

Clinical Research Progress of TCM Daoyin Exercise in the Intervention of Knee Osteoarthritis

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Abstract: Knee osteoarthritis (KOA) is a joint degenerative disease characterized by pain, swelling, stiffness, and even limitation of movement of the knee joint, seriously reducing the quality of life of patients. Daoyin Exercise, as a typical Chinese traditional exercise therapy, has a long history and has the characteristics of being safe and effective, easy to promote, convenient, practical, modern doctors apply it to the prevention and treatment of KOA, can achieve a good effect. This paper summarizes the research status of the application of guidance in knee osteoarthritis in the past 10 years, to provide a basis and ideas for the clinical promotion of TCM guidance more effectively.

Keywords: Knee osteoarthritis; Traditional Chinese medicine; Daoyin Exercise; Research progress

1. Introduction

Knee osteoarthritis is a common chronic and progressive degenerative disease of the knee joint. Its clinical symptoms are obvious pain, swelling, stiffness, and even deformity and dysfunction of the joint. Some clinical studies show that ^[1] the prevalence rate of KOA in China has reached 14.6%, and the incidence rate of females is higher than that of male, and the prevalence rate increases with age. In recent years, with the aggravation of population aging in our country, the incidence of this disease is increasing year by year, which has a great impact on people's quality of daily life. KOA patients with mild conditions and no indication of operation are mainly treated with drugs or surgery, mainly non-steroidal anti-inflammatory drugs, which can relieve pain, swelling, other symptoms to a certain extent, and control inflammatory reactions, but can not effectively prevent the progression of knee joint disease, and long-term use will also cause damage to gastrointestinal, liver and kidney function ^[2]. For the patients with severe joint degeneration and clear surgical indications, arthroscopic treatment, osteotomy, orthopedic surgery and knee arthroplasty are mainly adopted, but the trauma is large and the medical cost is high, which increases the economic burden of the patients.

Traditional Chinese medicine mostly classifies KOA as "bone arthralgia", "knee arthralgia", "calendar festival", "crane knee wind" and so on, according to traditional Chinese medicine, the basic etiology and pathogenesis of knee osteoarthritis are deficiencies of liver and kidney, loss of tendon and pulse, and pathogenic factors such as wind, cold and dampness. "Zhang's Medical knowledge" mentioned: "the knee is the house of tendons, knee pain is all due to deficiency of liver and kidney, deficiency is the attack of wind, cold and dampness." "The root of KOA is the syndrome of deficiency and reality. If you don't get through it, you will suffer pain. If you are not proud, you will suffer pain, the deficiency of liver and kidneys can not resist the invasion of external evil into the human body, which leads to blood stasis, blood stasis, wind-cold-dampness evil, external and internal causes are mixed, causing deficiency for a long time, which become the important pathogenic factors of this disease ^[3]. In the treatment of this disease, the methods of traditional Chinese medicine include internal administration of traditional Chinese medicine, acupuncture, external treatment of traditional Chinese medicine, massage, Daoyin Exercise, and so on. Among them, compared with other treatments, Daoyin Exercise has the advantages of simple operation and no site restriction. After skillfully mastering the essentials of movement under the guidance of doctors and students, patients can arrange their own exercise time and place.

Daoyin Exercise in traditional Chinese medicine is the limb movement under the guidance of the theory of traditional Chinese medicine, breathing, mental adjustment, and the traditional exercise method with "adjusting body, heart and breath" as the main means, long-term practice can play a role in

strengthening the body, preventing and treating diseases, regulating emotions and prolonging life^[4]. The word "Daoyin". It can be found in the book "Zhuangzi"^[5]: "Blow your breath, spit out the old, and accept the new". The person who is quoted by this way, the person who takes shape, is what the examiner of Peng Zushu likes. "It is mentioned in Shuowenjiezi: "The guide leads, and the guide opens the bow. "It means to make harmony and softening by stretching the body. It is mentioned in the book that "the food of the people is miscellaneous but does not work, so its disease is often impotent, cold and hot, and its treatment should be guided by practice". It can be seen that the ancients have already closely combined the treatment of disease with the method of guiding merit. The author consulted the literature on TCM Daoyin function in the prevention and treatment of knee osteoarthritis in the past 10 years and found that it can be combined with other treatment methods, and can also be used alone, to achieve good results in the treatment and later rehabilitation of KOA. The clinical application of TCM Daoyin Exercise in the prevention and treatment of knee osteoarthritis is summarized as follows.

