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 LOWER LIMB EXTENSION IN THE TREATMENT AND REHABILITATION OF OSTEOARTHRITIS
 PATIENTS

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 ქვედა კიდურების ოსტეოართროზის მკურნალობა და რეაბილიტაცია
 ტრაქციული თერაპიის მეთოდით

„პარკ ჰოტელ წყალტუბო“, წყალტუბო, საქართველო; ანსუ, ქუთაისი, საქართველო

რეზიუმე

ოსტეოართროზი სახსრების დისტროფიული დაავადებაა, შედარებით ნელი პროგრესირებითა და არამკვეთრად გამოხატული სიმპტომატიკით. კლინიკურად ოსტეოართროზი ხასიათდება მექანიკური ტიპის ტკივილის სინდრომით, რომელიც განპირობებულია ხრტილოვანი ქსოვილის ამორტიზაციული თვისებების დაქვეითებით. მეთვალყურეობის ქვეშ იმყოფებოდა 100 პაციენტი, ძირითადად ქვედა კიდურების სახსრების დაზიანებით. 43 პაციენტს აღენიშნებოდა დაავადების 1 სტადია, 48-ს მე-2 სტადია, 9-ს მე-3 სტადია Kolgren-ის მიხედვით. სინოვიტი აღენიშნებოდა 50 პაციენტს. პაციენტები გაყოფილ იყვნენ 2 ჯგუფად. 1 ჯგუფის პაციენტებს (50 კაცი) უტარდებოდათ ქვედა კიდურების დაჭიმვა წყალტუბოს სუსტად რადონულ აზოტურ მინერალურ წყალში. კურსზე 8-10 ტრაქცია და 10-12 მინერალური აბაზანა. მე-2 ჯგუფის (50 კაცი) პაციენტები იღებდნენ წყალტუბოს სუსტად რადონულ აზოტურ 20 წუთიან მინერალურ აბაზანას, კურსზე 20-23 აბაზანა. ზოგად კლინიკურ გამოკვლევებთან ერთად იკვლევდნენ ანთების პროცესის აქტივობის მაჩვენებლებს. შემადგენელი ქსოვილის დესტრუქციულ პროცესებზე მსჯელობდნენ ცილა შემცველი გლიკოზამინგლიკანების და სისხლის შრატში ოქსიპროლინის შემცველობით. გამოკვლეულ იქნა სისხლის მიმოქცევა ქვედა კიდურებში და კუნთოვანი ტონუსი. კლინიკურ, ლაბორატორულ-ბიოქიმიურ და ფუნქციონალურ მაჩვენებლებს ადარებდნენ მკურნალობამდე და მკურნალობის შემდეგ. ტრაქციისა და ბალნეოთერაპიის შედეგად მიღებული მაჩვენებლების შედარებისას ორივე შემთხვევაში აღინიშნებოდა დადებითი ცვლილებები, თუმცა ყველაფერი ეს მეტად გამოხატული იყო ბალნეოთერაპია-ტრაქციის შემთხვევაში. ამრიგად, ქვედა კიდურების ტრაქცია მინერალურ წყალში აუმჯობესებს ბალნეოთერაპიის ეფექტურობას ოსტეოართროზით დაავადებულ პაციენტების მკურნალობასა და რეაბილიტაციაში.

Osteoarthritis is a degenerative joint disease with mild symptoms and relatively slow progression. The clinical manifestation of osteoarthritis is characterized by a pain syndrome of a mechanical type, caused by a decrease in the depreciation properties of cartilage tissue. Pain sensations occur in the subchondral bone due to the spread of a push wave to it when walking, which is not extinguished by thinned cartilage. The resulting rigidity of the ligamentous muscular apparatus limits the mobility of the joint, reducing the load on it, but increases the compression of the affected articular surfaces. Products of cartilage tissue destruction, getting into the joint cavity, cause inflammation, which rarely involves the entire synovial membrane, they often have a local, encapsulated character. Fecality of synovitis complicates both general and local drug and non-drug therapy. One of the possible means that can favorably influence the symptom complex that has been created in osteoarthritis, in our opinion, can be limb traction. Traction effect can contribute to the dilution of the articular surfaces, stretching of the joint capsule and ligamentous-muscular apparatus. This will allow to dilute and unload the surfaces of the joints (reducing the compression of the articular cartilage during traction), disincapsulate local synovitis, eliminate stiffness of the ligaments and muscles and restore disturbed regional blood circulation. The favorable effect of traction is indicated by single publications.

