GUIDELINES
FOR STUDENTS
INDEPENDENT WORK
IN THE PRACTICAL CLASSES PREPARING

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Poltava 2016.
THEME BASIS:

Direct electric current of low tension is an adequate irritant for the human organism. Complex biochemical and biophysical processes occur in living tissues of the organism under its influence, providing different physiological reactions, which cause its therapeutic effect.

EDUCATIONAL AIMS:

Student must know:

- Physiological and medical effect of electric current;
- Main indications and contra-indications for the medical usage of galvanization and medicinal electrophoresis;
- Kinds of the electrophoresis;
- Electro medical apparatuses.

Student must be able:

- To prove the necessity of electrical treatment and prescribe proper one (with usage of galvanic current) to the patient;
- To perform the procedures;
- To interpret the procedure effect on organism;
- To combine electrical treatment with other methods of therapy.

Material and methodical theme support: apparatus, tables, slides.

SHORT CONTENT OF THE THEME:

Galvanization – medical application of constant electric current with low power and tension characteristics. Galvanic current normalizes the functional state of central and vegetative neural system, by regulation of the inhibition and stimulation processes in cerebral cortex; improves blood and lymph circulation, assists widening of coronary vessels and improves the functional possibilities of the heart; rises oxygen maintenance in blood; rises the maintenance of glycogen and adenosine diphosphoric acid in myocardium; improves the function of inner secretion glands, influences the excitability of neuromuscular system.

General influence of galvanic current is indicated through neural reflexes. Local effects are: antiphlogistic, metabolic, trophic (under cathode); analgetic, sedative (under anode).

Medicinal electrophoresis – combined action of the electric current and medicinal substances on organism. Those medical substances enter tissues through the undamaged skin or mucous tunic under the action of the electric current.

Kinds of electrophoresis.

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<th>According to method and location of influence</th>
<th>According to kind of electrical energy</th>
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<tr>
<td><em>Through skin:</em> usual (classical)</td>
<td>Galvanophoresis</td>
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<tr>
<td>micro, labile, super</td>
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<tr>
<td><em>Intracavitary, enters through the mucous tunic:</em> intranasal, intraoral, intraocular, intra-aural, intra-intestinal, intravaginal, intrauterine, urocystic.</td>
<td>diadynamophoresis</td>
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<tr>
<td><em>Interstitial</em> (intra-organ)</td>
<td>amplipulsophoresis</td>
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<tr>
<td></td>
<td>aeroionophoresis</td>
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<td></td>
<td>or franklinophoresis</td>
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</tbody>
</table>

REFERENCE CARD FOR STUDENTS WORK
I STAGE: study of biophysical, biological and physiological effect of electric current.

**GALVANIZATION AND ELECTROPHORESIS**

**Acting factor:** constant electric current with low power and tension characteristics

**Effect**

- **biophysical:** Changes of ion correlation in cells, electrolysis, electro osmosis, electrodiffusion, polarization.
- **biological:** Irritation of peripheral neural receptors, changes of electrolyte correlation in cells, pH changes, changes of cellular membrane penetrability, of hydratation degree, of cellular dispersion.
- **physiological:** Vasodilatation, changes in the inhibition and stimulation processes, changes of impulse conduction on cathode and anode, formation of biological active substances, normalization of processes in central and vegetative neural system.

II STAGE: study of medical effect of constant electric current, indications and contra-indications.

**GALVANIZATION AND ELECTROPHORESIS**

**Medical effect: neuro – reflex**

- **Indications:** neurosis, migraine, neurocirculatory dystonia, vasomotorial rhinitis, bronchial asthma, morbus hypertonicus of I – II stages, stable forms of stenocardia, gastritis, duodenitis, ulcer disease, biliary and intestinal dyskinesia, solar plexitis, neuritis, neuralgia, psoriasis, neurodermatitis, functional disorders of pelvic organs.
- **Contra-indications:** acute purulent inflammatory processes, insufficiency of blood circulation of IIb–III stages, morbus hypertonicus of III stage, unstable forms of stenocardia, myocardial infarction, stroke, feverish status, eczema, dermatitis, skin defects, inclination to bleeding, malignant neoplasms, intolerance to electric current.
III STAGE: study of medicinal methods.

REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

I STAGE: Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnesis, objective examination of the patient, study of the analysis results.

II STAGE: Substantiation of the diagnosis, choice of the physiotherapy treatment method.

III STAGE: Clarification of indications and contraindications for galvanization and electrophoresis.

IV STAGE: Choice of a specific treatment method according to the indications. Dosing (determination of the electric current power, procedure duration. Choice of medical substance, kind and electric current polarity for the electrophoresis).

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patient’s condition, temperature, pulse, AP, local manifestations.

VII STAGE: Evaluation of the procedure results at the end of treatment

VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course. (Treatment staging, changing one treatment course to another).

**GALVANIZATION AND ELECTROPHORESIS**

**Medicinal methods**

- **Local**: transversal, longitudinal application of electrodes
- **General**: by Vermel, by Scherbak, by Kassel-Graschenko.
- **Influence on reflexo-segmental zones**: (by Kellat, by Bergonye, by Berganyon), influence on Zaharyins – Geds zones.
MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.

1. Patient A., 30 years old. Diagnosis: chronic gastritis with the hypersecretion function of the stomach. Prescribe the proper electrotherapy to the patient.
2. Patient H., 32 years old. Diagnosis: chronic cholecystitis. Prescribe the proper electrotherapy to the patient.
3. Patient K., 43 years old. Diagnosis: bronchial asthma. Prescribe the proper electrotherapy to the patient.

Standards of tasks solution.

1. Galvanization of epigastric region. The patient lies on back. The laying 12 x 16 cm (with anode) is put on the epigastric region and fixated by the bag with sand. Second laying of the same size (with cathode) is put under the back, transversal to the body, lower then the scapulas. Power of the el. current up to 15 mA, duration of the procedure 15 – 20 min., every day, 10 – 15 procedures.
2. Galvanophoresis of gall-bladder region with magnesium sulphate. The patient lies on back. The laiyng saturated with 5% solution of magnesium sulphate, with sizes 10 x 15 cm and anode are put on the right hypochondrium region. Second laying of the same size and cathode are put transversal under the back. Power of the el. current up to 10 mA, duration of the procedure 15 – 20 min., every day, 10 – 12 procedures.
3. General galvanization by Vermel. Anode and laying with the size of 30 cm² are put on the interscapular space of the patient, while he lies on the back. Bifurcated cathode and layings (with sizes 10 x 15 cm) are put under gastrocnemius muscles. Power of the el. current up to 30 mA, duration of the procedure 20 min., every day or over the day, 10 – 15 procedures.
PRACTICAL SKILLS ACCORDING TO THEME:

1. Examination of the patients with the substantiation of galvanization and electrophoresis prescription.
2. Fill in the procedure cards.
3. Master the technique and methods of galvanization and electrophoresis.
4. Realization of the procedures under the teacher’s control.

THEME: PULSE CURRENT.

THEME BASIS:

Usage of pulse current in modern physiotherapy for treatment of different diseases is very perspective, because impulse action in a certain set regime is same with the physiological rhythms of the functioning organs and systems of the organism. Rhythmic influence of pulse current affects the functional condition of different organs and systems.

EDUCATIONAL AIMS:

Student must know:
- Physiological and medical influence of pulse current on organism;
- Main indications and contra-indications for the medical usage of pulse current;
- mechanism of pulse current action;
- Apparatuses for electrical treatment.

Student must be able:
- to use the pulse current with a certain medical aim;
- to substantiate the combination of the electrical treatment (with usage of the pulse current) with other methods of therapy;
- to perform the procedures;
- To be able to estimate the pulse current influence on organism.

