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Research progress in Chinese Traditional Exercise and Chinese Herbal Medicine for Osteoarthritis

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Abstract: *Osteoarthritis (OA) is a common condition that seriously affects the quality of life of patients. Traditional exercise and medication are the conventional treatments for OA, but there are strict indications and contraindications. As an important part of traditional medicine, Chinese herbal medicine is widely used in the treatment of OA. Chinese medicine treatment can effectively improve joint pain, dysfunction and other symptoms and signs, and has a relatively good safety profile. The use of Chinese medicine and traditional Chinese medicine exercises in the treatment of OA can provide new ideas for clinical practice. The combination of Chinese herbal medicine and external application in the treatment of OA may provide new ideas for clinical practice.*

Keywords: *Osteoarthritis; Chinese Traditional Exercise; Chinese Herbal Medicine; therapy*

1. Introduction

Osteoarthritis is a degenerative disease, in fact, osteoarthritis is not terrible, but if not treated and intervened early, and when osteoarthritis is serious, it will have a great impact on people's lives, resulting in a serious decline in the quality of life. Osteoarthritis often occurs in the distal interphalangeal joints of the knee, hip, and hand, but negatively significant joints are also susceptible to friction, which can lead to osteoarthritis. Suffering from osteoarthritis is a very painful thing, especially osteoarthritis often occurs, but also bring a great impact on the patient's life and work, and severe osteoarthritis, but also lead to bone and joint deformity and disability. For advanced cases, artificial joint replacement is currently recognized as an effective method to eliminate pain, correct deformity, and improve function when surgery is generally tolerated, which can greatly improve the quality of life of patients [1].

2. Traditional Chinese exercise

2.1. Tai chi

The American College of Rheumatology (ACR) and Arthritis Foundation have updated guidelines for the management of knee OA, strongly recommending Tai Chi as a first-line treatment option [2]. Tai Chi exercise has a scientific theoretical basis and is the first choice for human fitness and health preservation in the future, Tai Chi exercise can delay physical aging, Tai Chi can improve pain in patients with osteoarthritis, and physical therapy can also be performed. Tai Chi has been shown to be an effective strategy to prevent falls in patients with KOA, with significant effects in improving balance [3]. Osteoarthritis belongs to a chronic killer, and Tai Chi can improve mind and health of knee OA through meditation. Practice of Tai Chi may be the key to improve knee movement and flexibility, and Tai Chi exercise can improve functional outcomes and quality of life caused by knee arthritis [4]. Tai Chi is a mild aerobic exercise and a smooth meridian movement. Tai Chi belongs to life sciences and is a knowledge about the sublimation of quality of life. In this sense, Tai Chi is the movement that best improves quality of life. Tai Chi exercise can effectively improve proprioception in elderly patients with osteoarthritis.

2.2. Wuqinxi

Wuqinxi exercise can significantly relieve the pain of patients with KOA, improve the balance ability

ISSN 2616-5791 Vol.4, Issue 2: 53-59, DOI: 10.25236/AJMHS.2023.040209

and motor ability of patients, and improve abnormal gait, mainly in increasing gait speed, stride length, and the percentage of support period. It can be used as a safe and effective exercise rehabilitation method for patients with stable moderate osteoarthritis [5]. Wuqinxi exercise is associated with changes in KOA patients, such as increased lower limb muscle strength, improved proprioception, reduced pain, increased common contractility of the lateral/medial thigh, and decreased common contractility of the gastrocnemius and anterior tibia during walking and stepping [6]. The quality of life pursued by Wuqinxi refers to that human life has high standard and high quality in three aspects: physiological value, medical value and social public welfare value, especially social public welfare value. Wuqinxi exercise is beneficial to improve the exercise tolerance and pulmonary function of patients during the transition period after discharge, and has a positive promoting effect on their rehabilitation effect. Wuqinxi training can effectively improve the balance function, walking ability and quality of life of patients, and provide an effective means to improve the symptoms of patients.

2.3. Baduanjin

Baduanjin can stimulate muscles and nerves throughout the body, accelerate systemic blood flow and lymphatic reflux, help reduce local joint edema and inflammation, relieve joint pain, and create favorable conditions for the healthy recovery of knee osteoarthritis. Baduanjin nourishing mind is the exercise of ideation, adjusting mentality, so that it enters quiet, the cerebral cortex is in an internal inhibition state, promoting the sufficient rest of cerebral cortex cells, has a good protective effect and regulatory effect on the cerebral cortex, regulates the tension and reaction speed of muscles, and is conducive to strengthening the stability of the knee joint [7]. These movements perform traction exercises on bones, muscles, and joints, which can improve lower limb strength and endurance, enhance joint flexibility and stability, reduce joint pain, and improve joint motor function [8]. Through Baduanjin regulating qi, promoting blood circulation, and finally acting on the knee joint, it can effectively regulate the metabolism of knee muscles, improve blood circulation at the joint, improve the motor control ability of the elderly, improve the stability of posture and motor coordination of the elderly, and can prevent falls in the elderly. Baduanjin can promote the secretion of synovial fluid and promote the repair of synovium and superficial cartilage.