The purpose of this work was to study the therapeutic possibilities of underwater horizontal traction on the lower extremities in patients with osteoarthritis. Under observation were 100 patients with a predominant lesion on the joints of the lower extremities (in 37% of patients the hip joints were affected,

in 60% of the knee and 3% of the ankle joints). 43 patients had stage 1, 48 – stage 2 and 9 – stage 3 osteoarthritis according to Kellgren. Monoarthrosis was observed in 16 patients, oligo arthrosis in 46, polyosteoarthritis in 38 patients. Synovitis was in 50 patients. Patients were divided into 2 groups: group 1 - 50 patients who underwent traction of the lower extremities in low-radon nitrogen mineral (Tskaltubo) water. Per course 8-10 tractions (traction weight from 2 to 10 kg for both limbs). Only 10-12 mineral baths lasting up to 30 minutes. 2-nd group - 50 patients who served as control for the 1-st group received only general weakly radon nitrogen mineral (Tskaltubo) baths according to the optimal and effective method (developed by us). Per course 23-25 procedures lasting 20 minutes. Along with a general clinical examination (including a scoring of the severity of the pain syndrome, measurement of the volume of the joints and muscle mass, range of motion), we studied the indicators of the activity of the inflammatory process (C-reactive protein, diphenyl test, seromuroid, haptoglobin, ceruloplasmin). Destructive processes in the connective tissue were judged by the concentration of glycosaminoglycan's (GAG) and hydroxyproline in the blood serum. Examined state of the blood flow of the lower extremities (method of rheography) and muscle tone (method of global myography).

Compared changes in clinical, laboratory, biochemical and functional parameters before and after treatment. The results of treatment were objectively assessed depending on the overall dynamics of the studied parameters. Taken as a significant improvement, if 80% or more of the indicators returned to normal, for an improvement in 50-80% of the indicators, without changes-with a positive trend of <50% of the indicators, a negative trend of 60% or more of the indicators was considered a deterioration. When comparing the results of using traction in the Tskaltubo mineral water and general balneotherapy, positive significant changes were found towards improvement. Both in the 1-st and 2-nd groups, the severity of the blue syndrome decreased, the locomotor function improved, the symptoms of synovitis decreased or disappeared (swilling, increased skin temperature, etc.). These results were more pronounced in patient's treated with the balneotherapy-traction complex. So, in patients without synovitis in the 1-st group, the pain syndrome index decreased by 4,5 times (from $1,45 \pm 0,15$ to $0,25 \pm 0,10$ points. $p < 0,001$), in 2-nd group only 2 times (from $1,43 \pm 0,14$ to $0,74 \pm 0,12$ points. $p < 0,01$). In patients with synovitis, these differences were more significant, in the 1-st group, the pain symptom index decreased by 4 times (from $2,05 \pm 0,14$ to $0,50 \pm 0,10$. $p < 0,001$), in the 2-nd group by 1,6 times (from $2,00 \pm 0,21$ to $1,20 \pm 0,20$ point. $p < 0,01$). The effectiveness of balneotraction therapy was more pronounced in the 2-nd and 3-rd stage of arthrosis. Similar changes occurred with other clinical symptoms: joint mobility, their volume, etc. Positive dynamics of clinical results was confirmed by laboratory, biochemical and functional indicators. The decrease in ESR, the level of C-reactive protein, the indicators of the diphenylamine test in both groups was significant ($p < 0,005-0,01$). As can be seen from Table 1, in patients with synovitis, the indicators of inflammation activity decreased more significantly in the 1-st group.

