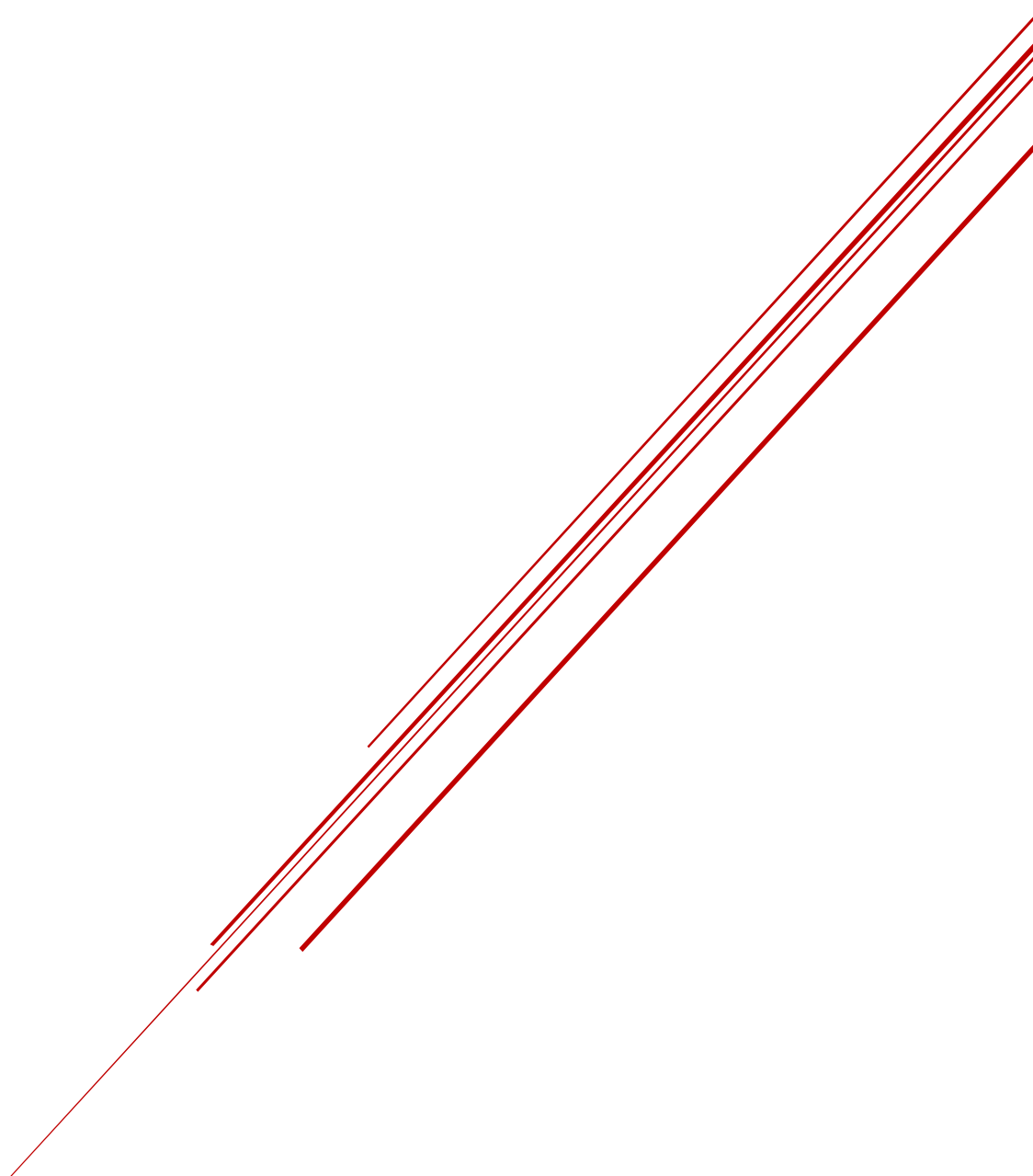




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J. E. PURKYNĚ UNIVERSITY IN ÚSTÍ NAD LABEM
FACULTY OF HEALTH STUDIES

**BASIC PRINCIPLES OF
PHYSIOTHERAPY AND
EXAMINATION METHODS I**

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Ústí nad Labem 2019

Opponents:

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Introduction

The course is designed as theoretical - practical. It provides students with information about basic methods of locomotor system examination and goals of physiotherapy. The knowledge gained in teaching this subject is a prerequisite for successful mastery of physiotherapeutic procedures.

Subject knowledge:

The student is able to define the basic concepts of physiotherapy, knows basic anamnestic data, understands the principles of fitness exercises, can explain the concept of short and long term physiotherapy plan.

Professional skills:

Students are able to realize fitness exercises in individual indication groups with regard to the specifics of age and environment. They are able to apply passive and active movement in basic physiotherapeutic procedures, they can practically practice verticalization, positioning and respiratory physiotherapy. Can use basic means of relaxation.

1 INTRODUCTION TO THE SUBJECT

Quick preview of the chapter

This chapter introduces the basic concepts of rehabilitation and defined principles of rehabilitation. It represents components of comprehensive rehabilitation.

Aim of the chapter

The chapter presents basic information from examination methods and complex information about treatment methods in physiotherapy. It is an introduction to rehabilitation disciplines.

Keywords

Rehabilitation - Physiotherapy - Occupational Therapy - Physiatry - Rehabilitation Engineering - Myoskeletal Medicine

Rehabilitation = coordinated and continuous effort of society to optimally return any disadvantaged individual to active life,

- includes medical, educational, occupational, social, technical, cultural, legislative, economic, organizational and political issues.

Comprehensive rehabilitation of persons with disabilities = multidisciplinary approach to the client, interconnected chain of professionals who participate in the support of comprehensive client development,

- it is devoted to persons whose health due to illness, accident or birth defect, has been reduced to varying degrees and who need special assistance to achieve the highest possible degree of independence,
- A strictly INDIVIDUAL approach to each individual must be followed. It helps in determining work performance.



Initial principles of rehabilitation

- Early initiation of rehabilitation is the basis of its successful fulfillment, leads to the necessary activation and motivation of the client,
- complexity, continuity and coordination are essential for the effective functioning of the rehabilitation process,
- availability of information on rehabilitation to needy persons,
- individual approach of provided care, the content of rehabilitation must correspond to the specific needs of the client,
- multidisciplinary assessment of the client's condition and appropriate rehabilitation measures,
- cooperation in the provision of rehabilitation - close cooperation of the multidisciplinary team during the rehabilitation process.

Prevention in the rehabilitation process

Rehabilitation plays an important role in the prevention of a number of diseases → primary prevention. An essential goal of rehabilitation is the activation of clients who are physically, mentally or sensually disadvantaged in the short or long term (or permanently), physically, mentally or sensory, and who cannot overcome this health disadvantage themselves. In this case, it is a secondary and tertiary prevention of the consequences of disease, injury or birth defects.

Components of comprehensive rehabilitation

Medical rehabilitation: a set of rehabilitation, diagnostic, therapeutic and organizational measures aimed at maximum functional fitness of an individual and creating conditions for its achievement.

- It is provided within the framework of hospital inpatient care, outpatient care and care in specialized therapeutic institutions, including spas,
- the aim is to support the maximum possible recovery of the client, prevent early and late complications, eliminate the functional deficit on the client's personality and social background.
- multidisciplinary team = team of specialists who combine treatment of the same client, usually headed by a specialist, nurse, physiotherapist, occupational therapist, psychologist, speech therapist, social worker,... the client's family plays a special role.