2.4. Yijinjing

Yi Jin Jing exercise can significantly improve the stability of the knee joint in patients with knee arthritis. Yi Jin Jing exercise can comprehensively improve the stability of the knee joint in patients with knee osteoarthritis: reduce the arthritis index, relieve the symptoms of knee pain and stiffness, regulate the overall function of the knee joint, increase the peak torque of the knee flexor and extensor muscles, enhance knee muscle strength and muscle endurance , reduce the common activation rate of the knee flexor muscles, improve the coordinated activation ability of the knee muscles , improve the balance function of opening and closing the eyes [9], and improve the accuracy of proprioception. Some bone diseases generally have insidious onset, may not have any clinical symptoms in the early stage, Yi Jin Jing long-term practice, physical fitness, and have a good preventive and therapeutic auxiliary effect on degenerative bone diseases [10]. Yi Jin Jing is a fitness method that can effectively improve the cognitive function of the elderly.

3. Oral Chinese Herbal Medicine

Chinese herbal medicine is a unique drug for the prevention and treatment of diseases in TCM and is an important marker for TCM to distinguish it from other drugs. Traditional Chinese medicine (TCM) is mainly composed of botanicals (roots, stems, leaves, and fruits) and mineral drugs, and because botanicals account for the vast majority of TCM, TCM, also known as Chinese herbal medicine, has about 5,000 kinds of TCM used in various regions, and countless formulas are formed by the compatibility of various medicinal materials, which has formed an independent science-materia medica after thousands of years of research [11]. According to the specific situation of osteoarthritis through the syndrome differentiation and treatment of traditional Chinese medicine, the application of external or oral treatment of traditional Chinese medicine. The traditional theory of TCM treatment of osteoarthritis believes that "wind, cold, and dampness pathogens, arthritis block meridians, resulting in meridian blockage and no systemic pain." The purpose of TCM treatment of osteoarthritis is to expel wind and disperse cold, relieve spasm and meridians, and promote blood circulation and remove blood stasis, which can significantly reduce the joint replacement rate [12].

ISSN 2616-5791 Vol.4, Issue 2: 53-59, DOI: 10.25236/AJMHS.2023.040209

3.1. Yanghe Decoction

Yanghe decoction is a literary preparation with the effects of warming yang and tonifying blood, dispersing cold and eliminating stagnation, and has a wide range of effects. Yanghe Decoction (YHD) is a famous prescription, which consists of Rehmannia glutinosa, staghorn glue, cinnamon, white mustard seed, ephedra, turmeric charcoal and licorice [13]. Yanghe Decoction is effective and safe in the treatment of most knee arthritis. Yanghe decoction has chondroprotective effect, prevents apoptosis, and has a role, and is widely used in the treatment of osteoarthritis [14]. Modern medical research has confirmed that Yanghe decoction can be used in spondylitis, autoimmune thyroiditis and breast cancer diseases [15]. Therefore, Yanghe decoction is considered a safe and effective alternative therapy.

3.2. Duhuo Jisheng Decoction

Duhuo Jisheng Decoction, from "Prepare Urgent Qianjin Yaofang", is a common prescription for the treatment of low back pain in traditional Chinese medicine. In the treatment of osteoarthritis, it can significantly relieve pain, limit activities, improve daily activities, apply Duhuo Jisheng decoction to tonify the liver and kidney, expel wind and disperse cold, assist in promoting blood circulation and removing blood stasis, and replenish qi and remove diseases, which is equivalent to the efficacy of non-steroidal anti-inflammatory drugs. Duhuo Jisheng decoction regulates autophagy through the p38/MAPK signaling pathway, providing a new method for the treatment of osteoarthritis, at the same time, there are no adverse reactions such as ulcers, palpitations, and hypertension caused by non-steroidal anti-inflammatory drugs, which are safe and effective and inexpensive [16]. Duhuo Jisheng Decoction inhibits the production of proinflammatory factors and the degradation of extracellular matrix (ECM) through SDF-1/CXCR4/NF-κB signaling pathway, providing a new mechanistic understanding for the treatment of osteoarthritis [17]. Duhuo Jisheng Decoction is safe and effective in the treatment of OA, and can be used as an effective method for medical treatment of OA.