SHORT CONTENT OF THE THEME:

Pulse current – the current with the periodically increasing and decreasing magnitude.

The main parameters of the current are:

a) Frequency of impulse repetition;

b) Duration of each impulse;

c) Form of impulses.

Depending on the characteristics, it can cause stimulatory (that is why pulse current is used for muscle stimulation) or inhibitory (it can be used for performing of electrosleep therapy and electroanalgesia) action.

The combination of stimulatory and inhibitory action of pulse current is used in diadynamic therapy and amplipulse therapy. The pulse current causes: the stimulation of the cells while passing through them and restoration of rest state while it is paused. Physiological reaction on each impulse passing is the muscle constriction under the electrodes. One can get the stimulation of parasympathetic or sympathetic nervous system using different frequency of impulses.

REFERENCE CARD FOR STUDENTS WORK

(Stages of the medicinal methods of physiotherapy features study and choice of medical impact.)

I STAGE: study of physiological action of the pulse current.
**II STAGE:** indications and contra-indications for the pulse current usage.

**Pulse current**

**Indications:**
- Pain syndromes of different genesis, muscular paresis, atony of smooth muscles of inner organs, dystrophic changes in them, diseases connected with changes in CNS regulatory functions.

**Contra-indications:**
- Cholelithiasis and nephrolithiasis, thrombosis, trombophlebitis, fractures, acute purulent processes, decompensated pathologies.

**Medicinal:**
- Prohibition of peripheral neural receptors, dominant forming in CNS, improvement of blood circulation, microcirculation, developing of collaterals, influence on exchange processes.

**Physiological:**
- Improvement of regeneration and trophism in tissues, electrostimulation of cross-striated and unstriated muscles, removal of pain syndrome, normalization and coordination of reflexes.
III STAGE: study of medicinal methods and apparatuses.

**Pulse current**

- **Frequency**
  - Low
    - Electrostimulation
    - Electrolysis
    - Diadynamic therapy
  - Average
    - Fluctuorisation
    - Amplipulse therapy

**Pulse form**
- half-sinusoid
- right-angled
- triangular
- exponential

**Current form**
- half-sinusoid with frequency from 50 to 100 hertz
- current kinds: one-beat, two-beat, modulated with short and long periods, one-beat and two-beat wave
- monopolar, dipolar symmetrical, dipolar unsymmetrical
- sinusoid with frequency of 5000 hertz, modulated by low-frequency vibration 10 – 150 herz
- Work kinds I, II, III, IV.

**Apparatuses:**
- «Tonus–1»
- «Tonus–2»
- «Stimul–1»
- «Electroson–3»
- «Electroson–2»
- «Tonus–2»
- «Tonus–1»
- АСБ–2–1
- «Amplipulse–3»
- «Amplipulse –4»
REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

I STAGE: Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnesis, objective examination of the patient, study of the analysis results.

II STAGE: Substantiation of the diagnosis, choice of the physiotherapy treatment method.

III STAGE: Clarification of indications and contra-indications for impulse therapy prescription.

IV STAGE: Choice of a specific treatment method according to the indications. Dosing (pulse form, frequency and duration).

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patient’s condition, temperature, pulse, AP, local manifestations.


VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course (treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.

1. Patient 45 years old. Diagnosis: CHD: stable exertional angina II functional class. Cardiosclerosis atherosclerotic. What phys. procedure should be prescribed?
2. Patient 30 years old. Diagnosis: Duodenal ulcer with pronounced pain syndrome. Prescribe electrical treatment with usage of pulse current.

Standards of tasks solution.

2. Diadynamophoresis: anode with 2% novocaine solution is put on epigastric region; cathode is situated transverse on back in the region of VII – XII thoracic vertebrae. Current kind – two-beat continuous, current thickness – 0, 05 mA/cm, duration – 10 – 15 min, daily, 10 procedures.

MATERIALS FOR INDEPENDENT AUDITORIUM WORK

PRACTICAL SKILLS ACCORDING TO THEME:
1. Examination of the patients with the substantiation of pulse therapy prescription.
2. Fill in the procedure cards.
3. Master the technique and methods of electrosleep, diadynamic therapy, amplipulse therapy.
4. Realization of the procedures under the teacher’s control.
5. **THEME: ULTRASOUND THERAPY.**

**THEME BASIS:**

Ultrasound therapy is one of the most widespread procedures in physiotherapy. Ultrasound can change the membrane penetrability; improve the diffusion and osmosis processes; raise the ion, hormone activity, activity of biologically active substances by transferring them into free condition; stimulate the fermentative activity; improve metabolism. Ultrasound has biodegradable, antiphlogistic, analgetic effects.

**EDUCATIONAL AIMS:**

**Student must know:**
- mechanism of ultrasound action on organism;
- physiological and medicinal effects of ultrasound;
- indications and contra-indications for the medical usage of ultrasound;
- apparatuses for the ultrasound therapy.

**Student must be able:**
- To prove the necessity of ultrasound usage in patient treatment;
- To prescribe the treatment using ultrasound therapy.
- To perform the procedures;
- To interpret the procedure effect on organism.

**SHORT CONTENT OF THE THEME:**

Ultrasound is the elastic vibration of physical medium with frequency more then 20 kHz (in other words in supersonic acoustical frequency range), which spread as alternate compressions and stretchings of the medium. Ultrasound, used in medical practice, has range from 800 to 900 kHz. Max absorption of ultrasound energy is observed in bone tissue, on the tissue borders, on the inner cell membrane.

Intensity of the ultrasound action is in direct dependence on vibration amplitude, oscillatory speed and amplitude of pressure change.

Ultrasound can change the membrane penetrability; improve the diffusion and osmosis processes; raise the ion, hormone activity, activity of biologically active substances by transferring them into free condition.

Ultrasound can be reflected by thinnest air layers. That is why the airless contact surroundings (oil vaselini, degas water etc) must be used for the performance of ultrasound therapy.

Combined action of ultrasound and medicinal substances, which are inserted into organism through undamaged skin with the help of ultrasound, is called medicinal phonophoresis.

**REFERENCE CARD FOR STUDENTS WORK**

(Stages of the medicinal methods of physiotherapy features study and choice of medical impact.)

**I STAGE:** study of the mechanisms of ultrasound action on organism.
Ultrasound therapy

Action

Biophysical: mechanical, thermal, physicochemical.

Physiological: micromassage of cells and tissues, change of the membrane penetrability, diffusion and osmosis in cells, changes in acid-base equilibrium, transfer of zoles into gels, widening of blood vessels, improvement of blood, stimulation of metabolism in tissues, formation of biologically active substances, acceleration of the redox processes, stimulation of metabolism in cells, and improvement of the tissue respiration.
II STAGE: study of medical effects of ultrasound therapy, indications and contra-indications.

Ultrasound therapy

Therapeutic action: biodegradable, antiphlogistic, analgetic, spasmyloytic, fibrinolytic

Indications: support-motor disfunctions, traumas or diseases of peripheral nervous system, digestive apparatus, ENT-organs, deseases of minor pelvic organs.

Contra-indications: exertional angina III–IV functional class, cardiac infarction, stroke, morbus hypertonicus III st., vascular disfunction, pregnancy at early term (lower 1/3 of the belly), trombophlebitis.

III STAGE: the ultrasound method succession.

Patient’s preparation to the procedure

1. Instruction of the patient.
2. Stowage or seating of the patient.
3. Uncovering of the procedure region.
4. Coating with the contact surrounding.