Individual fields of medical rehabilitation:

- **physiotherapy** = therapeutic procedures using different forms of energy to treat pathological conditions, it deals in particular movement system, its diagnosis, treatment and prevention of its disorders,

- **ergotherapy** = a profession that seeks, through meaningful employment, to preserve and use the abilities of the individual needed to cope with normal daily, work, leisure and recreational activities for persons of all ages with various types of disability (physical, sensory, mental, mental or social disadvantage); uses specific methods and techniques, training of specific skills, counseling or customizing the environment
- **physiatry** = physical medicine, medical field using various types of physical stimuli (energy: kinetic, mechanical, thermal, chemical, electrical,... and their combinations) for prevention, diagnosis and therapy, including physical therapy, balneology and balneotherapy,
- **rehabilitation engineering** = technical interdisciplinary field dealing with the client's disability with technical aids in order to allow full control to society,
- **myoskeletal medicine** = deals with diagnostics and therapy of functional disorders of the locomotor system, ensures differential diagnostics.

Educational rehabilitation:

the aim is to achieve the highest possible level of education for persons with disabilities and thus promote their independence and involvement in all common activities of social life,

- is implemented through support measures which are different or are provided in addition to pedagogical and organizational measures linked to the education of children, pupils or students without disabilities,
- the main tendency is to integrate and integrate people with disabilities into mainstream schools.

Occupational rehabilitation: prepares and returns people with reduced capacity to work so that they can perform their current or other appropriate job,

- it is based on an assessment of the client's health, working capacity, educational attainment, skills acquired and the labor market situation,
- is provided by an expert group of workers established at each labor office,
- individual occupational rehabilitation plans may include the following elements: counseling, theoretical and practical training for employment, specialized retraining courses, creation of suitable conditions for employment,....

Social rehabilitation: the aim is to ensure existential (material) security, legislative protection, social integration, (re-) socialization of the client,

- the client undergoes the necessary skills training to achieve independence and self-sufficiency to the maximum extent possible with regard to the type and extent of his / her disability,
- it is usually provided in the form of field or outpatient services, if the patient's condition so requires, residential services are also possible,
- social rehabilitation is provided mainly by non-governmental non-profit organizations (civic associations of persons with disabilities), professional medical institutions and foundations.

Summary



Control questions

1. Describe individual fields of medical rehabilitation.
2. What is the goal of social rehabilitation?
3. How is prevention divided in the rehabilitation process?



Notes



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2 ANAMNESIS

Quick preview of the chapter

This chapter discusses the medical history - a set of all data on the patient's health condition, as well as a rehabilitation plan.

Aim of the chapter

This chapter introduces the individual parts of the anamnesis, defines the rehabilitation plan.

Keywords

Anamnesis – short term rehabilitation plan – long term rehabilitation plan

Anamnesis = a set of all data on the patient's health from birth to the present,

- a comprehensive view of the health problems treated by the investigated person,
- takes the form of a controlled interview between the investigator and the patient → it is important to establish a relationship of trust and cooperation.

Principles of taking anamnesis

- Privacy and trust (appropriate and peaceful environment, adequate intimacy, free from external interference),
- sufficient time,
- avoid excessive hypersensitivity / ignorance,
- questions adapted to the client's mental level (child x adult x senior...),
- avoid suggestive questions,
- not to ask multiple questions at the same time,
- to speak clearly and comprehensibly,
- perceive the body language of the client (non-verbal manifestations).



Individual components of the anamnesis

Basic, personal data: client identification (name, surname, personal identification number, address), height, weight, age, current BMI, TF and BP, reason for hospitalization, contact to a close person

Current illnesses: context and causes of health change, chronological order and time of subjective/objective symptoms, detailed description of the character and location of pain,

Personal anamnesis: chronological list of childhood diseases, injuries, operations, complications

Family anamnesis: health status of close relatives (parents or grandparents, siblings, own children), in case of death state age and cause of death

- targeted questions on familial CHD, MI, hypertension, stroke, DM, mental illness, cancer

School anamnesis: type of school education, level of education,

Occupational anamnesis: job classification, questions about workplace ergonomics (desk height, monitor placement,...), questions about possible exposure to harmful substances (infectious, orogenic, allergic,...), questions about stereotyped, repetitive movements,

Social anamnesis: social background (married, widowed, living alone / with partner / children), housing situation (floor, elevator, access to the house, public transport availability),

Gynecological anamnesis: menstrual cycle (menarche, regularity, pain), climacterium (age, hormone replacement), number of births x abortion, gynecological operations (year, type of operation),

Pharmacological anamnesis: enumeration of permanently used medicine, since it was taken, at what dose and how many times a day,

History of allergies): enumeration of allergens (medicines, food, dust, plasters,...),

Sports history: sports history, number of training sessions (daily, weekly), duration of one training session, type of exercise, (non-) presence of compensatory exercise for unilaterally burdensome sports activities,

Abusus: use of tobacco products (duration of use, daily consumption, stop smoker), alcohol, drugs, drug addiction.

Subjective symptoms

- Pain (dolor): intensity, character, location, irradiation, stimulating stimuli, relief positions,...
- fatigue (asthenia), exhaustion (exhaustion),
- insomnia, somnolence (hypersomnia),
- anorexia, thirst,

- nausea,
- dyspnoea
- palpitations (perception of palpitations)
- vertigo;
- heartburn (pyrosis),
- itching (pruritus).

Objective symptoms

- Consciousness disorders: qualitative x quantitative,
- cough (tussis),
- coughing up blood (haemoptysis x haemoptoe)
- vomiting (vomitum),
- hiccup (singultus),
- Swallowing disorders (dysphagia)

Constipation (constipation) x diarrhea,

- blood in stool (enterorrhagia x melena),
- edema (edema),
- urination (oliguria, anuria, polyuria, nocturia, hematuria).

Rehabilitation plan

Rehabilitation plan is compiled INDIVIDUALLY for each client with respect to their age, diagnosis, previous treatment, physical and mental possibilities and associated diseases. The basis for its compilation is a thoroughly taken medical history, kinesiological analysis of the client, or other special tests with regard to the current diagnosis.

A short-term rehabilitation plan includes medical rehabilitation procedures in a given rehabilitation facility over a short period of time (usually not exceeding 3 months). This is a series of specific therapeutic goals that will be met at a specified time and that should be achieved through specific therapeutic procedures. It usually consists of removing swelling and pain, restoring the range of movement, increasing the degree of self-sufficiency, preventing immobilization syndrome, strengthening weakened muscles, stretching shortened muscles and restoring the correct stereotype of walking.

The long-term rehabilitation plan contains other medical procedures necessary for successful fulfillment of the whole process of medical rehabilitation and for eventual transition to other components of comprehensive rehabilitation. It can be planned in a few months/years. A multidisciplinary team based on objective client testing, the course of treatment to date and other relevant data needed to determine long-term prognosis should be involved in its compilation. Most often these include medical rehabilitation procedures following the short-term rehabilitation plan, provision and adjustment of the home environment, regime home measures, design of spa or outpatient treatment.

Summary



Control questions



1. What does the legislative rehabilitation plan include?
2. What other personal history do you know?
3. What is pain?

Notes



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3 BREATHING GYMNASTICS

Quick preview of the chapter

This chapter discusses breathing gymnastics, an integral part of physiotherapy. It deals with division, body positions and its effects on breathing.

Aim of the chapter

This chapter introduces breathing movements and breathing control. It also introduces the positions of the body and its effects on breathing. It describes the division of breathing gymnastics.

Keywords

Breathing - dynamic breathing gymnastics - static breathing gymnastics - mobilization breathing gymnastics

The breathing process is a fully automated activity that can be entered by cortical control. It is one of the basic vital functions that provides the body with sufficient oxygen (O₂) and removal of carbon dioxide (CO₂). The respiratory system also provides non-respiratory functions such as specific immune mechanisms, non-specific protective mechanisms, metabolic, excretion, and phonation functions.

