P16 - the loss of body mass	30,3	1l,3	0,68
P17 - presence of daily general feeling - fluctuation	6,9	1l,3	0,36
P18 - intensification of daily general feeling fluctuation	35,4	11,3	0,66
P19 - depersonalization, - derealization	21,5	13,3	0,57
P20 - illusions	28,0	13,3	0,62
P21 - obsessions, phobias	8,0	11,3	0,38

To compare the effectiveness of the conducted cryotherapeutic treatments in relation to particular depression symptoms, the change of each symptom's intensity in T1 was recounted as a percentage of intensity of measurement T0.
Among all the examined clinical depression symptoms the most spectacular was the improvement in sleep disorders. It concerned disorders of falling asleep, dream shallowing (numerous waking up during the night sleep), and early waking up in the morning (the change of intensity of symptoms equals 91 %, 98%, 100%, respectively). Such symptoms as tardiness of thinking, activity, jactitation, general somatic symptoms (headaches and others) and the loss of body mass were changed in over 80% in comparison to the state before cryotherapy. The fact of 80% improvement in position of Hamilton scale dealing with dispiritedness, suicidal thoughts and tendencies seems to be quite significant.

Application of cryotherapy in treatment of patella-thigh syndrome

Syndrome of patella-thigh overload (patella chondriomalation) is a pathological state consisting in entire or partial destruction of patella articulation cartilage depending on degree and duration of the overload. Most commonly, it concerns young and active people, often practicing such sports disciplines as: light athletics, football, judo, handball, ice-skating, karate, volleyball.

Patella chondriomalation manifests itself by:

- pain after long-time bend of knee joints,
- pain accompanying jumping,

- pain when knee twisting (in and outside),
- uncertainty of articulation when overloaded,
- knee edema after long-time training,
- feel of patella leaping while bending and straightening a knee,
- pain intensification when descending.

Numerous researches and clinical observations showed anatomic and functional complexity of capsule-ligament apparatus, dynamic system of knee articulation and functional interdependence of its elements. The complexity of knee articulation and the fact that etiology of patella chondriomalation is heterogeneous and not well known make many troubles during treatment of the disease.

Many authors pay attention to significance of traumas and micro injuries that result from damage or wear of articulation cartilage. Perturbation of kneecap balance such as:

- high patella position (Fig. 1),
- knee articulation sprain,
- patella dislocation,

are considered to be very detrimental and significant.

Dandy points out that damage of meniscus is to a high degree caused by processes of articulation sprain degeneration.

Fig. 1. Female patient, 23yo.. patella risen substantially.

The aim or research work

The aim of research work was systemic cryotherapy into rehabilitation of suffering from infantile cerebral palsy children and youth incorporation as well as determination of achieved therapeutic benefits.

Research material:

The pilotage rehabilitation program with systemic cryotherapy usage was performed under the patronage of the Health Department of Municipal Office in Wroclaw. Twenty six people, in the age of 4 to 24 years old, of low fitness from Association for Children and Youth in Wroclaw "Ostoja", took part in the program. Parents consented participation of their children in program before rehabilitation.

The method of rehabilitation:

Systemic cryotherapy:

10 procedures of systemic cryotherapy in cryogenic chamber (NZOZ KAR-MED Medical Centre in Wroclaw, at the temperature of -110℃ within time of 1,5 to 2 minutes were performed in doctors' presence with ruthless obeying of safety principles during the procedure.

Table 1. The comparison of observed reaction of children and youth subjected to systemic cryotherapy.

	educators and assistants		physiotherapists		parents and carers	
	behaviors	patient quantity	behaviors	patient quantity	behaviors	patient quantity
positive reactions	better mood, increased activity during exercises, decreased spasticity - easier dressing	14	better mood, exercises acceptance, better contact with a child, decreased spasticity, increased activity in spontaneous	16	better mood by day, calm sleep by night, increased activity in spontaneous motor activity, decreased spasticity - easier dressing and feeding, decreased	18

	and feeding		motor activity	incidence of disease	
negative reactions	increased sialosis, Hyperexcita-bility, somnolence by day	9	weeping, negative excitability	7 negative excitability, difficulties in falling asleep	5
unchanged behaviors	3		3	3	

Individual program performed in Rehabilitation-Educational Centre:

- poli-sensorial simulation of development:
- Bobath method, the method of controlled teaching - Peto and finally the method of developing movement by W. Sherbone,
- relaxation massage,
- music therapy
- activities with speech therapist
- pedagogical therapy

Systemic cryotherapy was included as additional therapeutic element of existing individual program of children and youth. It enabled to evaluate cryotherapy effects in observed group of children and youth.

