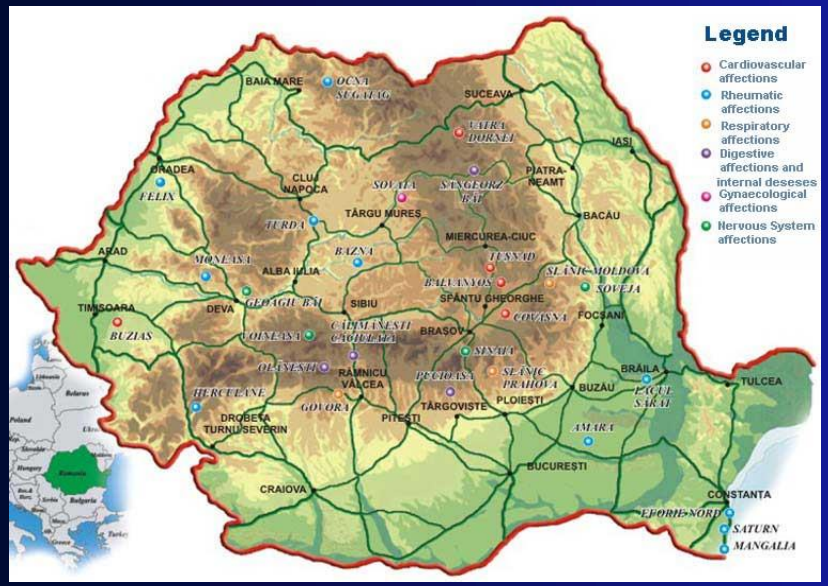
Estonia, Haapsalu: "Quo vadis Estonian curative mud"

Centre of Excellence in Health Promotion and Rehabilitation

Techirghiol therapeutic mud

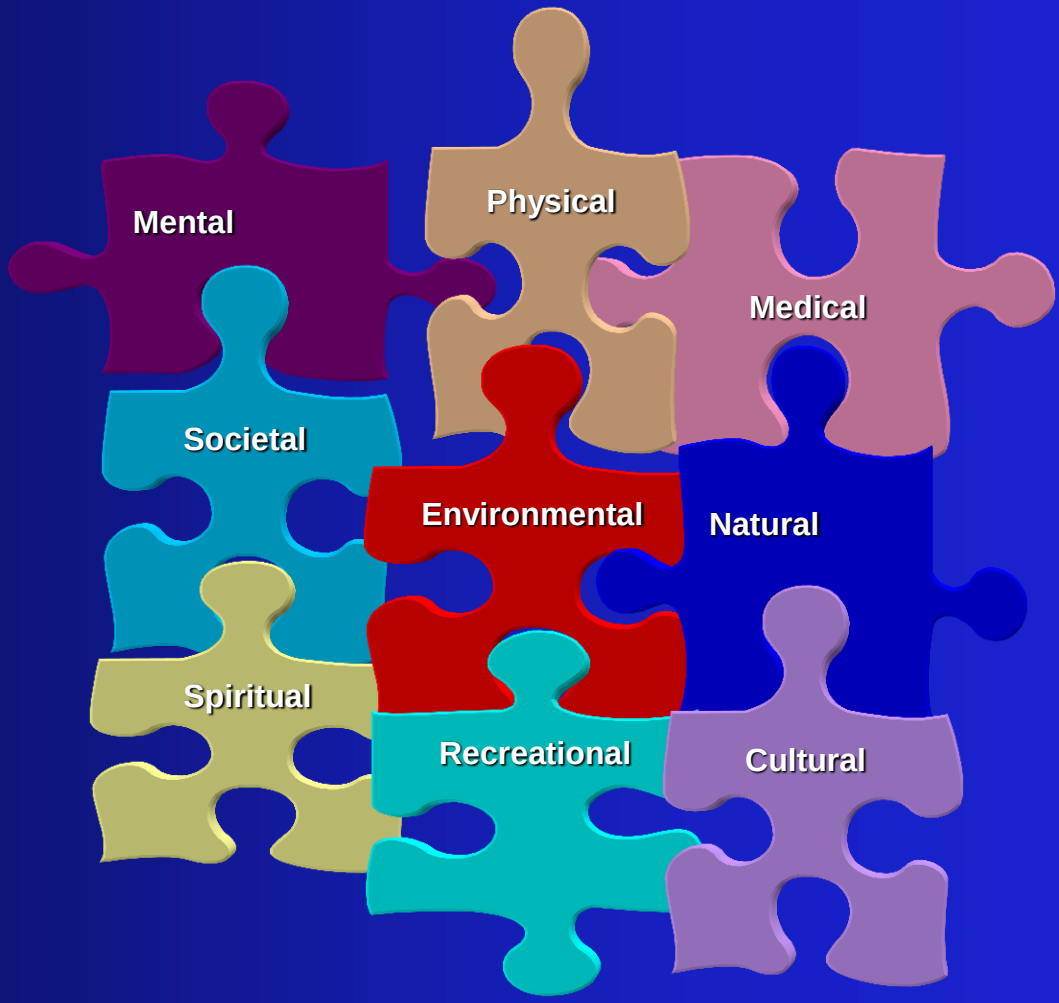


Dr. Biol. Constantin Munteanu


RO TURISM

Health Resort Medicine as a comprehensive concept for health

- Prevention
  - Wellness
  - Health promotion
  - Recreation
- Treatment
  - Curative
  - Complementary
  - Palliative
- Rehabilitation



Health Resort Medicine as a comprehensive concept for health

- Balneotherapy: a stimulation - adaptation treatment method applied in forms of bathing, drinking and inhalation cures performed with natural healers, method which is acting by three main ways: thermally, mechanically and chemically.
- Natural therapeutic factors:
  - underground sources of natural "therapeutic" waters,
  - natural peloides (mud),
  - gasses (CO_2, radon and H_2S),
  - seasonal agents and various microclimates (speleotherapy).
- Quality of life and welfare: health is a fundamental right of the human being
- The joint use perspective of natural therapeutic factors and physiotherapy with new robotic assistive interventions might increase the clinical importance of balneal resorts, and also include the modern trend of availing robotic assistive equipment to the benefit of patients.

Importance of Health Resorts and Spas

(1) Therapeutic use of classical forms of prevention and rehabilitation.

(2) They provide economic incentives for regional health care industries and tourist markets

(3) They serve as healthy ecological locations for environmental protection and appreciation.

Experts in Rehabilitation, Physical Medicine and Balneology are involved in treating specific deseases generating functional impairments:

a) traumatic disorders;
b) musculoskeletal disorders;
c) inflammatory rheumatic diseases;
d) cardiovascular diseases;
e) respiratory diseases;
f) gynecological diseases;
g) dermatological diseases;
h) neurological disorders;
i) neuropsychomotor disease;

Basic Infrastructures of Health Resorts

- Certified natural therapeutic factors and remedies
- High quality standard of air and healthy climate
- Special equipment for bathing, drinking, inhaling, gymnastics
- Therapeutic environment with parks and walking areas
- Areas for fitness, sports, and relaxing
- Specialized physicians and medical teams
- Special hotels or pensions with dietetic offers
- Cultural events
- Health education centres
- Health promoting urbanisation
- Equipment of medical care and first aid
- High quality standard of hygienic equipment

Health Resort Medicine in Romania

- Large range of natural therapeutic factors spread over almost the entire surface, exploitable the entire year and covering the entire range of sicknesses treatable by balneotherapy;
- Within a restricted area belonging to one and the same resort area, several types of mineral waters are encountered, associated sometimes with other factors – adequate bioclimate, saline halls, having the possibility of treating patients with multiple infirmities
- The volume and quantity of mineral substances reserves are very high, offering the possibility of creating new resorts
- Exceptional efficacy of certain cures with mineral water, especially for the cases where classical treatments have no results (allergies – Olăneşti, sterility - Sovata);
- The purity of the environment factors and quality of the natural environment, lacking major polluting factors, as ambiance determined for spa areas and resorts, with a complementary effect
- Key personnel well trained to provide best medical assistance during the balneal cure

Health Resort Medicine in Romania
Therapeutic factors

Unique spa resources

1. hot springs
2. mineral springs
3. mud
4. moffets
5. bioclimate (sedative, exciting or tonic)

used in medical services for preventive health, rehabilitation and wellness.

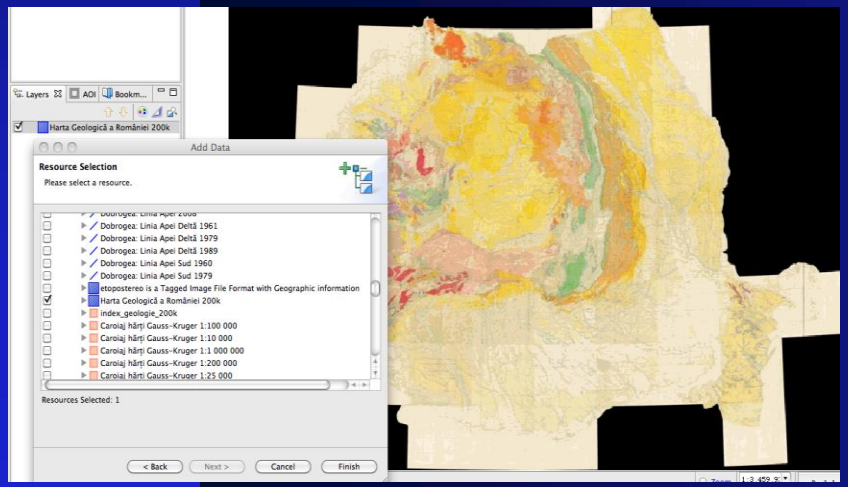
- Use of therapeutic natural factors under medical supervision
- Associating a series of techniques to help patients improve their health (physical medicine therapies)

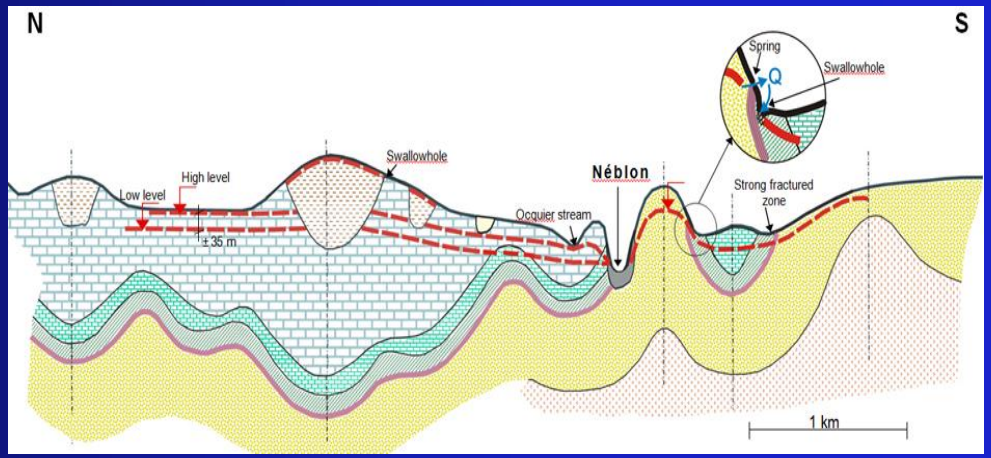
Scientific Research on natural therapeutic factors

Geological and hydrological surveys on natural therapeutic resources

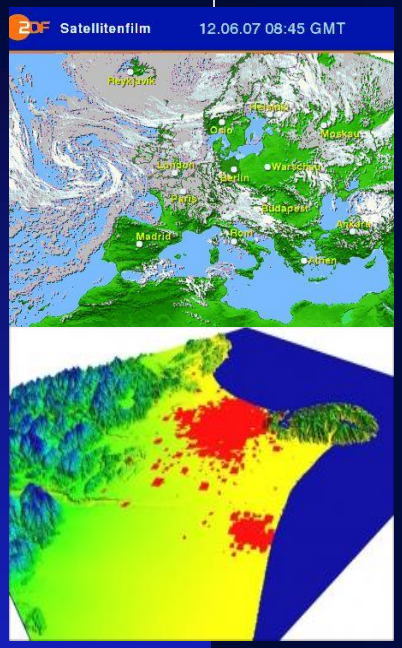
Geological research is completed by synthesis materials (studies, reports, etc.) together with cartographic materials.

Based on the conclusions of these materials we obtain detailed economic knowledge to capitalize therapeutic mineral resources.