Respiratory disorders can occur not only in respiratory diseases (asthma bronchiale, chronic obstructive pulmonary disease, cystic fibrosis), but also in neurological diseases (morbus Parkinson, stroke, multiple sclerosis), metabolic diseases (obesity), rheumatic diseases (Bechterew Morbus), in traumatic injuries in the thoracic area, after surgery on the thoracic cage (thoracotomy, sternotomy), structural disorders of the musculoskeletal system (scoliosis) and functional disorders of the musculoskeletal system (muscle imbalance).



Breathing movements

Respiratory movements can take place in three torso sectors:

- **lower - abdominal** (from diaphragm to pelvic floor),
- **medium - lower thoracic** (between diaphragm and fifth thoracic vertebra),
- **upper - upper thoracic** (from Th5 to lower cervical vertebrae).

Different breathing movements of the upper and lower ribs can be observed during breathing. Lower ribs move mainly laterolaterally (sideways), upper ribs move anteroposteriorly (anterior-posterior). When inhaled, the chest widens in all directions - laterolateral, anteroposterior and cranio-caudal (vertical). Chest respiratory movements are mainly influenced by the type of chest, body position, muscle activation and tension, etc.

Respiratory movements alternate rhythmically in two phases - **inhale** and **exhale**. These phases are separated by **preinspiration** and **preexpiration**. Preinspiration is a short pause at the end of exhalation, with an inhibitory effect on muscle activity. It follows inspiration, which has an excitatory effect on the muscular activity of the postural-locomotor system. Inhaling involves in particular the diaphragm, which by its activity increases the volume of the thoracic cavity, which creates a **overpressure** (approximately -0.8 kPa) and the air is sucked into the lungs.

At the end of the inhale there is a short pause - preexpiration, during which there is a slight activity of the diaphragm and an excitatory effect on muscle activity. Resting exhalation is a more or less passive process, during which an **overpressure** (approximately 0.33 kPa) occurs and air is expelled from the lungs by releasing accumulated energy in the elasticity of the stretched lungs and chest. Expiration is generally associated with the promotion of **relaxation and relaxation of muscle tension**. Auxiliary expiratory muscles are used for increased physical activity.

Respiratory control - respiratory centers

Human respiratory muscles are innervated by motoneurons located in C4-C8 and Th1-Th7 (in the 1st to 8th cervical spinal segment and in the 1st to 7th thoracic spinal segment). These motoneurons are superior to the so-called respiratory center in the extended spinal cord. It consists of two groups of neurons that inhibit each other: One group, active by inhalation, inhibits the other group active on exhalation and vice versa. (This respiratory center also responds by increasing frequency due to increased body needs.) The respiratory center in the elongated spinal cord is superior to the reticular formation in the elongated spinal cord, which modulates respiratory center activity based on afferent signals from peripheral receptors through various feedback and also signals from higher levels of the brain.

Unlike affecting the heart, it is possible to interfere consciously with breathing: It is possible to hold your breath, affect your breathing rate, etc. But more important in this respect are the automatic mechanisms that control breathing independently. Their functioning is mainly ensured by the autonomic nervous system. Breathing is closely related to the circulatory system. It is also influenced by, for example, coughing and sneezing reflexes,

swallowing, yawning, speaking, singing and various emotional and psychological influences.

Body positions and their influence on breathing

The basic positions are either vertical or horizontal, the other positions are rather modifications of the two basic positions. It is important to ensure the stability of the body in every position.

- **stand:** breathing is limited by the weight of the upper limbs, but is still physiological and most convenient for breathing, as the freedom of the chest and spine is ensured in all directions,
- **sed upright sitting with lowered legs:** pressure of the organs of the abdominal cavity restricts the movement of the diaphragm, especially the upper thoracic respiration is free,
- **child's sitting:** the whole spine is arched in it, the diaphragm movements are again limited, lower thoracic breathing prevails,
- **lying on back:** chest gets into an inspirational position, exhale is more difficult, chest has limited movements in dorsal direction,
- **lying on the stomach:** the chest is fixed on the front with a pad, the diaphragm is in a higher position and thus the inspiration is limited,
- **lying on the side:** fixation of half of the chest on which the client is lying, the other side can expand better (increase breathing movements),
- **HKK located along the body:** stimulation of upper thoracic respiration,
- **HKK placed in candlestick position** (90 ° ABD and 90 ° ZR in shoulder joints, 90 ° FL in elbow joints): supports lower thoracic respiration,
- **raised HKK:** allow more abdominal breathing,
- **sloping surfaces:** they can be used lying down on the back/sides/abdomen, for semi-sitting, used for positioning, for relief, for expectoration.

Breathing gymnastics

Breathing gymnastics can be used to support the exhalation of anesthesia in the early postoperative period, to improve chest mobility, to optimize the breath wave and improve ventilation, or to relax. Individual types of breathing gymnastics are chosen according to the stated goal of therapy.

Principles of breathing gymnastics

- ventilated room,
- blow your nose, remove any secretion from your mouth,
- lightly drink to moisten the mucous membrane,
- relax the tongue muscles (ideally in front of the mirror),
- relaxation of the muscles surrounding the mouth and connecting the nose and upper lip - oronasal frenulum,
- the client should take a comfortable position with the helpers relaxed,
- respiratory muscles,
- the pelvic-spine-head axis (straightening of the axial apparatus) must be maintained,
- each exercise requires full concentration, slow execution,
- between the individual exercises can be chosen relief, rest position of the client with spontaneous breathing, when the client perceives the effect of breathing gymnastics.

Types of breathing gymnastics:

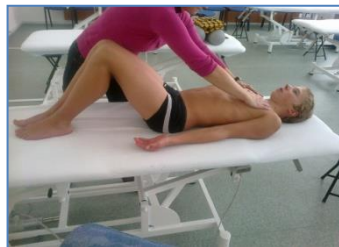
- **Static breathing gymnastics:** focuses on improving ventilation and loss of breathing movements,
 - co-operate with all of them all

- working with back-up movements, inhalation / exhalation depth, active exhalation, breathing rhythm change, pauses, reported exhalation, etc.
 - Everything is practiced without the movements of the upper or lower limbs,
 - can be stored in the safety of the body (lying, sitting, standing),
 - we do not direct the client's breath directly and do not forcefully interfere with the respiratory rate,
- **dynamic breathing gymnastics:** it is based on static breathing gymnastics, with gradually increasingly difficult movements of the upper or lower limbs, movements of the torso, pelvis or head,
- this creates demands on the cardiovascular system of the client and gradual adaptation to increasing physical load,
- **breathing gymnastics mobilization:** formerly known as localized breathing gymnastics, the purpose is to improve chest development (excellence), can be combined with soft tissue treatment and joint mobilization,
- suitably chosen verbal instructions are important,
 - the therapist puts his hands, overball, soft ball or eg TheraBand on the mobilized chest area,
 - during breathing, the pressure on the area may change,
 - the client tries to deliberately target the mobilized area by breath and improve the range of breathing movements,

upper thoracic breathing - lying down on back



Pict. 1 Lying on the back - upper thoracic
Source: own photo documentation



Pict. 2 Lying in the supine position - upper chest - with therapeutic resistance
Source: own photo documentation

Medium thoracic breathing - supine position

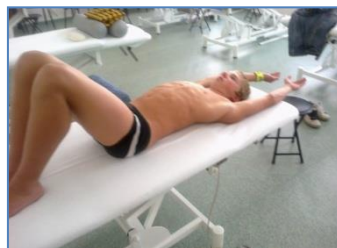


Pict. 3 Lying back position - medium thoracic
Source: own photo documentation



Pict. 4 Lying on the back - medium thoracic - with the therapist's resistance
Source: own photo documentation

lower thoracic breathing



Pict. 5 Lying on the back - lower thoracic
Source: own photo documentation

upper and middle thoracic breathing - supine position



Pict. 6 Lying on the side - upper and middle thoracic
Source: own photo documentation



Pict. 7 Lying on the side - upper and middle thoracic - with the therapist's resistance
Source: own photo documentation

Medium chest breathing - lying down on the stomach



Pict. 8 Lying position on the abdomen - middle thoracic
Source: own photo documentation



Pict. 9 Lying on the stomach - medium thoracic - with the therapist's resistance
Source: own photo documentation

lower chest breathing - lying down on the abdomen



Pict. 10 Lying position on the abdomen - lower thoracic
Source: own photo documentation



Pict. 11 Lying on the abdomen - lower thoracic - with the therapist's resistance
Source: own photo documentation



Pict. 12 Anti-seizure position
Source: own photo documentation



Pict. 13 Relaxation position
Source: own photo documentation

- **fitness breathing gymnastics:** this is a comprehensive lesson with an introductory (warm-up) part, first top (new) exercises, second top (repetitive) exercises, relaxation and final part,
 - is most often practiced within group physical education in spa treatment.