Device preparation

1. Selection of the necessary vibrator.
2. Switching on the device in proper regime and intensity.
3. Device work check.
4. Switching on the procedure clock.

Procedure performing

Labile method with the vibrator travel or the stabile method with the fixated vibrator.

Procedure ending

1. Switching of the device.
2. Removing of the contact surrounding.

REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

I STAGE: Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnese, objective examination of the patient, study of the analysis results.

II STAGE: Substantiation of the diagnosis, choice of the physiotherapy treatment method.

IV STAGE: Choice of a specific treatment method accordingly to the indications (choice of the contact surrounding, labile or stabile method). Dozing (intensity, generation regime).

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patient’s condition, temperature, pulse, AP, local manifestations.

VII STAGE: Evaluation of the procedure results at the end of treatment

VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course (treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.


Standards of tasks solution.

1. Ultrasound action on the inflammatory focus (lower lobe of right lung). Contact straight, method labile, regime continuous. Intensity 0, 1 – 0, 6 Wt/cm duration 5 min., daily, 5 – 10 procedures.
2. Ultrasound action on the the ankle-joint. , method labile, regime continuous. Action through water. Distance from vibrator to ankle-joint 1 – 2 cm, action from all sides. Intensity 0,4 – 0,8 Wt/cm, procedure duration 5 – 8 min., the procedures are made every other day, 8 –10 procedures.

PRACTICAL SKILLS ACCORDING TO THEME:

1. Examination of the patients with the substantiation of ultrasound therapy prescription.
2. Give the prescription of the ultrasound therapy to the patient.
3. Master the technique and methods of ultrasound therapy.
4. Realization of the procedures under the teacher’s control.

THEME: HIGH-FREQUENCY CURRENTS AND EL.FIELDS

THEME BASING:

Important role in electrical treatment belongs to the methods which are based on usage of high-frequency variable electromagnetic vibrations. Scientific and technical progress, development of electronics greatly enriched this section of physiotherapy. The action of high-frequency electrical fields leads to different effects in organism: antiphlogistic, biodegradable, analgesic. That makes possible to use them in medical practice for treatment of different diseases on different stages of their development.
EDUCATIONAL AIMS:
Student must know:
- Biophysical effects of high-frequency electrical fields action;
- Physiological and medical effect of high-frequency electrical fields;
- Indications and contra-indications for the medical usage.

Student must be able:
- to use the high-frequency electrical fields with a certain medical aim;
- to work with the devices;
- to perform the procedures;
- to be able to estimate the high-frequency electrical fields influence on organism.

SHORT CONTENT OF THE THEME:
Under the high-frequency electrical fields action one can see the arrangement of the pendular oscillatory current movement in tissues. Mechanical energy of that movement transfers into thermal energy that leads to the formation of the endogenous heat in tissues. The great value in electromagnetic vibrations effect on organism belongs to the oscillatory effect. Its essence is the following: the molecules of tissues-dielectrics are dipols (they are electro-neutral and conduct electrical current badly), however their positive and negative charges are displaced towards their poles. One can see spatial re-orientation (polymerization) of dipols in accordance with frequency of field tension change when molecules enter variable electro-magnetic field. The influence of high-frequency electromagnetic field produces oscillatory movements of dipols of dielectrics, that leads to unfolding of molecule chains and changes of their physicochemical properties. The higher is the frequency of the electromagnetic vibration – the greater is the oscillatory effect.

The high-frequency therapy provides destructive effects on the thermolabile microorganisms (bacteriostatic effect); improves immunity by activation of the glucocorticoid function of the adrenal gland and stimulation of the phagocytosis; takes off the blood vessel spasm, improves the microcirculation and metabolism by ferment activation, accelerates the redox reactions.

REFERENCE CARD FOR STUDENTS WORK
(Stages of study of action mechanisms end medical effects of high-frequency currents and el.fields)

I STAGE: Study of biophysical, physiological and medical effect of high-frequency currents and el.fields
High-frequency currents and el.fields

Action

**biophysical:** thermal, nonspecific–oscillatory, pendular ion movement; oscillatory – specific change of dipole polarisation.

**physiological:** blood vessel dilation, acceleration of blood and lymph circulation, improvement of microcirculation, normalisation of CNS processes, stimulation of metabolism, formation of biologically active substances, acceleration of redox reactions, influence on endocrine organs and hormone activity.

**medical:** antiphlogistic, biodegradable, analgesic
II STAGE: indications and contra-indications

### High-frequency currents and el.fields

<table>
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<th>Type of treatment</th>
<th>Range of electromagnetic vibration</th>
<th>method</th>
<th>devices</th>
<th>Fixated working frequency</th>
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<td>Rf – therapy</td>
<td>30 kHz – 30 MHz, 10km – 10m</td>
<td>Current of supertonal frequency; d’arsonvalization, inductothermy</td>
<td>ДКВ–2, ИКВ–4</td>
<td>22 kHz</td>
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<td></td>
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<td></td>
<td>Ultratok; Iscra1 Iscra 2</td>
<td>110 kHz</td>
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<td></td>
<td></td>
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<td>13,56 MHz</td>
</tr>
<tr>
<td>UHF – therapy</td>
<td>30 MHz, 10 m – 1m</td>
<td>El. field UHF</td>
<td>UHF–300, Ekran 2, Impulse 2, Impulse 3</td>
<td>40,68MHz</td>
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<td></td>
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<td></td>
<td>UHF66 UHF62 UHF 4</td>
<td></td>
</tr>
<tr>
<td>Microwave therapy</td>
<td>300MHz 3000 MHz 100MHz, 1m–10cm – 1cm, 1–10mm</td>
<td>ДМВ – therapy, CMB – therapy, EHF – therapy,</td>
<td>Volna 2, Lych 58, Porog 1</td>
<td>460 MHz</td>
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<td></td>
<td></td>
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<td>Romashka Lych–2 Yav–1</td>
<td>2375 MHz</td>
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<td>57–65 GGz</td>
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### II STAGE: indications and contra-indications

#### Indications:
- inflammatory diseases of different organs and tissues, commisures and unions, degenerative-dystrophic damage of joints and vertebral column, functional diseases of n. system, neuralgia, muscle spasm, traumatic tissue damage.

#### Contra-indications:
- disorders in pain and thermal sensitivity, syringomyelia, infectious diseases, bleeding disposition, malignant formations, insufficiency of blood circulation of IIb–III stages, myocardial infarction, stenocardia, morbus hypertonicus of III stage, praesens of heart implants, metallic objects, pregnancy, CHAPP breakdown liquidators.

### III STAGE: study of electromagnetic vibration diapasons, methods and devices.

**REFERENCE CARD FOR STUDENTS WORK**

(Stages of diagnostical search)

**I STAGE:** Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnesis, objective examination of the patient, study of the analysis results.

**II STAGE:** Substantiation of the diagnosis, choice of the physiotherapy treatment method.

**III STAGE:** Clarification of indications and contra-indications.
IV STAGE: Choice of a specific treatment method according to the indications. Dosing.

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patients condition, temperature, pulse, AP, local manifestations.


VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course. (treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.

Standards of tasks solution.
1. Ulcers region d'arsonvalization. Influence upon the skin round the ulcer (on distance of 5-10 cm), and ulcer itself for 5-10 minutes (low or average intensity) with fungiform electrode. Treatment course – 10 – 15 procedures daily or every other day.
2. UHF of the thoracic region. Capasitor plates with diameter = 16cm are put behind and in front of the thorax with air clearance = 3 cm each. Dosing – the patient must not feel heat. Procedure duration – 10 – 15 minutes, daily or every other day, treatment course -10 - 15 procedures.
3. Microwave therapy of the maxillary sinus region. Cilindric vibrator (from «Luch – 58» device) with diameter = 3,5 cm is put on the maxillary sinus region. Dosing – up to 3 Wt, daily or every other day, 8 –10 procedures.

