

Research on the progress of comprehensive rehabilitation treatment for patients with shoulder joint sports injuries

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ABSTRACT

After shoulder joint sports injury, shoulder pain, shoulder joint muscle strength weakening and activity limitation will occur, which will make shoulder joint function decline and affect the ability of self-care in life. In addition to early diagnosis and treatment and preventive work, attention should be paid to rehabilitation, so as to reduce the pain and injury degree of the shoulder joint, restore joint mobility, and improve muscle strength with effective rehabilitation treatment methods. This paper analyses the mechanism of shoulder joint stability and sports injuries, and discusses the progress of comprehensive rehabilitation treatment, aiming to provide rehabilitation guidance for patients with shoulder joint sports injuries.

KEYWORDS

shoulder joint; sports injury; integrated rehabilitation; treatment; progress

The shoulder joint is the joint with the greatest mobility in the whole body, and it is also one of the most flexible key parts, by which the upper limbs can perform activities such as forward flexion, backward extension, internal rotation, external rotation, internal retraction, and abduction ^[1]. And in some shoulder activity sports, such as badminton, swimming, basketball, tennis, skiing, etc., because of the greater utilisation of shoulder joint function, there are repeated over the top, throwing and other actions in the movement, the shoulder joint is in along time in the state of impact, imbalance, fatigue, which brings a higher load to it, and it is prone to cause shoulder joint sports injuries, which seriously affects people's normal activities. The recovery of shoulder joint injury is a long-term process, which requires the implementation of effective comprehensive rehabilitation treatment, so it is very important to explore the progress of comprehensive rehabilitation treatment.

1 Shoulder stabilisation mechanisms

The shoulder joint is mainly composed of the clavicle, scapula, and humerus forming the sternoclavicular, acromioclavicular, glenohumeral, and scapulothoracic joints. Of these, the scapula is a physiological joint and the glenohumeral joint is a ball and socket joint. Human shoulder joint movement is characterised by the sacrifice of stability for flexibility. Stability is based on the surrounding soft tissues such as capsular ligaments and muscles. The stabilisation mechanism is based on two stabilising devices, the static and dynamic shoulder joints. The former influences the glenoid labrum, the capsular ligament, the negative pressure in the shoulder cavity, the geometry of the articular surfaces, and the shoulder-humeral balance; the latter influences the rotator cuff, the biceps brachii, and the other shoulder muscles.

2 Analysis of shoulder sports injuries

Sports injuries to the shoulder joint can be categorised as mild, moderate or severe depending on the severity ^[2]. In mild injuries, there is mild pain, mainly centred at the top of the shoulder, mostly due to inflammation of the tendon. In moderate injuries, inflammation of the tendon is evident and sudden pain occurs during exercise. In severe injuries, the pain in the shoulder is so intense that it cannot be touched and can be exacerbated at night.

3 Progress in Integrated Rehabilitation Treatment

3.1 Physical Rehabilitation

Physical rehabilitation therapy, also known as physical factor therapy, is a treatment method with the help of physical

factors such as light, electricity, sound, magnetism and heat. It has the advantages of being non-invasive and painless, fast-acting and safe, and includes a variety of methods: (1) ultrasound. This method has a positive effect on relieving rotator cuff tissue pain and reducing inflammatory response. The study of Lu Weichen ^[3] and others reported that the application of ultrasound sonic physical factor therapy to patients with rotator cuff injury can effectively shorten the rehabilitation time of patients and enhance the rehabilitation effect. This method is mainly to massage and warm up the shoulder pain location of patients with the help of the thermal effect action of ultrasound and the physical properties of cavitation effect, in order to eliminate swelling, reduce adhesion, dredge calcium sludge, relieve muscle spasm and stiffness, improve local blood microcirculation, accelerate the absorption of inflammation, and promote the repair of locally damaged tissues, so as to effectively improve the discomfort symptoms of the shoulder, and to promote the recovery of function. (2) Laser irradiation. This method has good effect on shoulder pain relief, anti-inflammation and accelerated regeneration. The study of Liu Na ^[4] reported that the application of helium-neon laser to treat soft tissue defects of the extremities can effectively shorten the pain time of patients and promote the rapid recovery of body functions. A study by Zeng Science ^[5] and others reported that the application of laser pulse magnetic therapy to patients with rotator cuff tendonitis pain can better improve the degree of pain and shoulder joint function of the patients, and is safer. The laser pulse magnetic therapy instrument is a physiotherapy instrument that combines laser and pulsed magnetic field, with a depth of action of more than 8 cm, which is effective in relieving shoulder pain and anti-inflammatory and analgesic.

