EFFECT OF FOOTBALL ON REHABILITATION OF ANKLE INJURY PATIENTS

EFEITO DO FUTEBOL NA REABILITAÇÃO DE PACIENTES COM LESÃO NO TORNOZELO

EFECTO DEL FÚTBOL EN LA REHABILITACIÓN DE PACIENTES CON LESIONES DE TOBILLO

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ABSTRACT

Introduction: Brief introduction: Ankle tendon and ligament sports injuries are common in football players. Objective: To continue to improve special strength training related to the characteristics of football after rehabilitation of injured ankle tendons and ligaments. Methods: Two master football sportsmen were rehabilitated by multi-point equal-length, short-arc and long-arc equal-speed training combined with balance ability exercises. Results: There were two long muscle L be maintain muscle tone plantar flexors force four times of 96 n/m, n/m 121, 140 n/m, 145 n/m than back flexors force of 63 n/m, 52 n/m, 60 n/m, 74 n/m tall. Plantar flexor fatigue was 57%, 30%, 29%, 12%, 28%, 18%, 20%, 21%. Conclusions: With the passing of time, the relative peak moment value of the right ankle plantar flexor muscle group of the two patients kept rising, the dorsiflexor muscle was basically flat, and the work fatigue index decreased step by step, indicating that the right ankle muscle strength level was significantly improved, the anti-fatigue ability was improved, and the rehabilitation treatment had a good effect. ***Level of evidence II; Therapeutic studies - investigation of treatment results.***

Keywords: Football; Ankle joint; Athletic Injuries.

RESUMO

Introdução: Introdução breve: Lesões esportivas nos tendões e ligamentos do tornozelo são comuns em jogadores de futebol. Objetivo: Atingir melhora no treinamento de força especial relacionado com as lesões características do futebol depois de reabilitação de tendões e ligamentos do tornozelo. Métodos: Dois futebolistas de primeira linha foram reabilitados por treinamento multipontos de comprimento igual, arco curto e arco longo em velocidade igual, combinado com exercícios de habilidade de equilíbrio. Resultados: Havia dois músculos longos L para manter o tônus muscular, força dos flexores plantares antes e depois de quatro vezes de 96 n/m, 121 n/m, 140 n/m, 145 n/m e força dos flexores dorsais de 63 n/m, 52 n/m, 60 n/m, 74 n/m de altura. A fadiga do flexor plantar foi de 57%, 30%, 29%, 12%, 28%, 18%, 20%, 21%. Conclusões: Com o passar do tempo, o valor do momento de pico relativo do grupo de músculos flexores plantares do tornozelo direito dos dois pacientes continuou aumentando; o músculo flexor do dorso estava basicamente plano e o índice de fadiga no trabalho diminuiu gradativamente, indicando que o nível de força muscular do tornozelo direito melhorou significativamente, assim como a capacidade antifadiga e, portanto, que o tratamento de reabilitação teve efeito positivo. ***Nível de Evidência II; Estudos terapêuticos - Investigação dos resultados do tratamento.***

Descritores: *Futebol; Articulação do tornozelo; Traumatismos em atletas.*

RESUMEN

Introducción: Breve introducción: Las lesiones deportivas en los tendones y ligamentos del tobillo son comunes en los jugadores de fútbol. Objetivo: Lograr una mejora en el entrenamiento de fuerza especial relacionado con las lesiones características del fútbol tras la rehabilitación de los tendones y ligamentos del tobillo. Métodos: Dos jugadores de fútbol de alto nivel fueron rehabilitados mediante un entrenamiento multipunto de igual longitud, arco corto y arco largo a igual velocidad, combinado con ejercicios de habilidad de equilibrio. Resultados: Hubo dos músculos L largos para mantener el tono muscular, fuerza de los flexores plantares antes y después de cuatro veces de 96 n/m, 121 n/m, 140 n/m, 145 n/m y fuerza de los flexor dorsales de 63 n/m, 52 n/m, 60 n/m, 74 n/m de altura. La fatiga de los flexores plantares fue del 57%, 30%, 29%, 12%, 28%, 18%, 20%, 21%. Conclusiones: Con el paso del tiempo, el valor del momento máximo relativo del grupo de músculos flexores plantares del tobillo derecho de los dos pacientes continuó aumentando; el músculo flexor dorsal estaba básicamente plano y el índice de fatiga de trabajo disminuyó gradualmente, lo que indica que el nivel de fuerza muscular del tobillo derecho mejoró significativamente, al igual que la capacidad antifatiga, y, por tanto, que el tratamiento de rehabilitación tuvo un efecto positivo. ***Nivel de Evidencia II; Estudios terapéuticos - Investigación de los resultados del tratamiento.***

