

# Curative Effects on Knee Osteoarthritis by Exercise Training Combined with Physical Therapy

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**Abstract.** The prevalence of knee osteoarthritis in the elderly in our country as much as 49%, the main clinical manifestations of knee pain, stiffness, limited mobility and other dysfunction. Cause of many chronic fatigue and age-related degenerative changes in the knee joint, with its repeated attacks lead to the formation of osteophytes knee osteoarthritis. The current treatment of many KOA, including brake rest, medication, physical therapy, bracing, or even arthroplasty and so on. Medication side effects often, surgery trauma, however, although conservative rehabilitation trauma and side effects and there is a certain effect, but not satisfied, so we explore methods of exercise training in combination with other treatments KOA common treatment in order to obtain better results. Principle of Training treatment is: articular cartilage compression and relaxation exercises to make joint activities to strengthen the local blood circulation, promote the resolution of inflammation, relieve pain; movement also stimulates the growth of cartilage cells thus promoting bone repair, thus improving joint function; exercise training can increase bone stress that increases bone density and prevent osteoporosis, prevention of the occurrence KOA from the nature of the reasons.

## Theoretical Introduction of Knee Osteoarthritis

Knee Osteoarthritis, also known as degenerative knee joint disease, which is an involving articular cartilage, sub-chondral bone variety of tissues, synovial and other diseases, mainly in middle age, the prevalence increases with age ) clinical manifestations are: knee pain, swelling, difficulty moving,) exercise therapy, physical therapy and other factors all help to improve blood circulation knee, enhance muscle strength around the knee muscles, improving its stability, thereby improving the knee joint function and improve quality of life of patients.

Osteoarthritis of the knee may be due to trauma, fatigue, and a variety of factors, such as caused by aging tissues, based on its pathological degeneration of articular cartilage and synovial inflammatory changes occur, leading to joint swelling, pain, inconvenience, some scholars consider joint pain around the joints can lead to muscle atrophy, decreased muscle strength; on the other hand, muscle atrophy, decreased muscle strength, can lead to joint instability, causing the tibiofemoral joint, hip joint surface stress distribution skeletal abnormalities, promote Knee worsening arthritis. Therefore, eliminating inflammation, protect the articular cartilage, synovial, and improve muscle strength around the knee joint function is the principle we treat knee osteoarthritis <sup>[1]</sup>.

Many studies have found that exercise therapy treatment with physical factors tend to get better results. This study is the use of FM, intermediate frequency, infrared local irradiation of physical therapy combined with exercise training, before and after treatment with knee function scores compared efficacy results obtained are also obvious. Strength exercises should be emphasized that gradual, because persons who wish to pay attention to the principle of individual, otherwise it will cause excessive exercise or shortage, more effective treatment.

## Usual Treatment Methods

Ultrashort wave therapy: selection of Japanese production UWM-02 type FM treatment, the output frequency of 27.12MHz, the output power of 50W, using straps secured to the electrode pads

at the opposite knee, swelling and pain of acute severe knee OA patients with no heat, chronic knee OA patients with micro heat, day 1, every 20min, clever times as 1 course of treatment. Ultrasound therapy: use Germany Somomed4 ultrasonic treatment, the frequency of 1MHz, the sound of the first round (diameter 35mm), using the shift method, the output intensity 0.75-1 W / cmz continuous ultrasound, yogurt with 1% diclofenac glue as coupling agents, treatment sound head when in close contact with the skin knee, as slow-moving ring, treatment time 15min, 1 day, 15 times as a course of treatment <sup>[2]</sup>. Fig.1 shows the usual treatment methods.

