Les effets de la Cryothérapie Corps Entier

Bibliographie
(extraits de publications scientifiques)

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Contents

Time-Course of Changes in Inflammatory Response after Whole-Body Cryotherapy Multi Exposures following Severe Exercise ................................................................. 3

Effects of Whole-Body Cryotherapy vs. Far-Infrared vs. Passive Modalities on Recovery from Exercise-Induced Muscle Damage in Highly-Trained Runners ........................................ 4

Effect of short-term cryostimulation on antioxidative status and its clinical applications in humans ......................................................................................................................... 5

Adaptation related to cytokines in man: effects of regular swimming in ice-cold water ....... 6

Acute and long-term effects of winter swimming and whole-body cryotherapy on plasma antioxidative capacity in healthy women ................................................................. 6

Changes in thermal homeostasis in humans due to repeated cold water immersions ........ 7

Effects of long-term whole-body cold exposures on plasma concentrations of ACTH, beta-endorphin, cortisol, catecholamines and cytokines in healthy females ........................... 8

The influence of single whole body cryostimulation treatment on the dynamics and the level of maximal anaerobic power ..................................................................................... 10

Changes in the glutathione system of erythrocytes due to enhanced formation of oxygen free radicals during short-term whole body cold stimulus ................................................................. 11

Effects of repeated whole-body cold exposures on serum concentrations of growth hormone, thyrotropin, prolactin and thyroid hormones in healthy women ................................ 12

Cryotherapy in sports medicine ............................................................................................. 13

Effects of the whole-body cryotherapy on NTproBNP, hsCRP and troponin I in athletes ...... 14

Whole-body cryotherapy in rehabilitation of patients with rheumatoid diseases--pilot study. 15

Effects of whole-body cryotherapy on a total antioxidative status and activities of antioxidative enzymes in blood of depressive multiple sclerosis patients .......................... 16

Cryostimulation factor supporting rehabilitation patients with multiple sclerosis and fatigue syndrome .......................................................................................................................... 17

The effects of whole-body cryotherapy and melatonin supplementation on total antioxidative status and some antioxidative enzymes in multiple sclerosis patients .......................... 18

Translating whole-body cryotherapy into geriatric psychiatry--a proposed strategy for the prevention of Alzheimer's disease ..................................................................................... 19

The influence of whole body cryotherapy on mental health .................................................. 20

Whole-body cryotherapy as adjunct treatment of depressive and anxiety disorders .......... 21
Time-Course of Changes in Inflammatory Response after Whole-Body Cryotherapy Multi Exposures following Severe Exercise

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The objectives of the present investigation was to analyze the effect of two different recovery modalities on classical markers of exercise-induced muscle damage (EIMD) and inflammation obtained after a simulated trail running race. Endurance trained males (n = 11) completed two experimental trials separated by 1 month in a randomized crossover design; one trial involved passive recovery (PAS), the other a specific whole body cryotherapy (WBC) for 96 h post-exercise (repeated each day). For each trial, subjects performed a 48 min running treadmill exercise followed by PAS or WBC. The Interleukin (IL) -1 (IL-1), IL-6, IL-10, tumor necrosis factor alpha (TNF-α), protein C-reactive (CRP) and white blood cells count were measured at rest, immediately post-exercise, and at 24, 48, 72, 96 h in post-exercise recovery. A significant time effect was observed to characterize an inflammatory state (Pre vs. Post) following the exercise bout in all conditions (p<0.05). Indeed, IL-1β (Post 1 h) and CRP (Post 24 h) levels decreased and IL-1ra (Post 1 h) increased following WBC when compared to PAS. In WBC condition (p<0.05), TNF-α, IL-10 and IL-6 remain unchanged compared to PAS condition. Overall, the results indicated that the WBC was effective in reducing the inflammatory process. These results may be explained by vasoconstriction at muscular level, and both the decrease in cytokines activity pro-inflammatory, and increase in cytokines anti-inflammatory.

