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Curative effects of under-arthroscopic anchor implantation fixation to martial arts player's shoulder joint injury.

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Abstract

We chose 60 patients with shoulder joint injury that have received arthroscopic anchor implantation fixation treatment in Southwest Hospital from January 2012 to October 2015 and divided them into a control group and an observation group equally, using computer single-blind randomized method. Patients with shoulder joint injury in the control group have received conservative treatment, while patients with shoulder joint injury in the observation group have received arthroscopic anchor fixation treatment. The treatment effects, shoulder function score, scope of activities of shoulder joint, life quality score, pain score, and dislocation recurrence rate of shoulder joint for patients from different groups were compared. We found that after 7-15 months of follow-up observation following the treatment, the excellence rate of the observation group was 100%, while that of the control group was 80%, P<0.05. After the treatment, scope of activities of the shoulder joint, life quality score, and their pain score were significantly lower; shoulder joint function score, scope of activities of shoulder joint, and life quality score of those in the control group were significantly higher, and their pain score were significantly lower. During the time of follow-up after treatment, no recurrent dislocation of shoulder joint occurred within the observation group, which means a 0% recurrence rate, while there were 4 cases of recurrent dislocation of the shoulder joint in the control group, which means the recurrence rate in the control group is 13.33%. To conclude, the shoulder joint arthroscopic anchor fixation treatment on martial arts player for shoulder joint injury is effective in that it helps with shoulder joint functional recovery reduces the pain in the shoulder and improves patients' life quality. What is more, recurrence is also reduced after the treatment, which helps to improve the prognosis.

Keywords: Shoulder joint injury, Arthroscopic, Anchor implantation fixation.

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Introduction

Dislocation injury of the shoulder joint is a common lesion caused by sports in Wushu athletes. Symptoms of this injury are limited scope of activities, shoulder joint pain, and impacted daily life and work. The key to curing shoulder joint injury is to restore its stability, but it is easy for martial arts players to have recurrent dislocation after treatment because their shoulder joints move in a wide range. Therefore, it is crucial to seek effective treatment for shoulder joint injury [1,2]. In the period from January 2012 to October 2015, we made a single-blind randomized controlled study of 60 Wushu athletes who had shoulder joint injury and these 60 patients separately received conservative and under-arthroscopic anchor implantation fixation treatment. From this study, it is found that the treatment of under-arthroscopic anchor implantation fixation gained much more satisfactory effects compared with the conservative treatment. This study further expands the application of anchor implantation fixation in the field of medicine, and promotes the development of medical engineering.

Materials and Methods

General information

Totally 60 patients with shoulder joint injury in Southwest Hospital from January 2012 to October 2015 were selected as the study objects. The clinical data of the objects were analysed retrospectively. All of the selected patients are martial arts athletes, who got shoulder joint dislocation with Bankart damage type confirmed by X-ray and MRI. All the patients understood the treatments and signed an informed consent form before the treatment. The research was approved by the Hospital Ethics Committee.

The research divided patients into control groups and observation groups equally by using computer randomized single-blind methods. The control group included 28 men and 2 women, the youngest of which was 23 and the oldest 45, with an average age of 33.52 ± 10.17. Cases of shoulder joint dislocation include 10 cases of the left shoulder, 19 cases of the right shoulder and 1 case of both shoulders. The observation group included 27 cases of men patients and 3 of women

patients. The youngest was 24 y old, and the oldest was 46 y old, with an average age of 34.26 ± 10.09 y old. Dislocations of the shoulder joint included 11 cases of the left shoulder, 18 cases of the right shoulder, and 1 case of both shoulders. Based on the materials of patients in this study (gender, age, dislocation of the shoulder joint), statistical analysis showed that P>0.05 and comparability between the two groups was good.

Method

In the control group, patients with shoulder joint injury were treated conservatively. According to the patients' X-ray film, the clinician repositioned their shoulder joints manually, and brackets were used for external fixation. After treatment, the patients were able to perform passive training in the painless range training and increase appropriate training intensity according to their own circumstances.