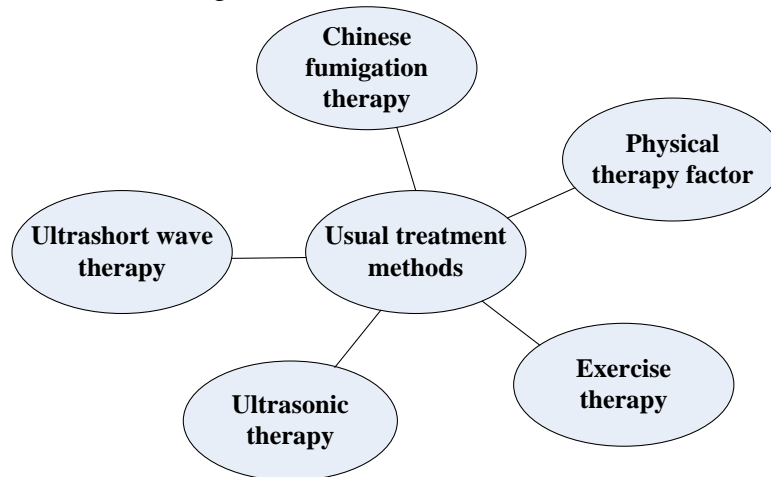


Fig. 1.The usual treatment methods of KOA

Exercise therapy: including strength training, joint training and aerobic training activity. Strength training: acute knee pain and swelling in patients with obvious, using isometric strength training, including static contraction of the quadriceps exercises: the patient supine, knee extension, tight quadriceps 10s, Relax 5s, repeated 20 times as a group; limb straight leg raising exercise, try to keep 10s when raised to more than 20 times as a group, a group of training a day, morning and evening. Chronic multi-point isometric isotonic strength training, selection of Changzhou money burst company E-GST-01 type quadriceps training chair, the patient sitting in a chair training knee flexion, extension exercises (flexion angles from 100- -300-X600 --- X900-1000), while maintaining joint training ship 900, a total of 10 groups of flexion, knee extension exercises, conducted simultaneously at different angles of knee isometric exercises, each lasting 10s, rest 30s, according to the patient's condition gradually increase the resistance movement, carried out within the tolerance of the patient, and after the training is completed, the original should not be increased limb pain, swelling, strength training once a day.

Physical therapy factor likes above. At the same time exercise therapy: ① strength training: acute joint pain and swelling obvious, the choice of isometric strength training, such as supine straight leg raising and isometric quadriceps training. Chronic phase to enhance muscle strength, increase joint stability for the purpose of selection of isotonic strength training, such as sandbag training (sitting position, put sandbags in front of the distal leg, straighten the knee) or cycling training, two times a day, each 20 times. ② joint mobility training: mainly passive knee flexion training. Methods: The prone position, bend knees, with a strong elastic ankle broadband child caught the front, the other end into the ipsilateral shoulder strap, the patient is asked Hold the stretch for training, while the knee to relax, do passive knee flexion training. Should pay attention to adjust the size of the traction force according to pain tolerance during exercise, do not use excessive force. The method described above for 10 days a course of treatment, after two courses of statistical effect.

Using audio electrotherapy machine, the choice of two electrode plates Scmx10cm 4mm thick cotton jacket liner, liner with. 0.9% sodium chloride solution soak, two electrodes were placed inside and outside the knee eye, or popliteal fossa, crane top opposite, external elastic band fixed, the current strength of 30-SOmA, every 20-30min o② herbal medicine fumigation more functional therapy machine, place the gauze bag containing medicine (angelica, safflower, pepper,

Notopterygium, aconite, Eucommia, Woodwardia system, etc.) in a dedicated steamer, add water 3-4kg, electricity boiling, steam cabin temperature when up to 37 °C at the beginning of treatment, adjust the temperature according to the constitution and the tolerance of the patient, usually between 39-45 °C, each 30min<sup>③</sup> for the acute phase of joint swelling evident patients should first intra-articular puncture fluid plus FM treatment, eliminate swelling line after fumigation treatment.<sup>[3]</sup>

### **Application of Exercise Therapy**

Knee osteoarthritis is a common degenerative cartilage disease, its main clinical manifestations are joint pain and dysfunction increases with age, there are increasing trend, more common in older patients. With the gradual aging of our population, the incidence of knee OA gradually increased. We adopt a means of rehabilitation exercise therapy-based treatment of knee OA patients were satisfactory<sup>[4]</sup>.