BIOCLIMATIC STUDIES



Working procedure for bioclimatic research refers to processing specialized climate and microclimate data, leading to value estimation of bioclimatic indices. Among these factors are mentioned:

-Thermal comfort index (based on actual temperature equivalent, determined using temperature, humidity, and wind intensity);

- Skin climatic stress index (on feeling hot / cold felt by the human body, depending on air temperature and wind intensity);

- Lung climate stress index (based on the feeling of hydration / dehydration of the lung lining, depending on water vapor pressure of the atmosphere);

-Total bioclimatic stress index (summing the values of the two previous climate stress).

- Other bioclimatic indices as air ionisation, etc.

Physico-chemical analysis of natural therapeutic factors

Quality of natural factors is determined by their effective physico-chemical properties: mineral or organic composition, gases dissolved, suspended particles, living organisms.

Surse de apariție	Suspensii	Coloizi	Gaze	Substanțe neionizate și dipoli	Ioni pozitivi	Ioni negativi
Din solul mineral și roci	-nămol -nisip -alte substanțe anorganice	argila SiO_2 Fe_2O_3 Al_2O_3 MnO_2	CO_2		Ca^{2+} Mg^{2+} Na^{+} K^{+} Fe^{2+} Mn^{2+} Zn^{2+}	HCO_3^- Cl^- SO_4^{2-} NO_3^- CO_3^{2-} $HSiO_3^-$ $H_2BO_3^-$ HPO_4^{2-} $H_2PO_4^-$ OH^- F^-
Din atmosferă			N_2 O_2 CO_2 SO_2		H^+	HCO_3^- SO_4^{2-}
Din descompunerea materiei organice	-sol organic -resturi organice	-materii vegetale organice -resturi organice	CO_2 NH_3 O_2 N_2 H_2S CH_4 H_2	-materii vegetale colorate -resturi organice	Na^+ NH_4^+ H^+	Cl^- HCO_3^- NO_2^- NO_3^- OH^- HS^- radicali organici
Organisme vii	-pești -alge -diatomee -organisme minuscule	-viruși -bacterii -alge -diatomee				

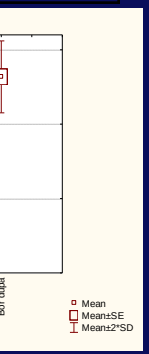
Microbiological analysis of natural therapeutic factors

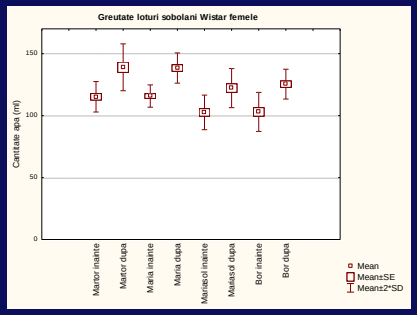
Microbiological analysis of different samples is done for preventive, diagnostic, prognostic or therapeutic aim.

Biologist working in a microbiology laboratory is responsible for correct sampling, laboratory analysis of the sample, validation of results and confrontation with complementary data (clinical, epidemiological and so on), thus indirectly participated in interpreting the results .

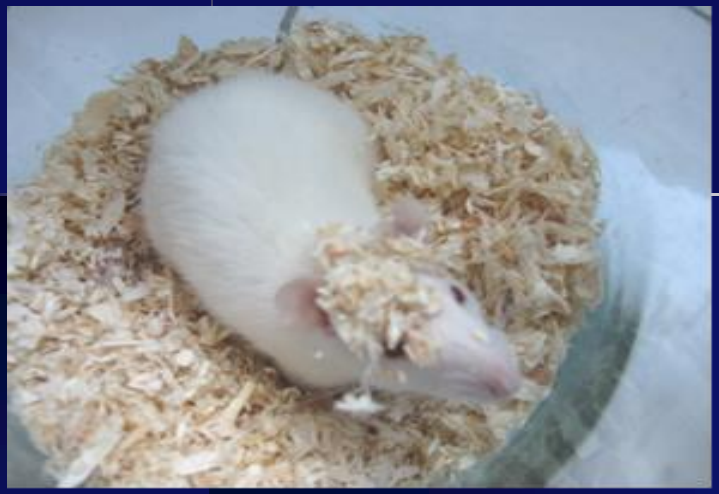
Animal model study: effects of Mary Mineral Water from Malnas Bai, Romania

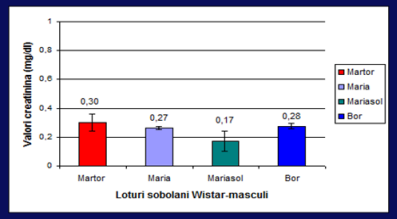
Males	Weight (g)	
	Before	After
Control	108	113
	107	125
	106	132
	112	133
	90	146
Maria Water	111	130
	101	135
	100	128
	116	120
	116	116
Mariasol	113	116
	112	143
	103	126
	116	126
	106	127
Bor	112	116
	118	144
	126	134
	104	123
	106	142

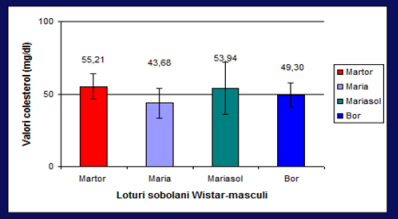


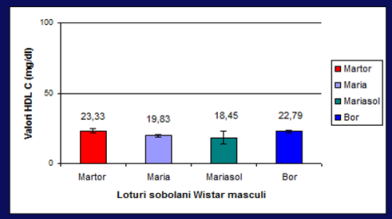


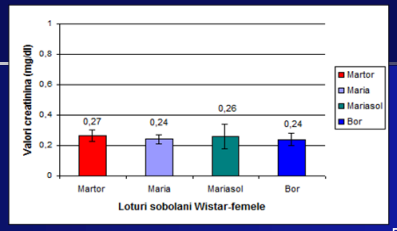
Females	Weight (g)	
	Before	After
Control	120	128
	108	143
	123	153
	113	135
	112	136
Maria Water	108	138
	119	143
	118	132
	118	133
	116	146
Mariasol	111	126
	108	124
	94	120
	102	131
	98	110
Bor	98	127
	113	135
	110	120
	96	124
	98	121

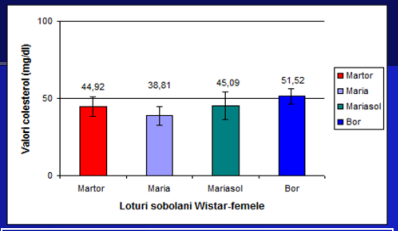


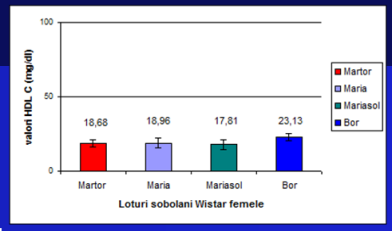

Valori creatinina (mg/dl)
0,30
0,27
0,17
0,28
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-masculi

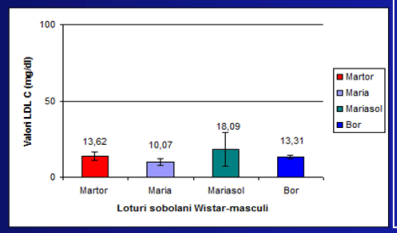

Valori colesterol (mg/dl)
55,21
43,68
53,94
49,30
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-masculi

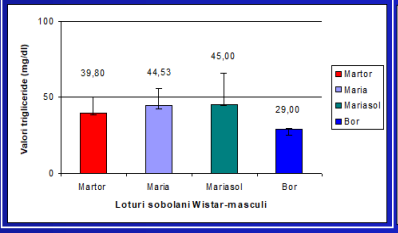

Valori HDL C (mg/dl)
23,33
19,83
18,45
22,79
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar masculi

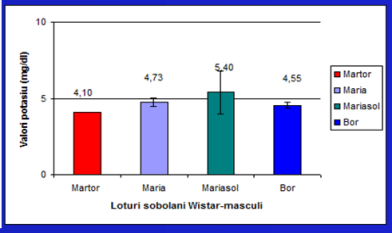

Valori creatinina (mg/dl)
0,27
0,24
0,26
0,24
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-femele

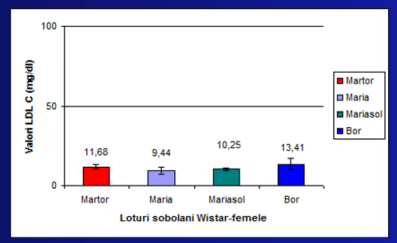

Valori colesterol (mg/dl)
44,92
38,81
45,09
51,52
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-femele

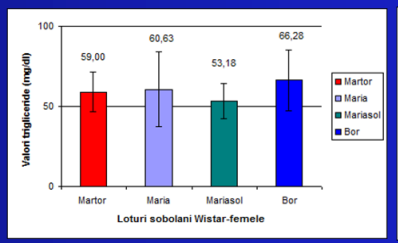

valori HDL C (mg/dl)
18,68
18,96
17,81
23,13
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar femele

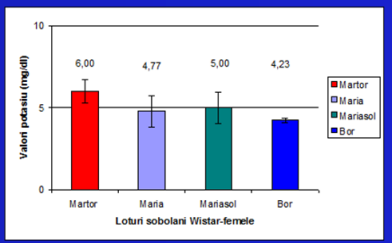

Valori LDL C (mg/dl)
13,62
10,07
18,09
13,31
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-masculi

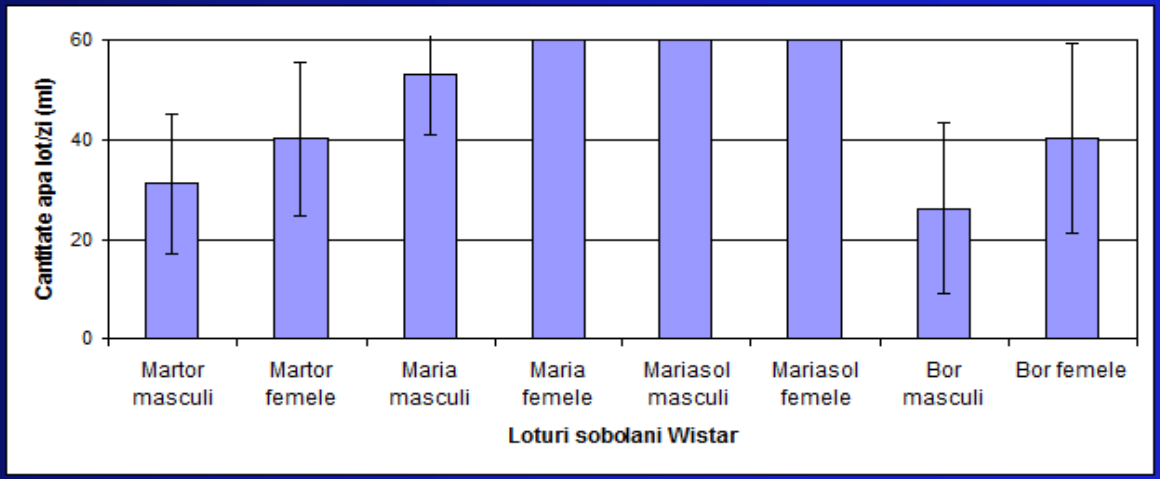

Valori triglyceride (mg/dl)
39,80
44,53
45,00
29,00
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-masculi


Valori potasiu (mg/dl)
4,10
4,73
5,40
4,55
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-masculi

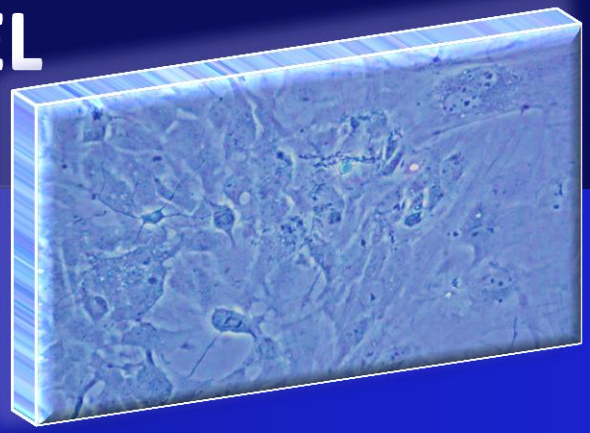

Valori LDL C (mg/dl)
11,68
9,44
10,25
13,41
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-femele