Descriptores: *Fútbol; Articulación del tobillo; Traumatismos en atletas.*

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INTRODUCTION

Ankle joint lateral ligament damage is the most common ankle injury, both in the general population and high level athletes in the process of work, life and sports, due to the effect of the external environment and own factors are prone to an ankle injury, but most see more in the ankle injury, the highest incidence of ankle joint lateral ligament damage.[1] The incidence of lateral ankle ligament injury is higher in both sports and non-sports population. In terms of non-exercise people, it is reported that the number of such injuries every day is as high as 23,000.[2] It is generally believed that women have a higher incidence of lateral ankle sprain.[3] The investigation and study on professional football players found that the incidence of ankle joint injury was as high as 100%[4]. In view of this research problem, Khalifeloo M et al pointed out that the proportion of ankle injuries in sports injuries is about 9% in the cause of ankle injuries. In terms of sports people, injuries of the lateral ligament of the ankle joint account for the highest proportion of sports injuries, and the incidence is as high as 20%~30%.[5] Ciou S H et al found in their study that football is not a high-risk sport in a sense, because due to the restrictions of rules, football players will try their best to reduce physical contact by running or penetrating in the process of attack or defense to avoid foul. However, even within the limits of the rules, there will still be reasonable physical contact in the process of scrum or jamming, especially with the increase of the intensity of confrontation, more and more physical contact will increase the probability of injury.[6-7]

METHOD

Research Objects

The basic information is shown in Table 1.

Wu a major guard, the right ankle achilles tendon strain is serious, there is a strain of achilles tendon peritonitis, the performance of local thickening, tenderness, and touch the induration feeling. There is still a 5cm thickening of the right achilles tendon, which is a degree II partial ligament tear according to the degree of soft tissue injury. Suspended from training, admitted to hospital and successfully completed achilles tendon and ligament sutures. Wu, the department of avant-garde, achilles tendon side collateral ligament excessive traction, acute sprain, is a degree I injury. Slight swelling. After physical examination and early isokinetic muscle strength test, both patients had no severe ankle pain, joint effusion and other phenomena.[8]

Research Methods

The maximum muscle strength indexes of ankle joint plantar and dorsiflexor muscles were mainly tested by using biodexpro3 isokinetic force measuring system at 60°/ SX5 times. The maximum muscle strength indexes of ankle joint plantar and dorsiflexor muscles were mainly tested at 180°/ SX25 times. The indexes were tested for 4 times before and after rehabilitation treatment. BiodexBBS dynamic balance system (divided into 8 levels) and myosystem portable emg instrument were used to compare the stability index and emg fatigue index of the affected side of two male football athletes before and after treatment. In the test, two people stand on the affected leg in turn, the healthy leg after bending the knee about 90°, stand for 30 seconds continuously, according to the stability program set by the system from easy to difficult in order to "8~1" grade, the sole as close as possible to the center of the display screen, the same part of the move, with the rotation of the platform to do a variety of forward, backward, roll-in and roll-out actions. Two tests were performed before and after treatment. At the same time, combined with surface EMG, the right tibialis anterior muscle, soleus calf muscle, extrafemoris thigh muscle and biceps femoris muscle were collected from electrode 1 to 4 respectively. The fifth channel is connected to the EMG conversion receiver to synchronize the balance test action with the EMG. SPSS software was used for statistical analysis of relevant data indicators, and two-tail T-test was performed for Wells.[9]

Table 1. Basic information of research objects.

