and biological aspects of hydrotherapy on the human body. Full body hydrotherapy procedures - indications and therapeutic use of individual procedures. Partial and local baths and wraps. Physical and biological effects, therapeutic indications of these procedures in modern rehabilitation.

12. Physiatry:

Phototherapy. Basic classification. Physical and biological principles. Indications and contraindications, the most common forms of phototherapy with infrared and ultraviolet light.

Laser therapy. Origin and biological effects of laser energy used in rehabilitation. Classification of lasers and their therapeutic significance. Indications and contraindications of laser therapy. Biolamp and its rational use in therapy.

13. Physiatry:

Magnetotherapy. Physical nature, biological effects. Use in rehabilitation - indications, contraindications.

Kinesiotherapy and Comprehensive Rehabilitation in Clinical Disciplines

1. Physiotherapy and comprehensive rehabilitation of patients after stroke.
2. Physiotherapy and comprehensive rehabilitation of patients after spinal injuries (transverse spinal cord lesions, vertebral fractures with neurological and non-neurological damage).
3. Physiotherapy and comprehensive rehabilitation of patients with extrapyramidal and cerebellar syndrome.
4. Physiotherapy and comprehensive rehabilitation of patients after amputation.
5. Physiotherapy and comprehensive rehabilitation of patients with chronic low back pain and after neurosurgery for discogenic compressive syndromes in the lumbar spine.
6. Physiotherapy and comprehensive rehabilitation of patients with chronic obstructive pulmonary disease and chronic respiratory disease (cystic fibrosis, bronchial asthma).
7. Physiotherapy and comprehensive rehabilitation of patients with arthritis (degenerative, rheumatoid).
8. Physiotherapy of patients with enthesopathy of the upper limb.
9. Physiotherapy of patients with polyneuropathy of the lower limbs and metabolic diseases.
10. Physiotherapy of patients with peripheral paresis and radiculopathy of the upper limb.
11. Physiotherapy of patients with peripheral paresis and radiculopathy of the lower limb.
12. Physiotherapy of patients after intrathoracic surgery, especially lung surgery.
13. Physiotherapy of patients after intrathoracic surgery, especially cardiac surgery.
14. Physiotherapy of patients after upper limb fractures, shoulder endoprosthesis.
15. Physiotherapy of patients after total hip arthroplasty.
16. Physiotherapy of patients after total knee arthroplasty.
17. Physiotherapy of patients after brachial plexus injuries.
18. Physiotherapy of patients after knee joint injuries.
19. Physiotherapy and comprehensive rehabilitation of patients with arterial hypertension, coronary artery disease and after acute myocardial infarction.
20. Physiotherapy and comprehensive rehabilitation in children with cerebral palsy.
21. Physiotherapy and comprehensive rehabilitation in patients with multiple sclerosis.
22. Physiotherapy of patients with scoliosis.
23. Physiotherapy of patients with cervico-cranial and cervico-brachial syndrome.
24. Physiotherapy of patients with peripheral paresis (plexus) of the facial nerve.
25. Indications and contraindications for physiotherapy of patients with venous insufficiency in the lower limbs.