

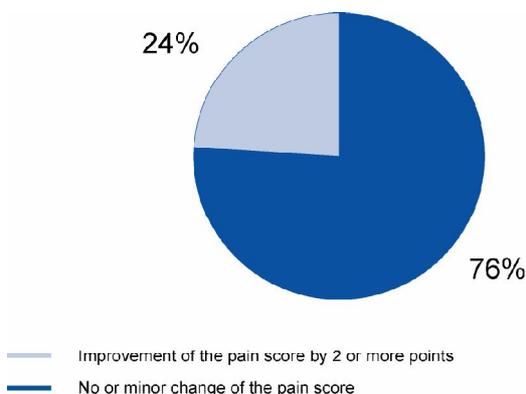
Studies on Whole-body Cryotherapy

WHOLE-BODY CRYOTHERAPY IN INFLAMMATORY AND NON-INFLAMMATORY RHEUMATIC DISEASES

D. KARGUS, K. BLUM, T. TÄUBER, J. TEUBER, BAYREUTH

Since 1999, our clinic is equipped with a whole-body cryochamber which is used to combat rheumatic disorders. The cryochamber design is a two-chamber system consisting of an antechamber with a temperature of approx. -60°C and a main chamber with a temperature of about -110°C . Patients change into bathing costume, trainers, gloves, nose mask and headband when they enter the chamber. At first, they stay in the antechamber for 1 minute, then they proceed to the main chamber with a temperature of -110°C where they keep moving for up to 3 minutes. After the first year of operation, the gathered data were critically evaluated to take stock.

PATIENT PAIN SCORE IN FIBROMYALGIA WITH CRYOTHERAPY (N=42)



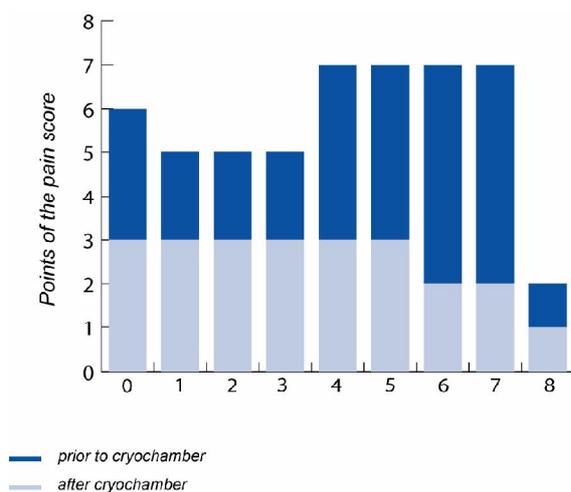
89 of our patients underwent whole-body cryotherapy for ten times. Prior to treatment and after 10 minutes of application, patients were interviewed and examined, and laboratory diagnosis was established. 42 patients suffered from fibromyalgia, 47 from an inflammatory rheumatic disorder (38 from a rheumatoid arthritis, 9 from Bechterew's disease). Patients with rheumatic arthritis and fibromyalgia met the American College of Rheumatology (ACR) criteria for the classification and diagnosis of fibromyalgia and rheumatic arthritis. Patients with Bechterew's disease were diagnosed according to the modified New York criteria.

In patients with fibromyalgia, the age span ranged from 28-73 years (with an average age of 53.05 years). The share of female patients dominated by a ratio of 35 female to 7 male patients. The mean age of patients with inflammatory rheumatic disorders was 53.37 years with ages ranging from 21 – 79 years. In this case, too, female patients were in the majority with a ratio of 24 female vs. 14 male patients. 9 patients with Bechterew's disease were examined with ages ranging from 46 – 68 years. The mean age was 54.25 years; in this case, the number of male patients dominated with a ratio of 7 male vs. 2 female patients.