MATERIALS FOR INDEPENDENT AUDITORIUM WORK

PRACTICAL SKILLS ACCORDING TO THEME:
1. Examination of the patients with the substantiation of high-frequency electrical field therapy prescription..
2. Write out the prescriptions and fill in the procedure cards.
3. Realization of the procedures under the teachers control.

THEME: AEROSOL THERAPY AND AEROIONOTHERAPY.
THEME BASIS:
Aerosols are widely used in different branches of national economy and medicine. Medicinal particles dispersed in air or other gas environments are used to influence on different body parts: skin, mucous tunics and wound regions. The aerosols widely used in physiotherapy to influence the mucous tunics of the respiratory system by means of the inhalation.
Aeroions – are the particles of the atmospheric air, which transfer positive and negative electric charges. In natural conditions aeroions are produced under the influence of solar, space radiation and other factors. Aeroions are the obligatory part of the atmosphere which have beneficial action on organism. Ionized air influences the health and work capacity greatly.

EDUCATIONAL AIMS:

Student must know:
- Biophysical basing of aerosol therapy and aeronotherapy.
- Medicinal and physiological effects of aerosol therapy and aeronotherapy.
- Indications and contra-indications;

Student must be able:
- To prove the necessity of aerosol therapy and aeronotherapy in patients treatment;
- To prescribe the treatment;
- To perform the procedures.

SHORT CONTENT OF THE THEME:

Aerosol therapy is a method based on breathing with the medicinal particles (fluid or solid) dispersed in air or other gas environments.

Aerosol effect depends on dispersion of the particles. The smaller the particles are the bigger the interaction square of medical substances with the mucous tunics and the depth of their penetration into the respiratory tract (the particles with diameter = 5 mcm and less reach alveoles, up to 30mcm – form a sediment in tracheya, bigger then 30mcm are held in nasal ducts and nasopharynx) is. The result of great dispersion is the rise of the medicinal activity of the spread substance because of the increased contact square, bettered absorption and entrance in blood and limph. Due to inhalation the medicinal substance has both local and general effects on organism.

Aeroionotherapy – is the method of influence on mucous tunics of respiratory system or skin with aeroions of different charges (negative charges are used more often).

Beneficial action of aeroions (especially negative) is marked in treatment of allergic diseases and diseases of nervous system. Also there is therapeutic action of aeroions on skin, respiratory ducts, blood, limph and protoplasm.

Ionized air affects the human health, improves the work capacity, takes down the tiredness, headaches and improves sleep.

REFERENCE CARD FOR STUDENTS WORK
(Stages of aerosol therapy and aeronotherapy effects study.)

I STAGE: study of affect mechanisms of aerosol therapy and aeronotherapy
**AEROSOL THERAPY**

**Dispersion**
- Disperse environment and phase
- Contact area
- Dispersion dependance
- Penetration depth

**Physiological affect:**
Increase of ciliated epithelium activity, lowering of AP; desensitize action, increase of LVC and increase of oxygenated hemoglobin concentration in blood.

**Mechanism of ingalatory action:**
Farmacological effect of medicinal substances, electric charge, influence of aerosol temperature

**Contact**
- Local

**Resorption**
Aeroionotherapy

Mechanism of action:
The products of interaction of the aeroions with skin and mucous tunics change the irritability and conductivity of nervous conductors causing generation of viscerocutaneus reactions in inner organs. Aeroion inhalation activates the movement of ciliated epithelium fringes in trachea and bronchial tubes, causes bronchial and alveolar vasodelatation, activates the regeneration in respiratory system.

Physiological action:
sedative, desensitize, hypotensive, antispasmogenic actions, improvement of miocardial, normalisation gastrointestinal tracts functions, activation of the redox processes, stimulation of erythropoiesis, ESR lowering.

II STAGE: study of medical effect of aerosol therapy and aeronotherapy.

AEROSOL THERAPY

Medical use

On skin and wounds
Disinfection and disinsection
On mucous tunics
Inhalation

Indications: acute and chronic deseases of upper respiratory ducts, bronchial tubes and lungs, morbus hipertonicus of I–II stages, heart diseases with blood circulation insufficiency of I–II st., for receiving narcotic and hypnotic action.

III STAGE: study of medical methods and equipment.

**Aeroionotherapy**

Medical effects: neuroreflectory, bacteriostatic, trophic.

**Indications:** morbus hipertonicus of I–II stages, neurosis-like conditions, bronchial asthma, bronchitis, acute and chronic diseases of upper respiratory ducts, ozena, ulcerous disease, wounds which do not heal for a long time, trophic ulcers.

**Contra-indications:** heavy forms of bronchial asthma, lung emphysema, expressed coronary deficiency, cerebral atherosclerosis with hemodynamic damages, tuberculosis and ozena with profound destructive changes in mucous tunic of the nose.

**Inhalational aerosol therapy**

Methods of aerosol generation

- Mechanical dispersion
- Ultrasound dispersion
- Electroaerosol generation

**Kinds of inhalation**

- powder
- thermomoist
- oily
- steam
- humid

**Scheme of inhalation realization:**

- Preparation to the procedure realization
  1. Instruct the patient.
  2. Fill the content of inhalator with the prescribed medicine.
  3. Seat the patient correctly.
REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

I STAGE: Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnesis, objective examination of the patient, study of the analysis results.

II STAGE: Substantiation of the diagnosis, choice of the physiotherapy treatment method.

III STAGE: Clarification of indications and contra-indications for the aerosol therapy and aeronotherapy.

IV STAGE: Choice of a specific treatment method accordingly to the indications. Dosing.

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patient’s condition, temperature, pulse, AP, local manifestations.

VII STAGE: Evaluation of results at the end of treatment

VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course. (Treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL:

SITUATIONAL TASKS:

Patient H. 40 years old. Diagnosis: Morbus hipertonicus of the II st.
Prescribe physiotherapy.

Patient B. 30 years old. Diagnosis: Chronic catarrhal bronchitis.
Prescribe physiotherapy.
Standards of tasks solution.
1. Eeroionization of the face. Electrode-ionizator is put on the distance of 15 cm. from patients face. Patient sits on a wooden chair. Second electrode is situated under the patients feet. The face is the aim of the airoion action. Current tension – 30 –40 kW. Procedure duration 10 – 15 minutes. Treatment course 12 – 15 procedures.
2. Thermomoist inhalation with the solutions of: hydrogen carbonate of natrium -2,0, natrii chloridi -1,0, distilled water – 100ml for one. Aerosol temperature 38–42°C, duration 10 min. treatment course - 10 procedures, daily.

MATERIALS FOR INDEPENDENT AUDITORIUM WORK

PRACTICAL SKILLS ACCORDING TO THEME:

1. Examination of the patients with the substantiation of aerosol therapy or aeronotherapy prescription.
2. Write out the prescriptions and fill in the procedure cards.
3. Realization of the procedures under the teachers control.
THEME: PHOTOTHERAPY

THEME BASIS:
Phototherapy consists of dosed influence of infrared, ultra-violet and visible radiation on the organism.
Almost all living processes on Earth happen in the light environment.
Sun is the source of light and the light is the source of life on our planet. By the physical properties light is the flow of electromagnetic vibrations in optic diapason, such vibrations are radiated by separate portions called quantums, which possess different energy.
Absorption of the quantum energy by the tissues and its transformation into other energy kinds first of all into thermal and biochemical energy (which affect organism on local and general levels) is in the foundation of biological action of the light.