In the observation group, the patients with shoulder joint injury underwent shoulder arthroscopic fixation treatment. A tracheal tube was inserted and the patient was under a general anesthesia. Body position took the beach chair in the lateral posterior shoulder angle 1.5 cm below the incision. A small knife was used to cut the skin, and a small straight clamp was used for blunt separation of the soft tissue. After entering the humeral joint and the shoulder arthroscopic tube into the rotation, the rotation was taken forward, arriving at the back of the shoulder joint capsule and into the shoulder joint space, the die exit; this was followed by the arthroscopic implantation of the shoulder to explore the situation locate the location of the shoulder joint injury. Exit the arthroscopic body and insert the guide rod into a place between the subscapular muscle and the upper tendon. The skin is cut into the arthroscopic tube, reaching the joint cavity after the guide rod. In addition, under the arthroscope, the knife blade was used to clean the wound and wound tissue of the shoulder joint, and the shoulder bladder was used to remove the shoulder and the ligament-ligament-labrum complex until the scapular neck bleeding can be; the use of anchoring suture on the front of the labrum joint capsule-labrum reconstruction, biliary brachial bone bite, the use of guided needle drilling, and then 2 to 3 anchor along the guide needle placed in Scapula 5 mm edge, the use of thread will be anchored suture through the joint capsule, knot, suture incision. (30º), abduction (20º) position, until 6 w after surgery.

Observation indicators

The treatment effect, shoulder function score, range of shoulder joint, quality of life score, pain score and recurrence rate of shoulder dislocation were compared between the two groups. Among them, the University of California, Los Angeles (UCLA), shoulder joint function assessment criteria are employed for shoulder joint function assessment; they mainly focus on shoulder pain, shoulder function, shoulder forward angle, muscle strength, subjective satisfaction, etc. The total score is 35.28 to 33 scores mean the function is good; 34 to 35 scores mean excellent. Higher scores indicate better shoulder function. The assessment was carried out in the last follow-up before the surgery [3]; the range of shoulder movement is measured by the joint protractor and the measurement of the shoulder flexion and external rotation angle is measured by at least two professional survey personnel, and the average value is taken to reduce the error. The quality of life assessment tool is GQOL-74 quality of life comprehensive assessment of the questionnaire, which includes physical health, mental health, material life, social function and other four aspects, single out of 100 points. A higher score means that the quality of life in this area is better before surgery and the last follow-up assessment. Pain was assessed by a visual analogue score, with a score of 0 to 10 points. The higher the score, the more severe the pain was, and the last follow-up was performed before surgery.

Statistical methods

SPSS19.0 software was used to process the data, among which the count data is used for χ^2 tests with expression forms of examples and percentage, and the measurement data for t-test with expression forms of mean ± standard deviation and with P<0.05 shows differences. And this kind of method has a statistical significance.

Result

Therapeutic effects comparison between two groups

After treatment, patients of both groups received 7-15 months of follow-up. The result shows that excellent and good rate of the treatment in the observation group was 100%, while that in the control group was 80%, P<0.05, Table 1).

Table 1. Therapeutic effects comparison between two groups (n (%)).

Groups	Number of cases	Excellent	Good	Common	Poor	Excellent and good rate
Control group	30	9 (30%)	15 (50%)	4 (13.33%)	2 (6.67%)	80%
Observation group	30	12 (40%)	18 (60%)	0 (0%)	0 (0%)	100%*

Note: *denotes compared with the control group, P<0.05.

Comparison of functions and activities of shoulder joint before and after the treatment

Compared to the condition before treatment, the function score and the movement range of the shoulder joints of the patients in both groups were significantly improved (P<0.05). However, the function score and the movement range of the observation group is obviously higher and larger than that of the control group (P<0.05, Table 2).

Table 2. Comparison of functions and activities of shoulder joint before and after the Treatment ($\bar{x}$ ± s).

