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USE OF CRYOTHERAPY IN DIFFERENT DISEASES

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ABSTRACT

Physiotherapy section - physicotherapy successfully applies frequent cryotherapy treatments in many different diseases. The paper presents a review of the literature on the basis of review papers as well as research papers from reputable scientific journals, which have been published over the last few years.

Key words: cryotherapy, physiotherapy, physicotherapy

INTRODUCTION

Treatments involving the use of cold has been known for thousands of years. Hippocrates himself (IV century BC) performed treatments using cold to reduce pain, swelling and bleeding. In the Napoleonic times, wraps made of snow, ice and cold water were used as a form of cold medicine. The time between the 19th and 20th centuries was a

breakthrough for cold medicine. At that time, ice bags and gel wraps were used, as well as ethyl chloride and steam of various gases. The aim of the study was to present the application of cryotherapy in various diseases. The contents of the paper will contribute to the broadening of the knowledge of both physiotherapists and patients on the possibilities of cryotherapy application. The paper presents mainly a review of the literature on the basis of review papers as well as research papers from reputable scientific journals, which have been published over the last few years. [1]

Treatments with the use of cold show a very wide range of action. Through the short-term effect of cold, which is performed systematically and one treatment lasts several minutes, you can positively influence the reduction of pain. Cold therapy is also used in anti-inflammatory and anti-swelling effects. It should be remembered that exposure of the body to prolonged cold may have a negative impact on it (cold, frostbite). In patients with osteoarthritis, prolonged exposure to cold may increase pain and accelerate degenerative processes. [2]

MAIN PART

Cold treatment uses a number of different origins of cold, including: ice, cold hydrotherapy, gel pack, cold dressing, cold air blow, frozen peloid slice, liquid nitrogen, propylene glycol, carbon dioxide. They are designed to lower the temperature of the skin, muscles and joints locally. A cryochamber is also used to cool the body down in general. The above methods of cold treatment lower the temperature mainly by conduction. To start cold therapy it is very important to know the indications and contraindications to carry it out. Indications for the use of cold are, among others: burns, states after mastectomy, states after surgery, lymphedema, hardening of the body, biological regeneration, osteoarthritis, rheumatic diseases (eg. Nervous system diseases (e.g. sciatica and brachial rush, increased muscle tension, neuralgia), diseases of the locomotive system (e.g. swelling after fracture or sprain, condition after overloading or injury, acute inflammation of soft tissues). Contraindications for the use of cold include: sensory disorders, frostbite, varicose veins, open wounds, bladder inflammation, circulatory disorders, Raynaud syndrome, Sudeck syndrome, acute respiratory tract diseases, radiation changes, paroxysmal hemoglobinuria, states of

1 Skopowska A, Ciechanowska K. Zastosowanie niskich temperatur w wybranych jednostkach chorobowych. Rehabilitacja w praktyce 2015; 1 : 37-39.
2 Klupiński K. Wykorzystanie czynników zimna w leczeniu stanu zwyrodnieniowego stawu ramiennego w okresie ostrym i podostrym. Praktyczna fizjoterapia i rehabilitacja 2018; 95: 41,42

weakness and cachexia. [3]

Kopacz et al. in their work "Efekt terapeutyczny działania krioterapii miejscowej na staw kolanowy, uzależniony od rozpoznania choroby zwyrodnieniowej" decided to investigate how cryotherapy increases the range of mobility in the knee joint bend and erection, as well as the intensity of pain in the VAS scale after the therapy. The authors used a group of 50 patients (38 women and 11 men) for the study. Patients were divided into two groups. In the first group there were people with osteoarthritis in the knee joint and in the second group there were people with multijoint osteoarthritis. In order to measure the range of mobility both before and after the therapy, goniometer measurements were performed and the occurrence of pain in VAS patients was evaluated. Patients underwent 10 cryotherapy with liquid nitrogen. After a series of treatments Kopacz et al. came to the conclusion that cryotherapy has a positive effect on the increase of mobility in the knee joint and the reduction of pain. However, better mobility ranges after cryotherapy are achieved by women than by men. [4]

Kopacz et al. in the paper "Wartość terapeutyczna krioterapii miejscowej w leczeniu objawowym pacjentów z zespołem bólowym stawu barkowego" examined how topical cryotherapy affects the increase of mobility in the shoulder joint, bending and erection, as well as pain intensity in the VAS scale after the therapy. The authors used 54 patients (31 women and 23 men) for the study. Patients before and after the therapy were thoroughly examined, the ranges of mobility of bending and erection in the shoulder joint were measured and the occurrence of pain on the VAS scale was assessed. Patients underwent a series of 15 cryotherapy procedures with liquid nitrogen to the shoulder joint area. After a series of treatments Kopacz et al. came to the conclusion that cryotherapy has a positive effect on the increase of mobility in the shoulder joint and the reduction of pain.[5]

