

Effects of Auricular Point Pressing with Bean Combined with Proprioceptive Training on Early Functional Activities of Affected Limbs after Knee Arthroscopy with Anterior Cruciate Ligament Reconstruction

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Abstract

Purpose To investigate the effect of auricular point pressing with bean combined with proprioceptive training on the early functional activities of affected limbs after knee arthroscopy anterior cruciate ligament reconstruction. **Method** A total of 90 patients with knee arthroscopic anterior cruciate ligament reconstruction received in our hospital from July 2020 to July 2021 were divided into groups according to the last parity of the hospital number. They were randomly divided into research group and control group, with 45 cases in each group. The control group was given routine medication and standardized basic rehabilitation training program. On the basis of the above, the research group adopted auricular point pressing with bean combined with proprioceptive training. The Lysholm score, NRS score, and motion range of joint were compared between the two groups. **Result** Before intervention, there was no significant difference in Lysholm score between the two groups ($P>0.05$); Two weeks after the intervention, the Lysholm scores in the two groups increased significantly, but the scores in the experimental group were higher ($P<0.05$). Before intervention, there was no significant difference in NRS score between the two groups ($P>0.05$); After two weeks of intervention, the NRS scores in the two groups were significantly decreased, but the scores in the experimental group were lower ($P<0.05$). Before intervention, there was no significant difference in the range of motion between the two groups ($P>0.05$); After two weeks of intervention, the level of joint range of motion in the two groups increased significantly, but the level in the experimental group was higher ($P<0.05$). **Conclusion** In the recovery process after knee arthroscopy with anterior cruciate ligament reconstruction, taking auricular point pressing with bean combined with proprioceptive training is beneficial to promote the recovery of knee joint function, further relieve the pain symptoms of patients and improve the joint range of motion.

Keywords

Auricular point pressing with bean; Proprioceptive training; Knee arthroscopy; Ligament reconstruction; Range of motion.

1. INTRODUCTION

The anterior cruciate ligament is one of the main ligaments that maintain the normal function of the knee joint. Once the anterior cruciate ligament is severely injured or torn, it will affect the function of the knee joint, and it will lead to the loss of the stable structure of the knee joint, and also cause the knee joint proprioception damage, which hinders the normal life of the patient [1]. Surgery is mainly used to treat anterior cruciate ligament injury in clinic, among which arthroscopic anterior cruciate ligament reconstruction of the knee is a commonly used

operation, which can obtain better therapeutic effect. Because surgical treatment is an invasive treatment, patients still need to go through a relatively long period of postoperative recovery. In this process, it is necessary to give targeted nursing measures to intervene patients, guide patients to perform postoperative functional exercises, and promote the recovery of knee joint function. Due to the limitation of muscle strength and pain in the early postoperative period, some patients may experience lag in functional exercise, which affects the functional activities of the knee joint and causes joint stiffness [2]. Auricular point pressing with bean is also known as auricular pressure therapy. By pinpointing the reaction points on the ears corresponding to the body parts, and moderately pressing with the seeds of Wangbuliuxing, it can reduce swelling and pain, and activate the meridians and collaterals, which is beneficial to relieve postoperative pain symptoms of patients [3]. Proprioceptive training is a branch of modern rehabilitation. There is sufficient evidence-based medical evidence to prove that it can play an important role in the rehabilitation of anterior cruciate ligament [4]. In our hospital, 45 patients with knee arthroscopy anterior cruciate ligament reconstruction underwent auricular acupuncture combined with proprioceptive training on the basis of routine nursing. The report is as follows.

2. MATERIAL AND METHOD

2.1. General Material

Inclusion criteria: The selected patients met the diagnostic criteria for anterior cruciate ligament injury in the "Clinical Diagnosis and Treatment Guidelines-Physical Medicine and Rehabilitation Volume" [5]. They had no meniscal injury and had knee arthroscopic anterior cruciate ligament reconstruction. The patients were 18-40 years old, with a medical history of less than 3 months. After being discharged from the hospital, they can cooperate with the follow-up consultation and return visit according to the doctor's order. They are aware of the research content, sign the consent form, and obtain the approval of the ethics committee of the hospital.

Exclusion criteria: Medical history more than 3 months; Severe muscle weakness or atrophy is present; Those who have cognitive impairment or communication impairment and cannot cooperate according to the doctor's orders; Drug allergy; Liver, kidney, and other organ dysfunctions.