Groups	Time	Function score of shoulder joint (scores)	Activity degree (°)	
			Anteflexion	External rotation
Control group (n=30)	Before Treatment	19.79 ± 4.83	69.42 ± 18.43	17.54 ± 6.24
	After treatment	26.16 ± 5.14#	93.16 ± 24.65#	25.38 ± 7.69#
Observation group (n=30)	Before Treatment	20.07 ± 4.69	69.97 ± 18.51	17.82 ± 6.13
	After treatment	31.95+5.31#*	125.89 ± 27.46#*	33.96 ± 8.41#*

Note: #denotes compared with pre-treatment; *denotes compared with the control group, P<0.05.

Score comparison of life quality before and after treatment

Compared to the conditions before the treatment, patients' life quality score was significantly improved (P<0.05) after treatment, while their life quality score in the observation group was significantly higher than that of the control group (P<0.05, Table 3).

Table 3. Score comparison of life quality before and after treatment ($\bar{x}$ ± s, score).

Groups	Time	Physical health	Mental health	Material life	Social function
Control group (n=30)	Before Treatment	72.73 ± 7.42	73.35 ± 6.9	71.08 ± 8.21	72.59 ± 7.19
	After treatment	80.58 ± 7.93#	81.72 ± 7.82#	79.28 ± 8.57#	80.92 ± 7.85#
Observation group (n=30)	Before Treatment	73.25 ± 7.85	74.86 ± 6.74	71.37 ± 8.04	73.07 ± 7.64
	After treatment	89.47 ± 8.69#*	89.56 ± 8.21#*	88.16 ± 9.24#*	90.46 ± 8.95#*

Note: #denotes compared with pre-treatment; *denotes compared with the control group, P<0.05.

Score comparison of shoulder joint pain before and after treatment

Compared to the conditions before the treatment, the pain scores of patients in both groups were significantly reduced (P<0.05) after treatment, while their pain scores in the observation group were significantly lower than that of the control group (P<0.05) after treatment (Table 4).

Table 4. Score comparison of shoulder joint pain before and after treatment ($\bar{x}$ ± s, score).

Groups	Pain score (score)	
	Before treatment	After treatment
Control group (n=30)	5.27 ± 1.73	3.54 ± 1.24#
Observation group (n=30)	5.15 ± 1.96	2.31 ± 1.16#

Note: #denotes compared with pre-treatment; *denotes compared with the control group, P<0.05.

Situation comparison of recurrent and dislocation of shoulder joint during follow-up

During follow-up observation after treatment, recurrent dislocation of shoulder joint did not occur in the observation group, with 0% recurrence rate, while there were 4 cases of recurrent dislocation of the shoulder joint in the control group, with a recurrence rate of 13.33% , P<0.05.

Analyze postoperative follow-up

In a period of 7 to 15 months follow-up, their shoulder joint stability is relatively good after the surgery and with no relapses.

Analyze the recovery effect of postoperative shoulder joint function

The excellent and good rate of shoulder joint function recovery of the 30 patients is 100%, with 13 cases of excellent and 17 good, excluding ordinary or poor case, and the score (P<0.05) is significantly improved compared to the one before the surgery (Table 5).

Table 5. Comparison of patients' shoulder function scores before and after operation ($\bar{x}$ ± s, score).

Period	Shoulder function score
Before	19.79 ± 9.83
After	34.95 ± 15.66*

Note: *means “compared with preoperative P<0.05”

Comparison of life quality of patients before and after operation

Comparing the patients’ life quality of preoperative, the score is significantly improved after the operation (P<0.05, Table 6).

Table 6. Comparison of patients’ life quality scores before and after operation ($\bar{x} \pm s$, score).

Period	Physical function	Mental health	Social function	Material life	Total score
Before	68.58 ± 7.53	69.72 ± 7.82	67.98 ± 8.07	68.92 ± 7.85	69.10 ± 7.89
After	79.47 ± 8.69*	79.56 ± 8.21*	78.16 ± 9.24*	80.46 ± 8.95*	79.57 ± 8.82*

Note: *means “compared with preoperative P<0.05”

Comparison of patients’ pain score before and after operation

Compared to the score before the treatment, the score is significantly reduced after the operation (P<0.05, Table 7).

Table 7. Comparison of patients’ pain scores before and after operation ($\bar{x} \pm s$, score).