Summary



Control questions



1. What are the principles of breathing gymnastics ?
2. In which sectors are respiratory movements taking place ?
3. Which part of the breath is limited in the supine position?

Notes



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4 ACTIVE MOVEMENT, TYPES OF MUSCLE CONTRACTS

Quick preview of the chapter

This chapter discusses active movement, types of muscle contraction. It defines the basic muscle distribution, movement division and energy intensity reports.

Aim of the chapter

This chapter introduces to student the types of muscles, muscle contractions and the division of movement according to energy intensity.

Keywords

Musculoskeletal system - muscle contraction

Active movements are performed by the client's own activity - his own will and strength. It is the result of the vector product of all forces acting on a given segment, ie the tension of activated muscles and other external and internal forces (gravity, friction, environmental resistance, etc.).

Division of muscles

Agonist = prime mover: main executor of movement; muscle that performs movement in that direction.

Antagonist: muscle performing the opposite movement of an agonist, to perform precise movement, cooperation between agonists and antagonists is required.

Synergist = assistant mover: they participate in the same movement as the agonist, they have an auxiliary function in that movement.

Muscles of fixation (stabilization): they do not participate directly in the movement, they keep the movement segment (fix it, stabilize) in an optimal position.

Neutralizing muscles: they interfere with the unwanted components of movement performed by the main muscles.



Tonic muscles: maintain the body's position in space against gravity,

- are adapted to the postural (anti-gravity) function to ensure stability and fixation of the body when moving,
- are stored in deeper muscle layers,
- more fatigue resistant, easier to regenerate,
- tend to have higher resting tension → tendency to hypertone, shortening.
- Example of tonic muscles: upper fibers of Trapezius, of triceps brachii (caput longum), Biceps femoris, Iliopsoas, hamstrings,...

Phase muscles: they are phylogenetically younger, provide locomotion,

- are placed closer to the body surface,
- are easily tired,
- have a lower resting voltage and are more prone to weakening.
- Example of phasic muscles: gluteus maximus, rectus abdominis, rhomboides minor and major, deltoideus, serratus anterior,...

The locomotor system is a set of components and subsystems that are used to ensure the active movement of the organism in a given environment. In terms of functional anatomy, it can be divided into four components:

1. **regulatory component (regulatory)** - it consists of central and peripheral nervous system,
2. **active component (active)** - it consists of muscles and tendons,
3. **supporting component (passive)** - it consists of bones, joints and ligaments,
4. **supplying component (infrastructural)** - it consists of blood vessels transporting nutrients necessary for the functioning of the locomotive system.

The muscular system is the active subsystem of the musculoskeletal system. It performs its motive function through the controlled production of mechanical energy. It consists of skeletal, smooth or cardiac muscle. Its basic property is the ability to contract.

The axial system is a passive subsystem of the locomotor system. Its function is supportive and protective, it consists of an axial skeleton (spine and joints on the spine, skeletal base of the chest and its joints).

The locomotion system is a subsystem of the locomotor system ensuring the active movement of a living organism in a given space and time. In humans, **locomotion** takes place through the lower limbs, the so-called **bipedal gait**.

The manipulation system is a subsystem of the movement system enabling manipulation with objects around the organism, ie. change the position of objects, their placement, shape, etc. The **manipulator** is usually performed by the upper limbs.

Types of muscle contractions

The axial system is a passive subsystem of the locomotor system. Its function is supportive and protective, it consists of an axial skeleton (spine and joints on the spine, skeletal base of the chest and its joints).

Concentric muscle contraction: muscle shortening occurs, as well as muscle tummy volume increase. The muscles perform positive work and the muscular strength acts in the direction of a moving segment of the body. The result is not only motion performed at a steady speed, but also acceleration - **motion acceleration**

a) **Eccentric muscle contraction:** there is a **stretching** and prolongation of the muscle belly. Skeletal muscle is not able to stretch itself, the cause of its stretching is always a different muscle (antagonist) or external force (burden). The result is a braking motion - **deceleration**.

Isometric muscle contraction is a muscle activity in which there is no movement and the distance between the insertion and the beginning of the muscle remains constant - **static muscle work**. It occurs when maintaining a given position in the joint, when fixing the position of the body when external force is applied, or when active force (pressure, tension) is applied to an object. Isometric contraction decreases blood flow in muscles (blood vessels are compressed by contracted muscle flaps), so the muscle works anaerobically, **increases blood pressure**, so it is advisable to follow the isometry by a short relaxation associated with breathing gymnastics.

Division of active movement

According to **energy intensity** we can divide active movements into:

- **movement in the image:** it is used by athletes before performance (ideomotor training), in physiotherapy it is used in immobile patients, movement visualization activates movement centers in the CNS, heart rate may increase, sufficient concentration of the client is important,
- **active movement assisted, with help, in relief:** it is applied in reduced muscle strength (in the second degree of muscle strength according to the muscle test according to Prof. Janda), physiotherapist, device (MOTomed), hanging system (Redcord®), relief in water, pushing the limb on the mat, etc.
- **active movement:** muscles are able to overcome gravity (3rd degree of muscle strength according to the muscle test by Prof. Janda),
-
- **active movement against resistance:** muscles are able to overcome external resistance - therapist pressure, TheraBand tension, weights (4th and 5th degree of muscle strength according to the muscle test by Prof. Janda).

Further we can divide the active movements into:

- **pendulum movement:** can be used only in certain positions of the body and only in some joints, the muscular force deflects the body

segments from the equilibrium stable position and consequently relaxes the muscles to pendulum movement in the segment in the gravitational field,

- **swing movement:** it takes place by rapid contraction of physical muscles, it is used in physiotherapy rather minimally (eg in Morbus Bechtěrev) because of the risk of microtraumatisation of soft tissues,
- **tensile movement, guided:** it is ensured by the muscular interplay of agonist and antagonist, resulting in slow, smooth and coordinated movement.

Summary

Control questions

1. What is an agonist ?
 2. Which kinds of movement do you know according to energy intensity?
 3. Describe types of muscle contractions.
-

Notes

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5 FITNESS EXERCISES

Quick preview of the chapter

This chapter presents a description of fitness exercises. It includes goals, principles and composition of fitness exercises.

Aim of the chapter

This chapter describes fitness exercises, introduces its principles and composition.

Keywords

Fitness exercise is an active exercise performed by the client himself under the control and instruction of the physiotherapist. Exercise level is chosen by the physiotherapist according to the diagnosis and current health condition of the client and with regard to the desired effect of physical activity. Exercise can take place lying down (back, side, abdomen), sitting or standing. The fitness exercise unit can be done **individually** within the client's bed or in a **group of clients** with the same diagnosis (use in spas, hospitals, homes for the elderly).

