

A case report on the treatment of medial meniscus injury of Aerobics athletes by cryotherapy

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Abstract: Based on the traditional repair and treatment method of medial meniscus, combined with the characteristics of Competitive Aerobics athletes, this experiment studies and analyzes the treatment effect of medial meniscus of an athlete's knee joint through the application of cryotherapy, first promoting contraction to control inflammation, gradually causing local congestion, promoting induced blood perfusion and enhancing nutrient input, The purpose is to seek an efficient and scientific method for the treatment of anterior cruciate ligament of knee joint, and to provide a novel and efficient treatment method for Competitive Aerobics athletes.

Keywords: competitive aerobics, medial meniscus, cryotherapy

1. Patient situation

Medical record data: Shi Mou, female, 30 years old, visited the hospital on September 16, 2021. The main complaint: severe joint injury, bouncing at the joint during movement, swelling of the joint and limited movement. History: the patient had symptoms of knee meniscus injury 1 year ago, but the symptoms were mild and there was no obvious feeling. One week ago, after the aerobics competition, the knee joint suddenly felt obvious pain and the walking activity was limited. There was no significant improvement in static cultivation. Physical examination: there is fixed tenderness at the meniscus injury, and obvious mass appears locally, which is more obvious when extending the knee. The third grade tear of medial meniscus was confirmed by MRI in Zhongshan Hospital Affiliated to Dalian University

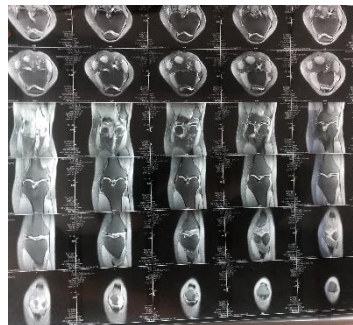


Figure 1. Frontal MRI diagnosis of knee joint

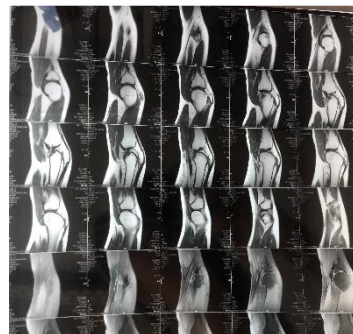


Figure 2. MRI lateral diagnosis of knee joint

2. Treatment

2.1. Cryotherapy

Cryotherapy is a non-invasive therapy that exposes the body to the cold therapy cabin at -100°C - -180°C . The sudden drop in temperature caused by nitrogen vapor stimulates the temperature receptors in the body, prompting the brain to send signals to return the blood to the main organs, so as to promote the recovery and operation of the body's blood circulation system, nerve circulation system and energy supply system. It can significantly improve strength, physical function and endurance, promote the treatment and repair of human tissues. Users stay in the cold treatment cabin for 3 minutes, no more than 5 minutes. Continuous low temperature gradually narrows blood vessels, promotes blood circulation, improves immune system, reduces fatigue, and promotes the healing of injured parts at a faster speed.

Freezing chamber therapy should be carried out within 30 minutes after muscle strength training, between -110°C and -130°C for about 2 minutes. Before entering the cold therapy room, the body shall be kept dry and the sweat on the body surface shall be wiped dry. During the whole treatment process, the patient shall maintain a standing position, keep breathing stable and cannot hold his breath.



Figure 3. Cryogenic compartment



Figure 4. Liquid nitrogen container

Leg strength training:

Zero load leg muscle strength training: first lie flat, bend the big and small legs to 90° , and make a circular motion with the hip as the fulcrum. 3-5 groups are suitable, and one group is about 8 until exhausted.

Resistance band leg muscle strength training: bind the elastic band to the lower part of the knee through the elastic band, slightly squat the two knees separately, and then move left and right. The left and right are one group for ten groups.

Instrument leg muscle strength training: sitting leg flexion and extension: exercise quadriceps femoris,

and make the muscles exhausted. Do 5 groups, 6-10 times in each group. Secondly, barbell squat: at the beginning, control the weight at 40kg, 10 in each group, and gradually increase the weight and quantity.

2.2. Specific treatment plan

From day 1 to day 5: the initial pain is obvious, mainly the weight-free training of the legs, so as to recover and enhance the muscle strength of the legs. Warm up: walk and stretch for 15 minutes; Leg muscle strength training: lift the heel with weight, and stimulate the quadriceps femoris to stretch and lengthen in the process of exercise. There are 3 groups, 20 in the first group, 15 in the second group and 10 in the third group, so as to promote the adaptability of muscles and protect the knee joint; Practice standing on a stake by holding a ball stake or a tree stake. At the same time, the knee joint needs to be slightly bent and the hip needs to be slightly sunk backward for at least 20 minutes each time; Lie on your back on the bed without bending the knee joint. Lift the affected limb about 30 ° away from the bed for 10 seconds. Do 10-15 for each group. During the straight leg lifting training, add a suitable sandbag on the lower leg as a weight-bearing until you are exhausted; Massage and stretching: the patient sits down, kneads several times from thigh to knee joint to promote muscle relaxation, and then massages slowly from light to heavy in the painful place for 3-5 minutes until there is no fever in the joint.