name	age	stature	weight	Traininglevel	Site of ligament injury	Start time of rehabilitation
Wu	28	1.83	78.8	master sportsman	Rightankle	After45days
Wang	29	1.79	69.6	master sportsman	Rightankle	45daysafterinjury

Rehabilitation treatment process

1. The first stage (15 days) of braking, the purpose is to prevent joint adhesion and low stiffness and muscle atrophy, adjust its anxiety, the initial use of closed chain training mainly, gradually increase the training intensity and load gradually restore muscle strength. Start with speed-centered recovery training principles. When performing ankle joint plantar and dorsiflexion exercises, the CPM should first help the exercise. When the limb is able to resist gravity, start short arc isokinetic muscle training. Range of motion is limited to 45°. During the training, the angular speed was changed from fast to slow, and the interval span was 30 groups, a total of 20 groups, 10 times for each group of isokinetic strength training.[10]

2. The second stage (19 days) aims to maximize the recovery of joint range of motion and muscle strength, and rapidly improve the muscle strength of lower limbs. Enhance the motor load of the active and antagonistic muscle groups of lower limbs, including increasing the range of joint motion. Gradually increase the number of practice in each group, and set the time, reduce the number of passive training, shorten the interval time. Exercise on both sides of the "pain point" instead of the "arc of pain".

3. In the third stage (10 days), the pain points of the joint of the two people were completely solved. It mainly focuses on the tibialis anterior muscle of dorsiflexion and the plantar-flexion calf posterior muscle group to carry out centripetal and centrifugal isometric exercise. Typically, multi-angle isometric muscle strength training is adopted: Select 20° interval Angle, force for 10 seconds at each angle of plantar, rest for 10 seconds, repeat dorsiflexion force for 10 seconds, as a group. Train 5 to 6 angles in turn, 5 groups for each Angle, and rest for 30s between groups. Then the full arc isokinetic centripetal muscle strength training method was selected appropriately, the speed gradually decreased, and the range of motion gradually increased and fixed.

4. The fourth stage (14 days) aims to accelerate the healing of the reconstructed ligament as soon as possible, strengthen the stability of the ankle joint, and enable the injured ankle joint to recover weight bearing and motion functions as soon as possible, so as to train with the team. At this stage, although the muscle strength of the achilles tendon and ligament of the ankle joint of the lower limb was basically restored, the 1-8 level procedure of the dynamic balance system was selected to carry out the targeted treatment of the dynamic stability of the joint and the motion perception ability of the individual in weightlessness. This multi-axis posture control, compensatory exercise can quickly improve the individual's sense of spatial position, stimulate the sensitivity of the muscle spindle around the ankle joint. The training stages are from easy to difficult, and the sequence is standing on both legs, standing on the healthy side, standing on the affected side, and balancing training on both legs with eyes closed. 20min per person/time.

RESULTS

Comparison of calf circumference and joint activity of healthy and rest sides before and after kang treatment

As can be seen from Table 2, the ankle and calf circumference of the two patients increased rapidly in more than one month, while the joint motion norm increased significantly and almost doubled.

With the passing of time, it can withstand the normal amount of training, no adverse reactions, swelling at the Achilles tendon subsided, pain significantly reduced, comparative examination found no significant difference in calf circumference, both sides tend to balance.

Examination of muscle function before and after lian Fu training

Figures 1 and 2 show the maximum strength and strength endurance indicators. Due to the influence of individual differences, the maximum strength index is mainly taken as the ratio of peak moment to body weight, also known as the relative peak moment (PT/BW). The relative muscle force strength endurance, which represents muscle contraction, is mainly reflected by the work fatigue ER, unit (%). Specifically, it represents the fatigue resistance ability of muscles when they contract repeatedly. The lower the endurance index, the stronger the fatigue resistance ability of muscles, indicating that the endurance is better. Then observe two people for a long time to maintain muscle tension and stress. With the passing of time, the relative peak moment value of the right ankle plantar flexor group of the two people kept rising, the dorsiflexor was basically flat, and the work fatigue index decreased step by step, indicating that the muscle strength level of the right ankle was significantly improved and the anti-fatigue ability was improved, and the right ankle even exceeded the uninjured left ankle in some muscle strength levels.