The exercise should be rhythmic, the therapist can set the pace by counting the times, or the exercise unit is accompanied by music. We move from simpler exercises to more complicated exercises, and the variety of fitness exercises is also important. If necessary, individual exercises are interleaved elements of breathing gymnastics.

The aims of the fitness exercises:

- client activation, prevention of immobilization syndrome,
- renewal / maintenance / improvement of the range of motion in the joints,
- prevention of pulmonary and vascular complications,
- muscle renewal / maintenance / improvement,
- preparation for verticalization,
- support of regeneration and reparation processes,
- positive influence on the client's mental state,
- support of peristalsis,
- to show the client his possibilities, to improve his condition.



Principles of fitness exercises:

- client preparation (adjust bed and client's position),
- preparation of the environment (ventilate the room),
- choose the appropriate terminology according to the age and mental level of the client,
- speak loud and clear enough,
- burden the client without overloading (checking pulse and respiratory rate values),
- increase the exercise load gradually,
- practice mirroring,
- meet the goal of fitness exercises.

Fitness Unit Composition:

1. Introduction: gaining client concentration, preparation for stress,
2. main part: fulfilling the goal of fitness exercises,
3. conclusion: calming the organism, relaxing elements.

Summary

Control questions

1. Describe the composition of the fitness exercise unit.
2. What are the principles of fitness exercises?

Notes



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6 PASSIVE MOVEMENT

Quick preview of the chapter

This chapter introduces passive movement, its principles and purposes. It informs about passive movement in individual joints of the body.

Aim of the chapter

This chapter introduces passive movement, its purposes and principles. It describes movements in individual joints of the human body.

Keywords

Passive movement - fixation - range of movement

Passive movements are performed without the client's own activity. These are movements performed by another person (therapist) or by the machine (motosplint, MOTOMed) during complete muscle relaxation of the client. It is carried out into a feeling of pain and is often used at the same time long distance pull (joint traction). Passive movements are indicated especially in clients in early postoperative state, in clients with impaired consciousness, in contractures or to induce relaxation.

Purposes of passive movement

- Maintain or increase joint range of motion
- stretch shortened structures,
- avoid contractures,
- reduce the development of spasticity,
- Keeping movement in memory
- nutrition and hydration of articular cartilage,
- Facilitation - stimulation to acquire a motoric image.

Principles of passive movement

- Proper grip (soft but firm),
- correct fixation (painless),
- slow execution of the movement itself,
- simultaneous joint traction,
- respect the feeling of pain, avoid microtraumatisation,
- sufficient number of repetitions.



Upper limb

SHOULDER JOINT

Flexion: lying down on the back / sitting, shoulder girdle fixation from the top, elbow joint can be extended or 90 ° flexion,

RP (range of motion): 90 ° without scapula bend,
150 ° bend scapula + VR (internal rotation) in shoulder joint,
180° straightening kyphosis Thp (thoracic spine).

Extension: lying on the abdomen, head turned to the second side from the examined limb / sitting, fixation of the shoulder girdle from above,

RP: 20 ° without scapula bend,
40 ° with scapula bend.

Abduction: lying down on the back / sitting, shoulder girdle fixation from the top,

RP: 90° without scapula bend,
150with scapula bend + external rotation in the shoulder joint,
180 ° kyphosis straightening Thp.

Horizontal adduction: supine/seated, shoulder girdle fixation, shoulder joint at 90 ° ABD (abduction), elbow joint at 90 ° FL (flexi), forearm in PRO (pronation),

RP: 110 – 120°.

Abduction extension: lying on the abdomen/sitting, shoulder girdle fixation from the top, shoulder joint at 90 ° ABD, elbow joint at 90 ° FL, forearm in PRO, RP: 30°.

External rotation: lying down on the back/abdomen head turned to the second tent from the examined limb, fixation of the shoulder girdle from the top, shoulder joint at 90 ° ABD, elbow joint at 90 ° FL, forearm in PRO, RP: 90°.

ELBOW JOINT

Flexion: lying down on the back/sitting, fixation of the lower end of the humerus from behind, shoulder joint in ADD, forearm in SUP (supination), RP: 140° (influenced by muscle condition).

Extensions: lying on back/abdomen, fixation from the lower end of the humerus, RP: 0 °, may be -10 ° in hypermobility (rather in women).

Supination: supine/seated, lower back humeral fixation above epicondyles, shoulder joint at ADD, elbow joint at 90 ° FL, middle forearm, RP: 90°.

Pronation: lying on back/sitting down, fixation of lower end of humerus from behind over epicondyles, shoulder joint in ADD, elbow joint in 90 ° FL, middle forearm, RP: 90°.

WRIST

Dorsal flexion (extension): lying down on back with arm off pad/seated ADD shoulder joint, elbow joint at 90 ° FL, forearm in PRO leaning on pad, arm off pad, fork fixation above processi styloidei, RP: 90° (keep fingers free).

Palmar flexion: lying down on back with arm off pad /seated ADD shoulder joint, elbow joint at 90 ° FL, forearm in PRO leaning on pad, arm off pad, fork fixation above processi styloidei, RP: 90° (keep fingers free).

Radial duction (abduction): lying on back with arm out of pad/seat ADD shoulder joint, elbow joint at 90 ° FL, forearm in PRO leaning on pad, hand on pad, fork fixation above processi styloidei, RP: 30°.

Ulnar duction (adduction): lying on back with arm out of pad/seat ADD shoulder joint, elbow joint at 90 ° FL, forearm in PRO leaning on pad, hand on pad, fork fixation above processi styloidei, RP: 40 – 60°.

HAND JOINTS

MP (metakarpofalang) joints of the 2. – 5. finger

Flexion: lying on back/seat ADD shoulder joint, elbow joint at 90 ° FL, middle forearm, fixation above metacarp head, RP: do 90°.

IP1 (interfalang) JOINTS OF THE HAND FINGERS

Flexion: supine/seat ADD shoulder joint, elbow joint at 90 ° FL, middle forearm, fixation above IP1, RP: do 120°.

IP2 JOINTS OF THE HAND FINGERS

Flexion: lying on back/seat ADD shoulder joint, elbow joint in 90 ° FL, middle forearm, fixation above IP2, RP: do 90°.

MP JOINT OF THE THUMB

Flexion: lying on back/seat ADD shoulder joint, elbow joint at 90 ° FL, middle forearm, fixation above MP joint of thumb, RP: do 60°.

IP JOINT OF THE THUMB

Flexion: lying on back/seat ADD shoulder joint, elbow joint at 90 ° FL, forearm in middle position, fixation above IP joint of thumb, RP: do 90°.

Lower limb

HIP JOINT

Flexion: lying down on the back, fixation of the hip bone,

RP: 130° s FL in the knee joint (depending on the volume of the abdominal wall),

90° s EX (extension) in the knee joint (depending on the state of hamstrings).

Extensions: lying down on the abdomen, legs off the mat, fixation of the sacrum axes, RP: 15 – 20°.

Abduction: lying down on the back, untrained DK (lower limb) in mild ABD for pelvic stabilization, fixation of the hip bone ridge on the measured side, keeping the trained DK in the middle position,

RP: 45°.

Adduction: lying down on the back, untrained DK (lower limb) in mild ABD for pelvic stabilization, fixation of the hip crest on the measured side, keeping the trained DK in the middle position, its movement goes through the middle line of the body,

RP: 30 °.

External rotation: lying down on the back, EX both DKK (lower limbs) in mild ABD - passive movement is then performed by rolling the DK on the mat,

- supine lying down, 90 ° FL in the hip and knee joints of the trained DK, the second DK is EX,

- lying down on the back, trained DK has lower leg lower than the mat, the second DK is supported by the sole on the mat,

- fixation: spina iliaca anterior superior from above on the untrained side,

RP: 45°.