2. Combined with non-operative therapy

2.1. Combined with oral administration of traditional Chinese medicine

Oral administration of Chinese herbal medicine has its unique role in the treatment of degenerative knee joint diseases, combined with Daoyin Exercise, both internal and external, internal and external viscera to tonifying deficiency, external exercise of muscles and bones to relieve pain. Through the observation of clinical curative effect, Peng Jianyong^[6] found that his self-made prescription for tonifying the kidney and removing phlegm combined with Taijiquan exercise can significantly improve the symptoms and joint activity function of patients with knee osteoarthritis of kidney deficiency and phlegm turbid type. And the effect of the combination of prescription and Taijiquan exercise is better than that of both alone. Dong Xiang^[7] selected 64 patients with knee osteoarthritis and randomly divided them into two groups. The control group was given Bushen Tongluo Pill and the treatment group was treated with Bushen Tongluo Pill combined with Baduanjing, the results show that, the total effective rate was 93.75% in the treatment group and 75.00% in the control group, the scores of VAS and WOMAC in the treatment group were higher than those in the control group, Bushen Tongluo Pill combined with Baduanjin therapy significantly improved pain and activity limitation in patients with KOA. Zhang Xia^[8] divided 60 patients with knee osteoarthritis of kidney deficiency and blood stasis into the control group and the treatment group with Bushen Huoxue recipe plus Baduanjin. Three months after treatment, the musculoskeletal function score, peak torque of quadriceps femoris, average power of quadriceps femoris, and serum were compared between the two groups. The results showed that Baduanjin combined with Bushen Huoxue recipe in the treatment of KOA with kidney deficiency and blood stasis could effectively enhance the muscle strength and function of quadriceps femoris, reduce inflammatory reaction, and inhibit autoimmune reaction.

2.2. Combined with acupuncture and moxibustion

Acupuncture is one of the commonly used treatments to improve the symptoms of patients with knee osteoarthritis. Its essence is to use acupuncture and moxibustion to treat diseases under the guidance of traditional Chinese medicine theory. Acupuncture at local acupoints can coordinate yin and yang, dredge channels and collaterals, and reconcile qi and blood, to improve patients' motor function, reduce inflammation, and relieve pain, but its curative effect will decrease with the cessation of acupuncture intervention^[9]. Active exercise combined with passive acupuncture can more effectively control the progress of osteoarthritis. Zhu Zhi^[10] randomly divided 92 patients with knee osteoarthritis into a treatment group and a control group. The control group was treated with acupuncture and the treatment group was treated with acupuncture combined with Taijiquan exercise. One month after treatment, the changes in knee joint WOMAC scale score and 10m walking time were compared. The results showed that the effective rate and WOMAC score of the treatment group were significantly better than those of the control group, and the time of 10m walking in the treatment group was significantly less than that in the control group. Cheng Shouren^[11] took pain score, X-ray, motion function, and range of motion of knee joint and 3m round trip timing of standing up and walking as observation indexes, 60 patients with the confirmed diagnosis were randomly divided into a treatment group and a control group. The curative effect of warming acupuncture combined with Taijiquan on knee osteoarthritis was studied, and it was found that all the indexes in the treatment group were better than those in the control group. Huang Douquan^[12] compared the efficacy of Baduanjin combined with electroacupuncture and simple electroacupuncture in the treatment of KOA through knee joint function Lysholm knee joint score and

resting and activity pain VAS score. The results showed that Baduanjin combined with electroacupuncture could effectively relieve pain symptoms and improve knee joint activity function. Ding Jiayan^[13] studied the efficacy of electroacupuncture combined with Yijin meridian in relieving knee osteoarthritis pain. Through comparing the VAS score, WOMAC score, TCM syndrome score, and TCM syndrome, it is found that the overall clinical effect of electroacupuncture combined with Yijin meridian comprehensive therapy is better than that of simple electroacupuncture therapy, and because of its low cost, simple clinical operation, patients have a higher degree of acceptance. Li Hui^[14] used a needle knife combined with Daoyin therapy, simple needle knife therapy, and simple Daoyin therapy respectively for 16 weeks as a course of treatment. The study found that after one course of treatment, the curative effect of the needle knife Daoyin group was better than that of the simple needle knife group and Daoyin group. The combination of the two treatments of KOA can effectively relieve knee joint pain and restore knee joint function. Wang Hongyu^[15] in a clinical study lasting 20 days and 4 courses of treatment, the acupuncture method of "invigorating the spleen and tonifying the kidney" combined with Daoyin function was used to treat KOA, and compared with the acupuncture method of "invigorating the spleen and tonifying the kidney" alone. Through the evaluation of the WOMAC score, VAS score, ROM measurement, SF-36 score, and other indexes, the results show that the acupuncture method of "invigorating the spleen and tonifying the kidney" combined with Daoyin training and simple acupuncture therapy can effectively treat knee osteoarthritis with high safety. The acupuncture method of "invigorating the spleen and tonifying the kidney" combined with Daoyin training is superior to simple acupuncture in improving clinical symptoms, joint function, and quality of life of patients. After 4-week clinical observation, Zheng Xiaojuan^[16] found that Baduanjin combined with acupuncture is effective in the treatment of KOA, and its mechanism may be to restore the biomechanical balance of lower limbs, increase the stability of knee joints, improve the symptoms of pain and activity disorder of patients, delay the process of KOA and improve the quality of life of patients by activating blood circulation, relaxing muscles and spreading pulse, strengthening muscles and bones.