EDUCATIONAL AIMS:
Student must know:
- Principle of picking up of the biodose;
- Features of the bactericide and bacteriostatic effects of the UV;
- Mechanisms of ultra-violet and infrared radiation action;
- Mechanisms of laser therapy action;
- Indications and contra-indications to the phototherapy.

Student must be able:
- To determine the biodose;
- To use the devices for the phototreatment;
- To create the scheme for the phototreatment.

SHORT CONTENT OF THE THEME:
Phototreatment is the use of radiant energy of sun and the artificial light sources with medical and prophylactic aims.
When the radiant energy falls on the skin it is divided into two parts, one of them is reflected and other one is absorbed by the organism. The absorbed quantum energy is transformed into chemical and thermal energy.
The main effect of infrared radiation is thermal one. Visible radiation of different wave-length diapasons causes different color sensations. In red diapason it approaches infrared radiation effects (including thermal one), in violet diapason it approaches ultra-violet radiation effects causing the photochemical reactions.
Violet part of visible radiation spectrum differs by the chromogenic action; blue one has some sort of bactericide action. Violet and blue radiation treatment lowers the excitability of the nervous centres, while red radiation raises it.
Ultra-violet radiation absorbed by skin affects nervous fibers in it and its metabolism.

<table>
<thead>
<tr>
<th>Kinds of phototreatment.</th>
<th>Infrared radiation</th>
<th>Visual radiation</th>
<th>Ultra-violet radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>wave-length</td>
<td>760nm – 340mcm</td>
<td>760 – 400nm</td>
<td>400 – 180nm</td>
</tr>
<tr>
<td>penetration depth</td>
<td>2 – 3 cm</td>
<td>Up to 1 cm</td>
<td>Up to 1 mm</td>
</tr>
<tr>
<td>Biophysical action</td>
<td>Thermal</td>
<td>thermal, photoelectric</td>
<td>photoelectric, photochemical</td>
</tr>
</tbody>
</table>
**Kinds of radiation**

<table>
<thead>
<tr>
<th>Long-wave (more than 1400nm)</th>
<th>Colors: red, orange, yellow, green, blue, violet.</th>
<th>– long-wave (LWUV) 400 – 315nm – middle-wave (MWUV) 315 – 280nm – short-wave (SWUV) 280 – 180nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-wave 1400–760nm</td>
<td>Monochrome coherent.</td>
<td></td>
</tr>
</tbody>
</table>

**Sources of radiation**

| Incandescent lamps: Мина, solux, aerial lamp | Incandescent lamp, laser | Arc light lamps |

**REFERENCE CARD FOR STUDENTS WORK**

(Stages of phototreatment action mechanisms and methods study)

**I STAGE:** phototreatment action mechanisms study.

**Infrared radiation**

- Irritation of thermal receptors
- Improvement of microcirculation
- Hyperemia, erythema formation
- General reflex and neurohumoral action

**Visual radiation**

- Spectrum colors
- Influence on stimulatory and braking processes

**Ultra-violet radiation**

- Lazer
- Stimulation of specific organ functions, regeneration, phagocytosis

Formation of erythema, pigmentation, influence on DNA, on microcirculation, normalisation of processes in CNS and vegetative nervous system, influence on all metabolism kinds, creation of D vitamine, regeneration, influence on endocrine organs and erythropoiesis.

**II STAGE:** study of the medical action of the phototherapy.
Infrared radiation

Medical action

Health-giving: resorption of the inflammatory processes, pain reduction, improvement of the regeneration, sweating

Pathogenic: thermal burns, general overheating, overload of the hemodynamics.

Indications: chronic inflammatory processes, including inner organs, long-healing wounds, thermal burns, commissures, unions, deseases of the support-motor system, peripheral nervous system, adiposity and myxedema

Contraindications: disposition towards bleeding, tumors, morbus hipertonicus of III stage, expressed atherosclerosis, blood circulation insufficiency of III st., active tuberculosis, acute purulent processes.

Visual radiation

therapeutic action

Color spectrum

Normalization of psychological processes

Indications: neuroses

Lazer

Trophic, antiphlogistic, analgetic

Contraindications: long-healing wounds and ulcers, neuritis, arthritis, arthrosis, ulcerous desease, inflammatory processes of inner organs
REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

I STAGE: Acquaintance with the patient, his/her case history. Clarification of the complaints, anamnesis, objective examination of the patient, study of the analysis results.

II STAGE: Substantiation of the diagnosis, choice of the physiotherapy treatment method.

III STAGE: Clarification of indications and contra-indications for impulse therapy prescription.

IV STAGE: Choice of a specific treatment method accordingly to the indications. Dosing.

V STAGE: Procedure realization or assistance.

VI STAGE: Evaluation of the procedure results, observation of the patient’s condition, temperature, pulse, AP, local manifestations.


VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course (treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.
1. Patient K., 60 years old. Diagnosis: chronic pyelonephritis. What phototreatment method should be prescribed?

Ultra-violet radiation

therapeutic action

Health-giving: general-tonic action, immunostimulation, hyposensitization, anti-inflammatory action, bactericidal, trophic, metabolic.


Indications: lung deseases, rheumatism, spondylosis, arthritis, trauma effects, neuritis, psoriasis, allergic dermatitis, erysipelas, rachitis, fractures, osteoporosis, ENT-deseases.

Contra-indications: active tuberculosis, bleeding sickness, Systemic deseases, thyrotoxicosis.
Prescribe phototreatment.

**Standards of tasks solution.**

2. Ultra-violet radiation treatment of trachea and bronchus regions. The patient lies. Two fields are treated per day: the front neck surface and upper half of the thorax 2-3 biodoses; back surface of the neck and interscapular space 3-4 biodoses. Over 1 – 2 days, 2 – 3 procedures.
3. Ultra-violet radiation treatment of the ulcer region. Dose - ½ – 1½ of the biodose with 2-3 day intervals. The treatment is realized not only at the ulcer surface but at the surrounding undamaged skin, too. The treatment course from 3 – 4 to 10 procedures.

**MATIRIALS FOR INDEPENDENT AUDITORIUM WORK**

**PRACTICAL SKILLS ACCORDING TO THEME:**
1. Examination of the patients and determination of the indications and contra-indications for the phototreatment.
2. Write out the prescriptions and fill in the procedure cards .
3. Determine the biodose.
4. Master the procedure realization process.

**THEME: HEAT-WATER THERAPY.**

**THEME BASING:**

Water-cure and heat-cure are very important parts in physiotherapy and balneology. These methods are widely used in medical practice, prophylactic and rehabilitative medicine. These kinds of therapy are tightly bounded with natural health-giving factors. They influence on the nervous and vasal systems of the organism, metabolism processes and functions of the endocrine glands.

The sections «water-cure» and «heat-cure» are tightly connected with the notion of the “heat” like one of the main medical factors of the method and the “water” like one of the carriers of this factor. However almost all water-cure and heat-cure procedures have mechanical and chemical actions, besides the heat action.

**EDUCATIONAL AIMS:**

**Student must know:**
- Biophysical action of water-cure procedures;
- Physiological basing of heat and cold affect on organism;
- Phisico-chemical characteristics of heat-carrying environments;
- Mechanisms of water-heat therapy action;
- Indications and contra-indications;

**Student must be able:**
- To explain water therapy action on organism;
- To chose needed method of water-cure;
- To explain the main principles of heat transmission and heat exchange;
- To use ozocerite, therapeutic muds with medical purposes.
The water is a very good environment for heat transmission to the organism because it has great thermal conductivity and heat capacity.

