



UNIVERSITATEA DE STAT DE MEDICINĂ ȘI FARMACIE
"NICOLAE TESTEMIȚANU" DIN REPUBLICA MOLDOVA

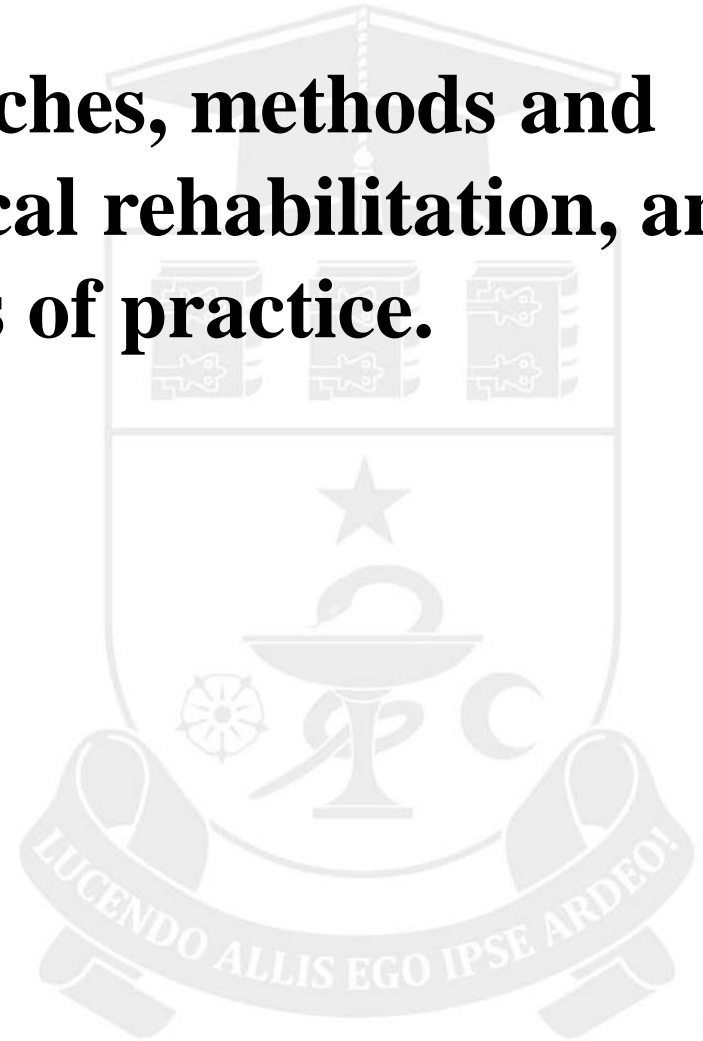
Methods and techniques in Medical Rehabilitation

Department of medical rehabilitation, physical
medicine and manual therapy



The goal of the lesson

Understand the branches, methods and techniques used in medical rehabilitation, and their principles of practice.





Objectives of the lesson

- **Understanding the methods and principles of application of physical and artificial physical factors in medical rehabilitation.**
- **Knowledge the notions of kinesiology and kinetotherapy.**
- **Knowledge of the classification and methods of practical application of kinetotherapeutic and manual therapy techniques.**
- **Understanding the notions of balneology and climatology and their practical application techniques.**



Physical Medicine

- **Branch of clinical medicine that use physical energy for their therapeutic effect.**
- **It studies the healing properties of natural and artificial physical factors.**
- **Elaborates the methods of their application for therapeutic, prophylactic and rehabilitation purposes.**





Classification of physical factors

Physical factors

```
graph TD; A[Physical factors] --> B[Natural  
water, air, sun,  
microclimate,  
mud,etc.]; A --> C[Artificial  
Electric current, magnetic  
field, mechanical  
vibration, light energy,  
etc.]
```

Natural
water, air, sun,
microclimate,
mud,etc.

Artificial
Electric current, magnetic
field, mechanical
vibration, light energy,
etc.



The effects of physical factors

- **The effect of physical factors is based on physical properties such as temperature, pressure, intensity and chemical composition of the factor.**
- **These involve the introduction of a certain physical energy into a biological system.**
- **This energy causes one or more physiological changes, which are used for therapeutic benefits.**



The effects of physical factors

- **Adaptive general reactions (through neuro-endocrine and vegetative mechanisms)**
- **Segmental reflex reactions**
- **Local action (metabolic)**
- **Physical-chemical modification of the internal environment.**



Classification of physical factors

- **By application mode:**

- a) **General**

- b) **Local**



- **After the physiotherapeutic factor action area:**

1. **body wraps (skin, mucosa, subcutaneous cellulosic tissue)**

2. **muscular and articular system**

- c) **internal organs**



The action of physical factors

- 1. Improvement of painful syndrome.**
- 2. Normalization of the secretory and motor function of the organs.**
- 3. Decreased inflammatory processes.**
- 4. Improving the trophics of tissues and organs.**
- 5. Stimulating regeneration processes.**



General contraindications of physiotherapy

Absolute

- **Fever, subfertility**
- **Serious (decomposed) condition of the patient**
- **Bleeding and predisposition to them**
- **Incompatibility with the physical factor**

Relative

- **Haematological diseases**
- **High blood pressure st.III**
- **Cardiovascular insufficiency st. III-IV**
- **Mental illnesses**
- **Malignant tumours**
- **Skin conditions**



