

# The influence of natural factors on the pathology of the locomotor apparatus on the upper course of Bârlad in the Central Moldavian Plateau

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**ABSTRACT:** A cold microclimate will prompt a reaction to be triggered by heat generation and the effects on the body are decreased sweating, peripheral vascular constriction by increasing the excitability threshold of the Krause corpuscles, cold receptors that maintain the blood pressure control threshold. Hot climatization requires vasodilation and sweating, especially when the air temperature exceeds 29° C. Objectives: To evaluate and present the beneficial effect of the microclimate formed on the upper course of Bârlad from the Central Moldavian Plateau on the human body of the patients with advanced pathology of the locomotor apparatus. Methods: The study was performed on a group of 17 patients aged 63-98 with chronic pathology of the locomotor system, the clinical status being analyzed over a period of 5-10 months sanatorium treatment. The pain scale - Visual Analogic Scale (VAS) was used. Results: The analysis of the clinical status of patients with chronic pathology of the locomotor apparatus for a period of 5-10 months balneary-climatic sanatorial treatment indicated an important improvement due to the climate of the area (VAS Media at the beginning of the evaluation - 7.12, after 5- 10 months of treatment in sanatorium - 3.06, P Stewdent = 0.01). Recommendations: Modeling some limits of microclimatic parameters in order to increase the degree of multifunctional comfort of patients.

**KEY WORDS:** Moldavian Plateau, natural factors, effect, VAS.

## 1. Introduction

Natural factors with balneary-climatic effect on the upper course of Bârlad in the Central Moldavian Plateau. The influence of natural factors on the pathology of the locomotor (musculoskeletal) apparatus on the upper course of Bârlad in the Central Moldavian Plateau of elderly patients represent scientific, medical, as well as social interest. Air from the natural environment or from closed artificial spaces presents a chemical and physical component specific to the location, geographic and geological characteristics, purity or pollution of the atmosphere. For the recovery and treatment of patients with various pathologies, particularly chronic, as well as the human body of patients of advanced age, a special role is given to balneary therapy and climate-therapy by using natural physical factors as well as preformed or modelled with effect on the inflammatory and allergic process, resistance of the organism to infections, activation of the immune system at cellular and possibly mitochondrial level (Iu. (Gh.) Simionca, 2012, D. Mihăilă, 2014). Climate zones in Romania have natural physical factors and microclimatic spaces with a beneficial effect on the human body (temperature, atmospheric pressure, negative air-ionization, mineral water springs, external water treatment lakes, salt mines rich in sanogenic and therapeutic factors, caves, mofettes) (Iu. (Gh.) Simionca, 2012, D. Mihăilă, 2014).

A cold microclimate will prompt a reaction to be triggered by heat generation and the effects on the body are decreased sweating, peripheral vascular constriction by increasing the excitability threshold of the Krause corpuscles, cold receptors that maintain the blood pressure control threshold. Hot climatization requires vasodilation and sweating, especially when the air temperature exceeds 29° C. Among the natural factors that influence the human body to be remarked ionisation of air, the values of which vary depending on the geographical areas and investigated locations. For example, total air ionization is about 500 ions / cm<sup>3</sup> in urban areas in a moving vehicle - approximate 200 ions / cm<sup>3</sup>, in mountain forests about 3500-4000 ions / cm<sup>3</sup>, but near a cascade the concentrations may reach about 50,000 ions / cm<sup>3</sup>. (S. Cupcea and coauth., 1959, J. Breton, V. Breton and Y. Le Goff, 1998, D. Mihăilă, 2014, L. Enache, 2016, L. Enache, 2017). The ionized air, through air ions with negative as well as positive polarity, has different properties, including bactericidal, antitoxic and therapeutic properties (Iu. Simionca, L. Enache, 2011, Iu. Simionca, L. Enache, 2011\*, L. Enache, 2017).

### 1.1. Objectives

Evaluation and presentation of the beneficial effect of the microclimate formed on the upper course of Bârlad from Central Moldavian Plateau on the human body of the elderly patients with advanced pathology of the locomotor apparatus.

## 2. Methods

As mentioned, environmental and climate factors can represent the locations in Romania not only as polluted areas but also as areas rich in natural factors with balneary-climatic properties, useful for health and raising the level of quality of life. The study was performed on a group of 17 patients aged 63-98 years with chronic pathology of the locomotor system, including bilateral gonarthrosis, bilateral coxarthrosis, arthrosis punch, polyarthrosis, arthrosis and other pathologies (somatic, organic, atrial fibrillation, chronic bronchitis, COPD, pulmonary cord).