Table 1. Changes in laboratory indicators of inflammation activity in OA patients with synovitis using balneotherapy and traction

Blood Counts	Patients Group			
	1 gr (n=24)	p	2 gr(n=26)	p
ESR, mm/h	$\frac{22.8 \pm 2.4}{6.6 \pm 1.7}$	<0.001	$\frac{19.9 \pm 1.9}{12.6 \pm 2.1}$	<0.001
C-reactive protein	$\frac{2.17 \pm 0.14}{0.53 \pm 0.14}$	<0.001	$\frac{2.06 \pm 0.08}{1.13 \pm 0.16}$	<0.001
Diphenylamine test, E.	$\frac{230.0 \pm 5.0}{200.0 \pm 1.0}$	<0.001	$\frac{230.0 \pm 6.0}{210.02 \pm 2.9}$	<0.1
Seromuroid, E	$\frac{0.215 \pm 0.0}{0.186 \pm 0.0}$	<0.001	$\frac{0.220 \pm 0.0}{0.200 \pm 0.0}$	<0.1
Gantoglobin, g/l	$\frac{1.38 \pm 0.06}{1.16 \pm 0.05}$	<0.05	$\frac{1.39 \pm 0.06}{1.18 \pm 0.05}$	<0.05
Cerulophazmin, mg/l	$\frac{283.0 \pm 1.6}{268.9 \pm 2.9}$	<0.001	$\frac{279.8 \pm 4.3}{255.7 \pm 1.7}$	<0.001

Note: in the numerator indicators before treatment, in the denominators after treatment

Table 2. Change in laboratory indicators of connective tissue destruction in patients with OA depending on the presence of synovitis when using balneotherapy and traction (M±m)

Blood Counts	Patients Group			
	1 gr (n=25)	p	2 gr(n=25)	p
	without synovitis			
GAG, generic mg100/ml	$\frac{18.01 \pm 0.2}{15.38 \pm 0.3}$	<0.001	$\frac{18.05 \pm 0.6}{15.48 \pm 0.5}$	<0.001
Hydroxyproline generic mkg/ml	$\frac{1.18 \pm 0.07}{0.97 \pm 0.07}$	<0.1	$\frac{1.19 \pm 0.15}{1.04 \pm 0.10}$	
	with synovitis			
GAG, generic mg100/ml	$\frac{21.47 \pm 0.6}{16.90 \pm 0.6}$	<0.001	$\frac{22.50 \pm 1.16}{17.22 \pm 1.03}$	<0.001
Hydroxyproline generic mkg/ml	$\frac{1.85 \pm 0.14}{1.27 \pm 0.12}$	<0.1	$\frac{1.86 \pm 0.11}{1.35 \pm 0.08}$	<0.1

Table 3. Changes in the hemodynamics of the lower extremities in patients with OA (according to rheography in ohms) depending on the stage of the disease and the presence of synovitis when using balneotherapy and traction ($p < 0,05-0,01$).

Desease Stage	Patients Group			
	1 group	2 group	1 group	2 group
	without synovitis		with synovitis	
I	$\frac{0.065 \pm 0.006 *}{0.094 \pm 0.009}$	$\frac{0.057 \pm 0.004 *}{0.067 \pm 0.003}$	$\frac{0.047 \pm 0.006 *}{0.067 \pm 0.004}$	$\frac{0.057 \pm 0.003 *}{0.070 \pm 0.004}$
II	$\frac{0.054 \pm 0.004 *}{0.070 \pm 0.004}$	$\frac{0.052 \pm 0.003}{0.065 \pm 0.004}$	$\frac{0.057 \pm 0.006 *}{0.099 \pm 0.009}$	$\frac{0.048 \pm 0.004 *}{0.050 \pm 0.004}$
III			$\frac{0.051 \pm 0.002 *}{0.090 \pm 0.003}$	$\frac{0.045 \pm 0.002}{0.051 \pm 0.003}$