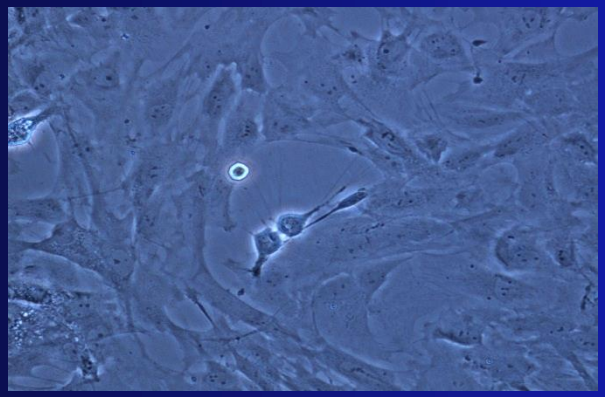

Valori trigliceride (mg/dl)
59,00
60,63
53,18
66,28
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-femele


Valori potasiu (mg/dl)
6,00
4,77
5,00
4,23
Martor
Maria
Mariasol
Bor
Loturi sobolani Wistar-femele

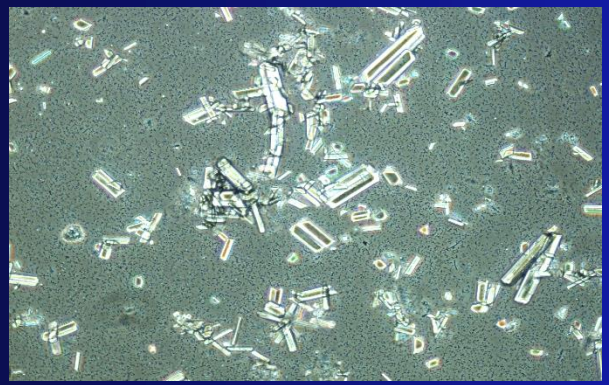

Cantitate apa lot/zi (ml)
60
40
20
0
Martor masculi
Martor femele
Maria masculi
Maria femele
Mariasol masculi
Mariasol femele
Bor masculi
Bor femele
Loturi sobolani Wistar

ADVANCED RESEARCH AT CELLULAR AND MOLECULAR LEVEL





In vitro studies allows evaluation of cell morphology, protein synthesis, secretion of certain substances, cell metabolism, cellular receptors interaction with different ligands, uptake or release of electrolytes or other types of substances that reach the cellular environment.



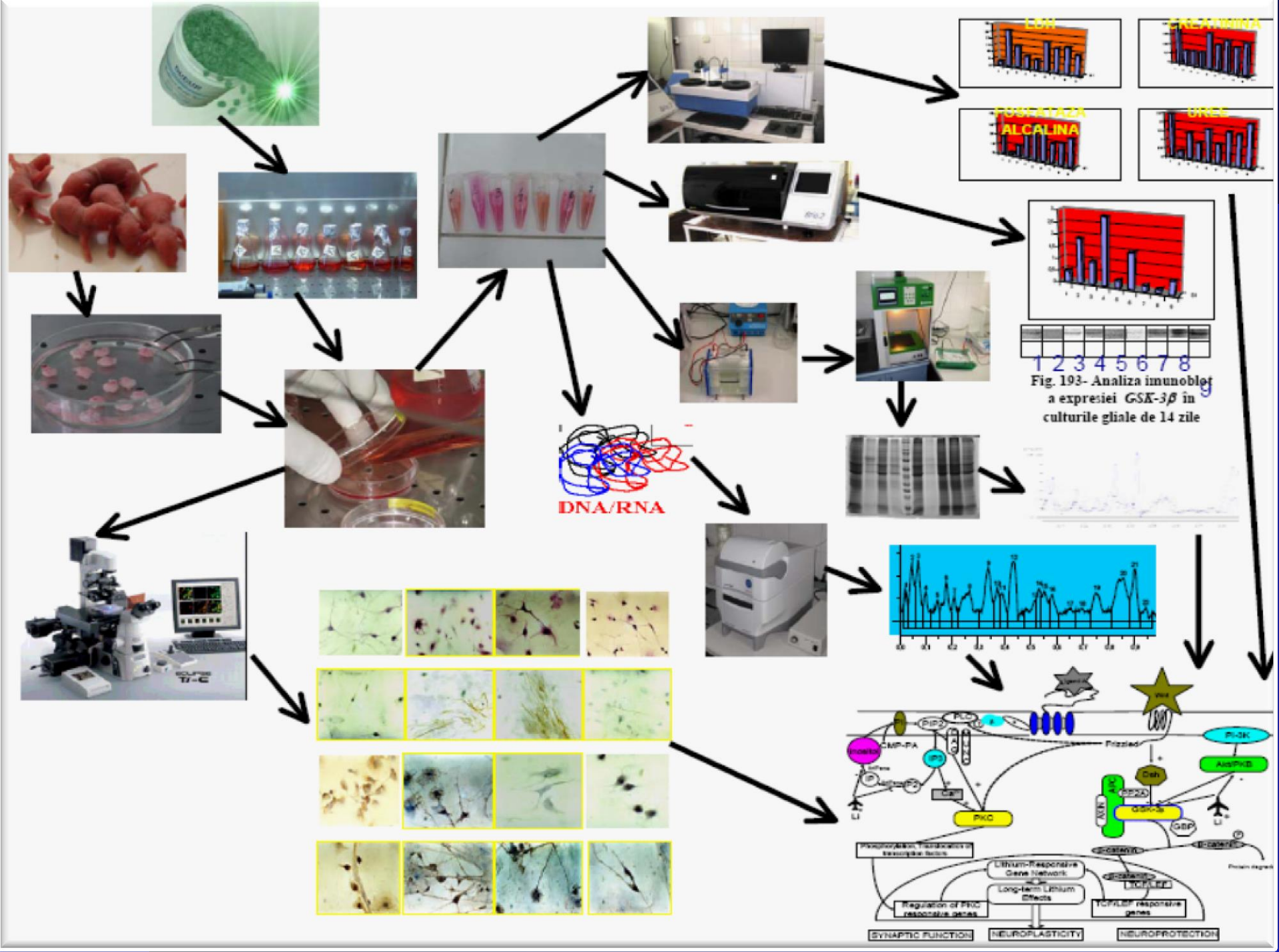


Fig. 193- Analiza imunoblot a expresiei *GSK-3β* in culturile gliale de 14 zile

Clinical studies for testing therapeutic efficacy of natural factors

In the context of the complex picture of early diagnosis, treatment and prevention of diseases associated with age, picture containing many unquantifiable and independent variables, difficult to analyze, appears to be necessary the analysis, mathematical modeling and simulation of bio-medical relations of laboratory parameters.

Biomarkers

Selection and recruitment of suitable study participants - time sensitive consultation is likely to be longer than in normal situations.

The concept of obtaining informed consent is considered the basic principle of GCP.

Integrated Model of curative spa takes place under experimental and clinical research conducted, leading to a scientific background, biological and medical updated, achieved by modern experimental techniques and clinical trials.

Techirghiol Lake

Techirghiol is a salty lake situated in southeast part of Romania, famous for its mud and its therapeutic effects.

- Has Been a Ramsar site since March 2006, as habitat for water birds
- Natural protected area by Government Decision No. 1586 from November 2006
- It has a maximum protection status

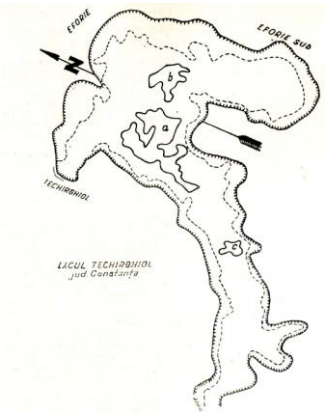
History

In 1889 at the International Congress of Hygiene in Paris, doctor of Romanian hospitals, N.G. Cherenbach, presented a paper on the therapeutic virtues of the lake

In May 1928 - Techirghiol town was visited by the participants in the International Congress of Thalassotherapy, held in Bucharest

In 1931 – it was the inauguration of the first Romanian Department of Balneology and Physiotherapy, at the Faculty of Medicine of Cluj, conducted by prof. Marius Sturdza

In 1937 - by the Royal Decree no. 3025, Techirghiol was declared a public utility. Before this Decree, the Minister of Industry and Trade highlights that “the mineralized Techirghiol Lake with its therapeutic mud presents a public health interest and also an economical one. It wasn’t defended and protected until now.”



The water and the lake of Techirghiol Lake, therapeutic factors of high medical and scientific value, have been the subject of numerous studies in the most diverse fields of research.

From the historical point of view it is interesting to mention the names of the researchers who were attracted to the complex problems raised by this lake: A. Saligny (1893), M. Georgescu (1900), P. Petrescu (1924), P Bujor (1928), E. Trandafirescu (1935), Eug. Bulavisky (1939).

Lake Techirghiol is the largest saline lake in Romania, with a length of 7,500 m, a depth of 9 m and a salinity of over 90 g / l. It differs fundamentally from the other lakes through its physico-geographic aspects, although genesis is the same (fluvial-marin liman). The healing, black and oily therapeutic mud is presented in terms of the highly hydrated global composition (71% water) rich in mineral substances (23%) and organic substance (6%). In dry soil, the ratio of mineral to organic is 3.8 to 1.

The fauna consists of several species of arthropods, worms and protozoa, flora by several algae species, and colorless and colorless sulfuric bacteria predominate.

Glossy and bluish, the dirt in Techirghiol Lake is black as black and has a characteristic smell. It possesses physical properties that make it extremely useful in the treatment of various diseases;

Therapeutic mud

Mud treatment is the best preparer for exercise since it brings tissues and muscles into soft and flexible condition

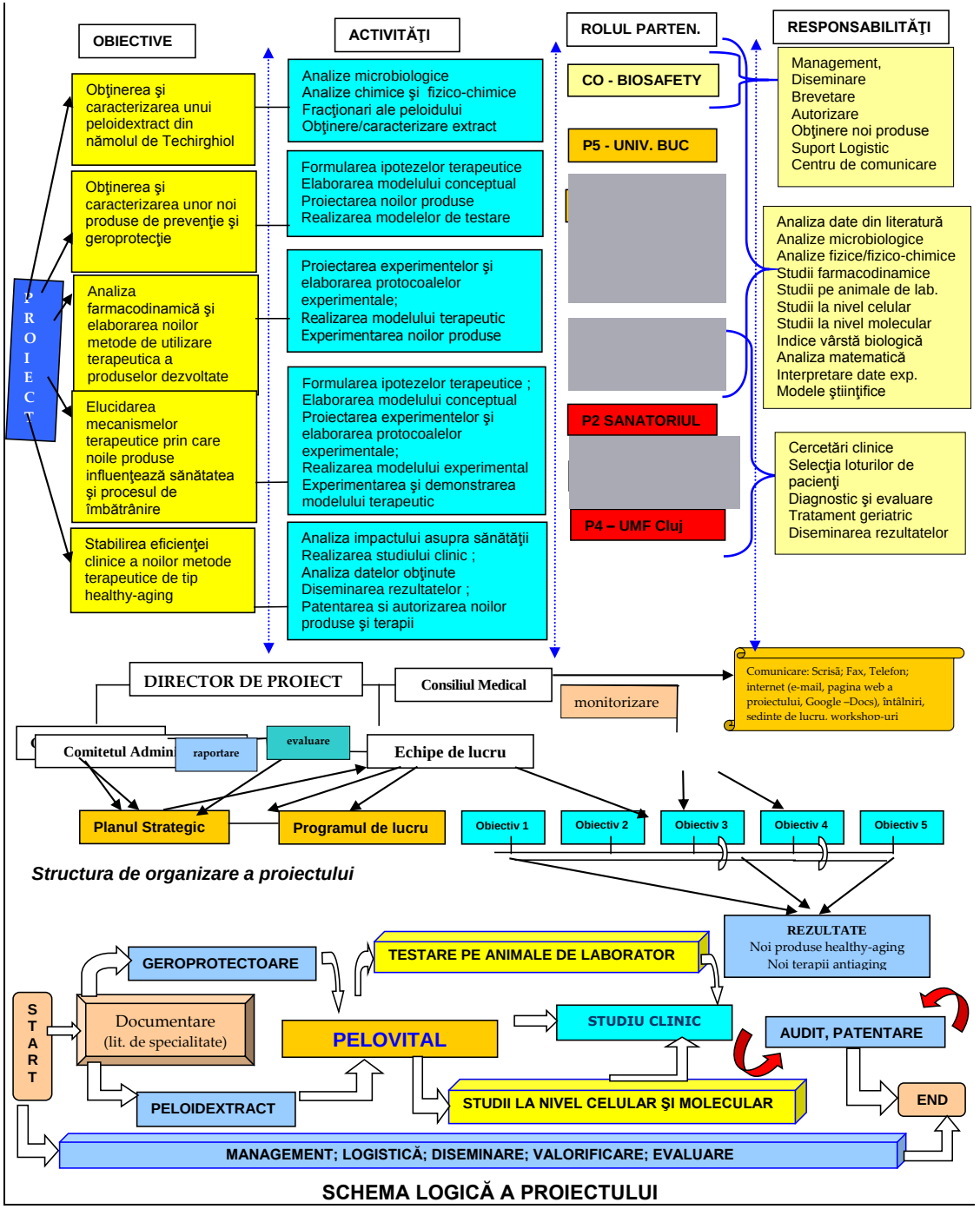
- Peloides used in peloidotheraphy - is one of the unique treatment methods of spa
- Are organic or inorganic substances formed as result of geological and/or biological events.
- Are found in form of grains in nature or they can be turned into grains with certain preparation processes.
- Can naturally contain water or have no water at all in their structures.
- Come to appropriate thickness and temperature by adding adequate amount of thermal or regular water during use.
- Are used in forms of mud baths and mud packages in serious of diseases.
- Therapeutic effects in certain diseases yet have to be proved