Thermal water factor influences the temperature receptors of the skin. Prolonged heat or cold influence oppresses the receptors reducing the pain. Too high or too low temperatures which influence on the organism for a short period of time improve the excitability.

Chemical action of the water depends on minerals and gases contained in it. In dependence of the components water procedures can give different effects: sedative, antiphlogistic, metabolitic, tonic or trophic. Mechanical affect of water action is conditioned by its pressure on the skin surface, n.receptors and blood vessels in it.

Physical factors which affect organism by the contact lapping are also used for heat transmission to the organism. They are: therapeutic muds, or peloids, paraffin, clay, sand, peat, bischofite. Those substances are heat-carriers, or peloids, so their usage in medical practice is called pelotherapy.

Human organism responds on the influence of water-cure and heat-cure procedures by a complicated neurohumoral reaction that reflexes on work of all organs and systems but especially on nervous, endocrine and cardiovascular systems.

REFERENCE CARD FOR STUDENTS WORK
(Stages of water-cure and heat-cure study)

I STAGE: – study of water-cure and heat-cure affect mechanisms.

<table>
<thead>
<tr>
<th>Water-heat treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watertreatment</td>
</tr>
<tr>
<td>Peloids</td>
</tr>
<tr>
<td>Therapeutic factors</td>
</tr>
<tr>
<td>Thermic</td>
</tr>
<tr>
<td>Chemical</td>
</tr>
<tr>
<td>Mechanical</td>
</tr>
</tbody>
</table>

II STAGE: study of the physiological and therapeutic affects of water-cure and heat-cure procedures.

<table>
<thead>
<tr>
<th>The physiological and therapeutic affects of water-cure procedures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
</tr>
<tr>
<td>Cold compress, ice</td>
</tr>
<tr>
<td>Warm compress</td>
</tr>
<tr>
<td>Lotion, dousing</td>
</tr>
<tr>
<td>Bath local cold</td>
</tr>
<tr>
<td>Bath local warm</td>
</tr>
<tr>
<td>Bath local with variable temperature</td>
</tr>
<tr>
<td>Bathes by Gauffe</td>
</tr>
<tr>
<td>Bathes general insensible, duration 10 –15 min</td>
</tr>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Bathes general insensible, duration 10 – 15 min.</td>
</tr>
<tr>
<td>Bathes general warm</td>
</tr>
<tr>
<td>Bathes general hot</td>
</tr>
<tr>
<td>Fresh showers</td>
</tr>
<tr>
<td>Warm showers</td>
</tr>
<tr>
<td>Spray shower</td>
</tr>
<tr>
<td>Underwater shower-massage</td>
</tr>
<tr>
<td>Underwater intestinal irrigation</td>
</tr>
</tbody>
</table>

**Mud cure**

- **Structure, properties and mud effect**
  - Structure: frame, colloid, water solution
  - Chemical composition: minerals, gases, biologically active substances
  - Properties: plasticity, heat capacity, thermal conductivity

- **Kinds of muds**
  - Silt: sulphide and sapropelic
  - Peat
  - Pseudovolcanic, hydrothermal e.t.c

**Medical effect:** antiphlogistic, trophic, biodegradable, analgetic.

**Indications:** chronic inflammatory processes, trauma consequences.

**Contra-indications:** acute inflammatory processes, tumors, tuberculosis, cardiovascular deseases.
II Stage: water-heat treatment study.

REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

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VIII Stage: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course (treatment staging, changing one treatment course to another).
MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.

1. Patient K., 40 years old. Diagnosis: chronic duodenal ulcer I stage, recurrent clinical course with retained secretory and acid-forming stomach function, intensification stadium. What methods of water treatment can you suggest?
3. Patient H., 34 years old. Diagnosis: Rheumatoid joint inflammation, predominantly articular form, I stage activity, exudation stage, sub acute clinical course with articular function violation of I stage. Prescribe the heat-cure.

Standards of tasks solution.

1. Pine-mineral bath, water temperature is 37°C, duration is 10 min, daily, treatment course is 10 – 12 procedures.
2. Oxygen baths, water temperature is 35°C, daily, duration is 15 min; treatment course is 12 – 15 procedures. Circular douche is 33 – 35°C, duration is 3 – 5 min, every next day. Treatment course is 10 – 12 procedures.
3. Ozocerite, cuvette – application method (on upper extremities in the form of gloves). Temperature is 50 – 60°C, procedure duration is 30 – 60 min, every next day, treatment course is 10 – 15 procedures.

MATERIALS FOR INDEPENDENT AUDITORIUM WORK

PRACTICAL SKILLS ACCORDING TO THEME:

1. Examination of the patients and determination of the indications and contra-indications for the water and heat treatment.
2. Write out the prescriptions and fill in the procedure cards.
3. Master the procedure realization process.

MATERIALS FOR THE EXTRACURRICULAR WORK (SESW)
Aromatic bathe using.
THEME: SANATORIUM-AND-SPA TREATMENT.

THEME BASING:

Sanatorium-and-spa treatment can be considered as the most natural and physiologic. It is very effective in remission period. The sanatorium-and-spa treatment is usually connected with other methods of treatment: electrotreatment, phototherapy, water cure, physiotherapy exercises, massage etc. The spa rest in good conditions under the effect of beautiful landscape creates favourable psychologic background. All this intensify the affect of the treatment and influence the organism effectively.

EDUCATIONAL AIMS:

Student must know:
- The main rules of sanatorium-and-spa treatment prescription.
- Indications and contra-indications for sanatorium-and-spa treatment;
- The main principles of inner pathology prophylactics.

Student must be able:
- To explain the physiological affect of sanatorium-and-spa treatment;
- To choose the method of sanatorium-and-spa treatment;
- To fill in the certificate for ticket receiving;
- To fill in the sanatorium-and-spa card.

SHORT CONTENT OF THE THEME:

Natural health-giving factors include: climate, mineral waters, therapeutic muds etc. They are spread non-uniformly in nature. The places where the natural health-giving factors are concentrated and used for human’s organism treatment are called resorts.

The resort territories are used for creation of the specialized medical establishments: sanatoria, balneal and hydroengineering structures and resort policlinics. Sanatorium is the medicinal – prophylactic establishment that provides comfortable placing of the patients and the conditions for their treatment. That is why they contain necessary buildings and devices which provide all needed procedures.

REFERENCE CARD FOR STUDENTS WORK

(Stages of sanatorium-and-spa treatment study)

I STAGE: indications and contra-indications for sanatorium-and-spa treatment, treatment types.
Sanatorium-and-spa treatment

Definition, history

Sanatorium-and-spa selection

Sanatorial regimes

**Indications:** chronic diseases of functional, inflammatory or dystrophic genesis in remission phase, without organ or system insufficiency

**Contra-indications:** acute infections, psychic diseases, alcoholism, intensification of chronic diseases, neoplasms, bleeding sickness, second half of the pregnancy.

**Kinds of resorts**
- Climatic
- Balneal
- Mud cure
II STAGE: resort kinds study.

Balneal resort classification.

Balneotherapy.
Mineral waters.

Definition, general properties

Composition: cations, anions, microelements

mineralisation

acidity, medium reaction

temperature

Main kinds of mineral waters and balneal resorts

Carbonic
Svalyava, polyana Kvasova, soimi, (Transcarpathian reg.)

Hydrosulfuric
Nemirov (Lvov reg.) sinyak (Transcarpathian reg.)

Radon
Hmelnik (Vinnuza reg.), Belaya Cerkov (Kuiv reg.)

Sodium chloride

Hydrocarbonate
Berezovskie mineral waters (Kharkov reg.)

