ASSESSMENT OF CRYOTHERAPY IN PATIENTS WITH OSTEOARTHRITIS (OA)

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One of the treatments for OA is cryotherapy. The aim of this paper is to assess the ef-fect of cryotherapy on the clinical status of patients with osteoarthritis, according to their subjective feelings before and after the application of a 10 – day cold treatment cycle. The aim is also to assess the reduction of intensity and frequency of pain, the reduction of the amount of pain medication used, and to assess the possible impact on physical acti-vity. The study involved 40 people, including 25 women (62.5%) and 15 men (37.5%).

27 patients had spondyloarthritis (67.5% of respondents), 7 had gonarthrosis (17.5%), and 6 coxarthrosis (15%). The overall average age was 50.62 years; the youngest patient was 29 years old and the oldest 73 years old. The average age of women was 8 years higher. The study used a questionnaire completed by patients, and consisted of three basic parts. The modifed Laitinen pain questionnaire contained questions concerning the intensity of pain, frequency of pain medication use and the degree of limited mobility. The visual analogue scale (VAS) was used in order for the patients to subjectively evaluate the therapy after applying the ten-day treatment cycle. According to the subjective assessment of respon-dents, after the cryotherapy treatments, a signifcant improvement occurred in 31 patients (77.5%), an improvement in 7 patients (17.5%), and no improvement was only declared by 2 patients (5%). Cryotherapy resulted in a reduction in the frequency and degree of pain perception in patients with osteoarthritis. Cryptherapy reduced the number of analgesic medications in these patients. It improved the range of physical activity and had a positi-ve effect on the well-being of patients.

Cryotherapy, an approach that has been used for many years, still retains its use in current medical practice. A signifcant rise in the number of its sup-porters is due amongst other things, to the emer-gence of new types of cryochambers [1, 2, 3, 4]. Osteoarthritis, including gonarthrosis and coxarthrosis, is the main cause of pain and limited mobility in the sixth dec-ade of life. Osteoarthritis is one of the most severe disease of civilization with a prevalence of 12% in Europe and the United State, rising to 60% of the population over 65 years of age [5]. Cold therapy, in the form of the cryogenic treatments, is extremely useful, for example in osteoarthritis, rheumatoid dis-eases, as well as in the treatment of post-traumatic changes. Patients with fbromyalgia experience subjective improvement

in the lack of pain, slowed conduction in sensory and motor nerves and reduced muscle spasticity [6, 7, 8, 9, 10, 11, 12, 13]. All cryotherapy methods aid in maintaining good physical ftness in healthy subjects [14]. The best therapeutic effect of cryotherapy is achieved in the treatment of lesions located in the motor system. It is benefcial in improving the well-being and increasing physical activity and helping relieve fatigue. Treatments last from 2 to 3 minutes, at a temperature of -150oC and below. Cryotherapy improves blood circulation. It also helps to neutralize the sub-stance, which causes pain and infammation. Movement is an essential element of treatment after a stay in the cryo-chamber [11, 12, 13, 15]. The aim of this paper is to assess the effect of cryotherapy on the clinical status of patients with osteoarthritis, according to their subjective feelings before and after the application of a 10-day cold treatment cycle. The aim is also to assess the reduction of intensity and frequency of pain, the reduction of the amount of pain medication used, and to assess the possi-ble impact on physical activity.

Material and Methods

The study was conducted at the Center for Comprehensive Rehabilitation in Konstancin-Jeziorna at the turn of February and March 2012, where cryochamber ARCTICA METRUM CRYOFLEX was used. The study involved 40 people, including 25 women (62,5%) and 15 men (37,5%). 27 patients had spondyloarthritis (67,5 % of respondents), 7 had gonarthrosis (17,5%), and 6 had coxarthrosis (15%). The overall average age was 50,62 years; the youngest patient was 29 years old and the oldest 73 years old. The average age of women was 8 years higher. The study used a questionnaire completed by patients, and consisted of three basic parts.

1. The modifed Laitinen pain questionnaire contained ques-tions concerning the intensity of pain, frequency of pain medication use and the reduction of mobility. The number of points in these four categories ranges from 0 to 16, with a lower number indicating better health of the patient.

2. The visual analogue scale (VAS) was used in order for the patients to subjectively evaluate the therapy after the ten-day treatment cycle. It is a reliable and frequently used method in the evaluation of pain intensity. The patient in-dicated a point on a 10 cm line to show their pain severity, where 0 represents no pain and 10 represents the strongest possible pain (moderate pain is 1-3, 4-6 means strong pain, 7-9 is very strong pain).

3. Subjective evaluation of the therapy. Patients assessed the state of their health after the treatment by choosing one of the available replies: signifcant improvement, improve-ment, lack of improvement or deterioration.