The methods of physiotherapy

Active

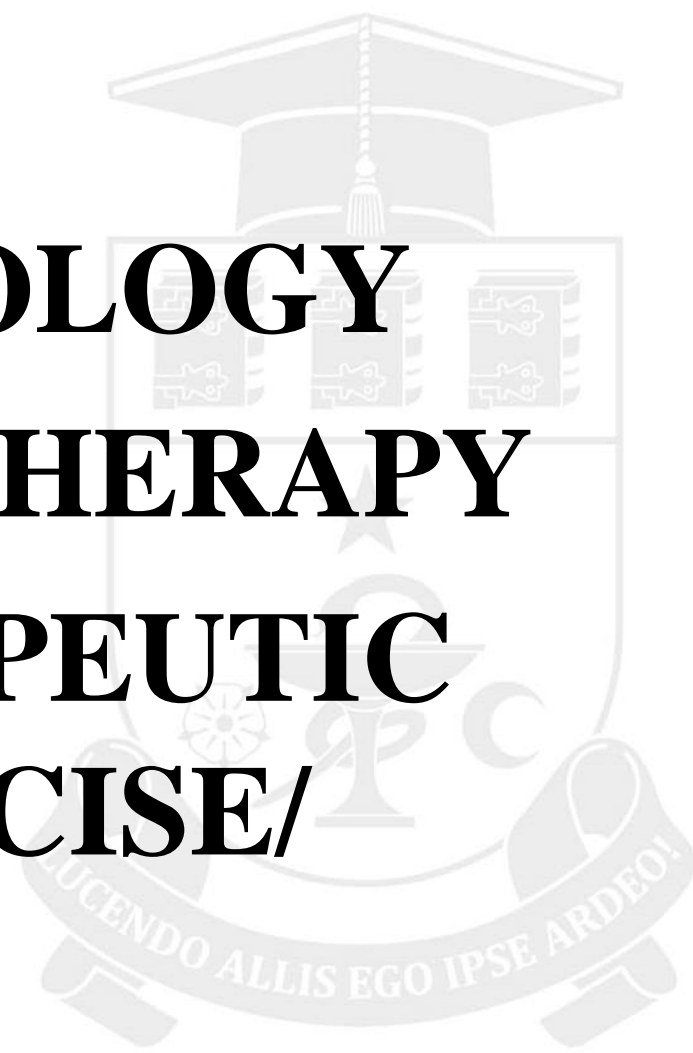
- **Physical Therapy**
- **Hydrokinetotherapy**
- **Occupational therapy**

Passive

- **Electrotherapy**
- **Thermotherapy**
- **Aerosoltherapie**
- **hydrotherapy**
- **Fangoterapie**
- **Balneotherapy**
- **thalassotherapy**
- **Massage**



KINETOLOGY KINETOTHERAPY /THERAPEUTIC EXERCISE/





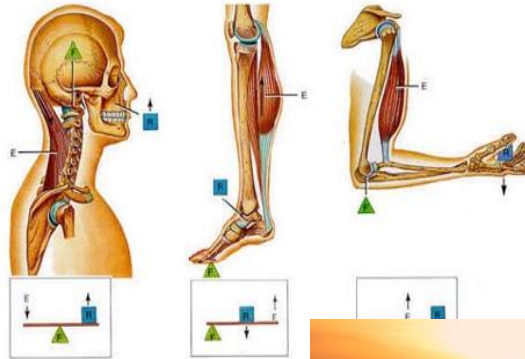
Kinesiology. Definitions

- **M. Dally, 1857, Paris - kinetology "the science or the study of motion"**
- **"*Kinetin*" - movement,**
- **"*Logos*" - to study, to talk about**
- **"The science of the movement of living organisms and of the structures that participate in these movements."**



Components of Kinesiology

Biomechanics



Therapeutic exercise



The psychomotor component





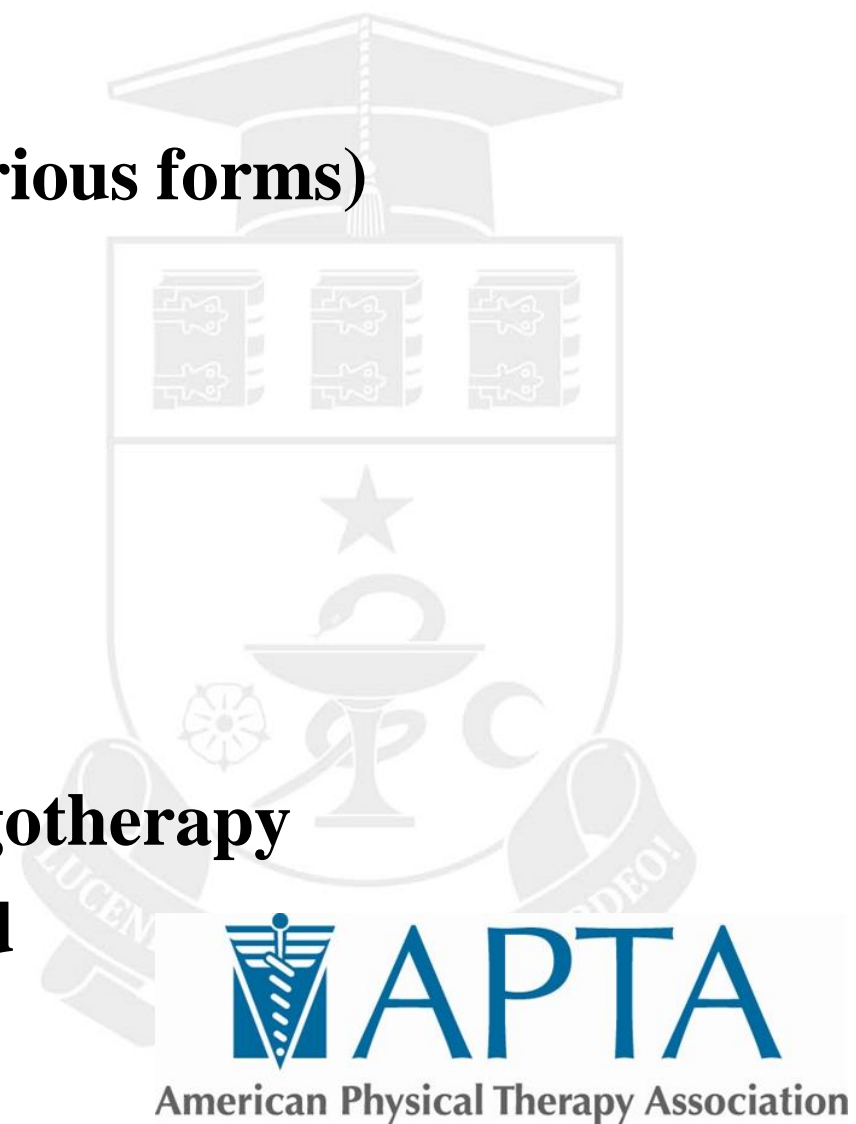
Tools of kinetotherapy in rehabilitation

Fundamental tools:

- **exercice (movement in various forms)**

Kinetotherapy aids:

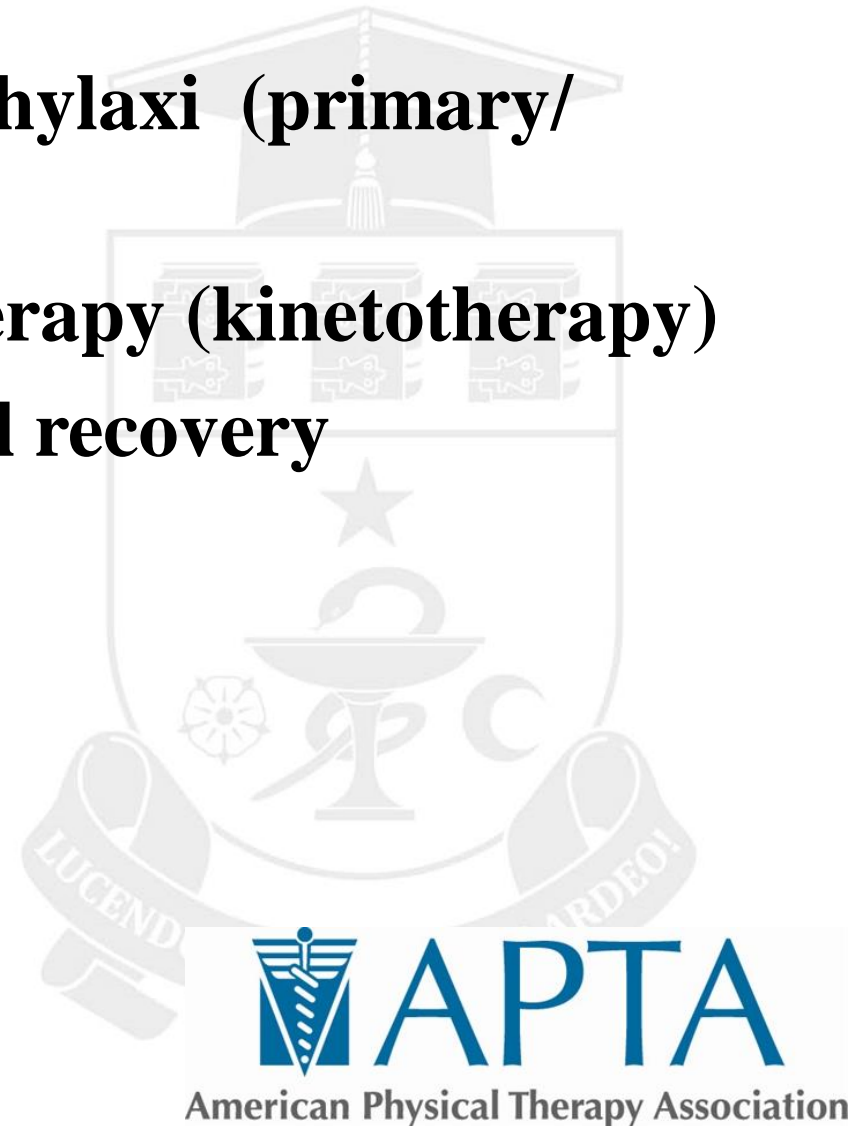
- **thermotherapy**
- **electrotherapy**
- **Hydrotherapy**
- **Occupational therapy, ergotherapy**
- **Physical activities adapted**
- **Massaj**





Kinetotherapy directions

- **Prophylactic - kinetoprophylaxi (primary/secondary)**
- **Therapeutic - physical therapy (kinetotherapy)**
- **Recovery – active physical recovery**





Criteria for the classification

By physiopathologic objectives

- **Kinetotherapy for range of motion**
- **Kinetotherapy for muscular tone**
- **Kinetotherapy to increase muscle endurance**
- **Kinetotherapy for coordination and balance**
- **Effort training kinetotherapy**
- **Relaxation kinetotherapy**
- **Postural kinetotherapy**



Criteria for the classification

By location of activity

- **Kinotherapy at the kinetic hall**
- **Kinotherapy at the patient's home**
- **Kinotherapy at the patient's bed**
- **Outdoor kinotherapy**
- **Kinotherapy in swimming pools**





The forms of kinetotherapy

- **Imitations and games**
- **General and respiratory gymnastics**
- **Selective medical gymnastics**
- **Reeducation of walking**
- **Education of gripping**





The forms of kinetotherapy

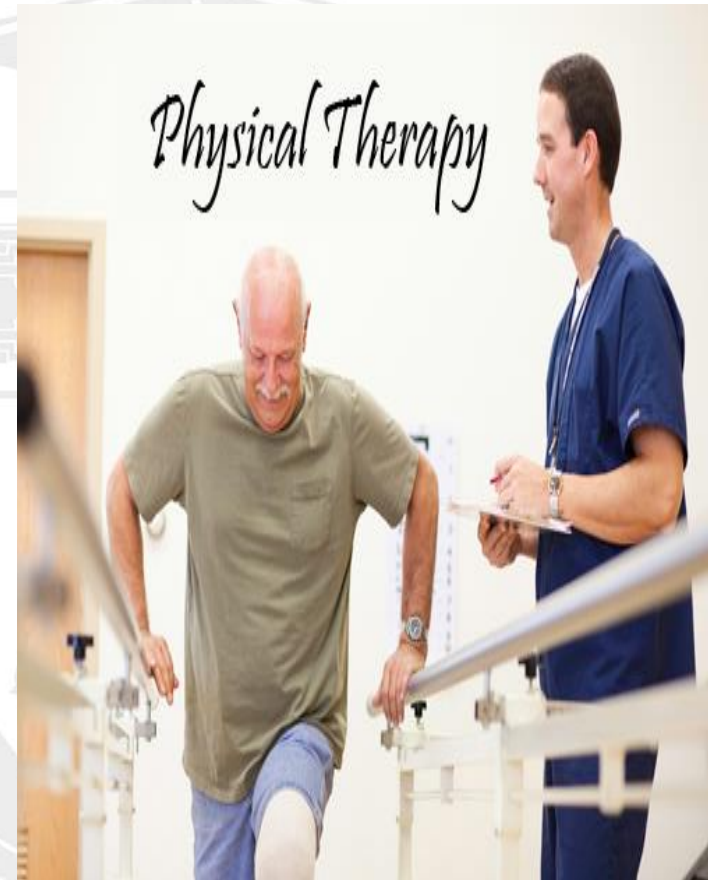
- **Hydro-kinetotherapy**
- **The curative sport**
- **The curative dance**
- **Occupational therapy**
- **Ergotherapy**
- **Active music therapy, art therapy**