- **Applications:**

1. Baths: full, half body or arm-leg
2. Package form application: are applied to specific areas of the body.

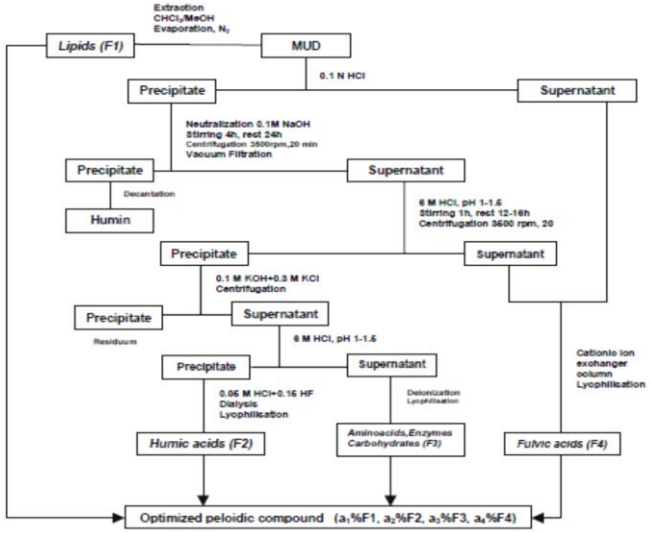
- **Method:**

1. After application the body gets freed of mud with the assistance of a warm shower (taken under the water in temperatures of 37-38 ºC).
2. Patient gets dried of immediately and rests for half an hour to an hour.
3. Afterwards patient either takes a light walk or receives a massage or is taken into a regional exercise program if necessary.



The project proposed by a consortium aims at obtaining, characterizing and investigating the therapeutic effects of patenting and authorizing the marketing of a new healthy-aging product from the future PELOVITAL range, developed through the innovative combination of an original extract from the Techirghiol lake peloid and one of the main 3 geroprotective molecules, intensively studied globally at this time: resveratrol, rapamycin or procaine.

The development of these new products responds to the need to positively promote the role of elderly people in society, who are able to maintain an active life in support of the young generation in the family, not to be a social and economic burden with very high medical costs and by the need to care for them in the form of disabling diseases.



Chemical characterization of Techirghiol therapeutic mud

Mihail Hoteteu[1,3], Constantin Munteanu[1,3], Elena Valentina Ionescu[2], Roxana Elena Almășan[2]

[1]Romanian Balneology Association
[2]Techirghiol Balnear and Rehabilitation Sanatorium
[3]SC Biosafety SRL

Objective

- The aim of this study was to establish the chemical and biochemical characteristics of Techirghiol's sapropelic sludge, the distribution between the solid and liquid phases of the peloid, the inorganic and organic compounds, of protein, lipid and carbohydrate classes, and to fractionate and characterize the biologically active humic substances present in the peloid.

Definition

- **Peloid is natural or artificial mud obtained by mixing water (thermal, sea or lake/river) with inorganic, organic or mixed materials, derived from geological or biological processes.**
  - **The first mention of the term "peloid" date back 1931 at the Executive Council of ISMH (International Society of Medical Hydrology)**
  - **The first written instructions of using them to treat some illnesses and ailments were presented by Clergies and Doctors during the XVIII century, but their application dates back to the XII-XIV centuries.**

Classification of peloids

- NATURAL peloids are formed by depositing more or less decayed, rotten, overripe, organic and inorganic substances in bayous, sea lagoons, saltwater and freshwater lakes, rivers, marshes, mineral water spring mires and in volcanic areas.
- ARTIFICIAL peloids are natural peloids that are refined and significantly changed before their use.

According to their origin:

- ORGANIC PELOIDS comprise those peloids consisting of over 10% of organic substances and includes
  - peat (peat soil, elevated and leveled peat)
  - organic mud (bitumen mud, sapropel and guitya)
- INORGANIC PELOIDS *comprise:*
  - mineral peloids (clay, loam, tufa)
  - volcanic peloids

Peloid division according to pH value

1. Ultra acid peloids, if their pH is less than 2.5
2. Acid, if their pH value is 2.6 – 5.0
3. Weak acid, if their pH value is 5.1 – 7.0
4. Weak alkali, if their pH value is 7.1 – 9.0
5. High alkali, if their pH value is more than 9.0

Chemical composition of peloids

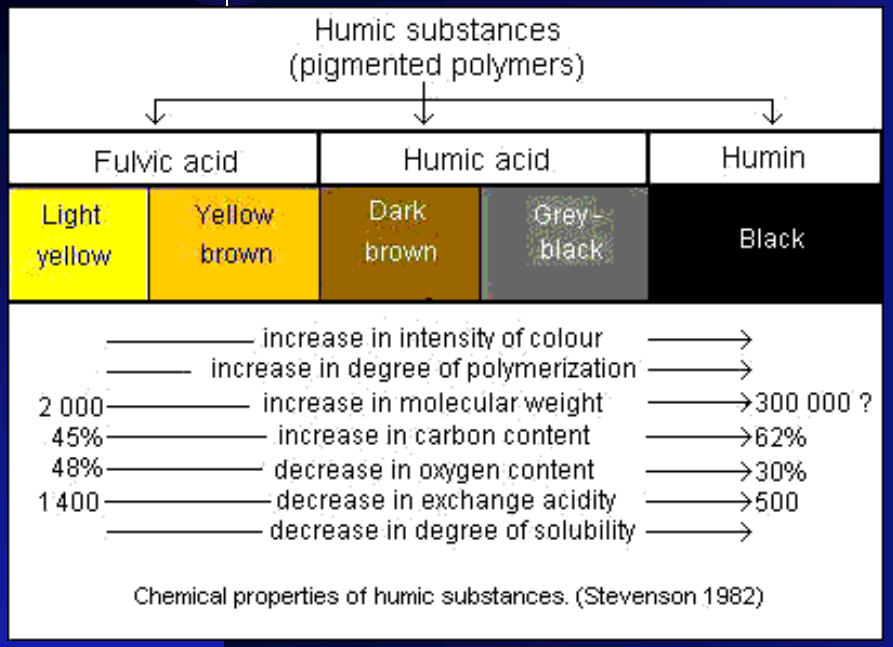
LIQUID PHASE

- Water, anions , cations ,
- Oligoelements (ug/kg)
  1. with a pronounced pharmacological effect (Fe, Co, J, Br and B)
  2. involved in the enzymatic processes (J, Fe, Cu, Mo, Zn, Co, Mn, Ni, Ba, Sr, Cd)
  3. elements (As, Pb, Hg, V and F)
  4. not yet elucidated biological role (Ti, Zr, Ir, Cs).
- Gases (CO_2, H_2S, SO_2)
- Biologically active substances - protein hydrolysates, aminoacids, enzymes .

SOLID PHASE

- 1. Crystal framework (peloid skeleton) – ***determines mechanical structure***
  - Oxides (SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, Na_2O, K_2O, TiO_2, MnO, P_2O_5), $Na_2O/CaO < 1$
- 2. Colloid complex - ***plastic hydrophilic basis which absorbs moisture and defines thermal properties***
- Inorganic component $Fe(HS)_3$, $Fe(OH)_3$, $Al(OH)_3$, H_2SiO_3
- Organic component – humic substances: humin, humic and fulvic acids

Humic Substances

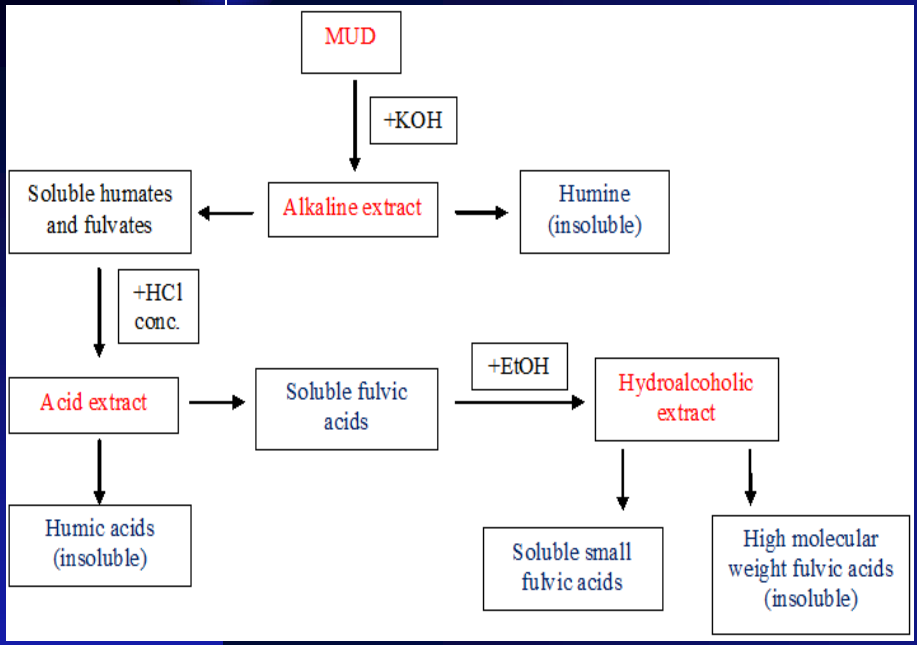


Chemical properties of humic substances. (Stevenson 1982)

It is commonly believed that humic substances occur during the humification process of the organic material.
The heterogeneity of molecular weights of various individual compounds with different chemical compositions containing biogenic elements (C, N, O, P, S) in carboxyl, phenol, alcohol, peptide, amide and other functional groups causes humic substances to be polydisperse, biofiles and polyfunction.

Their color ranges from yellow to black, molecular weight from 2000 to over 300,000 Da, have a C content between 45 and 62%, an O between 30 and 48% and free acid between 500 and 1400 mEq%.

The fractionation of humic substances



The mud was fractionated using the pH and polarity variation of the solvents and the humic extracts were spectrophotometrically characterized based on absorption in the wavelength range 340-700 nm, humic acids and fulvic acids being differentiated on the basis of solubility and molecular mass.In short, the mud is treated with a KOH solution, obtaining the alkaline extract of soluble humates and fulvates and precipitating the insoluble humus.

Acidification of the alkaline extract at pH 1 precipitates humic acids, and fulvic acids remain in solution.

Treating the solution of fulvic acids with ethanol leads to their formation in high molecular weight fulvular acids, insoluble in the hydroalcoholic mixture, while low molecular weight fulvic acids remain soluble in the solution.