Table I. **THE AVERAGE VALUE OF THE DEGREE OF SEVERITY OF PAIN BEFORE AND AFTER TREATMENT BY VAS 10-POINT SCALE**

Sex	Number of patients	(%)	Before therapy (points)	(%)	After therapy (points)	(%)
Both women and men	40	100	5.0	50	2.7	27
Women	25	62.5	5.0	50	2.8	28
Men	15	37.5	5.2	52	2.5	25

Table II. **THE NUMBER OF PATIENTS ASSESSING THE INTENSITY OF PAIN BEFORE AND AFTER THERAPY**

	Before treatment		After treatment	
Pain intensity	**Number of patients**	**Percentage (%)**	**Number of patients**	**Percentage (%)**
No pain	2	5	10	25
Mild pain	17	43	25	63
Strong pain	19	48	5	13
Very strong	2	5	0	0
Cannot withstand	0	0	0	0
The total number of patients	40	100	40	100

Table III. **THE NUMBER OF PATIENTS EVALUATING THE INCIDENCE OF PAIN BEFORE AND AFTER THERAPY**

	Before treatment		After treatment	
The incidence of pain	**Number of patients**	**Result (%)**	**Number of patients**	**Result (%)**
There is none	0	0	8	20
Periodically	13	33	25	63
Often	14	35	7	18
Very often	7	18	0	0
Continuous	6	15	0	0
The total number of patients	40	100	40	100

Results

After the ten-day treatment cycle of cryotherapy (accor-ding to the subjective assessment of respondents) – a signi-fcant improvement occurred in 31 patients (77,5%), an improvement occurred in 7 patients (17,5%), and no im-provement was declared by only 2 patients (5%). The av-erage baseline pain intensity in all patients was 5.0 points (50% VAS). Upon completion of therapy, this value de-creased to 2,7 points (VAS 27%). According to the survey, in women this value dropped from 50% to 28%, and in men from 52% to 25% (Table I). Patients felt that before and after treatment, pain intensity decreased by an average of 1,5 points to 0,9 points (Table II and Table VI), the frequency of pain fell from 2,2 points to 1,0 points (Tables III and VI), the use of analgesics from 1,0 points to 0,2 points (Tables IV and VI), while the limitations on physical activity decreased from 1,2 points to 0,7 points (Tables V and VI).

Table IV. **THE NUMBER OF PATIENTS USING PAINKILLERS BEFORE AND AFTER THERAPY**

	Before treatment		After treatment	
The use of painkiller	**Number of patients**	**Result (%)**	**Number of patients**	**Result (%)**
Without painkiller	12	30	34	85
On the spot	21	53	4	10
Still small doses	4	10	1	3
Still large doses	3	7	1	3
Still very high doses	0	0	0	0
The total number of patients	40	100	40	100

Table V. **THE NUMBER OF PATIENTS EVALUATING LIMITATION OF PHYSICAL ACTIVITY BEFORE AND AFTER THERAPY**

	Before treatment		After treatment	
Limitation of physical activity	**Number of patients**	**Result (%)**	**Number of patients**	**Result (%)**
None	4	10	13	33
Partial	29	73	25	63
Preventing work	2	5	2	5
Requiring partial assistance	5	13	0	0
Requiring total assistance	0	0	0	0
The total number of patients	40	100	40	100

Cryotherapy applied within the framework of a compre-hensive physiotherapy is an effective method in the treatment of osteoarthritis, contributing signifcantly to improved mobil-ity. The fnal outcome is defnitely better when cryotherapy is used in a long-term therapeutic process. With proper applica-tion it does not cause complications and provides a valuable complementary method of primary treatment [3, 7, 8, 10]. The results are a confrmation of the benefcial thera-peutic effects of cryotherapy in patients with degenerative arthritis. Cryotherapy has analgesic, anti-infammatory and anti-edematous effects, decreases muscle tension, changes in microcirculation and systemic reactions (hormonal and im-mune) [7, 8, 9, 11, 12].

Table VI. **THE RESULTS OF THE LAITINEN QUESTIONNAIRE BEFORE AND AFTER TREATMENT**

	Before therapy average (points)	After therapy average (points)
The intensity of pain	1.5 points	0.9 points
The incidence of pain	2.2 points	1.0 points
The use of painkiller	1.0 points	0.2 points
Limit physical activity	1.2 points	0.7 points

Almost 80% of respondents felt that after cryothera-py treatment, a signifcant improvement occurred. In the subjective assessment, patients focused in particular on the analgesic effect, the ability to undertake various activities in daily life (improvement of physical activity), relaxation and their generally improved well-being. The therapy has been proven effective, as indicated by the results obtained through the Laitinen questionnaire, VAS and subjective approach. The improvement observed in patients after cryotherapy is very important. Due to the high prevalence of osteoarthritis, it is a serious social, health and economic problem. Annual treat-ment costs of joint diseases in industrial countries are estimat-ed to amount to 1-2,5% of GDP [5]. The cost of treatment of degenerative joint disease is high and tends to increase both in Poland and in the world. Treatment costs and incidence can be reduced through the use of established standards of con-servative treatment and comprehensive prevention programs.

Conclusions:

- cryotherapy resulted in a reduction in the frequency and degree of pain perception in patients with osteoarthritis;
- a 10-day cycle of cold treatment reduced the number of analgesic medications in these patients;
- cryotherapy treatments have improved the range of physical activity and had a positive effect on the well-being of the patients.

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