Internal rotation: lying down on the back, EX both DKK (lower extremities) in mild ABD - passive movement is then performed by rolling the DK on the mat,

- supine lying down, 90 ° FL in the hip and knee joints of the trained DK, the second DK is EX,

- lying down on the back, trained DK has lower leg lower than the mat, the second DK is supported by the sole on the mat,

- fixation: the anterior superior iliac spine from above

RP: 45°.

KNEE JOINT

Flexion: lying down on the stomach, legs off the mat, fixation of sacrum axes,

RP: 130 - 150 ° (depending on muscle condition).

Extensions: lying down on the abdomen, legs off the mat, fixation of the sacrum axes,

RP: 0°.

TARSAL JOINT

Plantar flexion (supine): supine, DK in EX, lower leg with 90 °, fixation above ankles,

RP: 50°.

Dorsal flexion (extension): lying down on the back, DKK in EX, leg with 90 ° clamp, fixation above the ankles,
RP: 15 – 20°.

Supination: lying down on back, HD in EX, lower leg with 90 °, fixation above ankles,
RP: 30°.

Pronation: lying down on back, HD in EX, lower leg with 90 °, fixation above ankles,
RP: 30°.

Inversion: combined movement of PF (plantar flexion) + ADD + SUP legs,

Everze: combined movement DF (dorsal flexion) + ABD + PRO legs,
- their measurement is not unambiguous and is problematic, most often the DP estimation is used in thirds.

Summary

Control questions

1. What are the purposes of passive movement ?
2. What are the principles of passive movement?
3. What are the movements in the shoulder joint?
4. What are the movements in the hip joint?

Notes



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7 POSITIONING

Quick preview of the chapter

This chapter introduces the positioning. It includes positioning both as prevention against pressure sores and positioning in antispastic specimens in a patient with central stroke. Describes a functional hand.

Aim of the chapter

This chapter introduces positioning, part of rehabilitation nursing and serves as prevention of secondary damage that could negatively affect the further course of therapy.

Keywords

Pronation position - supination position - antispastic pattern

Targeted positioning is a part of rehabilitation nursing and serves as prevention of secondary damage that could negatively affect the further course of therapy. Clients **with restricted or lost movement or sensitivity** are indicated for positioning.

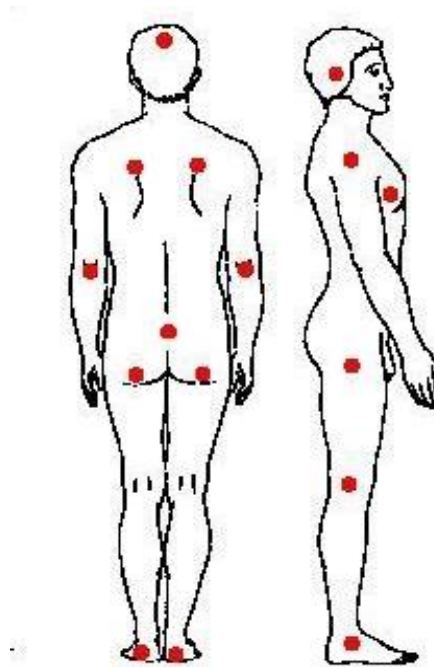
Positioning benefits:

- **support of vigility and client's attention:** change of location brings various stimuli for sensory and motor functions, in stroke it may contribute to alleviating neglect syndrome,
- **prevention of pneumonia:** positioning in combination with appropriate respiratory physiotherapy techniques reduces stagnation of sputum in the airways and thus prevents the development of infection or the formation of a mucus plug,
- **improvement of circulatory functions:** impairment of motor functions is also associated with changes in vasomotion, which increase the risk of embolism, thrombosis, edema and pressure sores, appropriate positioning together with passive movements and client mobilization helps prevent these complications;
- **regulation of muscle tone:** appropriate positions and movements allow to reduce or influence the development of spasticity (positioning in antispastic samples),
- **prevention of muscle contractures:** long-term posture of one position results in painful movement restrictions in the joint, followed by muscle shortening and later muscle contractures.
- **prevention of joint deformities:** frequent changes in the client's position prevent joint subluxations / luxations, pes equinovarus or scoliosis;



- **prevention of decubitus:** positioning allows lightening of the skin, which improves blood circulation and thus prevents skin defects.

Predilection spots for decubitus are most often bone protrusions covered with a smaller layer of muscle and fat. These include the area of sacrum axes, heels, ankles, processi spinosi Thp, nape and others. **Special positioning aids** such as anti-decubitus mattresses and mats, wedges, wreaths, etc. are used to protect and relieve these areas.



Pict. 14 Predilection spots for decubitus

source: uvn.cz

Positioning principles:

- positioning throughout the day
- adhere to regular intervals for changing the position (every 2-3 hours during the day, every 3-4 hours at night),
- protect predilection spots for decubitus,
- the location must not cause pain to the client,
- check skin condition (redness, moisture),
- ensure the correct position of the permanent urinary catheter, infusion line,
- positioning securely and stably.

Positioning methods

In regular positioning, the client should alternate all positions that are suitable for him with regard to his diagnosis and current health condition.

SUPPORT POSITION

This is a supine position. It is best tolerated by clients, but brings a higher risk of pneumonia and decubitus in the pat and os sacrum. Inappropriate positioning of the cervical spine in hyperextension promotes the development of headache.

Description of the position:

- head in slight flexion (supported by a low pillow and with shoulder joints),
- shoulder joints in mild ABD, alternation of ZR and VR,
- elbow joints in semiflexion, alternating with EX (not hyperextension),
- forearm alternately in PRO and SUP,
- the hand is alternately in a physiological and functional position,
- DKK are supported by pillow for semiflexion in hip and knee joints,
- heels lightened in anti-decubitus shoes.

SEMISUPINATIONAL POSITION

It is the middle position between the side and back position. The torso must be rotated backwards and supported by the pillow along its entire length. Make sure that the lower arm is compressed.

Description of the position:

- lower arm of HK in ABD and ZR, elbow joint in semiflexion, forearm in SUP, arm alternately in physiological and functional position,
- upper HK lying on side or slightly behind body and underlay, shoulder in middle position, elbow joint in semiflexion, forearm in PRO, hand alternately in physiological and functional position,
- lower hip joint in mild FL and ZR, knee in 60 ° FL, leg in zero position,
- upper hip joint in mild FL and VR, knee at 60 ° FL,
- a pillow is inserted between the knees and hocks.

SIDE POSITION

The body is perpendicular to the mat. This position has an antispastic effect and may cause drainage of the bronchopulmonary secretion.

Description of the position:

- lower arm in 90 ° FL, elbow joint in semiflexion, forearm in SUP, arm alternately in physiological and functional position,
- upper HK resting loosely on the pillow in front of the body, shoulder joint in ADD and FL, elbow joint in semiflexion, forearm in PRO, hand alternately in physiological and functional position,
- hip and knee joint lower DK in semi-reflex,
- upper DK supported by pillow, hip joint in ZR and 90 ° FL, knee joint in 90 ° FL, feet in zero position.

SEMIPRONATIONAL POSITION

This is the middle position between the side position and the lie on the abdomen. The chest is supported by a pillow, the head is supported by a smaller pillow and slightly rotated.

Description of the position:

- lower arm HK in ABD and VR, elbow joint in EX, arm alternately in physiological and functional position,
- Upper HK embraces pillow in front of torso, shoulder in ABD and FL, elbow joint in semiflexion, forearm in PRO, arm alternately in physiological and functional position,
- hip joint lower DK in EX, knee joint in semi-reflex,
- upper DK supported by pillow, hip joint in ZR and 90 ° FL, knee joint in 90 ° FL, feet in zero position.

HALF-SIT

At this position, 30 - 40 ° FL is in the hip joints. Half-sit can be occupied on a bed or in a wheelchair with the backrest folded down.