From day 6 to day 15: in the medium term, the leg muscle strength and knee joint function will recover to about 70%. At this stage, resistance band and instrument training will be added on the basis of the original leg training to stimulate the leg muscles in a deeper level. At the same time, freezing chamber therapy will be gradually carried out. Warm up: the elliptical machine warms up for half an hour to activate the leg muscles near the knee; Leg muscle strength training: resistance band hard pull training, stand with both feet shoulder width, step on the resistance band circle under your feet, naturally droop your hands on both sides of the body, grasp both ends of the resistance band circle, then bend your upper body forward, hips backward, bend your knees, and then get up and stand up. There are 15 in each group, a total of 5 groups. In the process of doing, pay attention to slow down and slow up with control; Squat in the resistance belt, step on the resistance belt with both feet, the distance between the feet is the same width as the shoulder, grasp both ends of the resistance belt with both hands, move both arms towards the shoulder, and the two palms outward. Then lower the center of the body to squat deeply, and move the hips backward and downward, 15 in each group, a total of 5 groups; Weight bearing heel lifting, heel lifting training on the basis of anti-40kg barbell, 20 in each group, a total of 5 groups. Freezing chamber therapy: 120 second freezing chamber therapy at - 120 °C within half an hour after training, once every 2-3 days, the patient's pain will be significantly improved, relieve muscle tension, increase joint flexibility and control inflammation. Massage and stretching: slightly bend the affected limb, close the heel to the hip, straighten it after reaching the maximum limit, and repeat this action 3-5 times; The leg muscles can be fully stretched by traditional stretching methods such as body flexion, which can promote blood circulation and prevent tendon adhesion, muscle atrophy, muscle spasm and so on.

3. Efficacy observation

After 15 days of treatment with the above procedures, the patient's knee bounce was eliminated, the tenderness was reduced, the weight-bearing squat increased from the original 30kg to 50kg, and the aerobics training returned to normal. In order to consolidate the treatment effect, it is recommended that patients join leg muscle strength training during exercise and relaxation, and wear knee protectors. Refer to the simple mcgiii pain scale (recovery: all the original symptoms disappear, the function returns to normal, and you can move and work normally. Remarkable effect: the pain is significantly reduced, which does not affect your normal work and activity life, or you can do simple training or work. Improvement: the symptoms gradually improve, and occasionally you feel pain, which affects your normal work and life, or you can't train and work normally. Ineffective performance: the pain is not improved, and you can work normally. It can be concluded that the patient has achieved remarkable curative effect through cold therapy cabin therapy and leg muscle strength training.

4. Discussion

Meniscus injury is the most common phenomenon in knee injury. It mostly occurs in sports and all kinds of sports work. For professional athletes, the traditional methods are mainly surgical treatment. In recent years, the role of meniscus in maintaining knee function has been further developed. We focus on later rehabilitation, In rehabilitation treatment, we should first consider the pain changes of patients, and

can resume normal exercise life. There is more blood supply in the lateral red area of the meniscus, and the slight injury can be recovered slowly. The more inward the blood supply, the weaker the self-healing ability after the injury. The medial meniscus of the patients mentioned in this article is seriously damaged. On the basis of traditional treatment methods, the medial meniscus is repaired by freezing chamber therapy. In recent years, cryotherapy has been gradually applied to the treatment and rehabilitation of sports muscle injury. It plays a role in controlling inflammation when the body is exposed to the low temperature environment in the cryotherapy cabin at minus 100°C to minus 180 °C. under the cryotherapy cabin, it promotes vasoconstriction, causes local blood filling and promotes induced blood perfusion. Combined with traditional rehabilitation methods, due to the poor stability of the knee joint in the early stage, attention should be paid to stimulating less static exercise. When the stability is strengthened, dynamic training can be gradually added. This can not only strengthen the compensatory effect of leg muscles on the knee joint, but also prevent the secondary injury of the medial meniscus in the later stage of exercise. Pressing the corresponding acupoints can promote the establishment of nerve conduction and reduce radiation pain. To sum up, through the above novel and efficient ways of active rehabilitation, patients can return to normal exercise state and invest in normal work, exercise and life. The original symptoms have almost disappeared, but rehabilitation exercises still need to be continued to prevent secondary injury and recurrence, so as to achieve lifelong prevention. The above rehabilitation therapy is novel and efficient. The expected rehabilitation goal is achieved through the combination of high technology and traditional rehabilitation means. The difficulty of rehabilitation movement is low, which is suitable for the needs of patients of all ages. It can also be completed independently without the assistance of others, which greatly improves the efficiency of rehabilitation and reduces the difficulty and complexity of rehabilitation, it has strong popularization and implementation.

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