2.3. Combined with other surgical procedures

Clinically, many doctors have unique and novel attempts for the combined application of Daoyin Exercise. Gao Chao^[17] adopted acupoint massage combined with Baduanjin to observe its effect on KOA patients with a deficiency of liver and kidney and internal obstruction of blood stasis. The results showed that Baduanjin exercise had a significant effect, which could improve the clinical symptoms of patients and promote the effective and rapid recovery of knee joint function. Wu Hongfei^[18] used Wuqinxi combined with knee arthroscopy to observe the relief of postoperative pain, joint ringing, noose, and other symptoms of patients. After the end of the course of treatment, the results showed that the improvement in knee joint function was more obvious. It is helpful to the recovery of knee joint function. Zhang Yiqiang^[19] found that the three-step and six-function method summarized by various Daoyin methods combined with external washing of traditional Chinese medicine and electroacupuncture has a good effect in the treatment of KOA. The above research combines Daoyin Exercise with all kinds of modern medical methods, which can not only achieve reliable clinical effects, but also show that TCM Daoyin Exercise is inclusive and adaptive, and can expand the advantages of a variety of treatments.

3. Application of TCM Daoyin Exercise alone in KOA

Daoyin Exercise has a history of thousands of years in our country, and now people think that it is a kind of exercise for health care, while ignoring its original role in treating diseases. Traditional Daoyin Exercise plays an important role in the treatment of various orthopedic diseases. It can not only strengthen muscles and bones by practicing external movements but also take into account the benefit of viscera. Long-term practice can benefit the liver and kidneys and relieve pain. To clarify the mechanism and clinical efficacy of its treatment of KOA, the researchers carried out multi-faceted research and observation to explore. The therapeutic effect of Daoyin Exercise surgery on KOA.

3.1. Taijiquan

Taijiquan is an ancient Chinese martial art. According to the Taoist theory followed by Taijiquan, practicing Taijiquan can balance the "qi" in our bodies and improve the function of the body. Long-term practice of Taijiquan can improve physical strength and flexibility, enhance endurance, improve balance, reaction time, proprioceptive and somatosensory sensation. Batra Abhinandan^[20] found that Taiji exercise can enhance the muscle strength of the quadriceps femoris and hamstring muscle, and improve

the synergistic contraction of active muscle, antagonistic muscle, and stable muscle during knee flexion and extension. Song Rhayun ^[21] found that tai chi training in elderly KOA patients can increase the extensor muscle strength and bone mineral density of the knee joint, thus reducing the risk of falls in daily activities. Zhang Hu et al. ^[22] divided 68 patients with KOA into the Taijiquan exercise group and the supine lower limb simulated cycling exercise group. The results showed that the symptom improvement of the Taijiquan group was better than that of the control group, and its mechanism may be related to the increase of hip adduction torque and indirect reduction of knee joint adduction torque. Zhou Zhanfan ^[23] and other studies have shown that Taijiquan can relieve pain in patients with KOA, improve the coordination of the largest muscles of their lower limbs, improve their walking ability, improve the symptoms of pain and stiffness, and delay the progress of KOA.

3.2. *Baduanjin*

Baduanjin is one of the ancient Daoyin exercise in China, because of its soft and slow, coherent and round life, loose and tight combination, movement, spirit, shape, and qi, it is especially suitable for the middle-aged and the elderly. And as a green and effective method for the prevention and treatment of knee osteoarthritis, it has been gradually favored by researchers in recent years. Chen Qi ^[24] found that Baduanjin exercise can prevent and treat knee osteoarthritis by enhancing the muscle strength and endurance of lower limb muscles. Jiang Yan ^[25] found that systematic Baduanjin training is beneficial to increasing lower limb muscle content, reducing fat content, and improving the symptom severity of knee osteoarthritis patients after a 12-week pre-study of the KOA treatment group. Yang Yaohua ^[26] intervened with the patients with KOA with Baduanjin. The results showed that the muscle strength of the quadriceps femoris, range of motion of joint flexion and extension, and walking function were significantly enhanced in the treatment group.