A total of 90 patients with knee arthroscopic anterior cruciate ligament reconstruction received in our hospital from July 2020 to July 2021 were divided into groups according to the last parity of the hospital number. They were randomly divided into a study group and a control group, with 45 cases in each group. There were 25 males and 20 females in the study group, aged 18-40 years old, with an average of (29.69 ± 5.03) years old. The causes included 14 cases of traffic accident injury, 20 cases of sports injury, 6 cases of fall injury, and 5 cases of sprain. The control group included 26 males and 19 females, aged 18-40 years, with an average of (28.27 ± 5.15) years old. The causes included 13 cases of traffic accident injury, 21 cases of sports injury, 7 cases of fall injury, and 4 cases of sprain. There was no significant difference in general data between the two groups in terms of gender, age and cause of disease ($P > 0.05$).

2.2. Method

Both groups of patients underwent anterior cruciate ligament reconstruction under knee arthroscopy. The control group was given analgesics according to the doctor's orders, and received routine rehabilitation care. Medical staff assist patients to wear protective braces, and allow patients to perform standardized basic functional exercises under the guidance of nursing staff. Under the guidance of rehabilitation specialists, patients gradually performed muscle strength training, joint range of motion training and walking exercises. After each exercise, ice was applied around the knee joint for 20 minutes to reduce swelling.

On the basis of the above, the research group adopted auricular acupoint pressing and bean pressing combined with proprioceptive training. (1) Auricular pressure with beans. On the day of surgery, unilateral ear acupuncture can be performed. The auricle can be routinely disinfected, and acupoints such as sympathetic, Shenmen, subcortical, and Ashi can be taken. Use Wangbuliuxing's seed paste to press on the above-mentioned auricular points, massage properly, and it is advisable to feel sore, numb, distended, painful and hot in the local area. Regularly press acupoints 20 to 30 times each time, alternately with both ears, 3 times/d. (2) Proprioceptive training. On the day of the operation, after the effect of the anesthetics disappeared, the ankle pump exercise of the affected limb can be performed to improve the proprioceptive stimulation. Proprioceptive tactile stimulation can be started on the first day after operation. Gently touch the skin of the affected limb with your hands and brush back and forth for 3-5 s, rest for 2-3 s and then perform the next time, so as to induce the retraction response of the stimulated limb muscles. The total stimulation time is about 1 min. Do it once a day after ice compress, 2 times/d. Percussion around the knee joint, quadriceps femoris and hamstrings with the tip of the 2nd to 4th fingers of the hand, 30 times/min, for 5 min. Pay attention to maintaining the percussion strength, try not to cause pain and discomfort to the patient, 2 times/d. At the same time, transcutaneous electrical stimulation electronic biofeedback therapy device was used for treatment. Adopt quadrupole interference current mode, reduce presynaptic inhibition and increase quadriceps nerve excitation impulse. Reconstruct the relationship between the ligament-muscular reflexes between the anterior cruciate ligament and the quadriceps, thereby stimulating the regeneration of knee joint proprioceptors and improving proprioception, 1 time/d. After the patient was discharged from the hospital, he was instructed to complete the proprioceptive training independently at home or with the assistance of his family, such as half-squat ball-throwing training or gait flexibility training.

2.3. Observation Indicator

Two weeks after the intervention, the Lysholm scale was used to evaluate the knee joint function of the two groups of patients. The scale involves eight dimensions, including lameness, weight bearing, whether there is interlocking, joint instability, pain, swelling, going up and down stairs, and squatting, with a total of 100 points. The higher the score, the better the knee function of the patient [6]. The pain symptoms of the patients were evaluated by the NRS scale. The scale is marked as 0-10 points. The higher the score, the more severe the patient's pain symptoms [7]. The range of motion of the knee joint was compared between the two groups of patients.

2.4. Statistical Analysis

The research data were analyzed with SPSS 22.0. Enumeration data were expressed as [n(%)], and χ^2 test was performed. The measurement data were expressed as ($\bar{x} \pm s$), and the t-test was performed. $P < 0.05$ means the difference is statistically significant.

3. RESULTS

3.1. Comparison of Two Groups of Lysholm Scores

Before intervention, there was no significant difference in Lysholm score between the two groups ($P > 0.05$); Two weeks after the intervention, the Lysholm scores in the two groups increased significantly, but the scores in the study group were higher ($P < 0.05$), as shown in Table 1 below.

Table 1. Comparison of two groups of Lysholm scores ($\bar{x} \pm s$, score)

Group	Before intervention	2 weeks after intervention
Study Group (n=45)	20.45±4.54	38.19±6.98*
Control Group (n=45)	20.41±5.65	31.96±5.82*
t	0.209	5.203
P	0.835	<0.001

Note: Compared with before intervention, *P<0.05.

3.2. Comparison of NRS Scores Between the Two Groups

Before intervention, there was no significant difference in the NRS scores between the two groups (P>0.05). After two weeks of intervention, the NRS scores in the two groups were significantly decreased, but the scores in the experimental group were lower (P<0.05), as shown in Table 2 below.