In order to assess the climatic effect of the topo- and microclimate formed in the area on investigated patients, the Visual Analogic Scale (VAS) was used. The clinical status was analysed over a period of 5 to 10 months sanatorium treatment (Băcești Medical and Social Assistance Center, Vaslui County, Romania. Director Ec. Briscaru Ion; Medical Officer, Dr. Cîrlig Vasile) in the area rich in forests with a favourable and specific climate formed on the upper course of Bârlad in the Central Moldavian Plateau. We studied data on the status of certain climatic parameters of the respective geographic area and locality (Stoienescu, 1966; Mihăilă, 2014; Enache, 2016; [https://ro.wikipedia.org/wiki/Judetul\\_Vaslui](https://ro.wikipedia.org/wiki/Judetul_Vaslui), <http://es.climate-data.org/europe/romania/vaslui-560/>, <https://es.climate-data.org/info/sources/>).

Determinations of the air-ionization regime (air ion concentration, polarity (positive and negative) - by air ion counter, operating on the principle of unloading a condenser electrically under the action of an airflow with controlled debit (Enache, 2016).

### 3. Results

As a result of the assessment of current and climatic climate data from the years 1960 - 1970 in the Bârlad Plateau area (Stoienescu, 1966), the following climatic parameters of the area, in which Băcești Medico-Social Assistance Center is located (Vaslui County), were found:

- Climate is temperate - continental, winds - with average annual speeds between 1.6 and 6.5 m / sec ([https://ro.wikipedia.org/wiki/Judetul\\_Vaslui](https://ro.wikipedia.org/wiki/Judetul_Vaslui)), average annual temperature 9.3°C, atmospheric precipitation 539 mm (<http://es.climate-data.org/europe/romania/vaslui-560/>).

- The vegetation is represented by forests rich in oak and beech, the aspect of the territory being predominantly hilly and of plateau with the average altitude of 150 - 350 m, the relief of the Bârlad Plateau according to the Hypsometric Maps is an average of 300 - 500 m (N.F. Leontiev and V. Sficlea in Atlasul Climatologic, România, 1966 of Stefan Mihail Stoienescu; <http://es.climate-data.org/europe/romania/vaslui-560/>, <http://es.climate-data.org/info/saources/>).

On the upper course of Bârlad on the Central Moldavian Plateau, outside the urban areas, the average natural ionization regime of the air is distinguished by values similar to the generally unpolluted natural environment with values of the total concentrations in the order of 1000 - 1200 ions / cm<sup>3</sup>, with a preponderance positive polarity of the ions, which determines a unipolarity coefficient of the order 1.1-1.3. In urban or urbanized areas (Băcești, Negrești, Scheia, Buhărești, Vaslui) the total ion concentration can be slightly reduced, maintaining a higher concentration of positive ions than the negative ones, a situation similar to that in other areas of Romania (Enache, 2016, 2017).

The analysis of the clinical status (Visual Analogic Scale - VAS test) of elderly (63-98 years) patients with chronic locomotor pathology, before and after sanatorium treatment (cures of recovery, health and quality of life) are presented in Table 1.

Based on the obtained results (Table 1) have been observed clinically significant improvements and positive clinical outcomes, as well as in elderly patients with bilateral gonarthrosis, bilateral coxarthrosis, arthrosis puncture, polyarthrosis, osteoarthritis associated with other pathologies (somatic or organic disorder, atrial fibrillation, chronic bronchitis, COPD, pulmonary cord). To mention an important improvement due to the climate of the area and air therapy in recovery treatment of patients with chronic locomotor pathology (VAS Media at the beginning of the evaluation - 7.12, after 5- 10 months of sanatorium, balneoclimatic treatment - 3.06, P Stewdent = 0.01).

**Table 1** The analysis of the clinical status (Visual Analogic Scale - VAS test) of elderly (63-98 years) patients with chronic locomotor pathology, before and after sanatorium treatment.