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Effects of Whole-Body Cryotherapy vs. Far-Infrared vs. Passive Modalities on Recovery from Exercise-Induced Muscle Damage in Highly-Trained Runners

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Enhanced recovery following physical activity and exercise-induced muscle damage (EIMD) has become a priority for athletes. Consequently, a number of post-exercise recovery strategies are used, often without scientific evidence of their benefits. Within this framework, the purpose of this study was to test the efficacy of whole body cryotherapy (WBC), far infrared (FIR) or passive (PAS) modalities in hastening muscular recovery within the 48 hours after a simulated trail running race. In 3 non-adjoining weeks, 9 well-trained runners performed 3 repetitions of a simulated trail run on a motorized treadmill, designed to induce muscle damage. Immediately (post), post 24 h, and post 48 h after exercise, all participants tested three different recovery modalities (WBC, FIR, PAS) in a random order over the three separate weeks. Markers of muscle damage (maximal isometric muscle strength, plasma creatine kinase [CK] activity and perceived sensations [i.e. pain, tiredness, well-being]) were recorded before, immediately after (post), post 1 h, post 24 h, and post 48 h after exercise. In all testing sessions, the simulated 48 min trail run induced a similar, significant amount of muscle damage. Maximal muscle strength and perceived sensations were recovered after the first WBC session (post 1 h), while recovery took 24 h with FIR, and was not attained through the PAS recovery modality. No differences in plasma CK activity were recorded between conditions. Three WBC sessions performed within the 48 hours after a damaging running exercise accelerate recovery from EIMD to a greater extent than FIR or PAS modalities.

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Effect of short-term cryostimulation on antioxidative status and its clinical applications in humans

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Whole body cryostimulation (WBCT) is becoming popular in medicine and sport as an adjuvant form of treatment since late 1970s. Only a few works concerning antioxidant protection after WBCT have been published. The aim of this study was to determine the effect of a ten 3-min-long exposures (one exposure per day) to cryogenic temperature (−130°C) on the level of total antioxidative status (TAS), activity of selected antioxidant enzyme superoxide dismutase (SOD) and main non-enzymatic antioxidant—uric acid (UA) in WBCT study group (man n = 24; female n = 22) and non-WBCT control subjects (man n = 22; female n = 26). Moreover, we evaluated the lipid peroxidation measured as thiobarbituric acid reactive substances products. Their blood samples were collected twice at an interval of 10 days in both study group and control subjects. The activity of antioxidant enzyme and lipid peroxidation was assayed in erythrocytes, while the concentration of uric acid was measured in plasma. After completing a total of ten WBCT sessions a significant increase (p < 0.001) of TAS and UA levels in plasma (p < 0.001) in comparison to non-WBCT was observed. Our data showed that there was statistically significant increase of the activities of SOD in erythrocytes obtained from WBCT study group compared to non-WBCT controls after 10 days of treatment (p < 0.001). It was concluded that expositions to extremely low temperatures use in cryostimulation improve the antioxidant capacity of organism.

**Adaptation related to cytokines in man: effects of regular swimming in ice-cold water**

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The cytokine response after thermal stress (sauna + swimming in ice-cold water) was investigated in subjectively healthy persons. Two groups were studied at the end of the winter season: habitual and inexperienced winter swimmers. Blood was collected at rest, after a sauna bath and after a short swim in ice-cold water. Conventional methods and ELISA kits were used to determine the blood picture, serum cortisol and dehydroepiandrosterone sulphate, plasma anti-diuretic hormone (ADH) levels, and the levels of several cytokines in plasma and in the supernatants of blood cell cultures which were stimulated with lipopolysaccharide (LPS). In regular winter swimmers, the concentrations of plasma interleukin 6 (IL-6), leukocytes, and monocytes at rest were significantly higher than in inexperienced subjects. In experienced female winter swimmers, the plasma concentration of the soluble receptor for IL-6 was significantly lower than in inexperienced female swimmers. In both groups, granulocytosis, haemoconcentration and significant increases in the concentrations of ADH, cortisol and IL-6 were observed after the stimuli. However, the changes in the cortisol concentration were dramatically larger in habitual winter swimmers. A significant correlation was found between the delta values of cortisol and the basal concentrations of IL-6. In cell cultures, the LPS-induced release of IL-1beta and IL-6 was higher at rest in the inexperienced winter swimmers. This release was dramatically suppressed after exposure to the stimuli in the inexperienced winter swimmers but tended to increase in the regular winter swimmers. These stresses appear to challenge both the neuro-endocrine and the immune systems and the results indicate that adaptive mechanisms occur in habitual winter swimmers.