The high-intensity magnetic field enters the shoulder and transforms into inductive electricity, which stimulates acupoints and shoulder lesions, reducing nerve excitability and providing analgesic effects. Induction electrical stimulation can increase muscle activity and relative movement between tissues to loosen tissue adhesions, improve blood circulation, accelerate the pain-causing substances and inflammatory substances to exclude, in order to play the effect of anti-inflammatory swelling and pain relief. And the laser can irradiate the shoulder joint pain area, improve the vascular wall, cell membrane permeability, accelerate the speed of absorption of inflammatory exudate and inflammatory cell infiltration and dissipation speed, play a significant role in pain relief. (3) Infrared irradiation. Bu Caifang ^[6] and others reported that infrared irradiation of the painful parts of patients with shoulder arthritis for 25min each time, once a day, can effectively reduce the patient's inflammatory response and improve the feeling of pain. Another study pointed out that excessive shoulder activity is an important cause of shoulder joint sports injury, and shoulder tendons and bones will degenerate, and the treatment is based on the principle of opening the meridians and activating the collaterals, relieving pain and dispelling wind ^[7].

Infrared instrument is a medical device applied in recent years, can mobilise the body's ability to resist disease, penetrate the clothing to act on the parts of the body in need of treatment, the release of different wavelengths of infrared light, penetrate the skin to the subcutaneous tissues and muscles to produce thermal effects in order to produce a massage effect, relaxation of the muscles, accelerate the microcirculation of the blood to alleviate the pain, and to achieve the effect of rehabilitation and treatment. (4) Shockwave. This method has obvious effects on swelling reduction, anti-inflammation and analgesia, and has become an important method for the treatment of musculoskeletal diseases, especially the electromagnetic shockwave has remarkable efficacy on rotator cuff tendinopathy. Feng Jinfeng ^[8] and other research reports show that the application of extracorporeal shockwave therapy to patients with rotator cuff injuries can effectively reduce the pain of the patients, improve the function and mobility of the shoulder joint, and enhance the ability of self-care. Extracorporeal shock wave is specifically designed to induce physiological effects with the help of high energy of instantaneous sharp changes in pressure. In the case of no damage to the shoulder skin, muscle and connective tissue, it plays a therapeutic role on the bone tissue and diseased connective tissue to accelerate the local blood circulation and reduce the inflammation.

3.2 Rehabilitation of shoulder push-ups

Pushing shoulder push-ups is a shoulder joint training method for fitness exercise, which is simple, easy to learn, and safe, and has an obvious effect on muscle activation around the shoulder joint and improvement of shoulder joint biomechanics. Tax Li ^[9] et al. reported that pushing shoulder push-ups can effectively relieve patients' shoulder pain, improve shoulder flexion and abduction mobility, and accelerate the recovery of shoulder joint function. The method is to use four point support position, hand and knee four-point kneeling position as the starting position, the upper arm is opened with the same shoulder width perpendicular to the ground, straighten the elbow joint, the palm of the hand is placed on the ground, relax the fingers and point to the front, the lower limb is flexed at the hip and bent at the knee, and the knee is loaded and attached to the ground. Let the patients sink the scapula as far as possible for 5s, and at the same time retract both sides of the scapula for 5s, and then guide the patient to force the top up, so that the thorax and the scapula are attached for 5s, and instruct the patient to move the body weight in four directions to do the flexion and extension of the joints, adduction and abduction of the joints under the condition of not inducing pain in the shoulder