3.3. Fangji Huangqi Decoction

Fangji Huangqi Decoction, which has the effects of invigorating qi and expelling wind, invigorating spleen and benefiting water, consists of Fangji, Astragalus membranaceus, Atractylodes macrocephala, Zingiber officinale, Jujube, and Glycyrrhiza uralensis, and is a special prescription used to treat lower limb edema in ancient times. Based on the analysis of pharmacokinetic characteristics of Fangji Huangqi Decoction by ultra-high performance liquid chromatography, it is helpful to understand the application value of active ingredients of traditional Chinese medicine in clinical practice and provides a basis for screening a variety of components of traditional Chinese medicine and its metabolites [18]. Establishing a model to observe the lineage-effect relationship provides a direction for screening effective active ingredients in complex TCM formulas [19]. Fangji Huangqi Decoction is a basic prescription for the treatment of rheumatic arthritis and osteoarthritis.

3.4. Shaoyao Gancao Decoction

Shaoyao Gancao Decoction is effective in the treatment of osteoarthritis, can effectively improve pain symptoms, reduce inflammatory response, and has a low incidence of adverse reactions. Shaoyao Gancao Decoction has a significant inhibitory effect on pain models by regulating the 5-HT signaling pathway [20]. Shaoyaogancao Decoction regulates the distribution of hormones in the body by regulating the NF-κB signaling pathway [21].Modern pharmacological studies of Shaoyaogancao Decoction have confirmed that it does have incredible effects on musculoskeletal contracture pain of the extremities, such as pulmonary gastrocnemius muscle spasm, neck pain, low back pain, heel pain, arthritis, and muscle contracture pain caused by various soft tissue injuries [22].

3.5. Bushen Zhuangjin Decoction

Bushen Zhuangjin Decoction has a therapeutic effect on knee arthritis by reducing chondrocyte apoptosis and promoting chondrocyte proliferation through NF-κB signaling pathway, which may be one of its mechanisms of action [23]. Endoplasmic reticulum-induced apoptosis of OA chondrocytes was inhibited by Bushen Zhuangjin Decoction, which also promoted the proliferation of chondrocytes and had a therapeutic effect on early OA. Bushen Zhuangjin Decoction can reduce the apoptosis of chondrocytes and promote the proliferation of chondrocytes by activating G1/S transition [24]. Bushen Zhuangjin Decoction can smooth the surface of regenerated cartilage tissue and basically fuse with the

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surrounding normal cartilage tissue.

4. Topical Chinese herbal therapy

External treatment of Chinese herbal medicine is a traditional medical therapy that uses non-oral drugs to achieve the purpose of preventing and treating diseases through the direct and indirect effects of drugs. External treatment of Chinese herbal medicine is clinically used for the treatment of a variety of diseases because of its simple operation and wide scope of application. It has a long history in China and is a treasure of Chinese medicine.

4.1. Chinese herbal fumigation therapy

Chinese herbal fumigation therapy of traditional Chinese medicine is a traditional external treatment of traditional Chinese medicine, which is an external treatment of medical diseases integrating the warming effect, meridian effect, and local direct penetration effect of concentrated drugs. The clinical efficacy and safety of traditional Chinese medicine fumigation in the treatment of osteoarthritis (OA) have provided effective clinical evidence and achieved more significant results, and the results are satisfactory after follow-up observation[25]. Oral Chinese herbal fumigation after arthroscopic debridement for KOA can improve pain, swelling and joint range of motion, promote the recovery of joint function, and improve clinical efficacy, and its mechanism of action may be related to the down-regulation of the level of joint influencing factors[26]. External washing therapy combined with traditional Chinese medicine and acupuncture is an effective improvement method for the treatment of osteoarthritis without side effects[27]. Chinese herbal compositions, especially involving an external lotion of Chinese herbs with clinical effect on treating osteoarthritis[28]. Traditional medicinal bath therapy combines medicinal bath therapy with specific traditional Chinese medicines and is still very popular in Asian countries and is applied to treat osteoarthritis, which has analgesic and anti-inflammatory effects, promoting blood circulation and removing blood stasis, especially for patients with osteoarthritis accompanied by itching[29]. Fumigation of Chinese herbal medicine can reduce the pain of patients, effectively improve the degree of swelling, and improve the functional effect of the affected area, with a low incidence of adverse reactions[30]. Studies have found that Chinese herbal fumigation combined with 99Tc-MDP has a good therapeutic effect on relieving pain, improving functional outcome and improving quality of life in patients[31]. Studies have found that allogeneic transplanted mice treated with Japanese herbal fumigation grow new regulatory cells that prolong survival and have potential therapeutic effects[32]. Chinese herbal medicine acts on the muscle surface of the whole body, so that the active ingredients of the drug directly penetrate into the deep tissues of the lesion site, use thermal penetration absorption to reach the lesion site, give full play to the efficacy, follow the meridians and blood vessels after absorption, reach the viscera, and transmit from outside to inside. It can play a role in dredging meridians, promoting blood circulation to remove blood stasis, driving wind and dispersing cold, clearing away heat and toxic substances, relieving swelling and relieving pain, adjusting yin and yang, and relieving pain. At present, Chinese herbal fumigation has achieved good clinical results and is widely used.