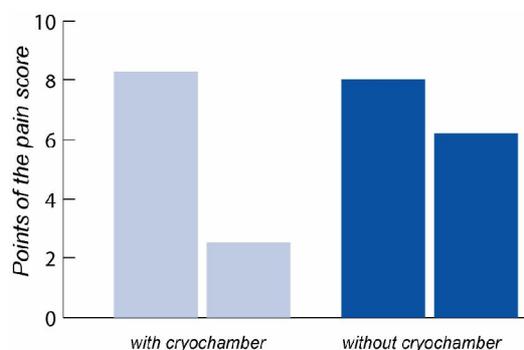
The control group was made up of patients for whom whole-body cryotherapy was contra-indicated or who rejected this therapy form from the start. Severe coronary heart disease, arterial occlusive disease, arterial hypertension, Raynaud disease symptoms, congestive heart failure or claustrophobia are considered a contra-indication. The patient pain score (PPS) was used as a control parameter for all three diseases.

Pain was rated according to a 0 – 10-point numerical scale (0= no pain, 10 = worst pain). In the case of rheumatic arthritis, the following criteria were additionally assessed: C-reactive protein (CRP), morning stiffness and number of swollen joints; additionally, blood sedimentation rate (BSR) as well as the stress hormones prolactine and cortisol were determined in the laboratory. No significant differences were found so that these parameters were no longer taken into consideration.

PATIENT PAIN SCORE FOR BECHTEREW'S DISEASE BEFORE AND AFTER CRYOTHERAPIE (N=9)



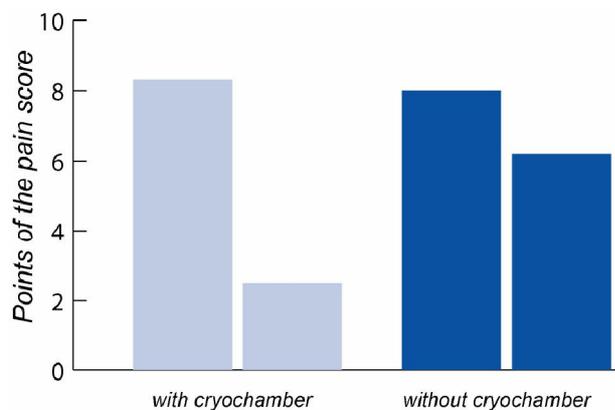
PATIENT PAIN SCORE IN PATIENTS WITH RHEUMATIC ARTHRITIS



In the case of fibromyalgia, cryochamber treatment had a positive effect on the pain score of 10 patients (7 female, 3 male). As a result, the pain score was reduced by 2 or more points thus

improving the pain intensity by reducing the pain. This is an improvement of 24% (refer to Fig. 1). In the remaining 32 cases, a relevant change of diagnosis occurred.

NUMBER OF SWOLLEN JOINTS IN PATIENTS WITH RHEUMATIC ARTHRITIS



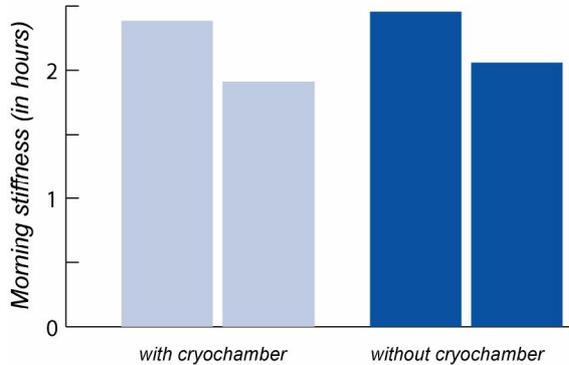
In some female patients, whole-body cryotherapy even had to be aborted due to increased pain intensity.

A diffuse increase of pain in the locomotor system which the patients were not able to localize to a specific area was reported as the main cause for therapy failure. A successful response to cryochamber treatment lead to a pain reduction of several hours. 4 of the female patients reported that they had been free of pain for several hours (up to a maximum of 5 hours) after systematic cold therapy for the first time. The need for analgesics (mainly NSAR and Tramadol) could therefore significantly be reduced by 30% as compared to the control group. When there is a positive response to whole-body cryotherapy, the number of positive tender points and also the pain produced upon pressing these points decreases. The number of positive tender points prior to treatment did not influence the result.

For Bechterew's disease, a significant improvement of the pain score occurred in 9 patients with the numerical value decreasing by 2 (or more) points (refer to Fig. 2).

The progress of the inflammation parameters (BSR and CRP) showed no significant change. In this case, too, the need for analgesics could be reduced by 30% as compared to medication prior to cold chamber treatment. Without whole-body cold therapy, no improvement of the pain intensity could be obtained.