Principles of kinetotherapy application

- **awareness**
- **individualization of treatment**
- **precocity of treatment**
- **grading effort**
- **continuity and succession of treatment to full recovery**
- **progressivity**
- **systematic application**
- **evaluation of the effectiveness of physical therapy and functional recovery**





Therapeutic effects

- **increasing muscle strength and strength**
- **improving joint mobility**
- **re-training coordination and balance**
- **breathing improvement**
- **increasing exercise tolerance**





Kinetic therapy is beneficial in:

- **Diseases of the spine: herniated disc, scoliosis, osteoarthritis**
- **Neurological disorders: stroke, headache.**
- **Heart disease: heart attack, HTA**
- **Bone fractures, sprains, joint dislocations.**
- **Degenerative diseases of the joints**



Example of prescription

- **In a patient with acute phase knee arthrosis, Kinetotherapy of postural facilitation in anti-edema position with static isometric exercises is recommended.**
- **After pain relief, dynamic passive / active, assisted / free exercises are indicated in order to amplify joint mobility and stability.**
- **Stationary → ambulatory → home.**



Occupational Therapy

“Occupational therapy is the form of treatment that uses specific activities and methods to develop, ameliorate or restore ability to deploy activities necessary for the life of individual, to compensate side dysfunctions and to diminish physical deficiencies.”



(American Occupational Therapy Association, 2008)



Occupational Therapy

Occupational therapy understands by occupation the amount of activities in the most varied fields, that the individual performs during the day. These activities include:

- **daily self-care;**
- **entertainment;**
- **work;**
- **educational activities;**
- **hobbies;**
- **other activities.**





ELECTROTHERAPY





ELECTROTHERAPY

- **Low intensity direct (continuous) electric current**
 - **Galvanization**
 - **Medical electrophoresis**





Galvanic current

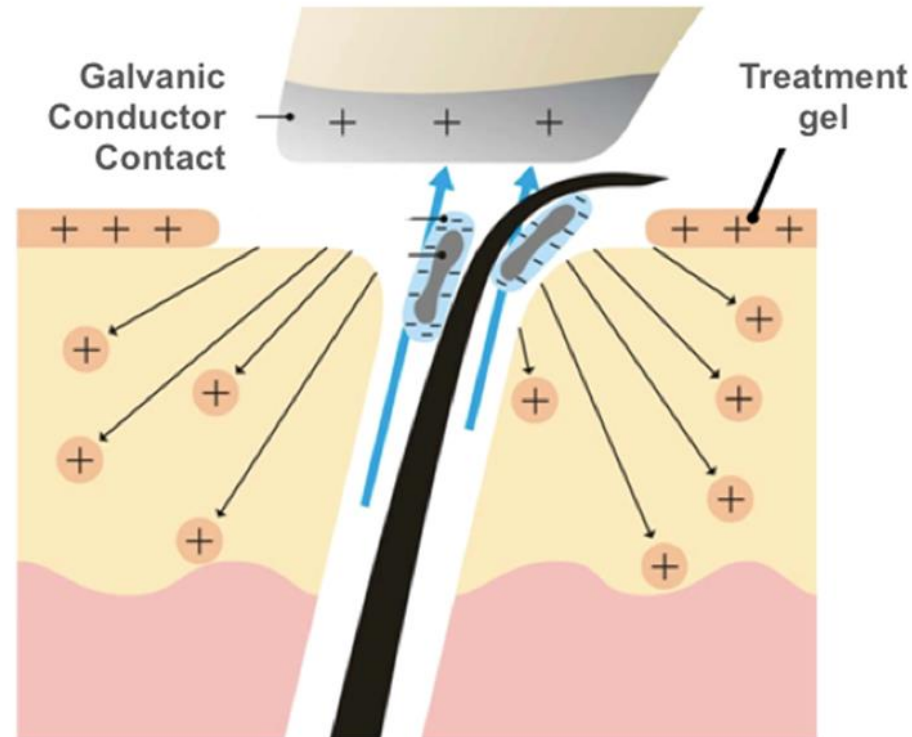
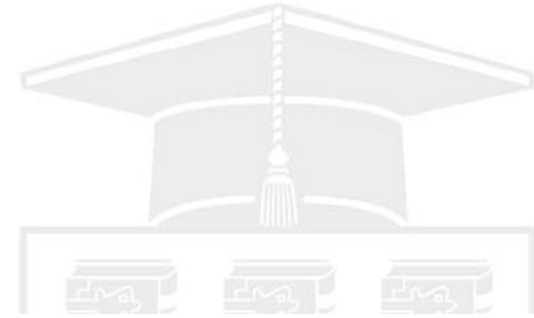
The electric power of zero frequency or the continuous current is called galvanic current. Production mechanism: through many methods, the most important are:

- **chemical methods.**
- **mechanical methods**
- **thermo-electrical methods**

Galvanic current properties: electrolysis, iontophoresis, electrophoresis, electro-osmosis, tissular resistance values alter depending on the textures nature.



Galvanic current





The effects of galvanic current

- **Analgesic, manifested at anode (+);**
- **Stimulation / excitation manifested at the cathode (-): performs muscle contractions as a result of the action of the current on the motor nerve fibers;**
- **Sedative, the result of the action on the CNS;**
- **Hyperimeant – vasodilation – bio trophic, by activating local vascularization, with effects on the general circulation;**
- **Resorption by non-specific neuro-vegetative control.**



Indications

- **Diseases of the respiratory system: bronchitis, asthma and pneumonia.**
- **Otorhinolaryngology disease.**
- **Gastrointestinal diseases, for example gastritis, pancreatitis, peptic ulcer.**
- **Cardiovascular system pathologies: hypertension, hypotension, angina, atrial fibrillation, etc.**
- **Diseases of the urogenital system.**
- **SN pathologies: migraines, neuroses, radiculopathy, intervertebral hernia.**
- **Musculoskeletal disorders: fractures, osteochondrosis, arthritis, osteoarthritis.**
- **Diseases of the endocrine system.**
- **Skin diseases**
- **Dental disorders: stomatitis, gingivitis, periodontitis.**



Example of prescription

- **Patient with bilateral gonarthrosis (Rg st.II)**
- **Electrophoresis**

Reg. art. knee bilateral

Sol. Lidocaine (+)

Sol. Acc. Nicotinic (-)

I 5-8 mA, t '15 min.