Table 2. Comparison of NRS scores between the two groups ($\bar{x} \pm s$, score)

Group	Before intervention	2 weeks after intervention
Study Group (n=45)	5.84±2.00	2.70±1.14*
Control Group (n=45)	5.88±1.47	1.80±1.12*
t	0.336	2.346
P	0.738	0.021

Note: Compared with before intervention, *P<0.05.

3.3. Comparison of the Motion Range of the Knee Joint Between the Two Groups

Before intervention, there was no significant difference in the range of motion between the two groups (P>0.05); After two weeks of intervention, the level of joint range of motion in the two groups increased significantly, but the level in the experimental group was higher (P<0.05), see Table 3 below.

Table 3. Comparison of joint motion range of between the two groups ($\bar{x} \pm s$, °)

Group	Before intervention	2 weeks after intervention
Study Group (n=45)	56.72±10.68	98.43±12.31*
Control Group (n=45)	53.47±9.89	91.10±12.63*
t	0.524	3.192
P	0.601	0.002

Note: Compared with before intervention, *P<0.05.

4. DISCUSSION

After arthroscopic anterior cruciate ligament reconstruction, patients usually need to be guided to perform functional exercises step by step, including muscle strength training, joint range of motion training, and walking exercises, which are of great significance for the recovery of joint function. However, some patients may hinder their functional exercise activities due to factors such as swelling and pain [8]. Therefore, it is necessary to adopt certain rehabilitation nursing strategies after surgery to reduce the pain of patients, so that patients can cooperate with early rehabilitation activities and restore their knee joint function as soon as possible.

Auricular acupoint pressing is the compression therapy of auricular acupoint area. Appropriately pressing the corresponding body parts on the ears with Wangbuliuxing seeds can reduce swelling, relieve pain, clear the meridians and activate collaterals, and has a positive effect on relieving postoperative pain symptoms of patients. Auricular acupuncture has a long history. Traditional Chinese medicine believes that the ear is connected with the internal organs through the twelve meridians, and the viscera organs have a dialectical relationship. And through the external collaterals of the twelve meridians, it forms a unified connection between the ear, the limbs, the skin, the muscles, the five senses and the seven orifices. Pressing beans through auricular acupoints can increase the pain threshold and exert an auxiliary analgesic effect [9]. In this study, the auricular acupoint pressing beans selected sympathetic, Shenmen, subcortical, Ashi and other acupoints, which can exert the effects of benefiting the heart and calming the nerves, regulating the meridians and relieving pain, and relaxing the meridians and promoting blood circulation. After two weeks of intervention, the NRS scores in the two groups were significantly decreased, but the scores in the experimental group were lower ($P < 0.05$), which reflected that auricular acupoint pressing beans could further relieve postoperative pain symptoms.

Proprioception is the perception of muscles, tendons, joints, ligaments, etc. in various parts of the body from one's own body. By processing and using this information, it is possible to perceive where it is and how the muscles themselves are moving. The lack of proprioception in patients with sports injuries is mainly the sense of position, movement, weight-bearing and motor coordination of soft tissues and joints. All motor skills are formed on the basis of proprioception [10]. Therefore, training proprioception to induce knee motion response plays an important role in functional exercise after knee ligament injury. In this study, after two weeks of intervention, the Lysholm scores in the two groups increased significantly, but the scores in the experimental group were higher ($P < 0.05$); After two weeks of intervention, the level of joint range of motion in the two groups increased significantly, but the level in the experimental group was higher ($P < 0.05$). It can be seen that proprioceptive training can further improve the knee joint function of patients and increase the range of motion of the joint. Proprioceptive training can activate the residual proprioceptive receptors in the knee joint of patients, so that patients can get effective exercise with proprioceptive input as soon as possible after surgery [11]. Proprioceptive training can promote muscle contraction, exert the function of muscle pump, promote local microcirculation, and help relieve edema and pain symptoms. Proprioceptive training is relatively simple and well tolerated by patients who do not resist treatment. Under the proprioceptive nerve-muscle feedback mechanism, the range of motion of the joint can be restored as soon as possible, which is beneficial to enhance the stability of the knee joint and improve the overall function of the knee joint [12].

To sum up, in the recovery process of knee arthroscopy anterior cruciate ligament reconstruction, the implementation of auricular acupoint pressing beans combined with proprioceptive training can produce a synergistic effect, which is conducive to promoting the recovery of knee joint function, further relieving patients' pain symptoms, and improving joint activities. Spend. It is of great significance to patients' postoperative recovery.

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