3.3. *Wuqinxi*

Wuqinxi is a set of health and fitness methods created by Hua Tuo, a famous doctor in ancient China, inspired by the movement posture of five kinds of animals, namely, tiger, deer, bear, ape, and bird. This method imitates the "five birds" with limbs and looks, combines breathing and breathing, combines movement and stillness, and practices both form and spirit. Some studies have shown that ^[27], according to the WOMAC scale, the score of KOA patients after Wuqinxi exercise is significantly lower than that of patients with pain, stiffness, and behavior limitations before exercise. Yin Xianjin ^[28] found that Wuqian opera exercise can improve the Noumenon perception of female KOA patients, improve their balance function, reduce the degree of knee joint swelling, reduce pain, and thus improve their knee joint daily activity ability. Wang Dan ^[29] intervened with the patients with KOA on 12 Fridays and found that Wuqinxi could relieve the pain of the knee joint, increase the balance and motor function of the knee joint, correct the diseased gait, and so on. The mechanism may be related to its ability to increase the muscle strength of lower extremities and the synergistic contraction of medial and medial thigh muscles, and to reduce the synergistic contraction of tibialis anterior muscle and gastrocnemius muscle.

3.4. *Yijinjing*

The Yijinjing originates from the Daoyin Exercise in ancient China and is one of the traditional massage methods of traditional Chinese medicine. This method is in the name of strengthening tendons and strengthening bones, which is mainly characterized by changing tendons and bones, pulling bones and stretching tendons, pulling large and small muscles in various parts of the body, as well as tendons, ligaments, joint capsules, and other connective tissues in large and small joints to improve the flexibility and flexibility of soft tissue. The function method requires that while breathing naturally, the rotation movements of various parts and directions of the body should be controlled slowly, each direction of the movement should echo each other, and the strength should be combined with strength and softness, deficiency and reality, and cooperate with the adjustment of breathing and the concentration of thoughts to achieve the purpose of calming the mind, dredging the meridians and blood, and regulating the qi machine. Zhang Shuaipan ^[30] compared the kinematics and dynamics of knee joint gait of KOA patients with stretching training and found that compared with stretching training, Yijinjing exercise could significantly improve the range of joint motion and walking ability of KOA patients, and at the same time increase joint flexion and extension torque and reduce its adduction torque and other parameters. Ye Yinyan ^[31] conducted a controlled trial on 52 patients with knee osteoarthritis. The results showed that the VAS score, proprioceptive sensitivity and balance ability, and WOMAC score in the Yijinjing intervention group were better than those in the control group. Yijinjing training can effectively relieve knee joint pain, relieve joint stiffness, improve patients' proprioceptive sensitivity and balance ability, improve knee joint function, and prevent and treat knee osteoarthritis. Fan Yuanzhi ^[32] confirmed that

Yijinjing can enhance the muscle strength of the quadriceps femoris and relieve the symptoms of patients with KOA.

The above clinical observations show that traditional Chinese medicine Daoyin can be combined with a variety of treatments, can also be used alone in the treatment of knee osteoarthritis, and can achieve significant clinical results, but also can consolidate the efficacy of other treatments, reduce the recurrence rate. This conclusion shows that Daoyin Exercise has strong inclusiveness, adaptability, and integration, and can expand the advantages of a variety of treatments.

4. Summary

Knee osteoarthritis is a joint degenerative disease with both acute and chronic disease, and its specific pathological mechanism can be attributed to the irreversible damage of knee joint cartilage. At present, the clinical diagnosis and treatment of knee osteoarthritis is mainly to relieve the joint pain of patients, improve and improve the knee function of patients with knee osteoarthritis, improve the daily quality of life of patients, and delay its further development. In recent years, with the continuous updating of the relevant diagnosis and treatment guidelines, we can find that the guidelines agree that non-operative treatment should be the first choice for patients with knee osteoarthritis who are not yet advanced. From the above clinical studies, it can be concluded that Daoyin Exercise on KOA is mainly manifested in improving the muscle strength of quadriceps femoris^[17,23] and stretching muscles and bones to smooth qi and blood^[16]. At present, the clinical research of TCM Daoyin Exercise in the treatment of knee osteoarthritis is still less, and the mechanism research is slightly insufficient, which can not have a clear and subtle understanding like Western medicine, and failed to find a suitable Daoyin combination to be used in the various stages of the disease and postoperative rehabilitation. However, Daoyin Exercise is certainly effective in the prevention and treatment of KOA. As far as patients are concerned, it is convenient, concise, and easy to operate. In the future, how to combine more effectively with modern medicine, choose the appropriate Daoyin Exercise according to the disease characteristics of patients with dialectical thinking, and carry out more systematic TCM rehabilitation therapy, more clinical research and summary are needed.

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