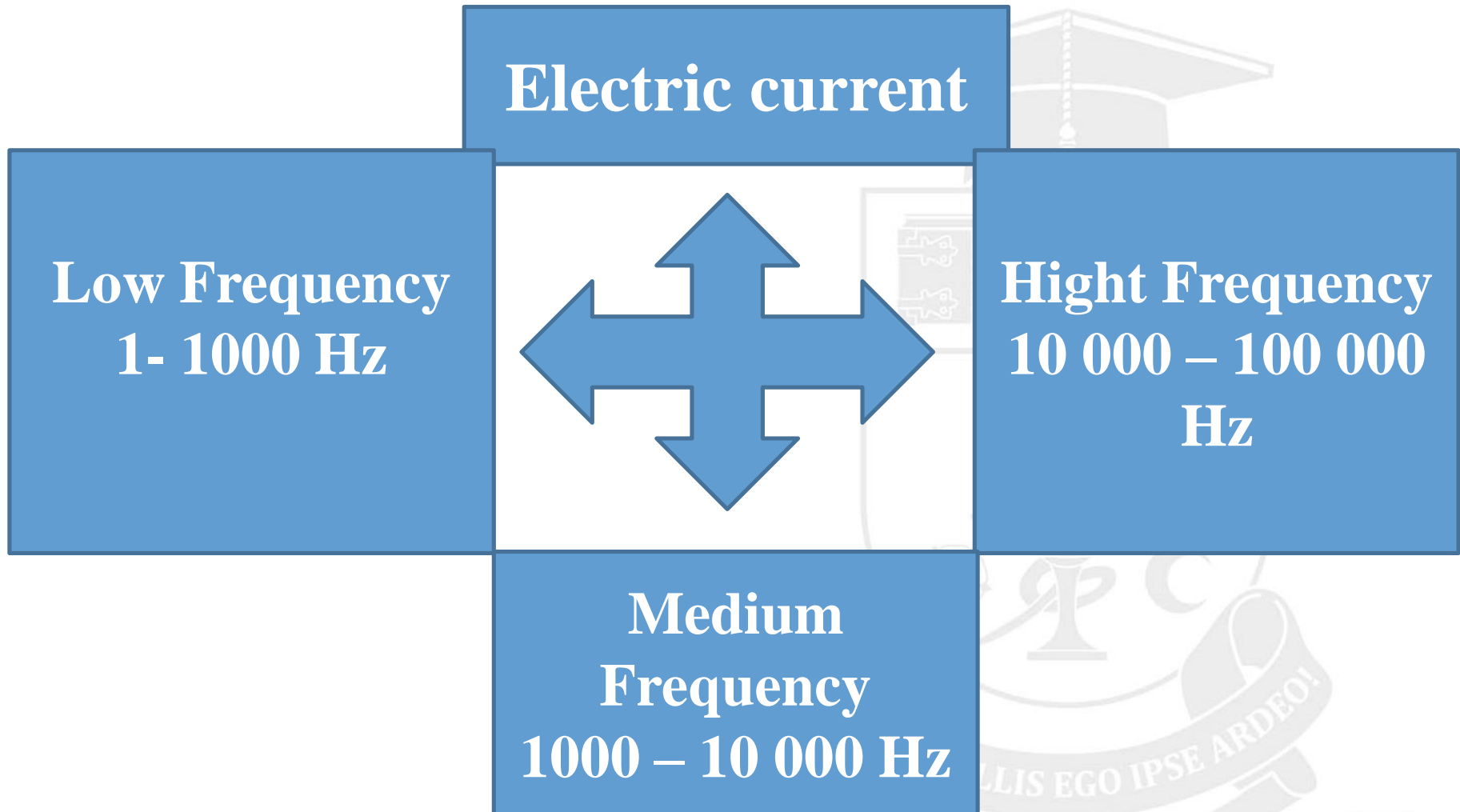
Daily

N 8-10 treatment cures





Classification of forms of electric currents by frequency





Pulsating low frequency current

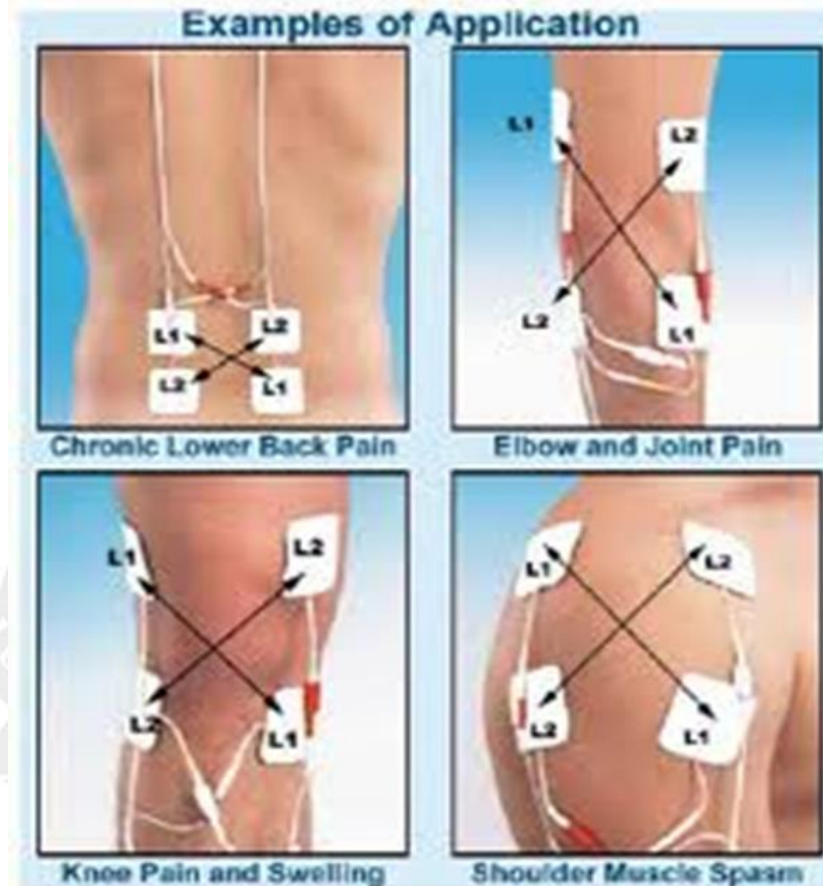
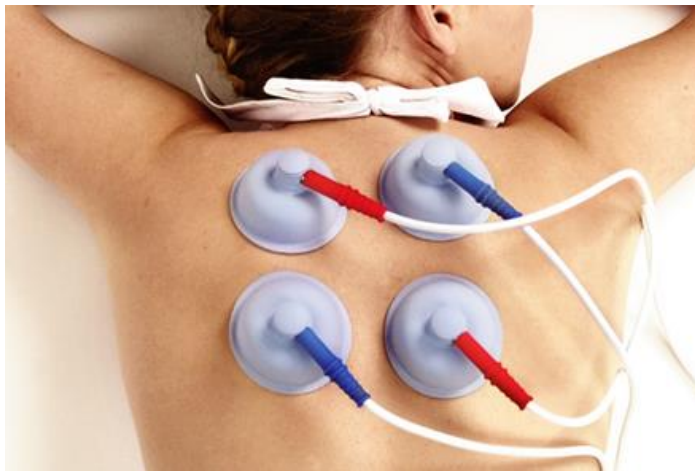
- **The electric sleep**
- **Diadinamotherapy (DDT)**
- **Amplipulse therapy**
- **Interference current therapy**
- **Fluctuorization**
- **Electrostimulation**
- **Electrodiagnostic**