Table 4. The effectiveness of treating patients with OA

Desease Stage	Patients Group	
	1 gr (n=50)	2gr (n=50)
A significant improvement	13/26	10/17
Improvement	36/72	42/73
Without change	1/2	6/10

From Table 1, in patients with synovitis, inflammation activity indicators decreased more significantly in group 1. Dilution on the articular surfaces and a decrease in pressure between them, apparently, had a positive effect on the state of the cartilage, which was reflected in the parameters of the connective tissue. As can be seen from Table 2, the content of total GAG and hydroxyproline in the blood serum decreased more significantly in the 1-st group, and in patients without synovitis, a significant decrease in the level of hydroxyproline was noted only after a course of underwater horizontal traction of the lower extremities. Along with clinical improvement and positive dynamics of inflammatory-destructive indicators, improvement in regional hemodynamics was noted (Table 3). The shifts were more significant with balneotherapy than with balneotherapy alone. With the severity of the disease, the differences in the improvement of blood circulation intensified, and at the 3-rd stage of arthrosis, significant changes were noted only in the 1-st group. Improved hemodynamics of the lower extremities, reduction of pain led to an improvement in the function of the neuromuscular apparatus, which was expressed in the disappearance of spontaneous bioelectrical activity of the muscles of the leg and its

intensification with maximum muscle contraction. In particular, in patients without synovitis the bioelectrical activity increased in the 1-st group from $295,7 \pm 3,40$ to $518,3 \pm 47,2$ ($p < 0,001$) microvolts, with synovitis from $485,3 \pm 39,1$ to $702,3 \pm 70,1$ mkV ($p < 0,002$), in 2-nd group, respectively, from $289,1 \pm 31,6$ to $447,0 \pm 47,8$ mkV ($p < 0,01$) and from $467,7 \pm 61,4$ to $685,2 \pm 67,9$ mkV ($p < 0,05$). This indicates a decrease in spasmodic phenomena both in the vascular bed and in the musculoskeletal system, which in turn affects the clinical and functional state of the musculoskeletal system of the lower extremities. The effectiveness of treating patients with OA, taking into account all the studied indicators, is shown in Table 4, from which it can be seen that the positive dynamics in balneotractor therapy is approximately 10% higher than that only in balneotherapy.

Thus, traction of the lower extremities in mineral water can be used as method that increases the effectiveness of balneotherapy for patients with OA. It allows to expand the use of resort balneotherapy for more pronounced forms of arthrosis with synovial phenomena, and also contributes to an earlier inclusion in the treatment process of therapeutic exercises mechanotherapy and other methods that accelerate the rehabilitation on patients with osteoarthritis.

References:

1. Miller B. Rjavina V. and etc. /Questions of Kurortology/ 1981;6:53-54.
2. Filchagin N. /Laboratory work/ 1982; 1:34-37.
3. Shanaev P. /Laboratory work/ 1987; 5:283-285.
4. Egsmose C., Lung B., Bach Andersen R. /Scand.J.Rheum.-1984; 24(4):238-242.
5. Leivseth G., Torstensson J., Keikeras O./ Clin.sci.-1989; 76(1):113-117.
6. Weber J., Rigoll U./Med.Sport.-1986; 26(7):212-214.