Mirgorod (Poltava region)

Metods of using

external

bath

hydroopathic establishments

buildings

well-room

internal

drinking

other
Mud cure resort classification.

- Kinds of muds and main resorts:
  - Silt, sulphide
  - Pseudovolcanic
  - Sapropelite
  - Peat
    - Sacs, Evpatory Odessa, Feodosia
    - Feodosia
    - Transcarpathian reg.
    - Mirgorod, Morshin, Nemirov.

Methods of use:
- Application: general, local
- Cavity: rectal, vaginal
- Electromuds

Classification of the climate factors.

- Main characteristic
  - Definition of weather and climate
  - Acting factors
  - Biological action
- Climate kinds
  - Desert
  - Steppe
  - Forest-steppe
  - Mountains
- Climatic establishments
  - Aerarium, solarium
  - Beach
  - Aerotherapy
  - Heliotherapy
  - Thalassotherapy
- Kinds of climatic procedures

REFERENCE CARD FOR STUDENTS WORK
(Stages of diagnostical search)

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VII STAGE: Evaluation of the procedure results in the end of treatment

VIII STAGE: Evaluation of the physiotherapy significance factor in whole treatment picture. Give recommendations after the treatment course (treatment staging, changing one treatment course to another).

MATERIALS FOR SELFCONTROL.

SITUATIONAL TASKS.

   2. Patient M., 35 years old. Diagnosis: Chronic gastritis with lowered secretory and acid-forming stomach function, remission. What resorts can be used for treatment.

   Standards of tasks solution.
   1. The patient can be suggested to visit mud and balneal resorts – Odessa, Sacky, Eupatorium, Polyana Kvasova.
   2. The patient can be send to balneal resorts with mineral waters – Mirgorod, Morshin.

PRACTICAL SKILLS ACCORDING TO THEME:

- examination of the patients with the substantiation of sanatorium-and-spa treatment.
- fill in the certificate for ticket receiving;
- fill in the sanatorium-and-spa card
The scheme of general UV–radiation treatment
(by M.G.Vorobyov, 1980)

<table>
<thead>
<tr>
<th>The procedure number</th>
<th>Basis circuit</th>
<th>Rapid circuit</th>
<th>Slowed circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biodose quantity</td>
<td>Distance from lamp (cm)</td>
<td>Biodose quantity</td>
</tr>
<tr>
<td>1</td>
<td>¼</td>
<td>100</td>
<td>½</td>
</tr>
<tr>
<td>2</td>
<td>¼</td>
<td>100</td>
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<td>½</td>
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<td>⅛</td>
<td>100</td>
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<td>100</td>
<td>2½</td>
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<td>8</td>
<td>1</td>
<td>100</td>
<td>3</td>
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<td>9</td>
<td>1½</td>
<td>100</td>
<td>3½</td>
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</tr>
<tr>
<td>25</td>
<td>3</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>
### THE BASIC MEDICINAL SUBSTANCES WHICH ARE USED FOR ELECTROPHORESIS