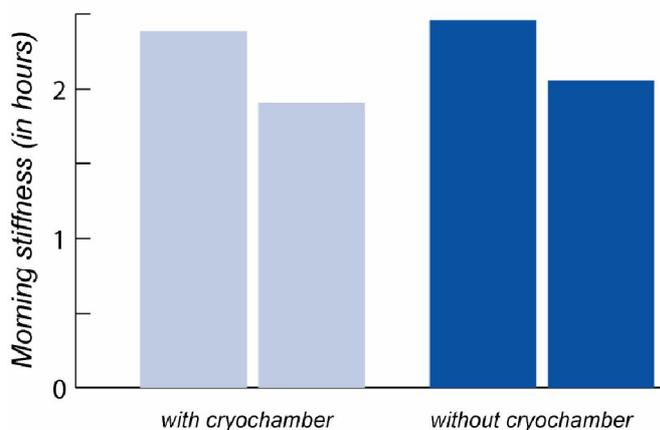
PROGRESSION OF MORNING STIFFNESS (IN HOURS) IN PATIENTS WITH RHEUMATIC ARTHRITIS



In 23 out of 32 patients with rheumatic arthritis pain was significantly relieved (visual pain score) due to systematic cryotherapy (refer to Fig. 3). As the majority of the patients was having an acute attack of disease, administration of a systemic corticoid therapy was indispensable. On average, a reduction of the cortison dose of about 10 mg Prednisolon was obtained in patients with cold therapy. In the further course of the treatment, the need for steroids could be reduced earlier than in the control group. Several patients (both with and without cold chamber treatment) were stabilized on basic therapy. As expected, the basic therapy itself had no effect on the outcome of the treatment. Concerning the number of swollen joints there was in part a significant improvement under cold therapy (refer to Fig. 4).

A visible success could be observed especially in young patients with the outbreak of rheumatic arthritis having started max. 1 year ago. Only a slight effect could be observed in older patients or after a long-term chronic disease. A similar effect of whole-body cold therapy was observed for morning stiffness where a remarkable improvement was detected especially in cases with acute inflammatory attacks (see Fig. 5).

CRP MG/L PROGRESSION (MEAN VALUE) IN RHEUMATIC ARTHRITIS





Although the blood sedimentation rate had not been significantly affected, a decrease in C-reactive protein could be observed in almost all patients (refer to Fig. 6). This success was especially obvious in patients who were having an acute attack of the disease.

In general it can be stated that in 25% of patients treated for a diffuse fibromyalgia, pain was alleviated following systemic whole-body cold therapy. If the therapy was successful, significant pain reduction or freedom from pain occasionally occurred for several hours. After termination of the treatment, patients reported that they could deal with pain better than before the therapy. Patients with Bechterew's disease who benefited from whole-body cold therapy or, besides pain relief, had observed an enhanced overall musculoskeletal movement also improved emotionally by developing the awareness that the found therapy allowed them to cope with their disease without the risk of side effects.

The positive effect of whole-body cold therapy on morning stiffness, proportion of swollen joints, C-reactive protein and visual pain score in rheumatic arthritis proved this therapy form to be a successful treatment against acute attack symptoms or at the beginning of a disease.

In summary, it can be ascertained that whole-body cold therapy is a causal and reasonable supplement of the therapy spectrum to combat fibromyalgia, Bechterew's disease and rheumatic arthritis. Due to the fast subjective and objective onset of the therapy effect especially for severe pain symptoms it is necessary to consider use of this treatment. Cold chamber therapy not only alleviates pain but also reduces medication and thus possible side effects. It has not yet been studied what exactly happens when the body is exposed to cold temperatures. There may be interferences caused by temperature-dependent biochemical reactions which occur during pain perception.

More investigations are planned to be carried out at our hospital to obtain precise information and to determine parameters which allow us to predict the success of whole-body cold therapy even before start of the therapy. In addition, we will investigate if there are further indications (such as further pain syndromes of the musculoskeletal system) which may be treated with whole-body therapy.

Contact address:

Prof. D. Kargus, MD
Herzoghoehe Clinic
Kulmbacher Str. 103
D - 95445 Bayreuth