Pulsativ current of medium frequency

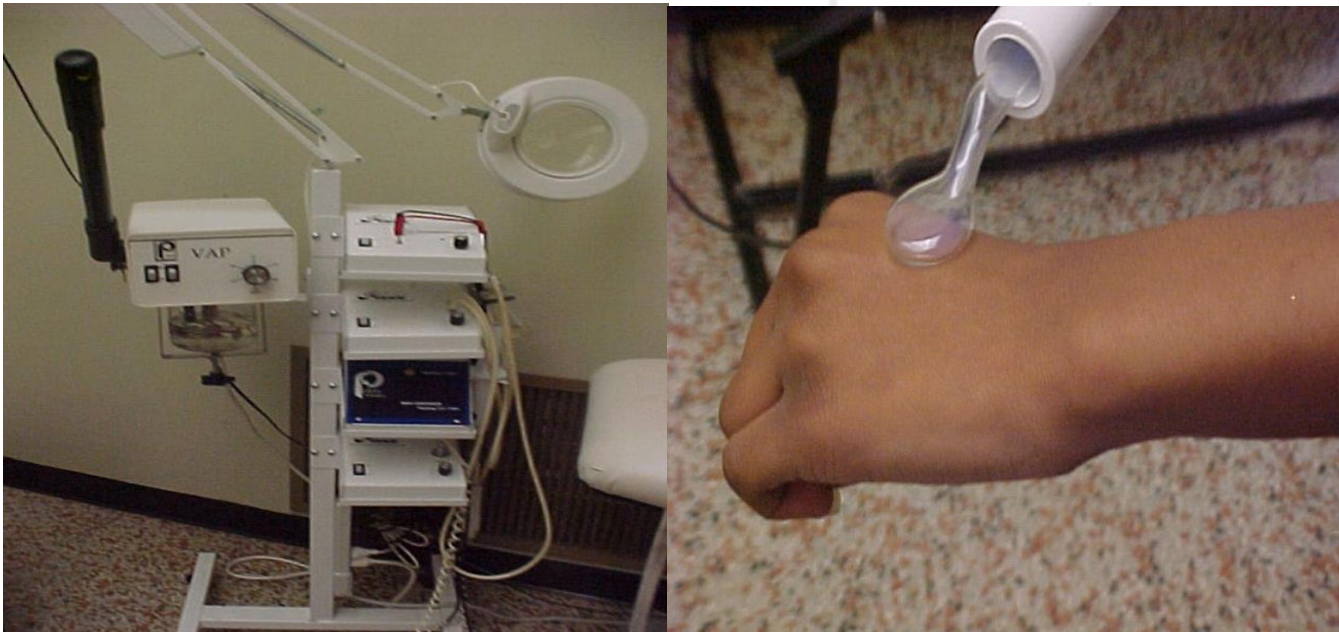
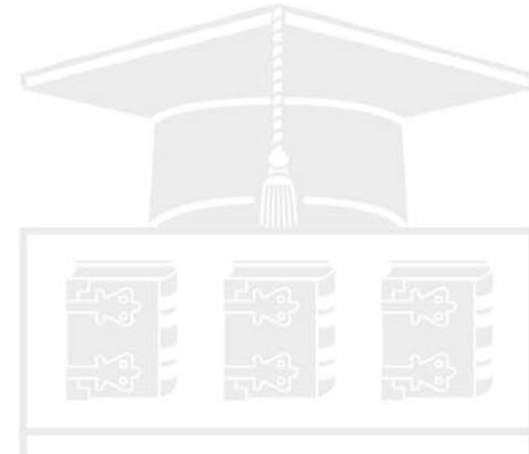
Medium-frequency pure currents
**Medium frequency rectified/
modulated currents**
Interference currents





High frequency electric current

- **Diathermy**
- **Ultrasonotherapy**
- **Local darsonvalvation**





Electromagnetic field

- **Magnitotherapy**
- **Inductothermtherapy**
- **Franklinization**
- **Ultra-high Wave Therapy**