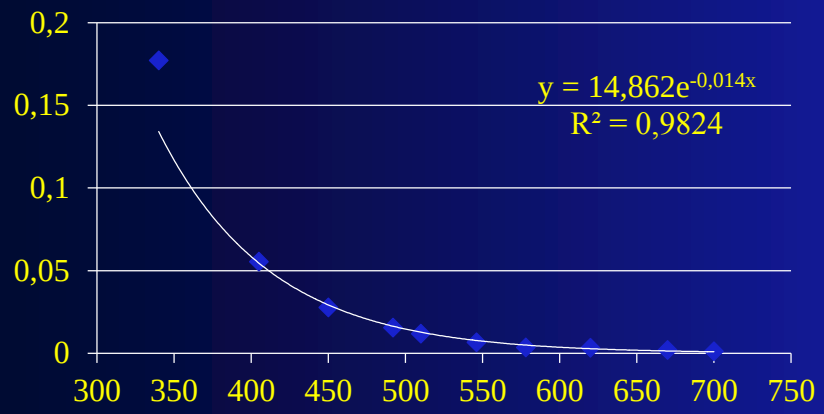
Quantitative determinations are performed gravimetrically for humic and spectrophotometric acids in fulvic acids.

Chemical and biochemical characteristics of Techirghiol mud

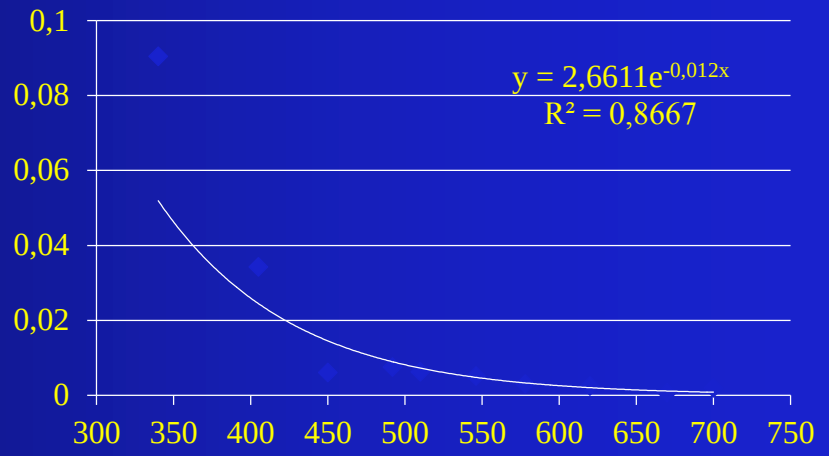
Parameter	Crude mud	Solid Phase	Liquid Phase	Solid Phase / Liquid Phase
Organic substances				
Protein substances (mg/g mud)	46.83	38.60	8.83	4.4
Lipids (mg/g mud)	23.67	14.11	4.71	3.0
Carbohydrates (mg/g mud)	5.63	4.64	0.912	5.1
Inorganic substances				
Ca (mg/g mud)	0.30	0.30	0.17	1.8
Mg (mg/g mud)	0.70	0.67	0.14	4.8
Fe (µg/g mud)	2.96	2.01	0.63	3.2
P (mg/g mud)	25.55	24.04	4.46	5.4
Enzymatic activity				
Phosphatase activity (U/L/g mud)	17.68	8.99	1.43	6.3

Characterization of humic substances

The absorption spectrum in the 340-700 nm range of the alkaline extract containing the mixture of humic and fulvic acids



The absorption spectrum in the 340-700 nm range of the acid extract containing fulvic acids



	Alkaline extract	Acid extract	Hydroalcoholic extract
A_{450}/A_{670}	14.53	10	8.5
ΔlogK	1.25	1.15	1.07

Characterization of humic substances was performed spectrophotometrically in the wavelength range 340-700 nm.

Characterization of humic substances was performed spectrophotometrically in the wavelength range 340-700 nm.

The quality of organic substances in peloids is assessed by two methods, namely the ratio of humic acids to fulvic acids and the ratio of the alkaline extract absorbances at 450 and 670 nm. The lower these values, the more humic substances are more stable. It is considered that the absorbance value at the wavelength of 400-464 nm defines the content of the substances at the initial humification stage and at λ 600-664 nm at the final humification stage.

As shown in the data presented, the ratio of humic and fulvic acids to Techirghiol's sapropelic sludge is 37.5 and the A450 / A670 decreases from 14.5 to 8.50 in the hydroalcoholic extract. The ΔlogK parameter decreases from 1.25 in the alkaline extract to 1.07 in the hydroalcoholic extract, which shows an increase in the humification level because the fulvic acids are purified and the humic acids precipitated, in the hydroalcoholic extract there being small-molecular-weight fulvic acids, fixed in the solution

Composition of humic substances in Techirghiol mud

Humic substance	Concentration (mg/g mud)
Humic acids	5.065
Total fulvic acids	0.135
Low molecular weight fulvic acids	0.110
High molecular weight fulvic acids	0.024

After fractionation, Techirghiol sapropelic sludge was found to contain 5,065 mg / g of humic acids, 0.110 mg / g of low molecular weight fulvic acids and 0.024 mg / g of high molecular weight fulvic acids.

Composition of humic substances in Techirghiol mud

There is an increased distribution of inorganic compounds in the solid phase of the peloid.
Also, the ratio of inorganic substance concentrations between the solid phase and the liquid phase exhibits an increasing variation in the order P> Mg> Fe> Ca
Organic substances show an increased absorption of carbohydrates and proteins, which are mainly found in the solid phase as a result of biochemical transformations of natural organic matter during the humification process.
Correlated with the increased phosphorus content of the solid phase of the Techirghiol sludge, the phosphatase activity of the solid phase is more than 6 times that in the liquid phase.

Conclusion

1. The values of some parameters of Techirghiol sapropelic mud composition and their distribution between the solid and the liquid phase were determined and the variance of the absorption in the solid phase was:
   - for the inorganic compounds P > Mg > Fe > Ca
   - for the organic compounds Carbohydrates > Protein substances (including with catalytic activity) > Lipids.
2. A new specific fractionation scheme is proposed to separate and characterize the compounds of humic substances specific to peloids and Techirghiol sapropelic mud.

TREATMENT WITH TECHIRGHIOL MUD

- Treat chronic rheumatism, osteoarthritis, arthritis, muscle ligament pain, joint wounds, eczema, psoriasis, neuro-dermatitis, acne, headache, neuralgia, stress, insomnia;
- In-depth cleansing of the skin, minimizing the appearance of wrinkles, revitalizing the complex in the tissues, eliminating toxins, removing fats, reducing the appearance of cellulite, purifying, softening and restoring the color and shine of the skin;
- Stimulates the immune system, accelerates metabolism, removes excess water in the body, relieves fatigue, relaxes the body and mind, increases the feeling of comfort, relieves the pain caused by previous injuries as well as those caused by rheumatism or immobility muscle.
  - Treating musculo-articular suffering in patients with post-traumatic limb sequelae was favorably influenced by saturated preparations from liquid mud extract. An anti-inflammatory, anti-inflammatory and trophic action of this preparation has been observed.
- Ankylosing spondylarthritis: mud applications have proven to be very useful in this disease, as well as in certain strains of rheumatoid arthritis.
- Warm mud packs in the recovery of semen after poliomyelitis have a positive reactivity on quadriceps and shingles, the physical and biochemical qualities of the sludge proving to be stimulating elements of the body.
- The technique of Techirghiol mud vaginal swabs is considered to be particularly effective, shortening treatment time, normalizing menstrual cycle, dysmenorrhoea, and dandruff are greatly diminished.
- It has curative effects on the genital apparatus, the disappearance of tricomonas infestation, the normalization of vaginal pH values. It is favorably influenced by old forms with post-inflammatory adhesions and even pseudotumoral forms.
- Warm bathing procedures with salt water and mud applications exert instant vagotonic effects imparting to the body a vagotropic vegetative state, depending on the intensity and duration of balneotherapy.
- The highly diluted mud baths (1 kg / 300 liters of water) used as the only therapeutic procedure for 300 hypertensive elderly osteoarthritis, have produced blood pressure drops from the first 6-7 days of cure.

Balneal and Rehabilitation Sanatorium Techirghiol

Balneal and Rehabilitation Sanatorium Techirghiol
Structure - Departments

410 beds

Medical balneal – climatology department

180 beds

Medical rehabilitation departments for children with psiho - neurologycal deficiencies

175 beds

Medical rehabilitation departments for adults I

170 beds

Medical rehabilitation departments for adults II

TOTAL: 935 beds

Pathology suitable for treatment in Sanatorium

Gynecological disorders

Diseases of central and peripheral nervous system

Inflammatory rheumatic diseases

Peripheral vascular affections

Degenerative rheumatic diseases

Posttraumatic sequelae

Dermatological conditions

Associated diseases

Complex rehabilitation programs are available for individuals after lumbar disk surgery in Balneal and Rehabilitation Sanatorium Techirghiol

Balneal treatment consists in:

- *Thermotherapy Treatment:*

- Mud Pack (MP)
- Mud Bath (MB)
- Paraffin Application (PA)
- Cold Mud Application (MO)

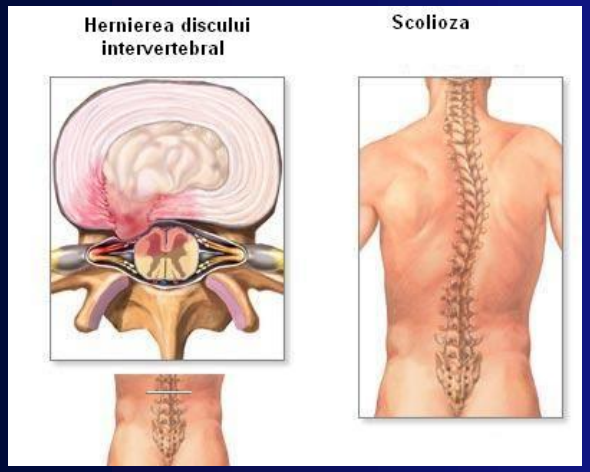
- *Hydrotherapy Treatment:*

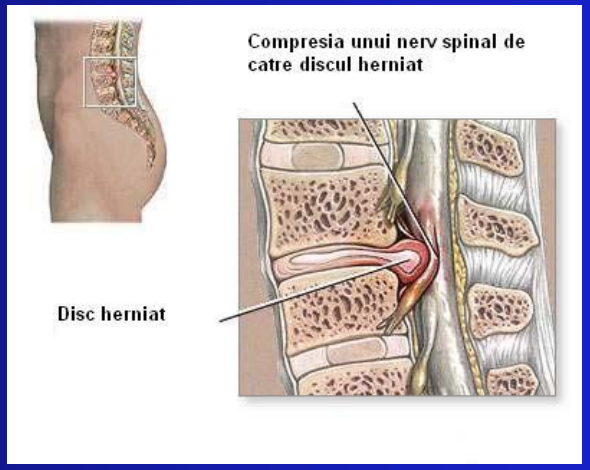
- Kinetotherapy in Salty Water (KW)
- Salty Water Bath (WB)
- Plant Bath (PB)
- Underwater Shower (WS)
- Hydro Massage (HM)
- Sun Bath and Swimming in the Lake (SB)

Complex rehabilitation programs are available for individuals after lumbar disk surgery in Balneal and Rehabilitation Sanatorium Techirghiol

- *Electrotherapy Treatment:*
  - Continuous Current (CC)
  - Low Frequency Current (LC)
  - Medium Frequency Current (MC)
  - High Frequency Current (HC)
  - Magnetotherapy (M)
  - Laser (L)
  - Other (O)
- *Massage*
- *Kinetotherapy*

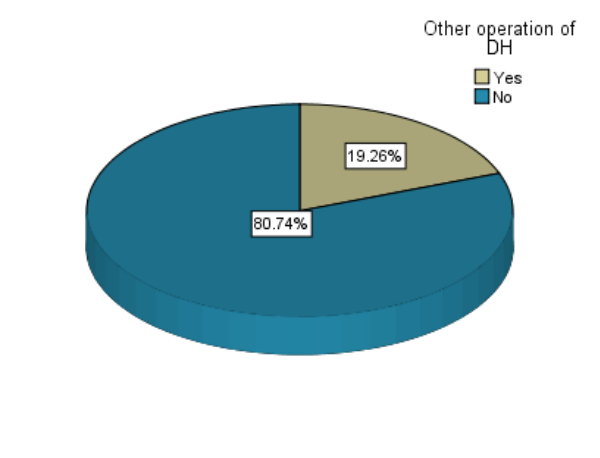
Retrospective study about rehabilitation after lumbar disc surgery at patients hospitalized in year 2016 in Balneal and Rehabilitation Sanatorium of Techirghiol