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ВЫТЯЖЕНИЕ НИЖНИХ КОНЕЧНОСТЕЙ В ЛЕЧЕНИИ И РЕАБИЛИТАЦИИ ОСТЕОАРТРОЗА

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РЕЗЮМЕ

Остеоартроз (ОА) дистрофическое заболевание суставов с неярко выраженной симптоматикой и относительно медленным прогрессирующим. Клиническое проявление ОА характеризуется болевым синдромом механического типа, вызванным снижением амортизационных свойств хрящевой ткани. Одним из возможных средств, способных благоприятно влиять на создавшийся симптомокомплекс при ОА, по нашему мнению, может быть вытяжение нижних конечностей. Тракционное воздействие может способствовать разведению суставных поверхностей, растяжению суставной капсулы и связочно-мышечного аппарата. Под наблюдением находилось 100 больных с преимущественным поражением суставов нижних конечностей. У 43 пациентов отмечалась 1 стадия, у 48 - 2 стадия и у 9 - 3 стадия ОА по Kelgren. Пациенты разделены были на 2 группы - 1-я - 50 пациентов, которым проводили подводное горизонтальное вытяжение нижних конечностей в слабарадоновой азотной минеральной (цхалтубской) воде. На курс 8-10 тракций, 10-12 минеральных ванн. 2-я группа- 50 пациентов, служила контролем к 1-й, получала только слабарадоновые азотные минеральные (цхалтубские) ванны по оптимальной и эффективной методике. На курс 20-23 процедур продолжительностью 20 мин. Наряду с общеклиническим обследованием (включающим бальную оценку выраженности болевого синдрома, измерение объема суставов и мышечной массы, амплитуду движений) проводили изучение показателей активности воспалительного процесса (С-реактивный белок, дифениловая проба, серомукоид, гаптоглобин, церулоплазмин). О деструктивных процессах в соединительной ткани судили по концентрации белок-содержащих гликозамингликанов (ГАГ) и оксипролина в сыворотке крови. Исследовали состояние кровотока нижних конечностей (методом реографии) и мышечного тонуса (методом глобальной миографии). Сравнивали изменения клинических, лабораторно-биохимических и функциональных показателей до и после лечения. Сдвиги были более

существенными при бальнеотракторной терапии, чем при одной бальнеотерапии. Таким образом, тракцию нижних конечностей в минеральной воде можно использовать как метод, повышающий эффективность бальнеотерапии пациентов ОА.

GEORGE SHA VIANIDZE, MARINA SHA VIANIDZE, TAMAR VALISHVILI, GEORGE LOMIDZE
LOWER LIMB EXTENSION IN THE TREATMENT AND REHABILITATION OF OSTEOARTHRITIS PATIENTS

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SUMMARY

Osteoarthritis (OA) is a degenerative joint disease with mild symptoms and relatively slow progression. The clinical manifestation of osteoarthritis is characterized by a pain syndrome of a mechanical type, caused by a decrease in the depreciation properties of cartilage tissue. Pain sensations occur in the subchondral bone due to the spread of a push wave to it when walking, which is not extinguish had by thinned cartilage. The resulting rigidity of the ligamentous-muscular apparatus limits the mobility of the joint, reducing the load on it, but increases the compression of the affected articular surfaces. Traction of lower limbs in weak radon nitric mineral water from Tskaltubo spring was tried for treatment of major joints osteoarthritis stage 1-3 versus balneotherapy alone. The disease running with synovitis was assessed as regards clinical indices, activity of the inflammation, connective tissue destruction, limb hemodynamics and neuromuscular status. Underwater traction produced a 10% increase in efficacy as compared balneotherapy alone, it extends indications to balneotherapy on osteoarthritis with synovitis and permits early introduction of adjuvant physical methods contributing to rehabilitation of osteoarthritis patients. Thus, traction of the lower extremities in mineral water can be used as method that increases the effectiveness of balneotherapy for patients with OA. It allows to expand the use of resort balneotherapy for more pronounced forms of arthrosis with synovial phenomena, and also contributes to an earlier inclusion in the treatment process of therapeutic exercises, mechanotherapy and other methods that accelerate the rehabilitation on patients with osteoarthritis.

Keywords: Lower limb extension, treatment, rehabilitation, osteoarthritis, Tskaltubo

