

THE IMPORTANCE OF RESPIRATORY PASSAGES IN MOTOR ACTIVITY REGULATION DURING JOINT DAMAGE

Eliava G.G.¹, Tsintsadze T.G.², Kasradze P.A.³, Natroshvili I.G.⁴, Sopromadze Z.G.⁵,
Svanishvili T.R.⁶, Tataradze E.R.⁷, Sopromadze M.M.⁸ (Georgia)

Email: Eliava578@scientifictext.ru

¹Eliava Georgi Grigorjevich - Doctor of Biological Sciences, Professor;

²Tsintsadze Tamar Givievna - Doctor of Medicine, Professor, Head of the Department,
DEPARTMENT OF PHARMACY,
GEORGIAN TECHNICAL UNIVERSITY;

³Kasradze Pavel Aleksandrovich - Doctor of Medicine, Head of the Department;

⁴Natroshvili Irakli Georgievich - Doctor of Medicine, Professor;

⁵Sopromadze Zeinab Grigorjevna – Doctor of Medicine, Associate Professor;

⁶Svanishvili Tamar Romanovna - Doctor of Medicine, Assistant Professor;

⁷Tataradze Elza Revazovna – Doctor of Medicine, Assistant Professor;

⁸Sopromadze Mariam Mevludovna – Senior Laboratory Assistant,
DEPARTMENT OF MEDICAL REHABILITATION AND SPORTS MEDICINE,
TBILISI STATE MEDICINE UNIVERSITY,
TBILISI, GEORGIA

Abstract: the motor activity is secured by a functional state of different systems and organs of the body, including central nervous system and breathing system.

The important role in motor activity regulation and different motions' performance is attached to the functional state of joints, which under normal conditions provide the contacting bone surfaces with different degree of mobility, while under pathological conditions sharply limit movement amplitude, including the development of ankyloses.

In case of pathology of upper respiratory passages one may trace the linkage of changes in the upper respiratory passages with visceral changes and motor activity.

In our opinion, upon incurrance of nidus of infection in the upper respiratory passages, along with other damaging factors, the severity (manifestation) of clinical picture and systemic symptoms is influenced by disturbances of reflex influences of upper respiratory passages that has to be taken into account when conducting adequate therapy and rehabilitation measures.

Keywords: motor activity, upper respiratory passages, reflex influence, joint damage, streptococcus.

ЗНАЧЕНИЕ ДЫХАТЕЛЬНЫХ ПУТЕЙ В РЕГУЛЯЦИИ ДВИГАТЕЛЬНОЙ АКТИВНОСТИ ПРИ ПОРАЖЕНИИ СУСТАВОВ

Элиава Г.Г.¹, Цинцадзе Т.Г.², Касрадзе П.А.³, Натрошвили И.Г.⁴, Сопромадзе З.Г.⁵,
Сванишвили Т.Р.⁶, Татарадзе Э.Р.⁷, Сопромадзе М.М.⁸ (Грузия)

¹Элиава Георгий Григорьевич – доктор биологических наук, профессор;

²Цинцадзе Тамар Гивиевна – доктор медицины, профессор, руководитель департамента,
департамент фармации,
Грузинский технический университет;

³Касрадзе Павел Александрович – доктор медицины, руководитель департамента;

⁴Натрошвили Ираклий Георгиевич - доктор медицины, профессор;

⁵Сопромадзе Зейнаб Григорьевна – доктор медицины, доцент

⁶Сванишвили Тамара Романовна – доктор медицины, доцент;

⁷Татарадзе Эльза Ревазовна – доктор медицины, доцент;

⁸Сопромадзе Мариам Мевлудовна – старший лаборант,
департамент медицинской реабилитации и спортивной медицины,
Тбилисский государственный медицинский университет,
г. Тбилиси, Грузия

Аннотация: двигательная активность обеспечена функциональным состоянием различных систем и органов организма, в том числе центральной нервной системой и дыхательной системой.

Важное значение в регуляции двигательной активности и в выполнении различных движений имеет функциональное состояние суставов, которые в норме обеспечивают соприкасающимся костным поверхностям различные степени подвижности, а при патологии резко ограничивают амплитуду движений, включая развитие анкилозов.

При патологии верхних дыхательных путей прослеживается связь изменений в верхних дыхательных путях с висцеральными изменениями и с двигательной активностью.