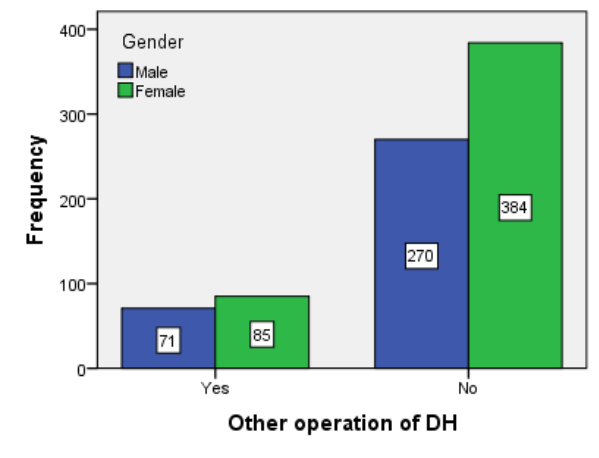




- In year 2016 in Sanatorium we hospitalized 12070 patients;
- Patients with surgery for lumbar disc hernia were 813 (6,74%)

History case of other DH surgery



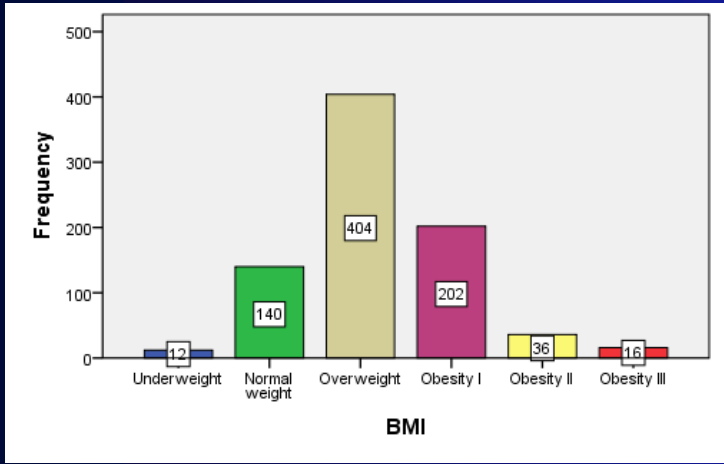


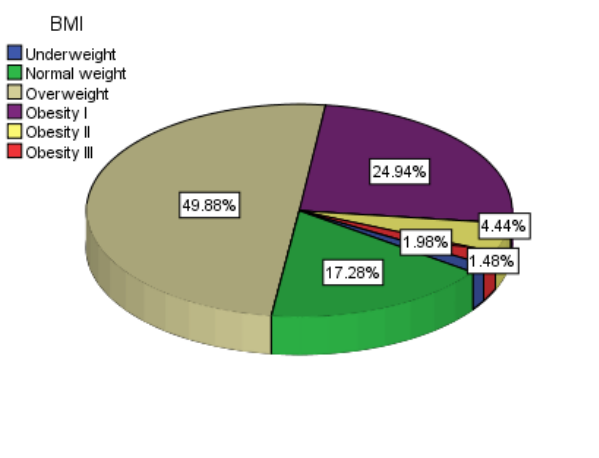
Other operation of DH * Gender Crosstabulation

			Gender		Total
			Male	Female	
Other operation of DH	Yes	Count	71	85	156
		% of Total	8.8%	10.5%	19.3%
	No	Count	270	384	654
		% of Total	33.3%	47.4%	80.7%
Total		Count	341	469	810
		% of Total	42.1%	57.9%	100.0%

- Almost 20% of patients have had in their medical history more than one intervention for disc hernia.

Body Mass Index (BMI) variation



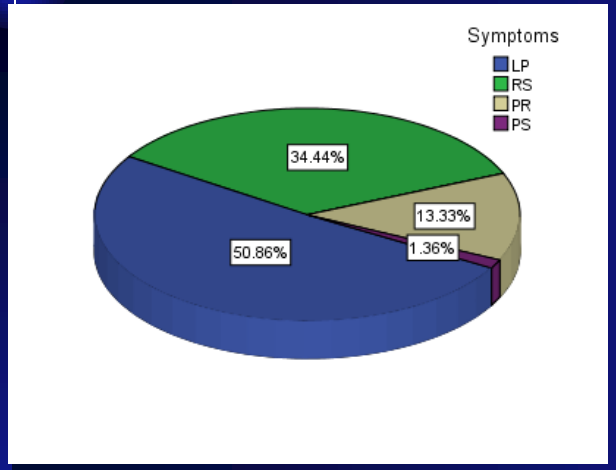


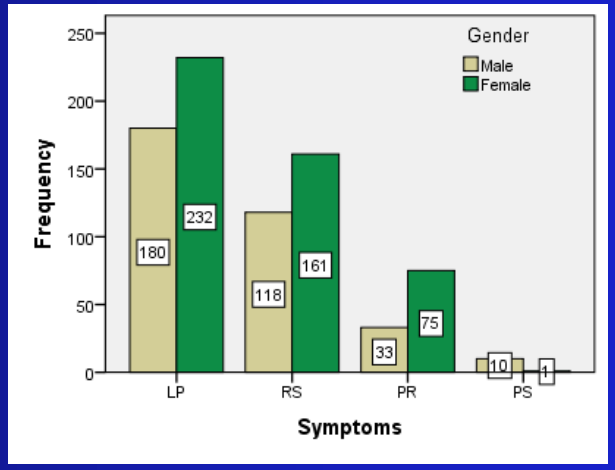
- **Over 80% of patients with surgery were overweight.**

BMI

		Frequency	Percent
Valid	Underweight	12	1.5
	Normal weight	140	17.3
	Overweight	404	49.9
	Obesity I	202	24.9
	Obesity II	36	4.4
	Obesity III	16	2.0
	Total	810	100.0

Symptoms at admission



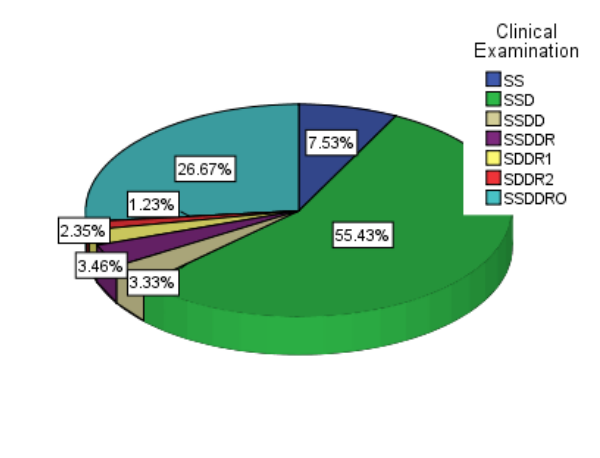


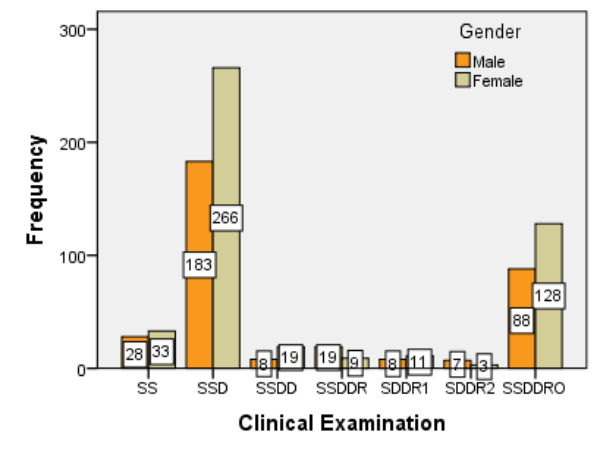
- **50% of the patients have showed lumbar pain and others 35% also had radicular pain at the first assessment.**

Symptoms * Gender Crosstabulation

			Gender		Total
			Male	Female	
Symptoms	LP	Count	180	232	412
		% of Total	22.2%	28.6%	50.9%
	RS	Count	118	161	279
		% of Total	14.6%	19.9%	34.4%
	PR	Count	33	75	108
		% of Total	4.1%	9.3%	13.3%
	PS	Count	10	1	11
		% of Total	1.2%	0.1%	1.4%
Total		Count	341	469	810
		% of Total	42.1%	57.9%	100.0%

Clinical examination



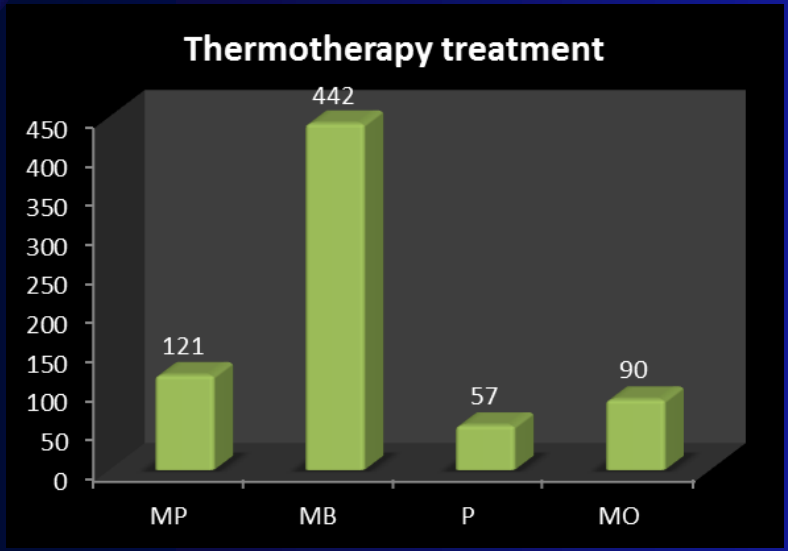


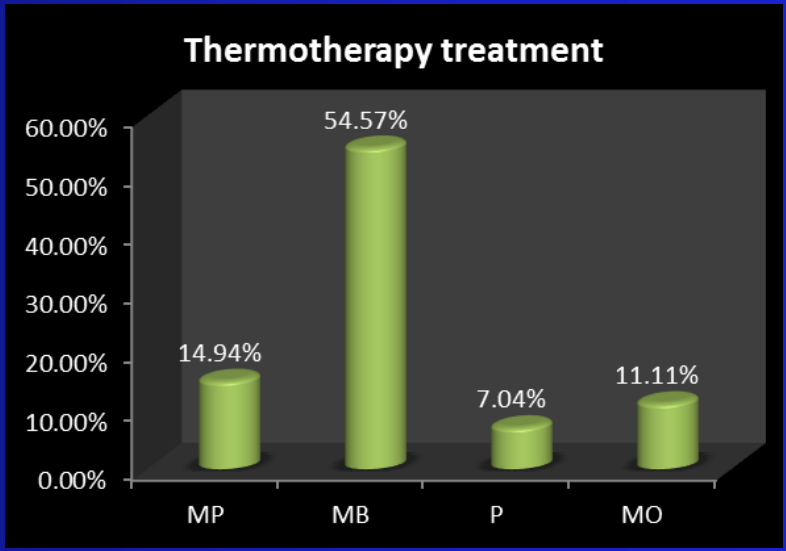
- Clinical examination has revealed that 55,43% patients were diagnosed with static and dynamic lumbar syndrome, and 26,57% have presented ablated osteotendinous reflex.