Patients Name, Surname (Abbreviation), female (f), male (m), years	Diagnosis	Period of treatment	Visual Analogic Scale (VAS)	VAS after treatment in area with natural therapeutics environmental factors
S.V. f. 63 years	Chronic painful shoulder, HTA, mixed dementia	1.03.2017 – 21.09.2018	7	3
C.I. f. 77 years	Bilateral gonarthrosis, bilateral coxarthrosis, somatic disorder	1.02.2017 – 21.09.2018	6	3
B.F. f. 78 years	Spondylodiscity T9-T12, HTA, cognitive deficit	29.11.2017 – 21.09.2018	8	5
B.G. m. 64 years	Arthrosis punch, COPD, chronically pulmonary cord	10.07.2017 – 21.09.2018	6	3
P.E. f. 74 years	Right scapular-humeral dislocation, organic disorder	04.01.2018 – 21.09.2018	7	4
D.V. f. 98 years	Right scapular-humeral dislocation HTA, organic affective disorder	02.01.2017 – 21-09.2018	7	5
B.R. f. 63 years	Pertrochanteric fracture and left operated peroneum, COPD, HTA	07.09.2017 – 21.09.2018	8	5
C.T. m. 77 years	Bilateral gonarthrosis, ICC II NYHA	01.04.2017 – 21.09.2018	7	4
C.I. f. 82 years	Right hip fracture prosthesis, HTA	15.01.2017 – 21.09.2018	9	4
N.E. f. 88 years	Right gonarthrosis, atrial fibrillation, dementia	31.05.2017 – 21.09.2018	8	3
R.T. m. 84 years	Right hand arthrosis, Parkinson's disease	29.11.2017 – 21.09.2018	6	3
P.I. f. 58 years	Arthrosis disease, COPD	29.01.2017 – 21.09.2018	7	4
A.M. f. 78 years	Bilateral gonarthrosis	24.04.2017 – 21.09.2018	6	4
C.E. f. 94 years	Polyarthrosis, HTA	03.02.2017 – 21.09.2018	7	5
N.E. f. 88 years	Right femoral neck fracture, HTA	04.02.2017 – 21.09.2018	8	3
A.E. f. 77 years	Arthrosis disease, chronic bronchitis	04.02.2017 – 21.09.2018	6	3
M.M. m. 72 years	Femoral neck fracture, organic disorder	09.09.2017 – 21.09.2018	8	5

#### 4. Conclusions and Recommendations

The sanatorial recovery and aérotherapy treatment in the Băcești Medical and Social Assistance Center, Vaslui County, in the upper Bârlad area, the Central Moldavian Plateau, the owner of a *GEOREVIEW 29/2019 (55-59)*

specific climate, contributes to improve the clinical status of elderly patients with chronic pathology of the locomotor apparatus. Recommendations: Modelling some limits of microclimatic parameters in order to increase the degree of multifunctional comfort of patients

## References

- Alexander D. D., Bailey W. H., Perez Vanessa, Mitchell M. E., Su Steave, 2013, Air ions and respiratory function outcomes: a comprehensive review, *Journal of Negative Results in BioMedicine* 12,14, <https://doi.org/10.1186/1477-5751-12-14>, © Alexander et al., licensee BioMed Central Ltd. 2013, Open Peer Review reports.
- Atlasul Climatologic, România, 1966, București, *Elaborare științifică și redactarea Dr.Stoicescu Ștefan Mihail*.
- Cupcea S., Deleanu M., Lenghel I., Elges E., Gros E., 1959, *Ionizarea aerului în câteva stațiuni balneo-climaterice din R.P.R.*, Comun. Acad. R.P.R., Nr.3, Tom IX.
- Breton J., Breton V. și Le Goff Y., 1998, Atmospheric ionisation patterns at 4 m above ground level in correlation to meteorological events, *Journal of Geophysical Research*, 103, p. 1837 – 1846.
- Enache L., 2016, *Biometeorologie și bioclimatologie : climatul și bioclimatul stațiilor balneare din Romania*, Craiova, Sitech, ISBN 978-606-11-5305-3, 55:551.5 (075), 55:551.58(075).
- Enache L., 2017, *Aspecte biomedicale ale ionizării aerului*, Editura SITECH, Craiova.
- Mihăilă D., 2014, *Atmosfera terestră: elemente de favorabilitate sau nefavorabilitate pentru organismul uman și activitățile turistice*, Editura SEDCOM LIBRIS, Iași: Bibliogr. I.S.B.N.: 978-973-670-350-8, 551.51, 234 p.
- Simionca Iu., Enache L., 2011, The experimental effect of artificial air ionizer (negative and positive) on some hematological parameters at Wistar rats, *Balneo Research Journal*, 2(1):15-26.
- Simionca Iu., Enache L., 2011, The experimental effect of artificial air ionizer on some nonspecific resistance parameters and immune system, *Balneo Research Journal*, 2(1):27-40.
- Simionca Iu. (Gh.), 2012, Studiu complex medico-biologic în vederea utilizării inovative a factorilor potențial terapeutici de mediu din saline și peșteri în sănătate și turism balneoclimatic. Soluții de modelare a acestora. Rezultate științifice și realizări (Raport). *Lucrările Conferinței Naționale de Speleoterapie cu participare internațională : Turda, octombrie 2011 /coord.: cercetător științific principal II, dr.Iuri Simionca*, Editura Casa Cărții de Știință, Cluj-Napoca : ISBN 978-606-17-0091-2, 553.63(498), 73 p., p.33 - 36.
- [https://ro.wikipedia.org/wiki/Județul\\_Vaslui](https://ro.wikipedia.org/wiki/Județul_Vaslui).
- <http://es.climate-data/info/saources/>.
- <http://es.climate-data.org/europe/romania/vaslui-560/>.