Period	Pain score
Before	4.59 ± 2.05
After	2.13 ± 1.27*

Note: *means “Compared with preoperative P<0.05”

Discussions and Conclusions

Due to the large range of shoulder movement, the shoulder joint is most likely to be dislocated in the body joints. Because of heavy training, martial arts athletes use the shoulder more frequently than normal people, so it is more likely for them to have shoulder dislocation [4]. Among all the joints of the human body, the shoulder joint has the widest range of motion, and its stability is maintained by the dynamic stability structure and static stability structure. Vernier joint and labrum complex play important roles in keeping the static stability of shoulder joint, while the rotator cuff tissue keeps the dynamic stability of the shoulder joint. In a shoulder dislocation injury, the edge of the shoulder often drops a high degree of freedom of the hummers, and joint stability is poor. This is the leading cause of recurrent dislocation of the shoulder and the pathological basis, and it is very unfavorable for the martial arts athletes’ daily life and work. Therefore, we should pay attention to shoulder injuries caused by mobilization in martial arts clinic and seek effective treatment methods [5-7].

The treatment principle of shoulder dislocation injury is mainly to repair the damaged shoulder structure, and the causes of shoulder dislocation injury are different in different age groups. For younger patients, the dislocation of the shoulder is mainly due to the destruction of the structure of the static stability; for older patients, it is mainly due to the damage of the dynamical structure. Therefore, the clinical treatment of shoulder dislocation injury needs to repair patient's corresponding shoulder joint structure. So far, the clinical treatment of shoulder dislocation injury methods includes conservative treatment and surgical treatment. The conservative treatment is mainly manual repositioning, using braces for external fixation and training the functions of the shoulder joint. However, the conservative treatment demands a long time of movement restriction, which is bad for the patient's functional exercise and cannot ease their shoulder pains effectively. Surgery is the main treatment for a shoulder injury and is usually adopted due to invalid conservative treatment, severe shoulder pain, and dysfunction or dislocation recurrence. It is mainly focused on the reconstruction of the shoulder joint labrum height so that the completeness of the shoulder joint capsule complex can be recovered. Meanwhile, the rotator cuff tissue is repaired to promote the stability of the shoulder joint to achieve the purpose of treatment [8]. Arthroscopic implantation of anchors is the main surgical method for the treatment of shoulder joint injury, which mainly uses shoulder arthroscopy to inspect and locate the shoulder joint injury and then implants the anchor to fix the dislocated shoulder joint, thus effectively restoring shoulder joint stability and improving shoulder function [9,10]. As a fixation material for shoulder joints, anchor has a small size and can fix shoulder joints properly, and the operation is easy too. However, in the anchor implantation, attention should be paid to the direction and depth of the nail to ensure that the anchor arrives smoothly at lips deep bone and thus effectively fixes the dislocation of the labrum [11].

We found that the excellent rate of the observation group is 100% higher than the control group (P<0.05), and after treatment, the function scores, shoulder movement range, and life quality scores of the patients in observation group were significantly higher than those of the control group (P<0.05), whereas the pain score was significantly lower than that of the control group (P<0.05), which indicates that the shoulder arthroplasty fixation treatment for shoulder joint injury could effectively reconstruct the shoulder joint stability and improve the shoulder function, release pain, and improve patient’s life quality. However, the conservative treatment failed to have satisfying results for shoulder joint injury patients due to its poorer recovery of shoulder functions, little improvement of shoulder movement range, trivial remission of shoulder pains, and little contribution to the improvement of patients’ life quality. The study also found that during the follow-up period after treatment, no shoulder joint dislocation recurrence was found in the observation group, meaning that the recurrence rate was 0%, while the control group had 4 cases of patients with shoulder dislocation recurrence, indicating that the recurrence rate was 13.33%, P<0.05. This means that the shoulder arthroscopy has a stabilizing effect. Patients with shoulder dislocation may be reduced after the treatment.

In summary, shoulder arthroscopic implant fixation treatment has a good therapeutic effect for martial arts athletes with

shoulder joint injuries in that it can effectively promote the patient's shoulder function recovery, reduce the shoulder pain, and thereby improve their life quality. It can also reduce the recurrence and help to improve the prognosis.

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