Example of prescription

- **Patient with bilateral coxarthrosis + low back pain**
- **Magnitotherapy**

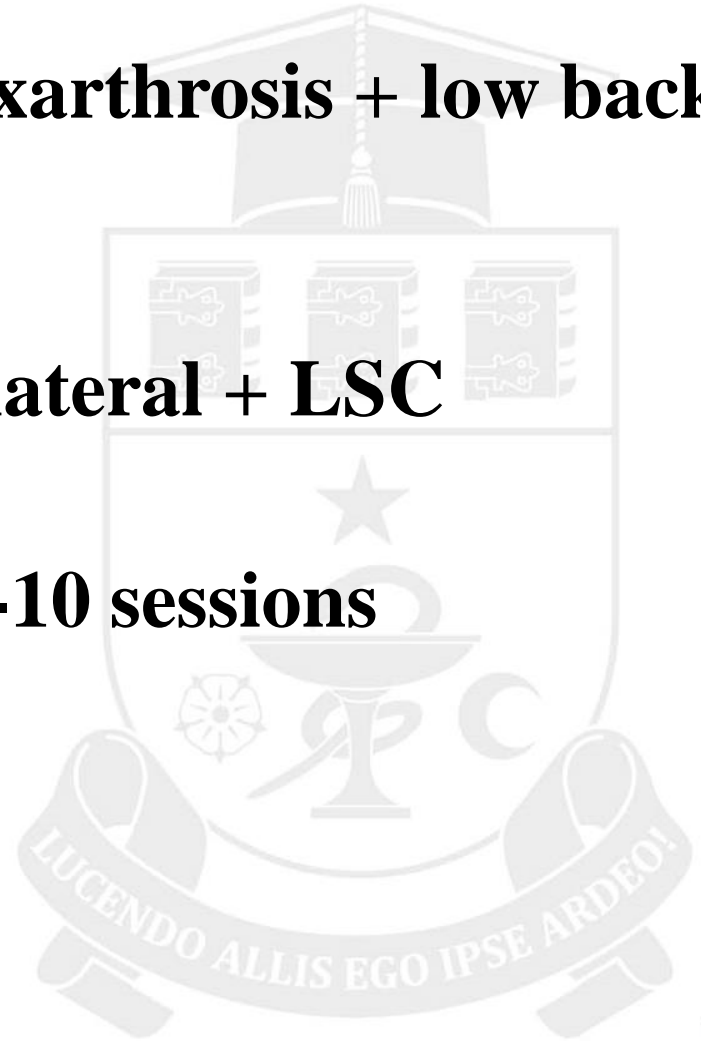
Reg. Coxofemur joint bilateral + LSC

I 30%; Fr 100Hz

t' min +12 min, daily N8-10 sessions

I (15,30,50,75,100)%

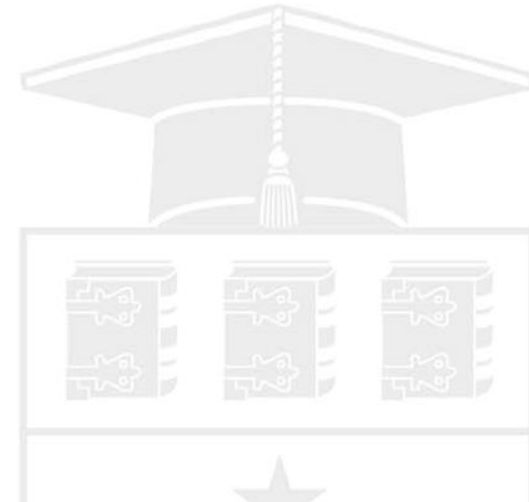
Fr (10,20,100,170) Hz





Phototherapy

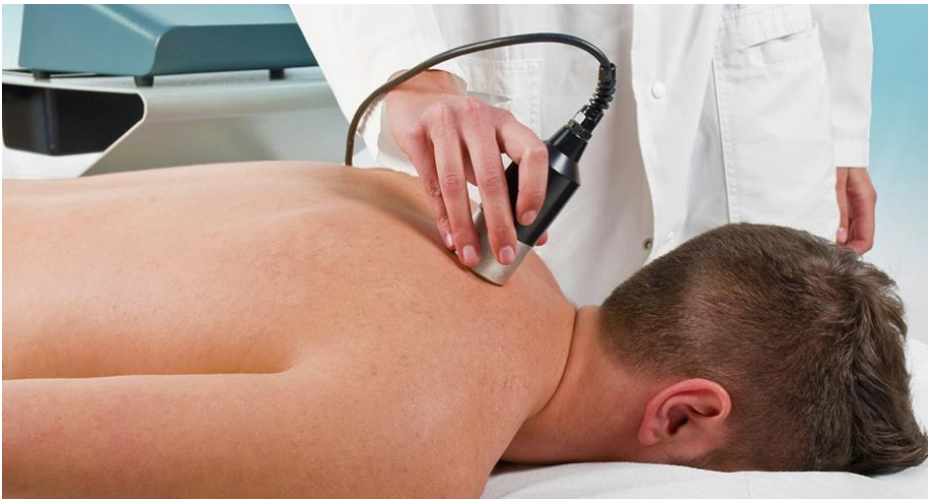
- **Infrared irradiation**
- **Visible rays therapy**
- **Ultraviolet irradiation**
- **LASER therapy**





Mechanical waves

- **Ultrasound therapy**
- **Medical phonophoresis**
- **Vibrio-therapy**





Thermotherapy

- **With high temperatures:**
- **Paraffin**
- **Peloidotherapy**
- **Psamoterapy**

- **With low temperatures:**
- **Cryotherapy**
- **Hypothermia**





Example of prescription

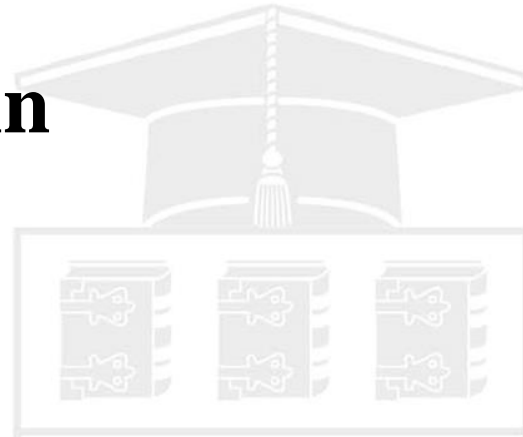
- **Patient with low back pain**
- **Thermotherapy**

Lumbar rule + sacral rule

Paraffin applications

T ° 48 °; 20 min.