По нашему мнению, при возникновении очага инфекции в верхних дыхательных путях, наряду с другими повреждающими факторами, на выраженность клинической картины и системных проявлений влияют и нарушения рефлекторных влияний с верхних дыхательных путей, что необходимо учитывать при проведении адекватной терапии и реабилитационных мероприятий.

Ключевые слова: двигательная активность, верхние дыхательные пути, рефлекторные влияния, поражения суставов, стрептококк.

The motor activity is secured by functional state of different systems and organs of the body, including central nervous system and breathing system [1, 5, 6].

The important role in motor activity regulation and different motion performance is attached to the functional state of joints, which under normal conditions provide the contacting bone surfaces with different degree of mobility, while under pathological conditions sharply limit movement amplitude, including the development of ankyloses [2, 3, 4, 8].

The major role in motor activity restriction is assigned to joint diseases, in particular rheumatic diseases [7, 8].

Diseases and damages of supporting-motor system hold one of the most prominent places in the structure of general morbidity of population.

According to the World Health Organization data, joint pain is encountered among 30% of population, 20% needs obligatory regular therapy under the care of physician, 10% become partially disabled persons, and 5% - completely handicapped persons.

Preservation of adequate motor activity is a necessary condition when treating many diseases, including those induced by Covid-19.

The rheumatic diseases are widely spread throughout the world. Even 2500 years ago the father of medicine Hippocrates described the acute joint inflammation during rheumatism and for the first time introduced the term arthritis.

The systemic symptoms (manifestations) are peculiar for the most part of rheumatic diseases, and in the pathological process may include different organs and functional systems of the body, including cardiovascular and breathing systems: heart, lungs, blood vessels, kidney, liver, digestive and nervous system etc.

Frequently it is difficult to recognize systemic symptoms like pneumonia or nephritis (e.g. during lupus erythematosus), they are considered as independent disease and inadequate treatment is administered that sometimes leads to irremediable results. On the other hand, in case of more than seven dozens of non-rheumatic diseases the first manifestation can be presented by severe pain in joints and their inflammation [7].

The above-mentioned factors require a qualified, differentiated approach from physicians.

According to rheumatic disease classification, the list of diseases include rheumatism, collagen-vascular disease (diffuse lesion of connecting tissue), systemic vasculitis, rheumatoid arthritis, juvenile arthritis, Bekhterev's disease etc.

Rheumatism as a systemic inflammation process is manifested by changes in the connecting tissue (mucoid degeneration – fibrinoid changes – fibrinoid necrosis), by cellular responses (infiltration by lymphocytes and plasmacytes) and formation of rheumatic nodules. The acute articular rheumatism can be considered as the disease of many systems and organs of the entire organism. This disease has systemic manifestations, since it affects cardiovascular system, supporting-motor systems, and extends to the different tissues of mesenchymal origin [7, 13].

Articular rheumatism is a multifactorial disease. Different factors take part in the development mechanism of acute articular rheumatism.

The theory of emergence of acute articular rheumatism, the etiological factor of which is presented by group A beta-hemolytic streptococcus (*streptococcus pyogenes*), got a widespread occurrence.

Group A beta-hemolytic streptococcus is a cause of nasopharynx streptococcal infections. Antistreptococcal antibodies are produced in the organism as a response to streptococcal infection ingress, and generation of immune complexes (streptococcus antigens + their antibodies + complement) takes place. These immune complexes circulate to blood and deposit in microcirculatory bloodstream. Streptococcal toxins and streptococcus enzymes have damaging action on connecting tissue and myocardium, as well. The above-mentioned changes promote acute development of rheumatism featured by outbreak and evident symptomatology.

In favour of this theory one can evidence the fact that after angina induced by streptococcus, a twinge of acute articular rheumatism develops. Time period between streptococcal angina onset and rheumatic twinge may vary within 1-4 weeks. The interrelation of streptococcal angina and rheumatic symptoms manifestation is registered among 40-80% of diseased persons.

In addition to the above-mentioned, one may indicate scarlatina complication by articular rheumatism [9].

The justice of this theory is testified by the administration of sulphamides leading to deceleration of respiratory passage infections, and reduction of acute articular rheumatism rate, as well [10, 11].