Osteoarthritis patients in their daily lives, out of fear of joint pain, in order to avoid aggravating joint pain stimuli, when the activity itself will adjust the center of gravity and walking posture, abnormal gait so uncoordinated. Cause limb pain in patients with active range of activities to reduce, followed by muscle atrophy, muscle strength decreased, decreased stability of the knee. Knee plays the role of the human load, its stability has special requirements, and this stability is dependent on strong ligaments around the joints and muscles. After knee stability decreased, affecting integrity protection mechanisms around the joints, increased wear of the articular cartilage, synovial membrane and joint capsule degeneration, thickening. Thus, according to the different motor function in patients with knee, personalized multi-point anti-isometric muscle training quadriceps and hamstring group of muscles, improve knee flexion and extension muscle strength and endurance. From the point of view in terms of biomechanics, muscle strength and endurance around the knee to improve and strengthen the stability of the knee joint, especially stability control body in motion. Provides the basis for the knee to withstand mechanical stress, vibration absorption, participate in the activities. Improvements in weight-bearing joints uneven stress state, reducing wear and knot hoof cartilage tissue.

Joint training activity: the acute phase mainly passive joint training activities, the use of dK-C1 intelligent lower limb joint rehabilitation. Patient supine, the limb is fixed on CPM machine, determine the scope of joint activities under the patient began the actual situation, the starting angle is less, the ending angle of 400, an increase of 10 prescriptions per adopt 5min, day 1, every 30min, increase daily 100,1 week maximum activity around the knee angle of 90 chronic use of joint mobilization techniques, specific methods include: ① tibiofemoral joint long axis traction, front side slide to slide back, knee extensor swing or swing. ② cluster hip joint side sliding, sliding up and down, separating traction. Each action was repeated three times, each time interval 6-10s. Aerobic exercise: joint swelling and pain should be reduced significantly in the acute phase of activity, but may vary inflammation dissipated after walking, swimming, tai chi Yu coffee and so on, but for intra-articular joint instability or reduced proprioception patients can't walk fast. Aerobic training needs 45min at least every day, each 15 times as a course of treatment.

### **Clinical Evaluation Standard**

Physical factors have a good anti-inflammatory, swelling, analgesic effect, exercise therapy can enhance muscle strength, increase the stability of the knee, and improve range of motion of the knee joint, the two complementary therapy, the role of each in the course of the different aspects of OA, can enhance the efficacy of the two combined to better promote the rehabilitation of knee function, thereby improving the quality of life of patients. Reference to the relevant standards, heal: pain, swelling disappeared, joint activity returned to normal; markedly: pain most of the disappeared, no swelling, joint activity close to normal; effective: joint pain part disappeared, swelling, range of motion has improved to some extent; Invalid: no significant change before and after treatment<sup>[5]</sup>.

Lvsholm knee score using standard isi, integral to the situation before and after treatment were evaluated) comprehensive evaluation of the knee, the normal 100, the knee without any symptoms, signs, excellent:> 80 points; Good: 79-70 points; in: 69-60 points; difference: <60 [] to determine the efficacy of the treatment as compared with before the count value of the differential treatment based markedly: the difference> 30 points; Effective: 11-29 points; progress: 6-10; invalid: <5 points.

Meanwhile joint mobilization techniques applied to make intra-articular structures or painless return to normal position, the soft tissue to maximize ease of functional activity. Inhibition of brain stem and spinal pain caused by substances released by nerve function, increase the pain threshold. Improve articular cartilage and subchondral plate avascular zone nutrition, prevent joint degeneration. By drafting and sliding joints, causing adherent muscles around the joints, ligaments, joint capsule and other soft tissues get loose, to increase its ductility, thereby expanding the scope of joint activities, but also to enhance the patient's proprioception. Through the above mechanism of action is not difficult to find, exercise therapy has positive significance for the prevention of the development of disability.

## Conclusions

Knee Osteoarthritis is the knee cartilage damage and osteoarthritis associated with the adjacent subchondral bone plate / bone lip became characteristic of the slow development of osteoarthritis. Prone disease in the elderly, correlated with age, gender, obesity, and other underlying diseases. The major clinical manifestations of knee pain, stiffness, limited mobility and other dysfunction, and many patients with limited functionality, many years after the onset of disability to become functional. Therefore, patients get effective treatment is essential. Treatment of various physical factors have long been proven good effect, this study also demonstrated that exercise training therapy as a positive and effective way to get good results in the treatment of, significantly better than the traditional physical factor therapy. Body movement can be maintained in a good state of motor function and prevent secondary damage joint exercise training methods of treatment. In summary, sports training with physical therapy for osteoarthritis of the knee to improve knee function (including pain) have a positive and significant effect on the prevention of the development of disability has a positive meaning.

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