Acute and long-term effects of winter swimming and whole-body cryotherapy on plasma antioxidative capacity in healthy women

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The effects of severe cold stress on total peroxyl radical trapping antioxidant capacity of plasma (TRAP) were studied in two groups of healthy women: a whole-body cryotherapy group (WBC, n = 10) and a winter swimming group (WS, n = 10). The biovariability of TRAP values was also analysed. The WBC group was exposed to -110 degrees C for 2 min, whereas the exposure for the WS group lasted 20 s in ice-cold water. Sessions were organized three times per week for 12 weeks. Blood specimens were collected at 2, 4, 8 and 12 weeks at rest, 2 and 35 min after the cold exposures and at the corresponding times without cold exposure on a separate day. Conventional methods were used to determine TRAP values. The between-subject variation was 13.6% and the within-subject variation 6.4%. The index of individuality was 0.46, and the index of heterogeneity was 0.079. These results indicate a marked heterogeneity among subjects. During the first 4 weeks, the mean TRAP value significantly increased at 2 min after cold exposure in the WBC group, returning to baseline 35 min after the exposure. Similar changes were observed in the WS group. However, all changes due to cold were relatively mild (<5%). After 4 weeks no changes in TRAP values after the cold exposures were noticed and no long-term changes in basal TRAP values were observed. In the main, regular WBC and WS do not seem to be harmful as far as plasma antioxidative capacity is concerned.

Changes in thermal homeostasis in humans due to repeated cold water immersions


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The purpose of this study was to monitor changes in body and skin temperatures, heat production, subjective shivering, cold sensation and body fat content in humans after intermittent cold water immersion. Repeated exposures of young sportsmen to cold water (head out, 14 degrees C, 1 h, 3 times per week for 4-6 weeks) induced changes in regulation of thermal homeostasis. "Cold acclimated" subjects exhibited an hypothermic type of adaptation. Central and peripheral body temperatures at rest and during cold immersion were lowered. The metabolic response to cold was delayed and subjective shivering was attenuated. The observed hypothermia was due to the shift of the threshold for induction of cold thermogenesis to lower body temperatures. "Cold acclimated" subjects also showed a lowered cold sensation. Because of the observed physiological changes, about 20% of the total heat production was saved during one cold water immersion of "cold acclimated" subjects. Maximal aerobic and anaerobic performances were not altered. No change in the thermosensitivity of the body temperature controller, as assessed from the unchanged slope of the relation between the deep body temperature and total heat production, was observed. Changes in cold sensation and regulation of cold thermogenesis were noticed first after four cold water immersions and persisted for at least 2 weeks after termination of the adaptation procedure. A trend towards a small increase in the body fat content was also observed. This finding, as well as the increased vasoconstriction, evidenced by the lowered skin temperature, indicate that slight changes in body insulation may also occur after "cold acclimation" in humans.

Effects of long-term whole-body cold exposures on plasma concentrations of ACTH, beta-endorphin, cortisol, catecholamines and cytokines in healthy females

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Objective
Cold therapy is used to relieve pain and inflammatory symptoms. The present study was designed to determine the influence of long-term regular exposure to acute cold temperature. Two types of exposure were studied: winter swimming in ice-cold water and whole-body cryotherapy. The outcome was investigated on humoral factors that may account for pain alleviation related to the exposures.

Material And Methods
During the course of 12 weeks, 3 times a week, a group of healthy females (n = 10) was exposed to winter swimming (water 0-2 degrees C) for 20 s and another group (n = 10) to whole-body cryotherapy (air -110 degrees C) for 2 min in a special chamber. Blood specimens were drawn in weeks 1, 2, 4, 8 and 12, on a day when no cold exposure occurred (control specimens) and on a day of cold exposures (cold specimens) before the exposures (0 min), and thereafter at 5 and 35 min.