<table>
<thead>
<tr>
<th>Ion or the particle, that is insert</th>
<th>Used substance</th>
<th>Concentration, or quantity of the substance on one procedure</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenalin</td>
<td>Adrenalin hydrochloride</td>
<td>0,1% 0,5–1 ml</td>
<td>+</td>
</tr>
<tr>
<td>Aloe</td>
<td>Fluid extract of aloe</td>
<td>1:3</td>
<td>+/–</td>
</tr>
<tr>
<td>Aminazine</td>
<td>Aminazine</td>
<td>1%</td>
<td>+</td>
</tr>
<tr>
<td>Analgin</td>
<td>Analgin</td>
<td>2–5% (hydrate) 5–10% in 25% ДМСО</td>
<td>–</td>
</tr>
<tr>
<td>Propranolol</td>
<td>Propranolol</td>
<td>0,5%, 5 ml</td>
<td>+</td>
</tr>
<tr>
<td>Ascorbic acid radical</td>
<td>Ascorbic acid</td>
<td>2–5%</td>
<td>–</td>
</tr>
<tr>
<td>Atropine</td>
<td>Atropine sulphate</td>
<td>0,1%, 1 ml</td>
<td>+</td>
</tr>
<tr>
<td>Acetylsalicylic acid radical</td>
<td>Acetylsalicylic acid</td>
<td>5–10% in 50% ДМСО</td>
<td>–</td>
</tr>
<tr>
<td>Acetylcholine</td>
<td>Acetylcholine hydrochloride</td>
<td>0,1–0,5%</td>
<td>+</td>
</tr>
<tr>
<td>Benzogeksonii</td>
<td>Benzogeksonii</td>
<td>1–2%</td>
<td>+</td>
</tr>
<tr>
<td>Bromide</td>
<td>Natrii (kalii) bromide</td>
<td>2–5%</td>
<td>–</td>
</tr>
<tr>
<td>Vitamin B₁</td>
<td>Thiamine bromide</td>
<td>2%</td>
<td>+</td>
</tr>
<tr>
<td>Vitamin B₁₂</td>
<td>Cianocobollamine</td>
<td>0,1–0,2 mg</td>
<td>+</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>tocopherol acetate</td>
<td>2% in 5% ДМСО, 0,5 ml 1%</td>
<td>+</td>
</tr>
<tr>
<td>Vitamin U</td>
<td>Метилметионинсульфоны хлорид</td>
<td>1%</td>
<td>+</td>
</tr>
<tr>
<td>Ганглерон</td>
<td>Ганглерон</td>
<td>0,25–0,5%</td>
<td>+</td>
</tr>
<tr>
<td>Heparin</td>
<td>Heparin</td>
<td>5000–10000 AU</td>
<td>–</td>
</tr>
<tr>
<td>Hyaluronidase</td>
<td>Hyaluronidase</td>
<td>0,1–0,2 г in 30 ml of distilled water</td>
<td>+</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Hydrocortisone succinite</td>
<td>1 amp. in 0,2% sol. of natrium hydrogen carbonate</td>
<td>–</td>
</tr>
<tr>
<td>Histamine</td>
<td>Histamine hydrochloride</td>
<td>0,1% (up to 1 ml)</td>
<td>+</td>
</tr>
<tr>
<td>Dibazol</td>
<td>Dibazol</td>
<td>0,5–2%</td>
<td>+</td>
</tr>
<tr>
<td>Pantohecin</td>
<td>Pantohecin</td>
<td>05–1%</td>
<td>+</td>
</tr>
<tr>
<td>Benadryl</td>
<td>Benadryl</td>
<td>0,25–1%</td>
<td>+</td>
</tr>
<tr>
<td>Iodine</td>
<td>Kalii (natrii) iodine</td>
<td>2–5%</td>
<td>–</td>
</tr>
<tr>
<td>Cavinton</td>
<td>Cavinton</td>
<td>1 ml (5 mg) of amp. sol. (0,5%) in 1 ml ДМСО</td>
<td>+</td>
</tr>
<tr>
<td>Potassium</td>
<td>Potassium chloride</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Calcium</td>
<td>Calcium chloride</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Caffeine</td>
<td>Caffeine –1% in 5% sol. of natrium hydrogen carbonate</td>
<td>1–2%</td>
<td>+/-</td>
</tr>
<tr>
<td>Lidaze</td>
<td>Lidaze</td>
<td>0,1 г in 30 ml acidulated water with pH 5,2</td>
<td>+</td>
</tr>
<tr>
<td>Lithium</td>
<td>Lithium benzoate</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Magnesium sulphate</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Manganese</td>
<td>Manganese sulphate</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Copper</td>
<td>Copper sulphate</td>
<td>0,2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Mesatone</td>
<td>Mesatone</td>
<td>1–2%</td>
<td>+</td>
</tr>
<tr>
<td>Natrium</td>
<td>Natrium chloride</td>
<td>2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Nicotinic acid radical</td>
<td>Nicotinic acid</td>
<td>0,5–1%</td>
<td>–</td>
</tr>
<tr>
<td>Nitroglycerine</td>
<td>Novocaine hydrochloride</td>
<td>0,5 ml of 1% alcoholic solution + 99,5 ml of distilled water (single dose 5–10 ml)</td>
<td>+</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>Noshpa</td>
<td>Noshpa</td>
<td>1–2%</td>
<td>+</td>
</tr>
<tr>
<td>Obzidane</td>
<td>Obzidane</td>
<td>0,1% 5 ml</td>
<td>+</td>
</tr>
<tr>
<td>Papaverine hydrochloride</td>
<td></td>
<td>0,1–0,5–1%</td>
<td>+</td>
</tr>
<tr>
<td>Peloidine</td>
<td>Peloidine</td>
<td>1%</td>
<td>+/-</td>
</tr>
<tr>
<td>Penicillin</td>
<td>natrium salt of penicillin</td>
<td>5000–10000 AU in 1 ml of 0,9% sol. of sodium chloride</td>
<td>–</td>
</tr>
<tr>
<td>Pentamine</td>
<td>Pentamine</td>
<td>5%</td>
<td>+</td>
</tr>
<tr>
<td>Pilocarpine hydrochloride</td>
<td></td>
<td>0,1–0,5%</td>
<td>+</td>
</tr>
<tr>
<td>Platphyllin hydrotartrati</td>
<td></td>
<td>0,05–0,1%, 1 ml</td>
<td>+</td>
</tr>
<tr>
<td>Prednisolone</td>
<td></td>
<td>0,5%</td>
<td>+</td>
</tr>
<tr>
<td>Proserin</td>
<td>Proserin</td>
<td>0,1%</td>
<td>+</td>
</tr>
<tr>
<td>Ronidaze</td>
<td>Ronidaze</td>
<td>0,5 g in 30 ml acetated buffer sol.</td>
<td>+</td>
</tr>
<tr>
<td>Sodium salicylate radical</td>
<td>Sodium salicylate</td>
<td>1–5%</td>
<td>–</td>
</tr>
<tr>
<td>Seduxen</td>
<td>Seduxen</td>
<td>0,5%, 2 ml</td>
<td>+</td>
</tr>
<tr>
<td>Cerumen</td>
<td>Ichthyol</td>
<td>10–30%, 2–5%</td>
<td>+</td>
</tr>
<tr>
<td>Silver nitrate</td>
<td></td>
<td>0,5–1%</td>
<td>+</td>
</tr>
<tr>
<td>Cinoccaaine hydrochloride</td>
<td>Cinoccaaine hydrochloride</td>
<td>0,25–1%</td>
<td>+</td>
</tr>
<tr>
<td>Vitreous body</td>
<td>Vitreous body</td>
<td>2 ml</td>
<td>+/-</td>
</tr>
<tr>
<td>Toephillin</td>
<td>Toephillin</td>
<td>2–5%, pH 8.6–8.8</td>
<td>–</td>
</tr>
<tr>
<td>Tetracycline hydrochloride</td>
<td></td>
<td>5000–10000 AU in 1 ml of distilled water</td>
<td>–</td>
</tr>
<tr>
<td>Tetramecaine</td>
<td>Tetramecaine</td>
<td>0,5–2%</td>
<td>+</td>
</tr>
<tr>
<td>Tripsin</td>
<td>Tripsin</td>
<td>0,5 in distilled water, pH 5,0</td>
<td>+</td>
</tr>
<tr>
<td>Fencarol</td>
<td>Fencarol</td>
<td>0,5% in 25% sol of DMCO</td>
<td>+</td>
</tr>
<tr>
<td>Phosphoric acid radical</td>
<td>Natrium phosphate</td>
<td>2–5%</td>
<td>–</td>
</tr>
<tr>
<td>Fluorine</td>
<td>Natrium fluoride</td>
<td>2%</td>
<td>–</td>
</tr>
<tr>
<td>Quinine hydrochloride</td>
<td></td>
<td>1%</td>
<td>+</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Chlorine</td>
<td>2–5%</td>
<td>–</td>
</tr>
<tr>
<td>Zinc sulphate</td>
<td></td>
<td>0,5–1%</td>
<td>+</td>
</tr>
<tr>
<td>Euphiline</td>
<td>Euphiline</td>
<td>2–5%</td>
<td>+/-</td>
</tr>
<tr>
<td>Ephedrine hydrochloride</td>
<td></td>
<td>0,1–1%</td>
<td>+</td>
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</tbody>
</table>
The minimal age for different methods of physiotherapy

<table>
<thead>
<tr>
<th>Method</th>
<th>Age of a child</th>
<th>Second course</th>
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<tbody>
<tr>
<td>Galvanization local</td>
<td>4–6 weeks</td>
<td>1 month</td>
</tr>
<tr>
<td>Galvanization general</td>
<td>5 years</td>
<td>1 month</td>
</tr>
<tr>
<td>Electrosleep</td>
<td>2–3 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Diadynamic therapy</td>
<td>2–3 years</td>
<td>10 days</td>
</tr>
<tr>
<td>Amplipulse therapy</td>
<td>3 months</td>
<td>6 days</td>
</tr>
<tr>
<td>Fluctuating current</td>
<td>6 months</td>
<td>6 days</td>
</tr>
<tr>
<td>D'arsonvalization local</td>
<td>2 years</td>
<td>1 month</td>
</tr>
<tr>
<td>Ultratonometherapy</td>
<td>1 years</td>
<td>1–2 months</td>
</tr>
<tr>
<td>Inductothermy</td>
<td>5 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>UHF–therapy</td>
<td>First days of life</td>
<td>2–3 months</td>
</tr>
<tr>
<td>НВЧ–терапия</td>
<td>2 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Magnetotherapy</td>
<td>1–1.5 years</td>
<td>1–2 months</td>
</tr>
<tr>
<td>Franklinization general</td>
<td>14–15 years</td>
<td>1–2 months</td>
</tr>
<tr>
<td>Franklinization local</td>
<td>5–7 years</td>
<td>2 months</td>
</tr>
<tr>
<td>Infrared radiation</td>
<td>First months</td>
<td>1 month</td>
</tr>
<tr>
<td>U-V radiation general</td>
<td>First months</td>
<td>2–3 months</td>
</tr>
<tr>
<td>U-V radiation local</td>
<td>First days of life</td>
<td>1 month</td>
</tr>
<tr>
<td>Lazertherapy</td>
<td>2 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Ultrasound therapy</td>
<td>2–3 years</td>
<td>3 months</td>
</tr>
<tr>
<td>Massage</td>
<td>First days of life</td>
<td>1 month</td>
</tr>
<tr>
<td>Underwater shower–massage</td>
<td>2 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Bathes carbonic, pearl</td>
<td>2–3 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Bathes hydrosulfuric, turpentine</td>
<td>5–7 years</td>
<td>5–6 months</td>
</tr>
<tr>
<td>Ozokeritotherapy</td>
<td>First days of life</td>
<td>1–2 months</td>
</tr>
<tr>
<td>Mud cure local</td>
<td>2–3 years</td>
<td>2–3 months</td>
</tr>
<tr>
<td>Thalassotherapy</td>
<td>2–3 years</td>
<td>1 month</td>
</tr>
</tbody>
</table>
Recommended literature:


Composed by Radionova T. O.