Methods of observation:

Before the cryotherapy the neurokinesilogical evaluation was performed (neurologist, physiotherapist). All therapists, working with children and the youth, their carers as well as parents, were performing systematic observation of potential changes of children's behavior, using specially prepared observation cards.

Results

During rehabilitation and 1 month after observations were performed in order to evaluate therapeutic benefits.

The observations of educators, physiotherapists as well as parents and carers prove positive change in behavior of most children and youth. Detailed observations are shown in Table 1.

Taking into account all observations, positive changes in 14 patients were achieved. However 3 children revealed negative changes. Most of positive changes were observed among home environment.

Discussion

Significant increase of interest of treatment with cold usage has been observed in recent years.

On the basis of actual literature reports as well as experiences, following indications for cryotherapy as an individual method and also element of complex rehabilitation must be noted:

- inflammatory diseases and various etiology degeneration of motion organ,
- diseases of centrifugal and peripheral nervous system,
- psyche based diseases,
- autoimmunological based diseases
- sports medicine and also biological renewal.

On this basis the authors applied rehabilitation, of suffering from infantile cerebral palsy with cryotherapy usage.

The application of cryotherapy in neurological patients is indicated for its congestion, analgesic, antioedematous and also decreasing spasticity actions. Direct influence of extremely low temperatures onto muscular tissue does not cause muscle force decrease but along with suppression of reflex movement of spinal cord mainly, determines decrease of muscle spasticity as a result of either algaesthesia (analgesia synergy) or central nervous system damage.

In conditions of low temperatures, in which steam and expiratory carbon dioxide change into ice dust, respiratory anoxia can not happen, because oxygen concentration does not decrease below 21 %. The safety of method displays also in fact, all of internal organs function in proper temperature of the blood, well oxygenated along with efficient microcirculation. Thus, systemic cryotherapy offers unique combination - both high intense stimulation effect and relatively low discomfort.

The application of the whole body cryotherapy in sport

Low temperatures are widely applied in treatment of every description of sports injuries. It adjuncts rehabilitation after surgical procedures, limits secondary lesions of tissues. Nowadays covering the athlete's leg with ice is a common sight. The favorable effects of cryotherapy have been known for many years. In local cryotherapy ice compresses are replaced with the demister of liquid nitrogen. At present to eliminate the negative consequences of professional sport more and more often systemic cryotherapy, also known as the whole body cryotherapy, is applied. It is common knowledge that low temperatures cause reaction cycle in organism which improves significantly the efficacy of kinesitherapy. The influence of low temperatures on training results has not been discovered so far. The innovative examination were performed at University School of Physical Education in Wroclaw.
The systemic cryotherapy meets with athletes' and trainers' approval. A few cryogenic chambers were installed in sport centers among others in Wroclaw, Spala, Zakopane, Warszawa, Ciechocinek, Łódz, Rawa Mazowiecka, Kołobrzeg.

Synthetic Liquid Air

Employing liquid air in powering the cryochamber is far more efficient than using liquid nitrogen because there is no need to air the chamber in order to provide a sufficient oxygen level. There is enough oxygen in the liquid synthetic air for the patient to be safe and comfortable during the treatment. Apart from a significant increase in safety level we also avoid airing the chamber thus saving the cooling agent - a process that makes use of liquid air simply more economical. Another aspect which argues for this solution is the fact that in the air sprayed inside the chamber, content of oxygen is a few percent higher than in the atmosphere, so the whole process is a kind of oxygen therapy (the patient breathes the air with an oxygen content of not 18% but about 22%).

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