Results
Plasma ACTH and cortisol in weeks 4-12 on time-points 35 min were significantly lower than in week 1, probably due to habituation, suggesting that neither winter swimming nor whole-body cryotherapy stimulated the pituitary-adrenal cortex axis. Plasma epinephrine was unchanged during both experiments, but norepinephrine showed significant 2-fold to 3-fold increases each time for 12 weeks after both cold exposures. Plasma IL-1-beta, IL-6 or TNF alpha did not show any changes after cold exposure.

Conclusions
The main finding was the sustained cold-induced stimulation of norepinephrine, which was remarkably similar between exposures. The frequent increase in norepinephrine might have a role in pain alleviation in whole-body cryotherapy and winter swimming.

The influence of single whole body cryostimulation treatment on the dynamics and the level of maximal anaerobic power

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Objectives
The objective of this work was to determine the dynamics of maximal anaerobic power (MAP) of the lower limbs, following a single whole body cryostimulation treatment (WBC), in relation to the temperature of thigh muscles.

Materials And Methods
The subjects included 15 men and 15 women with an average age (± SD) of 21.6 ± 1.2 years. To evaluate the level of anaerobic power, the Wingate test was applied. The subjects were submitted to 6 WBC treatments at -130°C once a day. After each session they performed a single Wingate test in the 15, 30, 45, 60, 75 and 90th min after leaving the cryogenic chamber. The order of the test was randomized. All Wingate tests were preceded by an evaluation of thigh surface temperature with the use of a thermovisual camera.

Results
The average thigh surface temperature (T(av)) in both men and women dropped significantly after the whole body cryostimulation treatment, and next increased gradually. In women T(av) remained decreased for 75 min, whereas in men it did not return to the basal level until 90th min. A statistically insignificant decrease in MAP was observed in women after WBC. On the contrary, a non-significant increase in MAP was observed in men. The course of changes in MAP following the treatment was similar in both sexes to the changes in thigh surface temperature, with the exception of the period between 15th and 30th min. The shorter time to obtain MAP was observed in women till 90th min and in men till 45 min after WBC compared to the initial level.

Conclusions
A single whole body cryostimulation may have a minor influence on short-term physical performance of supramaximal intensity, but it leads to improvement of velocity during the start as evidenced by shorter time required to obtain MAP.

Changes in the glutathione system of erythrocytes due to enhanced formation of oxygen free radicals during short-term whole body cold stimulus

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The red cell glutathione levels of 10 healthy volunteers who are accustomed to winter-swimming were measured before and after this short-term whole body exposition to hypothermic environment. From the increases of the erythrocytic level of oxidized glutathione (GSSG) and of GSSG: total glutathione ratio an extensive formation of oxygen free radicals during and following the exposition to the intensive cold stimulus was concluded. That is in accordance with the finding on the drastic decrease of the concentration of uric acid as an important radical scavenger of the human blood plasma. Furthermore, the initial erythrocytic concentrations of reduced glutathione (GSH) and GSSG of subjects accustomed to winter-swimming were compared with those of healthy control persons who are not accustomed to regular winter-swimming. The markedly increased concentration of GSH and the reduced GSSG:total glutathione ratio in the erythrocytes of winter-swimmers reflect the adaptation to a regular oxidative stress. This antioxidative adaptation is postulated as a new basic mechanism of the hardening by exposition to an intensive short-term cold stimulus often applied within the hydrotherapy.