Clinical Examination * Gender Crosstabulation

			Gender		Total
			Male	Female	
Clinical Examination	SS	Count	28	33	61
		% of Total	3.5%	4.1%	7.5%
	SSD	Count	183	266	449
		% of Total	22.6%	32.8%	55.4%
	SSDD	Count	8	19	27
		% of Total	1.0%	2.3%	3.3%
	SSDDR	Count	19	9	28
		% of Total	2.3%	1.1%	3.5%
	SDDR1	Count	8	11	19
		% of Total	1.0%	1.4%	2.3%
	SDDR2	Count	7	3	10
		% of Total	0.9%	0.4%	1.2%
	SSDDRO	Count	88	128	216
		% of Total	10.9%	15.8%	26.7%
Total		Count	341	469	810
		% of Total	42.1%	57.9%	100.0%

Thermotherapy treatment

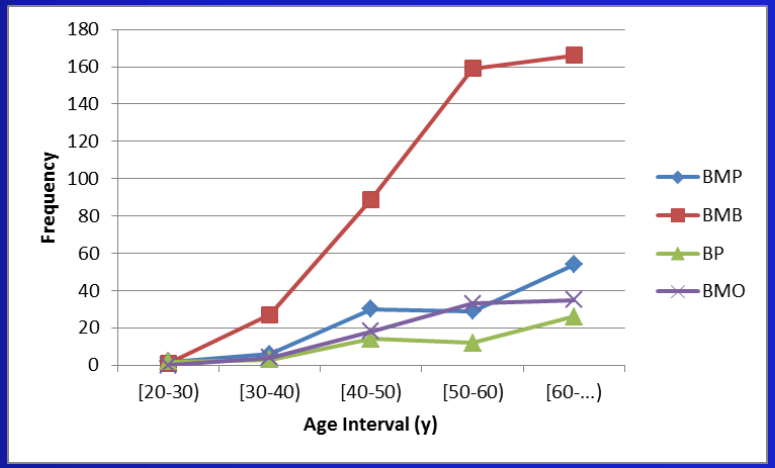




- **For 54,57% patients it was prescribed mud bath, for 14.95% mud pack and 11,11% mud ointment.**

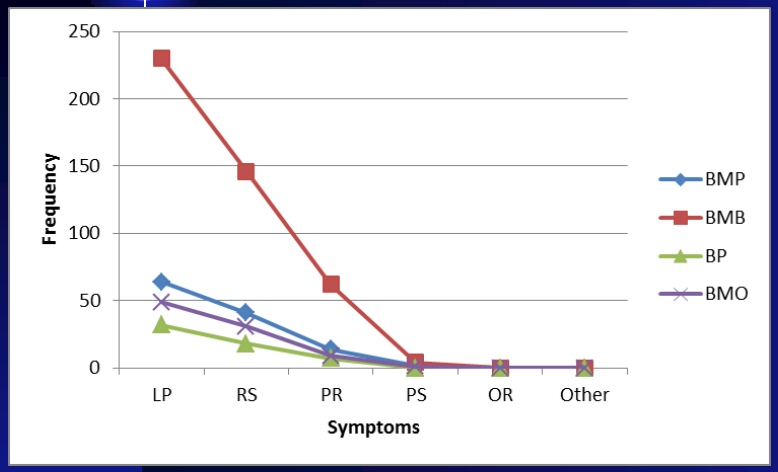
Thermotherapy treatment

		BMP		BMB		BP		BMO	
		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Age Interval (y)	[20-30)	2	50.00	1.00	25.00	2.00	50.00	0.00	0.00
	[30-40)	6	13.64	27.00	61.36	3.00	6.82	4.00	9.09
	[40-50)	30	18.18	89.00	53.94	14.00	8.48	18.00	10.91
	[50-60)	29	11.24	159.00	61.63	12.00	4.65	33.00	12.79
	[60-...)	54	15.93	166.00	48.97	26.00	7.67	35.00	10.32



- 50% of young patients(20 - 30) received hyperthermic mud therapy (mud pack).

Thermotherapy treatment

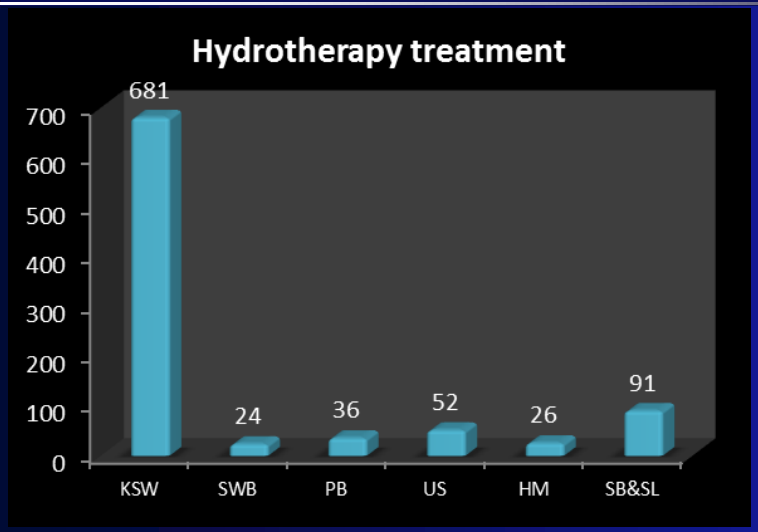


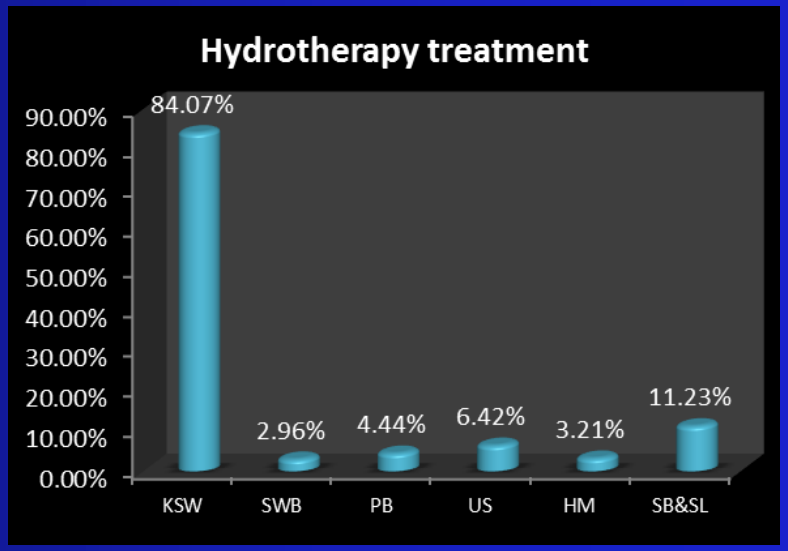
		BMP		BMB		BP		BMO	
		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Symptoms	LP	64	15.5%	230	55.8%	32	7.8%	49	11.9%
	RS	41	14.7%	146	52.3%	18	6.5%	31	11.1%
	PR	14	13.0%	62	57.4%	7	6.5%	9	8.3%
	PS	2	18.2%	4	36.4%	0	0.0%	1	9.1%
	OR	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%

- Symptoms:
- 1 = Lumbar Pain (LP),
- 2 = Radicular Syndrome (RS),
- 3 = Radicular Syndrome + Paresthesia (PR),
- 4 = Paresis Syndrome (PS)
- 5 = Only Radiculopathy (OR)
- 6 = Other

The chart lines show similar distribution for any type of bath not matter of the symptoms.

Hydrotherapy treatment



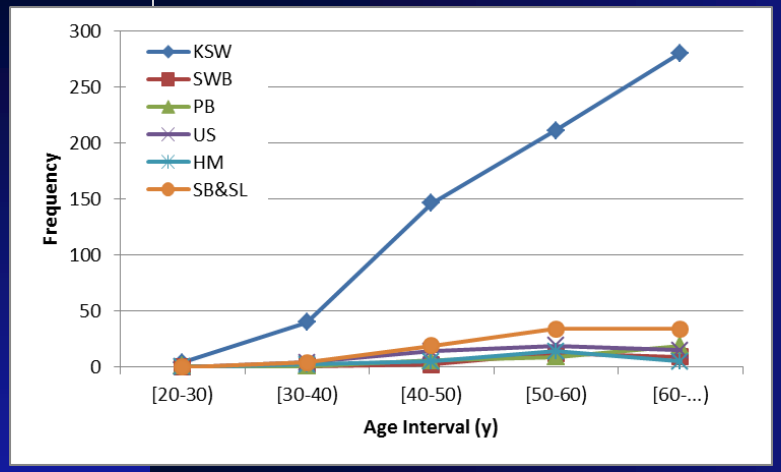


Hydrotherapy Treatment:

- Kinetotherapy in Salty Water (KW)
- Salty Water Bath (WB)
- Plant Bath (PB)
- Underwater Shower (WS)
- Hydro Massage (HM)
- Sun Bath and Swim in the Lake (SB)

An impressive number of patients have done kinetotherapy in our pool with salty lake water. The benefic combination of gymnastics and thermal water has therapeutical effects on our patients.

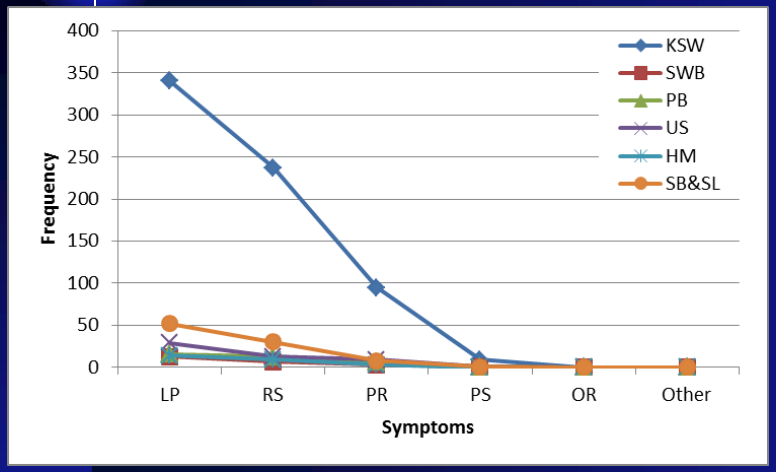
Hydrotherapy treatment



- **All the young patients (20 - 30) hospitalized in Sanatorium have done kinetotherapy in our salty water pool.**

		KSW		SWB		PB		US		HM		SB&SL	
		Yes		Yes		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Age Interval (y)	[20-30)	4	100.0%	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%
	[30-40)	40	90.9%	1	2.3%	1	2.3%	4	9.1%	2	4.5%	4	9.1%
	[40-50)	146	88.5%	2	1.2%	6	3.6%	14	8.5%	5	3.0%	19	11.5%
	[50-60)	211	81.8%	12	4.7%	9	3.5%	19	7.4%	14	5.4%	34	13.2%
	[60-...)	280	82.6%	9	2.7%	19	5.6%	15	4.4%	5	1.5%	34	10.0%

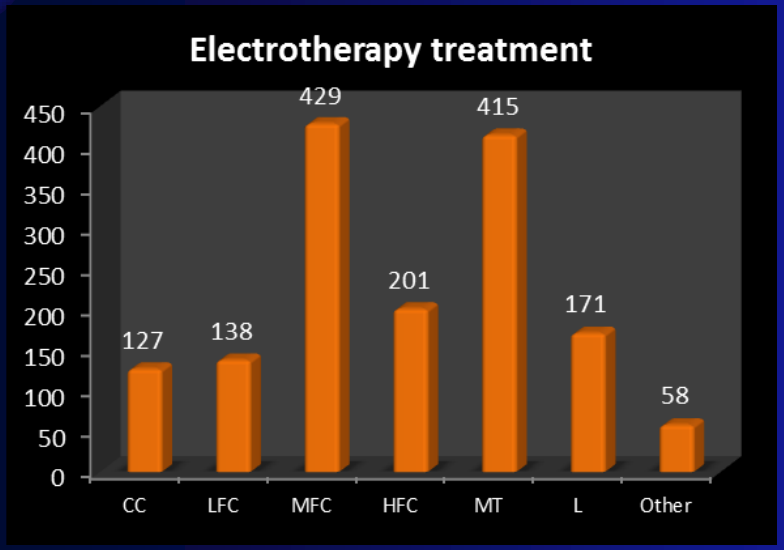
Hydrotherapy treatment

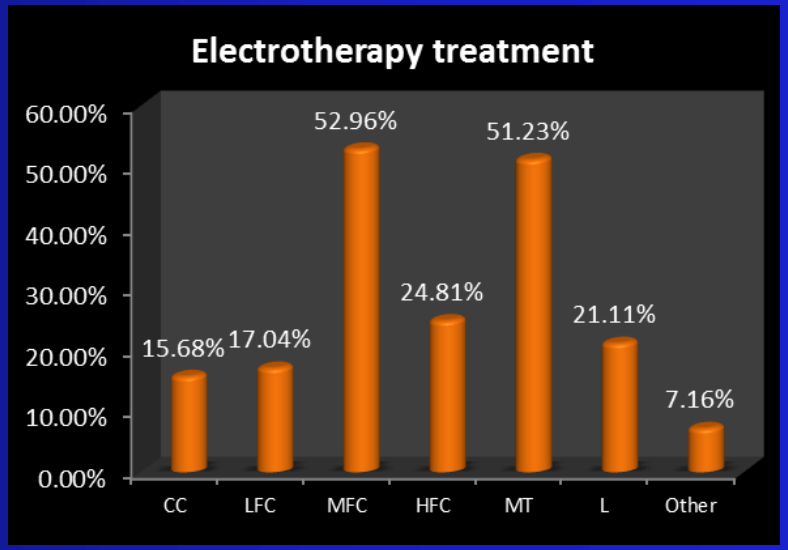


- Analyzing the patients symptoms that have done hidrokinetotherapy, we can observe an equal percentage no matter the symptoms.