Klupiński et al. in his paper "Wykorzystanie czynników zimna w leczeniu stanu zwyrodnieniowego stawu ramiennego w okresie ostrym i podostrym" recommends at the beginning of physiotherapy to reduce increased physical activity and reduce the load on the patient's joint. It is also worth to use orthopaedic supplies, e.g. slings or orthosis. In an acute

3 Klupiński K. Wykorzystanie czynników zimna w leczeniu stanu zwyrodnieniowego stawu ramiennego w okresie ostrym i podostrym. Praktyczna fizjoterapia i rehabilitacja 2018; 95: 41,42
4 Kopacz Ł, Lubkowska A. Efekt terapeutyczny działania krioterapii miejscowej na staw kolanowy, uzależniony od rozpoznania choroby zwyrodnieniowej. Fizjoterapia Polska 2015; 1: 6-14.
5 Kopacz Ł, Ciosek Ż. Wartość terapeutyczna krioterapii miejscowej w leczeniu objawowym pacjentów z zespołem bólowym stawu barkowego. Fizjoterapia Polska 2015; 4: 54-62.

condition, it is very important to use cold therapy. Klupiński reports that it is worth using frequent cold therapy procedures, but with a short duration. Proposals for physiotherapeutic treatments using cold in osteoarthritis are: liquid nitrogen cryotherapy, carbon dioxide cryotherapy, cold baths, cooling sprays, ice massage, cooling ointments. In order to increase the effectiveness of cold treatment it is worth adding treatments: laser therapy, magnetic field, interference currents, phonophoresis and iontophoresis (with anti-inflammatory and analgesic substances).[6]

Ciosek et al. in the paper "Wpływ dynamicznego plastrowania w połączeniu z krioterapią miejscową na zakres ruchomości oraz dolegliwości bólowe odcinka lędźwiowego wśród pacjentów z chorobą zwyrodnieniową kręgosłupa" examined a group of 90 patients diagnosed with lumbar spine degenerative disease. The study group was divided into three groups. The first group consisted of patients undergoing cryotherapy and kinesiology taping, the second group consisted of patients undergoing cryotherapy only, while the third group consisted of patients undergoing measurements only. Patients were evaluated for mobility in the lumbar region of the spine and for pain severity on the VAS scale. The evaluation took place on the first day before the therapy and on the fifteenth day after the end of the therapy. The results of the study showed that kinesiology taping together with cryotherapy had a much better effect on the reduction of pain and increased mobility in the lumbar spine than cryotherapy alone. Patients who did not undergo any of the above procedures did not experience any improvement.[7]

Studnicki et al. in the work "Krioterapia miejscowa jako metoda wspomagająca leczenie pacjentów ze zwyrodnieniem stawu biodrowego" evaluate the mobility and pain of patients who suffer from hip joint degeneration after local cryotherapy. The authors' research involved 72 patients with diagnosed hip joint degenerative changes. The age range of the subjects was 40-70 years. The study group was divided into two groups: A and B. In group A there were 36 patients (22 women and 14 men), in group B there were 36 patients (15 women and 21 men). In group A, physical activity was declared by 72% (B 79%) of respondents, lack of activity by 28% (B 21%). In the study a questionnaire (anonymous) was used and before and after the procedures pain intensity in the VAS scale was measured and the range of mobility in the hip joint was measured. Individual exercises and physiotherapy were used in

6 Klupiński K. Wykorzystanie czynników zimna w leczeniu stanu zwyrodnieniowego stawu ramiennego w okresie ostrym i podostrym. Praktyczna fizjoterapia i rehabilitacja 2018; 95: 41,42

7 Ciosek Ż, Kopacz Ł. Wpływ dynamicznego plastrowania w połączeniu z krioterapią miejscową na zakres ruchomości oraz dolegliwości bólowe odcinka lędźwiowego wśród pacjentów z chorobą zwyrodnieniową kręgosłupa. Fizjoterapia Polska 2017; 2: 36-46.

therapy of study group A, whereas in study group B local cryotherapy was additionally used. The procedures lasted five days a week. After the treatment, the authors observed a decrease in pain in VAS in two groups - in group A by 2 points and in group B by 4 points. The range of bending motion in group A improved by about 15 degrees, and in group B by 25 degrees. The range of excursion in group A improved by about 3 degrees and in group B by 5 degrees.[8]