Effects of repeated whole-body cold exposures on serum concentrations of growth hormone, thyrotropin, prolactin and thyroid hormones in healthy women

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Cold therapy is used to relieve pain and inflammatory symptoms. Humoral changes may account for the pain alleviation related to the cold exposures. The aim of the present study was to examine the effects of two types of cold therapy, winter swimming in ice-cold water (WS) and whole body cryotherapy (WBC), on the serum levels of the growth hormone, prolactin, thyrotropin and free fractions of thyroid hormones (fT3, fT4). One group of healthy females (n = 6) was exposed to WS (water 0-2 degrees C) for 20 s and another group (n = 6) to WBC (air 110 degrees C) for 2 min, three times a week for 12 weeks. Blood samples used for the hormone measurements were taken on weeks 1, 4 and 12 before and 35 min after the cold exposures and on the days of the respective weeks, when the cold exposures were not performed. During the WS treatments, serum thyrotropin increased significantly at 35 min on weeks 1 (p < 0.01) and 4 (p < 0.05), but the responses were within the health-related reference interval. During the WS, the serum prolactin measured at 35 min on week 12 was lower than during the control treatment, and no changes in fT3 or fT4 were observed. During the WBC, no changes in the serum levels of the studied hormones were observed during the 12 weeks. In conclusion, repeated WS and WBC treatments for healthy females do not lead to disorders related to altered secretions of the growth hormone, prolactin, thyrotropin, or thyroid hormones.

Cryotherapy in sports medicine

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The use of cryotherapy, i.e. the application of cold for the treatment of injury or disease, is widespread in sports medicine today. It is an established method when treating acute soft tissue injuries, but there is a discrepancy between the scientific basis for cryotherapy and clinical studies. Various methods such as ice packs, ice towels, ice massage, gel packs, refrigerant gases and inflatable splints can be used. Cold is also used to reduce the recovery time as part of the rehabilitation programme both after acute injuries and in the treatment of chronic injuries. Cryotherapy has also been shown to reduce pain effectively in the post-operative period after reconstructive surgery of the joints. Both superficial and deep temperature changes depend on the method of application, initial temperature and application time. The physiological and biological effects are due to the reduction in temperature in the various tissues, together with the neuromuscular action and relaxation of the muscles produced by the application of cold. Cold increases the pain threshold, the viscosity and the plastic deformation of the tissues but decreases the motor performance. The application of cold has also been found to decrease the inflammatory reaction in an experimental situation. Cold appears to be effective and harmless and few complications or side-effects after the use of cold therapy are reported. Prolonged application at very low temperatures should, however, be avoided as this may cause serious side-effects, such as frost-bite and nerve injuries. Practical applications, indications and contraindications are discussed.

Effects of the whole-body cryotherapy on NTproBNP, hsCRP and troponin I in athletes

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Whole-body cryotherapy refers to brief exposure to very cold air for treating symptoms of various illnesses. In sports medicine, whole-body cryotherapy is administered to improve recovery from muscular trauma. As specific studies are lacking, we measured cardiac markers in 10 top-level rugby players of the Italian National team before and after a 1-week course of daily sessions of whole-body cryotherapy. All subjects continued with the same training workload as that of the previous weeks. N-terminal pro B-type natriuretic peptide (NTproBNP) levels increased but remained within the normal range, whilst troponin I (TnI) and high sensitivity C-reactive protein (hsCRP) were unchanged. Whole-body cryotherapy did not impair cardiac function in this sample of elite athletes.

Whole-body cryotherapy in rehabilitation of patients with rheumatoid diseases--pilot study

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Cryotherapy as a whole-body cold therapy (with cold air cooled by addition of nitrogen blown on the patients in an open cabin) for treatment of inflammatory rheumatic diseases already started in Bad Säckingen in 1986. In 1996, a new cold chamber (this time a closed chamber without any addition of nitrogen) based on compressor technology was introduced. The aim of our study was to test whether significant pain relief could be achieved by means of this cold therapy. Furthermore, we were interested in the practicability and acceptance of this new technique. Wellbeing during the treatment application and pain level were assessed using verbal and numerical rating scales. The sample consisted of 120 consecutive patients (75% women, age: 30-67 yrs, M = 52.6 yrs). These patients were suffering from primary fibromyalgia (40.7%), rheumatoid arthritis (17.3%), chronic low back pain (16.4%), ankylosing spondylitis (10.9%), osteoarthritis (9.1%), secondary fibromyalgia (3.6%) and other autoimmune diseases (1.8%) (mean duration of symptoms: 4 yrs). The patients were treated 2.5 minutes on average in the main chamber (mean temperature: -105 degrees C). The patients' statements concerning their pain level were analyzed by means of analyses of variance with repeated measures and paired-sample t-tests. RESULTS: The pain level after application of the cold therapy decreases significantly. The pain reduction lasts about 90 minutes. The initial pain level decreases during the whole time of treatment, no significant improvement, though, can be shown from the middle to the end of the four-weeks treatment. According to the results of our study, there is evidence that the whole-body cold therapy generates important short-term effects and somewhat weaker effects over the treatment period as a whole. Short-term pain reduction facilitates intensive application of physiotherapy and Occupational Therapy. The treatment procedure is practicable, and all in all well tolerated. From the patients' point of view, whole-body cold therapy is an essential part of the rehabilitation programme.