		KSW		SWB		PB		US		HM		SB&SL	
		Yes		Yes		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Symptoms	LP	340	82.5%	13	3.2%	16	3.9%	29	7.0%	14	3.4%	52	12.6%
	RS	237	84.9%	7	2.5%	13	4.7%	13	4.7%	9	3.2%	30	10.8%
	PR	95	88.0%	3	2.8%	6	5.6%	9	8.3%	3	2.8%	8	7.4%
	PS	9	81.8%	1	9.1%	1	9.1%	1	9.1%	0	0.0%	1	9.1%
	OR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Electrotherapy treatment



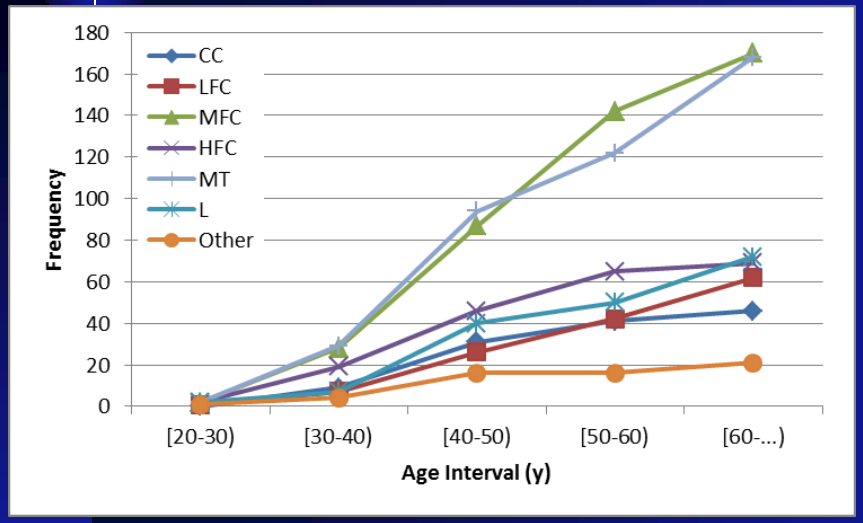


Electrotherapy Treatment:

- Continuous Current (CC)
- Low Frequency Current (LC)
- Medium Frequency Current (MC)
- High Frequency Current (HC)
- Magnetotherapy (M)
- Laser (L)
- Other (O)

About 50% of the patients have done medium frequency current therapy for its muscle toning effects and other 50% have done magnetotherapy for its sedative and regenerating effects.

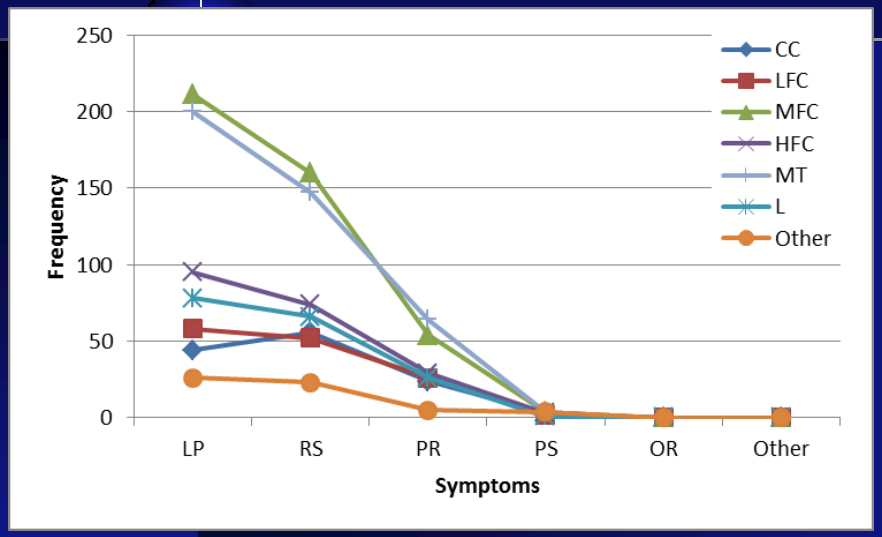
Electrotherapy treatment



- The therapy percentage remains the same, not counting the age difference for MFC and MT.

		CC		LFC		MFC		HFC		MT		L		Other	
		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Age Interval (y)	[20-30)	0	0.0%	1	25.0%	2	50.0%	2	50.0%	2	50.0%	2	50.0%	1	25.0%
	[30-40)	9	20.5%	7	15.9%	28	63.6%	19	43.2%	29	65.9%	7	15.9%	4	9.1%
	[40-50)	31	18.8%	26	15.8%	87	52.7%	46	27.9%	94	57.0%	40	24.2%	16	9.7%
	[50-60)	41	15.9%	42	16.3%	142	55.0%	65	25.2%	122	47.3%	50	19.4%	16	6.2%
	[60-...)	46	13.6%	62	18.3%	170	50.1%	69	20.4%	168	49.6%	72	21.2%	21	6.2%

Electrotherapy treatment



- We notice that patients with sciatic affection have done electro stimulation (LFC / MFC) in a larger number.

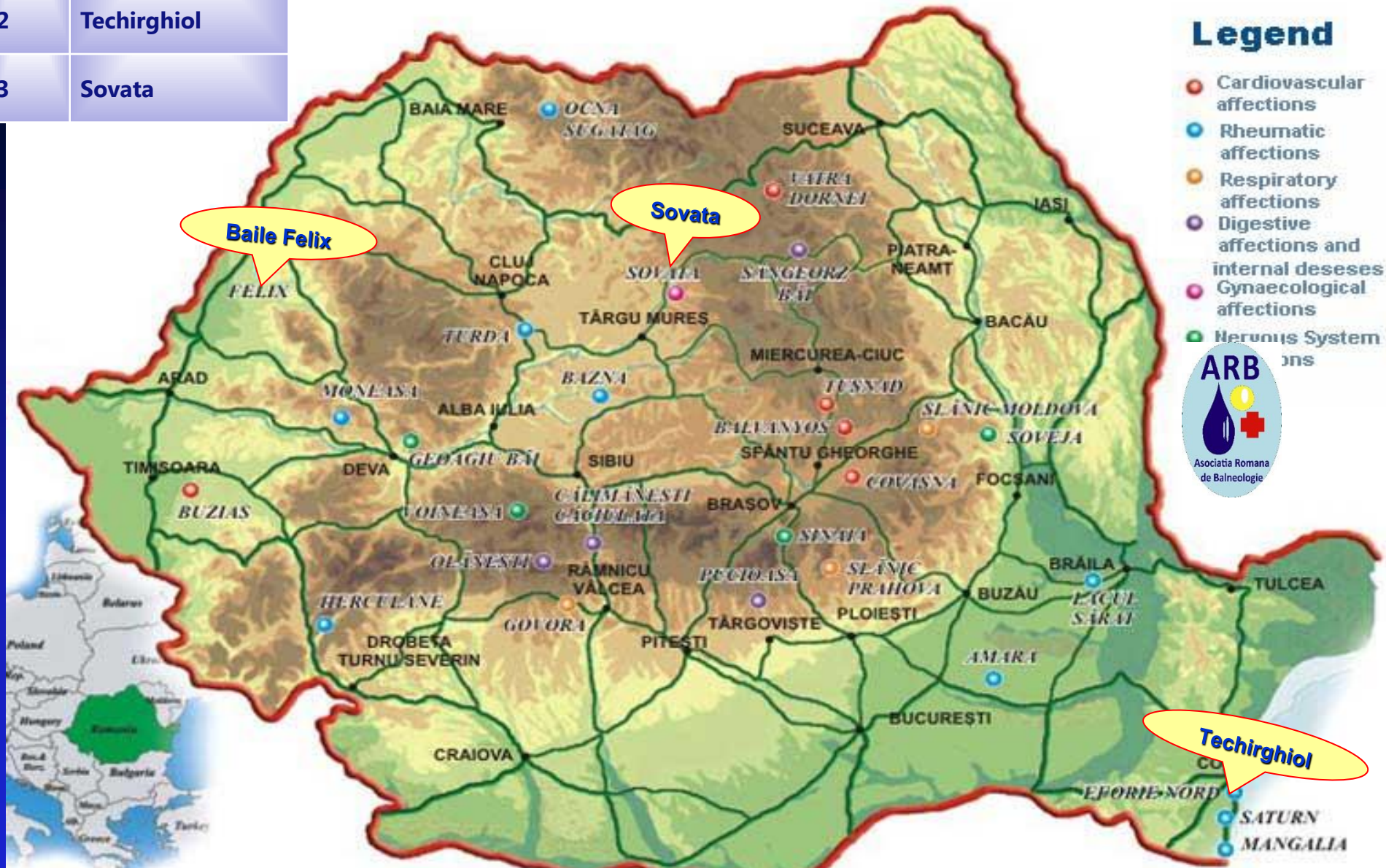
		CC		LFC		MFC		HFC		MT		L		Other	
		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Symptoms	LP	44	10.7%	58	14.1%	211	51.2%	95	23.1%	200	48.5%	78	18.9%	26	6.3%
	RS	56	20.1%	52	18.6%	160	57.3%	74	26.5%	147	52.7%	66	23.7%	23	8.2%
	PR	24	22.2%	26	24.1%	54	50.0%	29	26.9%	64	59.3%	26	24.1%	5	4.6%
	PS	3	27.3%	2	18.2%	4	36.4%	3	27.3%	4	36.4%	1	9.1%	4	36.4%
	OR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Conclusions

- The complex treatment applied in Sanatorium reduces pain after lumbar disk surgery with positive impact on the quality of life and disability and also decreases the appearance of a new disk hernia.
- The treatment should be individualized according to the patients and its symptoms.
- The patients can return faster to work and other daily activities.
- Its necessary to increase the number of patients with disc hernia surgery in Sanatorium only for the benefit of hidrokinetotherapy in the pool with salty water from the lake.

•TOP 3 Balneo Resorts of Romania

No.	BALNEO RESORT
1	Băile Felix
2	Techirghiol
3	Sovata




•Băile Felix
ROMANIA
HARTA RUTIERA
Drumuri Nationale
Drumuri Judetene
Ucraina
Ungaria
Serbia
Bulgaria
Bulgaria
Moldova
Oradea
Satu Mare
Sighetul Marmatiei
Baia Mare
Bistrita
Suceava
Iasi
Piatra Neamt
Ungheni
Cluj-Napoca
Targu Mures
Bacau
Miercurea Ciuc
Sighisoara
Alba Iulia
Arad
Timisoara
Deva
Sibiu
Brasov
Predeal
Sinaia
Bran
Galati
Braila
Buzau
Tulcea
Delta
Danube
Targu Jiu
Drobeta-Turnu Severin
Ramnicu Valcea
Targoviste
Ploiesti
Pitesti
Bucharest
Craiova
Giurgiu
Constanta
Marea Neagra
Vama Veche
Nadlac
Moravita
Bors
E81
E85
E576
E79
E60
E671
E68
E70
E577
E581
E87

Baile Felix

Techirghiol

5th September
SPINAL CORD INJURY DAY
Building an inclusive world

National Interdisciplinary Conference with International visibility:
"Comprehensive approaches in pain issues and in spinal cord pathology in the context of the International Day of Spinal Cord Injury (SCI Day)"

3-5th of September 2017, Constanța - "Ovidius" University, 5th of September 2017 - Techirghiol

Romanian Society of Physical and Rehabilitation Medicine & Balneoclimathology (RSPRMB)
Romanian Association of Balneology (RAB)

SOVATA


CONGRESUL NAȚIONAL DE RECUPERARE, MEDICINĂ FIZICĂ ȘI BALNEOLOGIE
Cluj-Napoca
22 - 25 Mai2018
România
Turda
26 Mai 2018
http://srmfrb.ro
http://bioclima.ro
Asociația Română de Balneologie (ARB)
UMF
UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE
IULIU HAȚIEGANU
CLUJ-NAPOCA
SALINA TURDA
Poarta spre inima Transilvaniei
Congresul Național de Recuperare, Medicină Fizică
și Balneologie din România, cu participare internațională
Thank you for your attention!