Table 2. Comparison of calf circumference and range of motion before and after rehabilitation treatment.

	Crus dimension	Range of motion
prior treatment	-1.6 ± 0.5	46.8 ± 1.2
post treatment	0.8 ± 1.0	85.3 ± 1.6

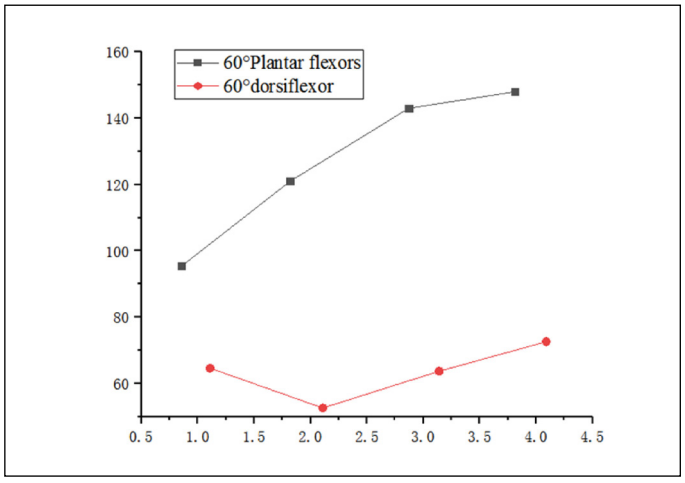

Figure 1. Four changes of relative peak torque.

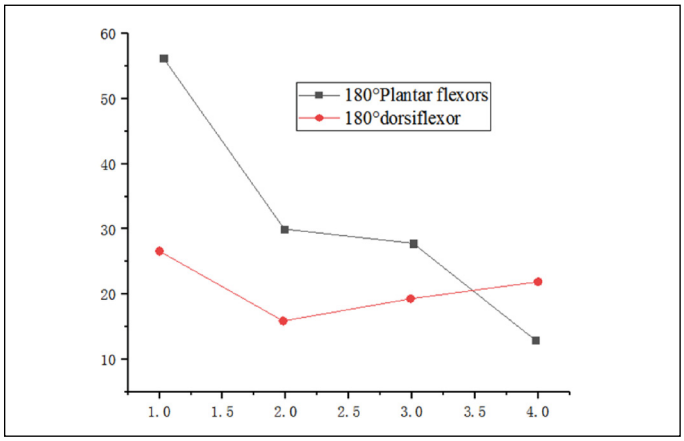

Figure 1. Four changes of relative peak torque.

DISCUSSION

Look from anatomy, anklebone is by tibia, fibula and inside, outside anklebone surface and talus form the flexion joint, inside triangle ligament is firmer, lateral collateral ligament is weaker. The ankle joint capsule is loose in front and back and tight on both sides. Ankle ligament injuries are most common in football players, especially in men's football, whose technical structure includes many skills such as sprint, jump, turn and stop, etc. Players are often in fast, wide range of running and long period of intense confrontation. Such high-intensity and high-bearing exercises are easy to be injured. Therefore, after the rehabilitation of the injured ankle tendon and ligament, it is necessary to continue to strengthen the special strength training related to the characteristics of football projects, and comprehensive strength training is very necessary for the treatment and prevention of ligament pain.

CONCLUSION

Strengthen the strength training of the ankle extensor muscle group, prevent the strength of the extensor muscle group to decline too fast, and further strengthen the strength training of the flexor muscle group, and improve the stability of technical movements and the range of the power of medium and long range shooting. The coordination exercises of knuckle related muscle groups such as F limbs, knees, waist and back should be appropriately increased, and the force training methods of internal and external rotation, active and passive combination should be adopted to change the special technical characteristics. After the rehabilitation treatment period, the calf muscle fiber of the two patients increased, and the corresponding strength and muscle fatigue resistance were significantly improved, indicating that the rehabilitation treatment achieved a good effect.

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