Effects of whole-body cryotherapy on a total antioxidative status and activities of antioxidative enzymes in blood of depressive multiple sclerosis patients


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Objectives
Oxidative stress (OS) plays an important role in the pathogenesis of multiple sclerosis (MS). In MS patients depression is often observed. Cryotherapy might have an effect on OS. The aim of this study was to compare the effects of whole body cryotherapy (WBCT) on changes in total antioxidative status (TAS) of plasma and activities of antioxidative enzymes in erythrocytes from depressive and non depressive MS patients.

Methods
Twenty-two MS patients with secondary progressive disease course (12 depressive and 10 non depressive) were treated with 10 exposures in a cryochamber. Before and after WBCT the plasma TAS and the activities of superoxide dismutase (SOD) and catalase (CAT) in the erythrocytes were measured.

Results
The level of TAS in depressive MS group was significantly lower than in non depressive MS (P < 0.0003). WBCT increased the level of TAS in depressive (P < 0.002) more than in non depressive MS patients (P < 0.01). WBCT treatment of MS patients resulted in the significant increase of TAS level in plasma but had no effects on activities of SOD and CAT.

Conclusions
Our results indicate that WBCT suppresses OS in MS patients, especially in depressive patients.

Cryostimulation factor supporting rehabilitation patients with multiple sclerosis and fatigue syndrome

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Introduction
Fatigue is considered to be one of the most prevalent and disabling symptoms among individuals with multiple sclerosis (MS). According to different studies, fatigue is reported by 75-95% of patients. Fatigue syndrome considerably affects quality of life. Characteristic feature of fatigue syndrome in multiple sclerosis is its relapse caused by warmth. There are only a few researches into fatigue in multiple sclerosis. The most commonly used scale to estimate fatigue is Fatigue Severity Scale (FSS). Cryostimulation has been applied to treat depression.

Aim Of The Study
Comparison of the influence of cryostimulation as a supporting factor of kinesytherapy on increasing strength of selected muscle groups of inferior extremities and degree of disability in case of patients with multiple sclerosis and fatigue syndrome and without the latter.

Material And Methods
The examination included 60 randomized patients with diagnosed multiple sclerosis (ICD10-G35). To assess the results scales: EDSS, FSS and widespread Lovett scale (punctuation with accuracy of measurement 0.5 point) were used. Interpretation of the FSS scale results was made according to Krupp and comp. Fatigue syndrome was diagnosed where results reached 6.5 and higher. Evaluation of muscle strength concerning chosen muscles groups of inferior extremities: quadriceps femoris, illopoas, biceps femoris. When the strength of leg muscles was asymmetric, lower values of Lovett scale were used. Patients were divided into 2 groups with regard to positive or negative fatigue syndrome. In the examined group (n = 24) fatigue syndrome was positive (FSS under 6.5) and control (n = 36) negative (FSS under 6.5). All patients were treated with cryostimulation and individual program of exercises adapted to their degree of disability.

Results
The use of cryostimulation and kinesytherapy to patients with MS and fatigue syndrome indicates statistically important (p = 0.05) decrease of disability degree in EDSS scale and improvement of muscle strength of quadriceps femoris and illiopsoas compared to MS patients without fatigue syndrome.