4.2. Chinese herbal bath therapy

Chinese herbal medicinal bath is effective in treating osteoarthritis without side effects and can be used as an alternative therapy for treating OA[33]. Although the expression levels of vascular endothelial growth factor and proliferating cell nuclear antigen in knee joint soft tissues were significantly increased, the positive cells after herbal bath were effective in the treatment of osteoarticular degeneration, which may cause the regulation of related genes to be enhanced. The clinical effect of Chinese herbal bath in the treatment of KOA is significant, which can effectively improve the degree of knee stiffness and knee joint function, reduce knee joint pain, and improve the quality of life of patients. The application of herbal medicine bath in the treatment of knee arthritis is safe and does not cause various types of adverse reactions.

4.3. External application of Chinese herbal therapy

External application of Chinese herbal medicine refers to the method of chopping and pounding fresh Chinese herbal medicine, or mixing Chinese herbal medicine powder with excipients into a paste and applying it to the affected area or acupoints called the application method. External application of

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traditional Chinese medicine in the treatment of patients with osteoarthritis, has a bactericidal and anti-inflammatory effect, can relieve the pain of arthritis, improve the functional effect[34]. It is recommended that patients with osteoarthritis usually perform external application of Chinese herbal medicine on time, do not perform strenuous exercise, pay attention to balanced nutrition in the diet, and maintain the safety and effectiveness of Chinese herbal medicine[35]. External application of Chinese herbal medicine makes Chinese herbal medicine act directly on the affected area, which can increase the local drug concentration, reduce the irritation of drugs to the gastrointestinal tract through transdermal absorption, and effectively avoid gastrointestinal discomfort caused by oral drugs and the toxicity of oral drugs, which is simple, rapid onset and safe.

4.4. Chinese herbal iontophoresis therapy

Drug iontophoresis is to dilate the local blood vessels of joints, warm the liver and kidney meridians, improve blood circulation, enhance human metabolism, promote the absorption of pathological products, so that drug ions directly penetrate into human joints[36]. Achieve the effect of eliminating dampness and detoxicating, warming meridians and dispersing cold, relaxing tendons and activating collaterals, relieving pain and joint function.

5. Chinese herbal dietotherapy

Traditional Chinese medicine (TCM) has long recognized that food can not only nourish, but also treat diseases and eliminate diseases. Diet therapy is used to cope with sub-health with better results[37]. Diet therapy is a method to use the characteristics of food to regulate physical function, so that it can obtain health or cure diseases and prevent diseases under the guidance of TCM theory[38]. Studies have confirmed that reasonable dietary intake can effectively relieve chronic pain and has appropriate preventive and regulatory effects[39]. The use of food to prevent and treat diseases, or to promote the recovery of diseases, is specifically applied in the form of food.

6. Discussion

Osteoarthritis belong to the category of "arthralgia" in traditional Chinese medicine (TCM), which is caused by evil spirits such as wind, cold, dampness, heat, phlegm, and blood stasis blocking meridians and affecting the movement of qi and blood, resulting in pain, heaviness, soreness, and numbness in limbs, bones, joints, and muscles, or symptoms such as unfavorable joint flexion and extension, stiffness, enlargement, and deformation. The main pathological changes of osteoarthritis are cartilage degeneration and disappearance, as well as reactive proliferation of ligament attachments at the joint margin and subchondral bone, forming hyperosteogeny, causing joint pain, stiffness deformity and dysfunction.

Long-term remission and reduction of adverse effects in patients depend on individualization of OA treatment regimens. Patients must choose the most ideal individualized treatment plan as much as possible based on their own treatment effect and tolerability. It is not advisable to simply emphasize the efficacy and ignore adverse drug reactions or worry about prone adverse reactions without giving standardized treatment. Therefore, the selection of individualized treatment options with good efficacy and no significant adverse effects is fundamental to control the disease and improve the prognosis of OA.

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