Daily, N 8 sessions





Balneology

Hydrotherapy

Climate therapy

specific physical environments





Balneology

- **Balneology is a natural physical science that study: mineral water, sludge, mud, gas emissions, climatic factors; that have a proven therapeutic activity**
- **This domain developed in a major directions of balneotherapy.**





Spa resorts with mineral waters





Hydrotherapy

- **Methodological application by qualified personnel in a specific activity of the physical water factor for the purpose of restoring, maintaining or increasing the functional qualities of persons with acute, chronic disabling syndromes.**





Methods of hydrotherapy

- **compresses**
- **packing**
- **friction**
- **windings**
- **showers**
- **bathrooms**
- **steam baths**





Therapeutic Baths

1. General

2. Local

- with fresh water,
- salt,
- flavored (conifers, willow)
- various degrees of mineralization





Specific baths

- **Sulfuric**
- **Rodon**
- **With oxygen**
- **With plants medicinal**





Classification by water temperature

- **Cold baths (<20 ° C)**
- **Cool baths (20-30 ° C)**
- **Intermediate baths (34-37 ° C)**
- **Neutral baths (36.5 ° C)**
- **Warm baths (38-39 ° C)**
- **Hot baths (> 40 ° C)**



Therapeutic showers

- **Cold showers, 30-60 "**, strengthen the body and are indicated in anemia and depressive states.
- **Hot showers, 3-5 'have** calming effects on nervousness and stress, \uparrow metabolism, cellular activity, gastric secretion, \downarrow TA by vasodilation.





Example of prescription

- **Patient with neurosis**
- **General bathroom with chamomile**

Temperature 37 ° - 38 ° C

Time 15-20 min

Daily, N12 sessions





Therapeutic sludge

- **Synonym – mud/peloid therapy.**
- **Branch of physiotherapy dealing with the study and therapeutic application of sludge.**
- **Peloids are formed under natural conditions under the influence of geological processes, in medicine they are used in the form of baths or local applications.**



Spa resort with mud





The effects of mud

- They are related to physical, chemical and biological potential of peloids.
- Ability to absorb and maintain heat for a long time (thermopexia).
- Thermoregulatory reactions, skin receptor stimulation, vasodilation, ion exchange between the peloid and the skin, vegetative reactions, bactericides effects.





Application techniques

- **Packages (partial or complete)**
- **Poultices**
- **Spa**
- **Iontophoresis**





Modified/natural air environment

- **Inhalation or aerosol therapy**
- **Electro-aerosol therapy**
- **Barotherapy**
- **Speliotherapy**





Therapeutic objectives

- **Humidification → airway dilation**
- **Facilitating the evacuation of bronchial secretions (fluidifying, mucolytic)**
- **Removing the infection**
- **Regeneration of vibrational epithelium**
- **Inhibition of antigen-antibody reactions (sodium chromoglycate)**



Indications

- **Chronic obstructive pulmonary disease (asthma, COPD)**
- **Cystic fibrosis**
- **Acute laryngitis and pharyngeal edema of the child**
- **Acute / chronic bronchitis and community pneumonia**
- **Rhinitis, acute or chronic otitis sinusitis**



Example of prescription

- **Patient with COPD**
- **Inhalations**

**Prospective 1ml + Sol. 0.5% NaCl
(or 5ml Furacillin)**

t' 5 min.,

Daily N 8-10 sessions





Medical climatology

- **CLIMATE** - Totality of the processes and meteorological phenomena characteristic of a geographical region (the active external environment in which the life takes place)
- **Medical**, consists of all the physical (cosmic, atmospheric, terrestrial and technical) and biological factors, typical for a certain region, which act on the



BIOCLIMATOLOGY

BIOCLIMATOLOGY is a science that studies the influence of climate on living beings. (climatic zone depending on the influence of the elements and components on the healthy and sick human organism)



BIOCLIMATE

The climatic zone according to the influences of the elements and components on the healthy and sick human organism





Characteristics of a climate

- **Temperature**
- **The electrical state of the air**
- **The composition of the air**
- **Bacteriological patch**
- **Air currents**
- **Rain / snow rains**
- **Actinic characteristics**
- **Geographic situation (local factors)**
- **Soil geology**





MICROCLIMATE MINES





SPELEOTHERAPY

- **Speleotherapy acts causally in the pathogenesis of asthmatic disease by interrupting the pathogenic stimulus (allergen-free air)**
- **Air humidity: fluidization of secretions, mucolytic ef.**
- **Na inhalation: osmotic and decongestant role**
- **Ca, Mg: anti-inflammatory, anti-allergic, spasmolytic**
- **Intervene in euritmization (stress suppression, normalization of the circadian rhythm distorted by "artificial night")**
- **Treatment methodology: not standardized, varies from a few hours to 16 h / day**
- **It may also include night sleep**



THALASSOTHERAPY

Uses all natural factors: bioclimate - seawater - lake water - sludge - mineral water.

On the body acts:

- 1. The contrast air and water t°**
- 2. Wave motion**
- 3. salinity of water**
- 4. air bath (sedative effect)**
- 5. sun bath (IR + UV radiation)**
- 6. sand bath (loss of liquids)**
- 7. sludge**
- 8. aerosols**
- 9. sulphurous waters**





Conclusion

The medical rehabilitation uses various methods of application of physical and artificial physical factors, kinetotherapeutic techniques, occupational therapy, manual therapy, speech therapy, medical psychology and others, for prophylactic, therapeutic and recovery purposes.



Bibliography

1. I.S.Stratulat, O.Pascal, V.Cihai, A.Tăbîrță, Manualul pentru rezidenți și specialiști în domeniu ” Mijloace fizice utilizate în medicina fizică și de reabilitare”Editura ”Gr.T.Popa”UMF,Iași,2019,2 vol.vol1- 456p.,vol2 -539p.
2. I.S.Stratulat, O.Pascal, V.Cihai, A.Tăbîrță, Manualul pentru rezidenți și specialiști în domeniu „*Balneoclimatologia în România și Republica Moldova: istoric și perspective europene*”. Editura Academie Române 2018, 379 p.
3. Codrina Ancuța. Esențialul în medicină fizică și recuperare medicală. Editura Gr. Popa. Iași. 2010.
4. Georgiana-Ozana Tache. Ghid de medicina fizica si recuperare medicala. Editura: SCRIPTA. Bucurști. (2001).
5. Randall L. Braddom. Physical Medicine and Rehabilitation. Publisher: Saunders; 4 edition (2010).
6. Пономаренко Г. Н., Турковский И. И. Биофизические основы физиотерапии. Медицина, 2006.
7. MAJ Guy R Majkowski. The Sports Medicine Resource Manual. 2008
8. Mark A. Merrick PhD. Physical Rehabilitation of the Injured Athlete (Fourth Edition). 2012



Questions ?