joints for 10 times, and then return to the normal position. Push-ups are performed three times a week for 20 min each time, which can increase the sensory input of the shoulder joint body via axial stimulation, activate the muscle groups around the scapula, gradually restore the position of the scapula and the trajectory of the scapula, improve the stability of the shoulder joint and coordination, and increase the patient's shoulder lifting action. The patient's retraction and jacking up movements can enhance the scapular muscle strength, especially the inferior oblique muscle bundle and the anterior serratus muscle, which can help the scapula sink and restore the normal position of the scapula and the thoracic silhouette. Push-ups are a closed-chain activity with distal fixation and proximal movement, which can provide axial pressure on the proximal end of the shoulder joint during abduction and flexion, and the scapular muscles can also cooperate with the upper trapezius muscle to generate rotational force couples to reduce shoulder joint shear force and help the scapula in the upper rotary movement. In addition, shoulder push-ups can intervene early in the patient to positively mitigate the soft tissue inflammatory response and restore shoulder joint coordination.

3.3 Comprehensive Rehabilitation Therapy in Chinese Medicine

Chinese medicine rehabilitation treatment methods mainly include acupuncture therapy, massage therapy, acupuncture and knife therapy, etc., which can relieve patients' shoulder joint pain for a short period of time and increase the degree and range of shoulder joint movement.

(1) Acupuncture therapy. This method belongs to the characteristic therapy of traditional Chinese medicine, which takes points for patients with dialectical evidence, and stabs specific points through the body of the needle, in order to play the role of activating the meridians and collaterals. Yu Binglun^[10] and other research reports show that the combination of acupuncture therapy on ultrasound-guided drug injection therapy for patients with acute supraspinatus small tear rotator cuff injuries can further reduce the patients' shoulder joint pain and improve the range of motion of the upper limb and quality of life. Specifically, with the patient in the sitting position, the patient's affected side of the shoulder anterior, shoulder, shoulder chastity and shoulder soles points were taken and needled with a 0.25mm*40mm needle set, and then the healthy side of the middle flat and Yanglingquan points were selected and stabbed 1.5 inches. And use 0.25mm*75mm needle set to stab the lateral striated mouth point, after getting qi insert diarrhoea, leave the needle for 30min. Suwen pointed out that the disease of shoulder joint injury is in the tendon, and the contracture of tendon leads to pain. Therefore, Chinese medicine attributes shoulder joint injury to tendon paralysis, which is caused by strain, trauma, wind, cold, dampness and evil invasion, resulting in venous paralysis and obstruction, and qi and blood are not smooth, and pain is caused by lack of circulation, and the tendon is attached to the bone, forming tendon to maintain the stability of the joint to constrain the bone. Hand yangming large intestine meridian through the shoulder, hand sun small intestine meridian out of the shoulder solution, hand shaoyang Sanjiao meridian through the forelimbs outside the shoulder, take the three yang meridian shoulder, shoulder chastity, shoulder soles, can play the role of meridian evacuation, fluent joints; take in the flat point, yanglingquan point can play a role in the treatment of shoulder joint disease; the mouth of the bar through the chengshan is the shoulder pain of a common acupuncture points. The points match and complement each other, in order to Shu Tong tendons and veins, harmonise qi and blood, anti-inflammatory pain, and improve the shoulder joint injury.