Description of the position:

- the head, neck and upper arms are supported by a pillow,
- elbow joints at 90 ° FL, with forearm supported by armrests or pillow,
- shoulder joints in semiflexion and mild ABD and ZR,
- medium wrist and hand.

PRONATIONAL POSITION

It is a lying position on the stomach. Not suitable for artificial lung ventilation clients. Tracheostomy is not a contraindication.

Description of the position:

- the head is rotated sideways,
- the chest may be supported by a pillow,
- the abdomen and pelvis lie flat,
- the distal part of the lower leg and the feet are padded so that the toes do not reach the pad,
- DKK can be in a differentiated position - one DK will be stepped on,

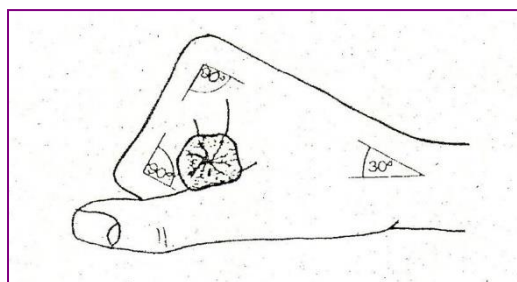
FOWLER'S POSITION

It is half-sit for optimum lung ventilation. This position is indicated in older clients, in patients with heart and lung disease and after chest or abdominal surgery.

FUNCTIONAL HAND

We use:

- Soft positioning glove with a loose pile in the functional position of the joints
- Relaxation splints with incomplete wrist extension and toe semiflexion
- Opponent splints
- Wrist 30-40 ° dorsal flexion
- MP joints 80-90 ° flexion
- IP1 joints 90 ° flex
- IP2 joints 30 ° flexion, thumb to opposition (ADD)



Pict. 15 Functional hand (Kapandji 1987)

POSITIONING IN HEMIPARESES

- **Hemiparesis:** partial paralysis of one half of the body caused by certain neurological diseases (stroke)
- **Positioning:** positioning the human body in healthy or beneficial postures by supporting and supporting to support recovery. It must be safe and painless for the patient

Correct positioning

- correct body posture in stroke is very important.
- bad positioning leads to stiffness, limited range of movement and muscle retraction.
- each position must be stable - instability provokes spasticity.

Correct positioning helps:

- prevent muscular skeletal deformities,
- prevent bed sores,
- prevent circulation problems (blood and lymphatic),
- send normal commands to the brain, unlike the temporary absence of sensory commands caused by a stroke,
- promote recognition and awareness of the affected party

Principles of positioning in hemiparesis

- the position of the person on the bed must be adjusted and changed every 2-3 hours.
- there should be different positions: from lying on your back to lying on your side on both sides, and so on.
- positioning thus leads to a change in the position of the joints and body parts and, as a result, various stimuli will be sent to the brain.
- hip and shoulder positioning is of paramount importance.
- careful positioning of the body must be performed throughout treatment.
- first, the patient is positioned passively, then with help and then independently.
- position can be maintained with soft pillows, rolled up sheets or towels, foam wedges, sand bags, gussets, snakes

Typical spastic stroke pattern

caused by an increase in muscle tone in antigravity muscles during development towards strong spasticity

WERNICKE-MANN'S POSTURE

The arm is pulled back and down, the arm is turned inwards

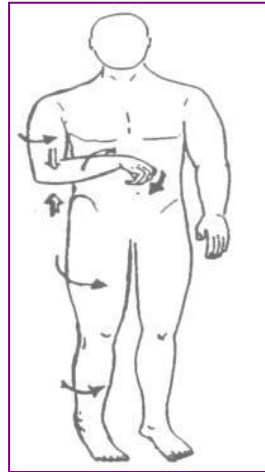
Bending the elbow is usually accompanied by a hand clenched in a fist, the palm facing down

The pelvis is pulled back, the leg is turned inwards

The hip, knee and ankle are straight

The stiff foot points down and is turned in.

Lateral trunk shortening



Pict. 16 Wernicke- Mann's posture (Haladová 2003)

Back position

- The head is facing toward the affected side
- Place a cushion under the shoulders - to raise it forwards.
- Arm resting on pillow, elbow and wrist straightened.
- Hand is palm down, thumb and fingers outstretched.
- Place a pillow under the hip.
- Place a small pillow under the knee.
- A soft cushion can be placed under the foot (pict. 17)



Pict. 17 Positioning in antispastic formulas - lying down on back (Haladová 2003)

Position lying on the side

- do not increase spasticity, suitable for "typical spasm in extension".

Position lying on the affected side

- shoulder is pulled forward, arm turned outwards.
- the elbow is taut (or bent).
- the hand is positioned so that the palm is at the highest.
- the affected leg is taut, the knee slightly bent.
- the unaffected leg is bent (pict. 18).



Pict. 18 Positioning in antispastic formulas - lying down on the affected side (Haladová 2003)

Position lying on the unaffected side

- the affected arm is pulled forward on the pillow.
- elbow and wrist are outstretched, hand and fingers are outstretched.
- the affected lower limb is bent on the pillow and is in neutral rotational leave.
- the head could be supported but not bent to the affected side (pict. 19)

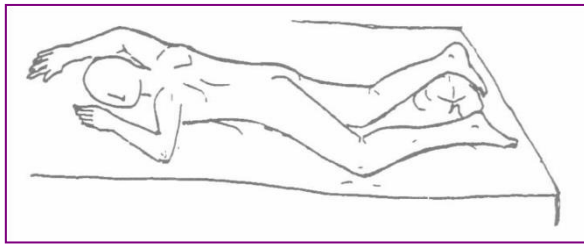


Pict. 19 Positioning in antispastic formulas - lying down on the unaffected side (Haladová 2003)

Position on the stomach

A prone position for a person with a relaxed shoulder joint, without joint constraints or muscle retraction.

- Position facilitates and strengthens the extension pattern of the arm and flexion legs.
- The head is facing toward the unaffected side.
- The affected arm is lifted up and forward, the elbow of the wrist and fingers extended.
- The affected hip is stretched, the unaffected leg is slightly stretched.
- Shin is placed on the pillow (fig. 20)



Pict. 20 Position lying on the stomach - A prone position for a person with a relaxed shoulder joint, without joint constraints or muscle retraction (Haladová 2003)

Summary

Control questions

1. What is the benefit of positioning?
2. What is the Fowler position?
3. Describe Wernicke-Mann's possession.
4. What are your predilection sites?

Notes



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8. RE-EDUCATION OF POSTURAL FUNCTIONS

Quick preview of the chapter

This chapter presents a description of the gradual verticalization: sit – stand - walk. It describes basic types of walking.

Aim of the chapter

This chapter presents a description of the verticalization. It defines sitting, standing and describes various types of walking.

Keywords

Sit - stand - walk

If the client is able to tolerate a higher position than just lying, his **gradual verticalization** is performed. First, the position of the upper body increases. At the same time, the therapist checks the values of heart rate and blood pressure, noting other possible negative responses of the vegetative system (client paleness, sweating, vertigo, nausea,...). If possible, the degree of verticalization is increased until standing.

Benefits of verticalization for the client:

- **vestibular stimulation,**
- **prevention of secondary complications** (pneumonia, decubitus, contractures, etc.),
- **better activation of the diaphragm when stationary** → ventilation parameters are improved,
- **facilitating drainage of bronchopulmonary secretion.**

Benefits of subsequent client mobilization:

- **prevention of muscular atrophy:** atrophy occurs mainly in the area of extensors; in one month, up to 60% of muscle mass can be reduced,
- **prevention of osteoporosis:** it develops after several weeks of inactivity, osteoporosis is at risk for clients more likely to fall (seniors, clients with central disabilities),
- **prevention of degenerative changes in cartilage, connective tissue and joint capsules:** after 3-4 weeks of immobilization, there is a reduction in the volume of hyaline cartilage essential substance and collagen fiber failure, the connective tissue is shortened and joint capsules are shortened.