Conclusions
Cryostimulation is a factor supporting rehabilitation patients with multiple sclerosis and fatigue syndrome.
The effects of whole-body cryotherapy and melatonin supplementation on total antioxidative status and some antioxidative enzymes in multiple sclerosis patients

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Oxidative stress is an important factor which contribute to the pathogenesis of lesions in multiple sclerosis (MS). Whole body cryotherapy (WBCT) is often used in treatment neurological and orthopedic diseases.

Material And Methods
The aim of this study was to determinate the level of total antioxidative status (TAS) in plasma and activity of superoxide dismutase (SOD) and catalase (CAT) in erythrocytes of MS patients (n = 28) before and after 10 exposures of WBCT (-120 degrees C/3 minutes/day). 16 MS patients during 10 exposures of WBCT additionally were supplemented by 10 mg of melatonin.

Results
Increasing of TAS level in plasma as well as supplemented with melatonin and non-supplemented MS patients was observed after 10 exposures of WBCT Melatonin statistically significant increased activity of SOD and CAT in erythrocytes of MS patients treated with WBCT.

Conclusions
Results of our study indicate significant increase of TAS level in plasma of MS patients of WBCT treatment. This indicate that WBCT might be a therapy which suppress oxidative stress in MS patients.
Translating whole-body cryotherapy into geriatric psychiatry--a proposed strategy for the prevention of Alzheimer’s disease

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Alzheimer's disease (AD), which is the most common form of dementia, constitutes one of the leading causes of disability and mortality in aging societies. Currently recommended medications used in treating AD include cholinesterase inhibitors and the NMDA antagonist--memantine, but poorly counteract progression of the disease. According to current knowledge, the neuropathological process underlying the etiology of AD begins many years, if not decades, before the development of overt symptoms of dementia. Mild cognitive impairment (MCI) is regarded as the first detectable manifestation of cognitive decline. Nowadays, there is a general consensus that vascular alterations, oxidative stress and inflammatory response contribute to the development of AD. Following these mechanisms and tracing the anti-inflammatory and anti-oxidative effects of cryostimulation, we postulate that whole-body cryotherapy (WBCT) might be utilized as a means of preventing AD. WBCT is a relatively safe and cost-effective procedure, which is widely applied in various medical specialties. Thus, there is an urgent necessity to evaluate the long-term effectiveness of WBCT in the prevention of AD in patients with MCI and healthy individuals.

The influence of whole body cryotherapy on mental health

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The paper presents a little known issue about the influence of wholebody cryotherapy on mental health. Observations of patients' behaviour after passing the cryogenic chamber leads to an interesting hypothesis. Short exposition to extreme cold has doubtless a profitable influence on man's frame of mind. Immediately after passing the cryogenic chamber, apart from the well known analgetic effect, we detect changes in patients' mental state such as improvement of mood, deep relaxation, freshening up, consolation, euphoria. This unusual state lasts for a long time after ending the cycle of cryotherapy. Different mechanisms of this effect are considered. New possibilities of this method have been presented. Durability of such an advantageous phenomenon are investigated in our research centre in Wrocław.

Whole-body cryotherapy as adjunct treatment of depressive and anxiety disorders

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Introduction
Rheumatism has been treated using whole-body cryotherapy (WBCT) since the 1970s. The aim of this study was to assess the efficacy of WBCT as an experimental, adjunctive method of treating depressive and anxiety disorders.

Materials And Methods
A control (n=34) and a study group (n=26), both consisting of outpatients 18-65 years old with depressive and anxiety disorders (ICD-10), received standard psychopharmacotherapy. The study group was additionally treated with a series of 15 daily visits to a cryogenic chamber (2-3 min, from -160 degrees C to -110 degrees C). The Hamilton's depression rating scale (HDRS) and Hamilton's anxiety rating scale (HARS) were used as the outcome measures.

Results
After three weeks, a decrease of at least 50% from the baseline HDRS-17 scores in 34.6% of the study group and 2.9% of the control group and a decrease of at least 50% from the baseline HARS score in 46.2% of the study group and in none of the control group were noted.

Conclusions
These findings, despite such limitations as a small sample size, suggest a possible role for WBCT as a short-term adjuvant treatment for mood and anxiety disorders.