(2) Tuina therapy. This method is atypical external treatment in Chinese medicine, which can relieve pain, soothe tendons, activate blood circulation, reduce the degree of pain in the patient's upper limbs, improve the mobility of the shoulder joint, and accelerate functional recovery. According to a report by Yang Time^[11], the application of Tui Na therapy to patients with periarthritis of the shoulder can effectively improve their pain and shoulder joint function and mobility. In traditional Chinese medicine, "tendons come out of the groove, bones are wrongly sewn", and Tuina includes pushing, pressing, kneading, and 揉 method, etc., which can regulate tendons and bones, dredge meridians and collaterals, and promote blood circulation through the line of qi and blood. Through precise positioning of acupoints, such as Tianzong, Shoulder Well, Shoulder Chastity, Shoulder Neiling, and Shoulder Point, it can stimulate and improve the local blood circulation, raise the pain threshold of the patient, loosen and tighten the stiff muscles, and accelerate the absorption of oedema, in order to achieve analgesic effect and restore the function of shoulder joint. Among them, Tianzong can reduce swelling and regulate qi, soothe muscles and collaterals, and push and massage the rich rotary shoulder arterial and venous branches under the umbilicus can promote local blood circulation; Shoulder well is the meeting point of the foot-shao yang gallbladder meridian, and after push and massage it is possible to promote qi and blood circulation, dispel wind and activate collaterals; Shoulder chastity can steam and disperse the upwardly moving qi in order to play a role in soothing the meridians and activating the collaterals; Shoulder Neiling belongs to the meridian and extra-meridian qi points, which can soothe tendons and dispel wind and activate the collaterals; Shoulder can disperse the wind and heat and activate the channels and collaterals to alleviate the pain of shoulder coils. Shoulder kneading, 揉 and internal and external rotation can relax the muscles, relieve muscle spasm, reduce pain and accelerate the absorption of inflammation. Doing point pressure and flicking on acupoints and other points in order to stimulate the

pain points to relieve the pain response has a good effect of improving the soft tissue injury and pain in the shoulder joint, and then gradually restoring the function of the shoulder joint.

(3) Needle knife therapy. This method belongs to closed tendon release, which is a method between surgery and non-surgery, derived from needle therapy. It mainly loosens the adherent tissues, reduces the fascial tension, relieves muscle stiffness and spasm, and reduces shoulder joint pain, in order to improve shoulder joint movement and improve the prognosis. Some studies have shown that acupuncture therapy can promote local blood circulation and lymphatic circulation in the shoulder joint and promote the absorption of inflammatory factors. Reports by Wang Jiao-yun^[12] et al. showed that the application of needle-knife release to patients with chronic rotator cuff injuries on the basis of rehabilitation exercises could significantly reduce patients' shoulder joint pain, improve shoulder joint function, enhance the quality of life, and obtain high clinical efficacy. Needle and Knife Release is a new type of medical therapy which combines the theory of traditional Chinese medicine and modern medical theory by Prof Zhu Hanzhang. For soft tissue injury caused by shoulder joint movement, needle and knife can be used to release the adherent tissues in the periapical region to alleviate the pain in the shoulder joint and restore its function. It can be divided into needle and knife, the needle plays the role of activating blood circulation and activating meridians and collaterals, and the knife can cut the skin tissue to reach the lesion, eradicate the lesion tissue nodules or scar, separate the adhesion tissue, and relieve the lesion tissue from compressing the nerve endings, and the mechanical stimulation can expand the local small blood vessels, accelerate the blood circulation, and eliminate the tensile stress of the lesion soft tissues, so as to alleviate the pain. And needle knife release can stimulate peripheral nerves, form humoral and cellular immunity, accelerate the absorption of inflammatory substances, and restore the balance of the shoulder joint and shoulder joint function. Zhang Qibing^[13] also reported that needle-knife release has a significant therapeutic effect on frozen shoulder.

4 Summary

It can be seen through the review that shoulder joint sports injuries need along time to recover, and it is very important to give effective rehabilitation treatment. In-depth research on physical rehabilitation therapy, shoulder push-up rehabilitation therapy, and comprehensive rehabilitation therapy of traditional Chinese medicine can be carried out in order to effectively promote the alleviation of the pain and injury level of the shoulder joint, enhance the muscle strength, and restore the joint function.

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