Gradual verticalization

Depending on the patient's current state of health, we practice gradual verticalization from horizontal to vertical. We require the client as much independence as possible.

We practice with the client during functional training:

- transfers within the bed,
- increased torso position (half-sit),
- roll to the side,
- sitting on bed with DKK in extension,
- sitting on the edge of the bed with lowered legs,
- sitting-body training
- sitting exercise
- training from sitting to standing,
- practicing walking on flat terrain,
- training of walking in frontal and sagittal plane,
- practicing walking up and down stairs.

SIT

Sit is the **vertical position of the pelvis, torso and head** with 90 ° FL in the hip and knee joints (FL can be adjusted according to the client's current needs). The weight of the upper body rests on the sitting bumps. The DKK weight is on the back of the thighs. Alternatively, the client can use the HKK force by pulling on the bar or ladder. It is always necessary to ensure the **stability of the body**, eg backrest or positioning aids. DKK is in contact with the floor or is supported by a box, step.

Types of the sit

- child sit
- sitting with lower legs over the edge of the bed
- orthopnoic sit (position) sed vozky (poloha vozky)
- Brügger's sit
- turkish sit
- Yoga sit

STAND

In preparation for standing, the client trains **the muscle strength of HKK** (especially extensor groups) and exercises **the hand grip function**. It is advisable to include **the stimulation of the DKK soles**. The client first tries to manage only a short standing position due to the risk of **orthostatic** collapse (paleness of skin and mucous membranes, uncertainty, staggering, worsening of reactions to queries, sweating, increase in heart rate) **to syncope** (sudden and short-term loss of consciousness).

WALK

Walking is a basic **locomotive stereotype** characteristic of each individual. This is an alternating cyclic movement of the DKK with the whole body. **The supporting and alternating phases alternate.**

Various types of **supporting aids** are used for walking training, which help to relieve the load of the lower limb and improve stability. It is essential to choose **the appropriate type of aid** with regard to the client's current health condition and his / her motor skills. Then set the **optimum height of the support surface of the aid**. If the support device is indicated due to the need to relieve the DKK load, it is necessary to check the amount and method of relieving by the client.

When using the supporting aids we try to **maintain the correct motor stereotype of walking** and laying and unwinding the feet. Handrails, parallel bars, playpens, special walkways can be used as **fixed aids**. **Portable aids** include various types of walkers, backrests, sticks and crutches.

Walking reeducation:

- weight transfer training,
- steps
- training of stepping mechanisms at the bedside,
- training of stepping mechanisms in space,
- walking under the supervision of a therapist,
- walking alone.

Monitored walking parameters:

- step length,
- speed, pace and rhythm of walking,
- distance of the feet from the center line of the body,
- the angle of deflection of the toes,
- stepping mechanism,
- HKK synkinesis,
- breathing.

Basic types of walking:

- walking with full / partial relief of one DK,
- walking under full load,
- walking with partial relief of both DKK,
- walking or swinging (amputaries without prosthesis),
- walking as paraplegics;
- walk to and from the stairs.

Walking with full strain, partial strain and full load

Walking four-stroke: 1. left crutch - 2. right crutch; 3. ill DK – 4. healthy DK

Walking three-stroke: 1. both crutches - 2. sick DK - 3. healthy DK

Two-stroke walking: both crutches and sick DK at the same time

Walking with partial relief of both DK

Walking four-stroke: 1. left crutch - 2. right DK - 3. right crutch - 4. left DK

Two-stroke walking: 1. right crutch - left DK; 2nd left crutch-right DK

Walking up the stairs

Walking up stairs -

- healthy DK - sick DK comes and crutches at the end

Walking down the stairs

- crutches – sick DK between them – healthy DK comes

Walking mistakes

- laying of feet
- step length
- inclined head
- height of armit crutches and french crutches
- circumduction

Summary

Control questions

1. What basic types of walking do you know?
2. Describe walking down the stairs.
3. What do we practice with the client as part of functional training?

Notes



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8 RELAXATION

Quick preview of the chapter

This chapter presents relaxation, which is a combination of physical and mental relaxation. Includes division of relaxation, relaxation requirements.

Aim of the chapter

This chapter introduces relaxation, defines the distribution of relaxation.

Keywords

Schultz's autogenic training - Jacobson's relaxation

Relaxation is a combination of physical and mental relaxation. It is an awareness of increased muscle tension and subsequent decrease in skeletal muscle tension. Regular exercise of relaxation techniques leads to calm, to improvement of physical and mental self-control and to self-control.

Relaxation requirements:

- quiet and pleasant environment,
- adequate room temperature,
- slow and patient training progress,
- quiet spoken word,
- where appropriate, the appropriate relaxation music.

Partition of relaxation:

1. **total:** for overall recovery of the organism,
2. **local:** for certain muscle groups, certain parts of the body utilize with oscillations, slow passive movements



SCHULTZ'S AUTOGENIC TRAINING

It is a **psychotherapeutic method** that places demands on the client's concentration and cooperation. This method is not suitable across all diagnosis. It is based on the knowledge of the relationship between psychological tension, the functional state of the vegetative nervous system and muscle tension. It takes place **under the verbal guidance of a therapist** who works to induce **a feeling of relaxation, weight, warmth, cold and specifically focuses on the breath, heart rate, abdominal and head area.**

- **Relaxation:** eyes closed, deep inhalation, breath hold, muscles tight, slow exhalation and relaxation,
- **weight:** the image of the weight of the individual body parts, the image of the magnet under the bed that draws the whole body down,
- **warmth:** pleasant feeling of warmth, imagination of immersion of limbs in warm water, easy flow of blood into relaxed muscles and dilated vessels,
- **breath:** concentration on calm, free and undemanding breath, breath not affected, only observed, perception of cooler inhaled air and warmer exhaled air,
- **heartbeat:** focusing on calm and regular heartbeat, perception of pulsation in chest, abdomen, neck, fingertips,
- **belly:** feeling warm in the abdomen after drinking warm tea, spreading feeling warm throughout the abdominal cavity, the idea of pleasantly warm compress,
- **head:** feeling of a cold forehead, the idea of walking a cold morning,
- **End of relaxation:** deep inhalation, exhalation and opening of the eyes, transition to a sitting position with energetic stretching.

JACOBSON'S PROGRESSIVE RELAXATION

It works with the principle of realizing the difference between **muscle contraction** and **muscle relaxation**. There are different design options, the client is always actively involved. This method is based on systematic stretching and relaxing of selected skeletal muscles to the rhythm of 5 seconds of tension and 10 - 15 seconds of relaxation.

The training consists of six basic exercises:

1. release of hands and arms,
2. facial relaxation,
3. relaxation of the neck, shoulders and upper back,
4. release of chest, abdomen and back,
5. loosening the loins, thighs and calves,
6. relaxing the whole body.

ALEXANDER'S TECHNIQUE

This technique teaches to maintain the right body posture, trying to eliminate the unnatural one. It works to prevent common back pain. The exercise is accompanied by a teacher who demonstrates how the client should sit, stand and move with the least possible strain on the muscles. It uses gentle touches and movements to change stereotypes.

RELAXATION OF CHILDREN

It is necessary to use as many illustrative examples as possible instead of complex verbal instructions. It is appropriate to stylize relaxation training into familiar situations (fairy tales, games). Relaxation helps children who are **anxious, restless, suffering from nightmares, speech defects, tics, etc.** You can apply relaxation techniques from children around three years of age.

Summary

Control questions

1. What is Schultz's autogenic training?
2. What is the Alexander method ?

Notes

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