Juszczak K et al. in the paper "Wpływ krioterapii ogólnoustrojowej na jakość życia chorych na reumatoidalne zapalenie stawów" evaluate the influence of systemic cryotherapy on the level of pain and functional state of patients with rheumatoid arthritis. The authors' research involved 67 people, including 57 women and 10 men with diagnosed rheumatoid arthritis. The age of the subjects was 30-60 years. In the study, a questionnaire (anonymous) was used as well as before and after the procedures, pain intensity was measured on the VAS scale and a 5-point scale was used to assess the duration of morning stiffness. After completion of the study, the authors observed that systemic cryotherapy reduces the duration of morning stiffness and the level of pain. [9]

Stanek et al. in the paper "Wpływ krioterapii ogólnoustrojowej na organizm pacjentów z zesztywniającym zapaleniem stawów kręgosłupa – podsumowanie badań własnych" report that systemic cryotherapy is a safe method and has a number of positive benefits for patients with AS. The positive benefits include analgesic and anti-inflammatory effects, which result in the possibility of reducing the use of analgesics and anti-inflammatory drugs. Moreover, in patients undergoing systemic cryotherapy, a significant improvement in spinal mobility and clinical condition has been observed. Moreover, systemic cryotherapy has a positive impact on the adaptation processes of the vegetative system as well as on the lipid profile, inflammatory mediators, morphology parameters, reduction of cardiovascular risk. [10]

Boerner et al. in the paper "Ocena skuteczności krioterapii i magnetoterapii u chorych ze zmianami zwyrodnieniowymi stawów kolanowych" evaluate the effectiveness of cryotherapy and magnetotherapy for pain and mobility in knee joints in patients with knee osteoarthritis. The authors' research involved 25 patients with diagnosed knee joint degenerative disease in the age range from 50 to 62 years (5 men and 20 women). Cryotherapy and magnetotherapy procedures were performed from Monday to Friday for ten

8 Studnicki R, Hansdorfer-Korzon R. Krioterapia miejscowa jako metoda wspomagająca leczenie pacjentów ze zwyrodnieniem stawu biodrowego. Forum Medycyny Rodzinnej 2015; 9(2): 100-102.
9 Juszczak K, Skotarczak A. Wpływ krioterapii ogólnoustrojowej na jakość życia chorych na reumatoidalne zapalenie stawów. Hygeia Public Health 2018; 53(2):193-198.
10 Stanek A, Cieślar G. Wpływ krioterapii ogólnoustrojowej na organizm pacjentów z zesztywniającym zapaleniem stawów kręgosłupa – podsumowanie badań własnych. Acta Bio-Optica et Informatica Medica, Inzynieria Biomedyczna 2006; 12(4): 39-42.

days. Before and after the procedures, pain was measured on the VAS scale and the range of movement of knee joints was measured using a goniometer. After a series of procedures, the patients had less pain and more mobility in the knee joints.[11]

SUMMARY

The discussed research results show the reader a wide range of possibilities offered by cryotherapy treatments in various diseases. Cryotherapy can be used to increase patient comfort by improving wellbeing, reducing pain, increasing the speed of the physiotherapy process, accelerating post-workout regeneration and as a method supporting other physiotherapeutic techniques in order to increase their effectiveness. According to the above mentioned studies, the combination of cryotherapy with other physiotherapeutic/physical therapeutic methods allows to achieve significantly better treatment results. Moreover, cryotherapy is a method that does not generate high costs for both patients and physiotherapists. However, before starting cryotherapy procedures, the indications and contraindications to perform the procedures should be taken into account. Unfortunately, cryotherapy treatment is not a recommended form of treatment for each patient, so the selection of appropriate therapeutic methods must always be individually adjusted after the patient. It is worthwhile to continue research on cryotherapy, especially as a method supporting other forms of therapy in various diseases.

CONCLUSIONS

1. Cryotherapy has a positive effect on increasing the range of mobility in the knee joint and reducing pain in patients with knee osteoarthritis.
2. Cryotherapy has a positive effect on the increase of mobility in the shoulder joint and the reduction of pain in people with shoulder joint pain syndrome.
3. Cryotherapy with kinesiology taping reduces pain and increases the range of mobility in the lumbar region of the spine.
4. Cryotherapy has a positive effect on increasing the range of mobility in the hip joint and reducing pain in people with hip joint degenerative disease.
5. Systemic cryotherapy is used in the complex treatment of rheumatoid arthritis and should be recommended in diseases of the locomotor system.

11 Boemer E, Ratajczak B. Ocena skuteczności krioterapii i magnetoterapii u chorych ze zmianami zwyrodnieniowymi stawów kolanowych. Acta Bio-Optica et Informatica Medica, Inżynieria Biomedyczna 2010; 16(4): 310-313.

6. Systemic cryotherapy has a positive effect on the complex treatment of ankylosing spondylitis.
7. Cryotherapy with magnetotherapy has a positive effect on the treatment of osteoarthritis of knee joints.
8. The combination of cryotherapy treatments with other physiotherapeutic treatments or physiotherapeutic methods brings much better results.

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