As it was mentioned above, the linkage of streptococcal infection with clinical manifestations of articular rheumatism is testified by the fact that streptococcal antibodies are available in blood serum during this disease. In this case takes place increase in antistreptolysin titer, which may induce inhibition of hemolytic streptococcus [11]. Especially interesting is that the increase of ASLO is frequently continuous and long-standing in case of anginas with accompanied articular rheumatism [13, 14].

The linkage of streptococcal infection with the progression of acute articular rheumatism points at the opportunity of its development due to locus of infection in other organs, as well, e.g. during infectious injuries of teeth, prostatic gland, gall bladder, appendix [8].

In our opinion, the availability of locus of infection in the nasopharynx disorders the activity of reflex field and disturbs corresponding reflex responses from upper respiratory passages in the process of natural nasal breathing [5, 6].

As is known, the reflex influences from upper respiratory passages participate in adjustment of blood circulation processes, metabolic processes, pulmonary ventilation and motor activity. Disturbance of these processes will promote aggravation of clinical symptomatology severity and systemic manifestation specific for acute articular rheumatism.

Our opinion is in accordance with the point of view of other authors, who suppose that reflex responses at the level of receptive field of tonsil and pharynx play an important role in the above-mentioned case [13].

Thus, when analyzing the pathogenesis of acute articular rheumatism and corresponding systemic manifestation from the viewpoint of streptococcal infection of upper respiratory passages and when conducting proper therapy and rehabilitation measures, it is necessary to take into account the importance of restoration of reflex influences from upper respiratory passages for improvement of clinical picture of the disease.

References / Список литературы

1. *Eliava G.* Fundamentals of biomechanics. "Technical University". Tbilisi, 2001. 3-136 (in Georgian).
2. *Eliava G., Mzhavanadze R., Balashvili M.* Peculiarities of bone system structure and their role in execution of different types of motion. „Georgika“. Tbilisi, 2019. 3-152 (in Georgian).
3. *Eliava G., Tsintsadze T., Natroshvili I., Sopromadze Z., Svanishvili T., Tataradze E., Sopromadze M.* Osteoarthritis and its pharmaco- and kinesitherapy. „Georgika“. Tbilisi, 2020. 1-128 (in Georgian).
4. *Eliava G., Tsintsadze T., Kasradze P., Mzhavanadze R., Balashvili M., Buachidze T., Topuria L., Topuria E.* Some aspects of osteoarthritis spread prevention and treatment. LXXI International Correspondence Scientific and Practical Conference "International Scientific Review of the Problems and Prospects of Modern Science and Education", Boston, USA, June 22-23, 2020). Publishing House "Problems of Science". 97-99.
5. *Bakuradze A.N., Eliava G.G.* Respiratory irritations of respiratory ways and methodological recommendations for their use. Publ. house "Sabchota Sakartvelo". Tbilisi, 1987. 1-92 (in Russian).
6. *Bakuradze A.N., Eliava G.G.* The impact of nasal breathing on electrical activity of skeletal muscles. *Physiol. J. USSR*, Publ. House "Nauka". Vol. XXI, 1985 (in Russian).
7. *Tatishvili N., Simonia G.* Internal diseases. „By Bakur Sulakauri Publishing House“. Tbilisi. Pp. 469-514.
8. *Șuceanu St., Ionescu V., Moange M.* Clinic and treatment of rheumatic diseases. "Medicinal publishing house". Bucharest, 1983.
9. *Bruckner I.* si colab. Etiopatogenia reumatismelor inflamatorii cronice. Conferinta națională de reumatologie, Bucuresti, 1968.
10. *Hurmuzache E.* si colab. Tratatamentul reumatismului cardioarticular si nervos (choreea) infantil prin desensibilizarea intradermică (autohemoterapie) după metoda sovietică. "Safir", *Pediatria*, 1952. 3, 35.
11. *Jones R.* Criteries (modified) for the guidance in diagnosis of rheumatic fever. Report of Committes in Standards and Criteria for programs of carte, *Circulation*, 1956. 13, 617.
12. *Lupu N.Ch., Ciobanu V.* Boala reumatismală Bouillaud-Sokolski. Ed. Acad. R.P.R., 1963.
13. *Priscu T., Maiorescu M.* Bolile reumatismale La copii, Ed. medicală, Bucuresti, 1970.
14. *Seze B.De.* Maladies des os et des articulations, Ed. Flammarion. Paris, 1970.