

Three Case Reports of Patients Treated with Korean Medicine after Rotator Cuff Repair

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[Abstract]

Objectives : This study examined the effects of Korean medicine treatment in three patients following rotator cuff repair.

Methods : Patients were treated with acupuncture, bee venom, moxibustion, and herbal medicine. Treatments were performed for an average of 3 weeks. A numeric rating scale (NRS) and range of motion (ROM) were used for evaluation of treatment effects.

Results : The NRS score decreased and the ROM increased after treatment. In Case 1, the NRS score decreased from 10 to 6; flexion increased from 25° to 180° and abduction increased from 35° to 180°. In Case 2, the NRS score decreased from 10 to 7; flexion increased from 30° to 125° and abduction increased from 15° to 100°. In Case 3, the NRS score decreased from 10 to 3; flexion increased from 40° to 120° and abduction increased from 60° to 95°.

Conclusion : Korean medicine treatment following rotator cuff repair was effective in decreasing the NRS score and increasing ROM. Although the study only involved 3 cases, Korean medicine treatment may reduce the duration of rehabilitation.

Key words :

Rotator cuff tear;

Acupuncture;

Bee venom;

Numeric rating scale;

Range of motion

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I. Introduction

The rotator cuff comprises the subscapularis, supraspinatus, infraspinatus, and teres minor muscles, and is involved in shoulder rotation. Compression of the humeral head into the glenoid cavity plays an important role in shoulder stabilization¹. Conservative treatment is generally performed for partial thickness rotator cuff tears, and surgery is considered when the symptoms show no improvement or become aggravated after conservative treatment for 3 months to 1 year. A full-thickness rotator cuff tear is an indication for surgical treatment, but must take into account the patient's age, occupation, activity, restricted range of motion, severity and duration of pain, expectation for therapeutic effect, and the patient's request². The purpose of rotator cuff repair is to attach the tendon to the greater tuberosity of the humerus at its original anatomical position, to facilitate recovery and improve shoulder function³.

In Korean medicine, shoulder pain includes 肩痛, 臂痛, 肩臂痛, and 肩不舉, which are mostly caused by the invasion of wind-, cold-, dampness pathogen around the shoulder joints or phlegm rheum (痰飲) and blood-stasis (瘀血)⁴. Postoperative rotator cuff symptoms mainly include nocturnal pain and piercing pain, and restricted range of motion^{5,6}.

Jeong et al.⁶ and Kim et al.⁷ reported use of complex Korean medicine treatment following rotator cuff repair, and Son et al.⁸ reported a case of 肩痛穴 treatment by 平衡鍼法.

Korean medicine treatment has been described for rotator cuff tears, but there are few reports on the therapeutic effects of Korean medicine in the early postoperative stage, before the initiation of active rehabilitation. We observed significant therapeutic effects of Korean medicine in 3 patients admitted to the Acupuncture & Moxibustion department at the Pohang oriental Hospital Korean medicine hospital affiliated with Daegu Haany University after rotator cuff repair, and herein re-

port these cases.

II. Subjects and Methods

1. Treatment method

Acupuncture, bee venom treatment, cupping, and moxibustion were performed using the same procedures in all 3 cases. Outpatient treatment was performed 3 times a week for cases 1 and 3, and once a week for case 2.

1) Acupuncture treatment

Using disposable filiform needle acupuncture (The Eastern acupuncture equipment manufacturer, 0.25 × 30 mm stainless steel), the needles were inserted at 曲池 (LI11), 臂臑 (LI14), 臑俞 (SI10), 秉風 (SI12), 曲垣 (SI13), 肩井 (GB21), 中府 (LU01), 雲門 (LU02), and 天府 (LU03) for 15 minutes once a day, and the depth of needle insertion was 10 mm or more^{1,9-11}.

2) Bee venom treatment

Bee venom 5% prepared from Jaseng Namyangju Wonoe Tangjunwon was used for treatment. Using a disposable insulin syringe (Shina Corporation, 29 gauge 1/2 inch), 0.05–0.1 cc of bee venom was injected at 穴位 of 肩髃 (LI15), 巨骨 (LI16), 肩髃 (TE14), 曲池 (LI11), 臂臑 (LI14), and 天府 (LU03), which are sites commonly used for shoulder joint treatment⁶. The treatment was performed once a day before acupuncture.

3) Moxibustion and cupping

Using Rejuvenation moxibustion (Youcare International, VITA-SKIN herbal medicine), treatment was performed at 臑俞 (SI10), 秉風 (SI12), 曲垣 (SI13), 肩井 (GB21), 肩髃 (LI15), and 肩髃 (TE14) around the shoulder joint¹. Cupping was performed on the trapezius muscle area for 4 minutes using disposable cups (The Eastern acupuncture equipment manufacturer, No. 2). Moxibustion and cupping

were performed every day at 9:30 am.

4) Herbal medicine treatment

In case 1, Seokyung Decoction (舒經湯) was prescribed from August 1st to August 11th, Banhagumchul Decoction (半夏芩朮湯) was prescribed from August 12th to August 21st, and Ssanghwa Decoction (雙和湯) was prescribed on August 22nd. In case 2, Ojeok Powder extract granule (五積散) insurance medicine (Mixed extract, Hanzung pharmaceutical Co.) was prescribed from August 13th to August 30th. In case 3, Ojeok Powder (五積散) was used from September 9th to September 25th, and Seokyung Decoction (舒經湯) was used from September 25th to September 30th. In cases 1 and 3, medicine was taken 3 times a day (2 packets 3 times a day); in case 2, one packet was taken 3 times a day after meals (Table 1).

2. Evaluation methods

1) Numeric rating scale

A Numeric rating scale (NRS) was used to quantify pain, with 10 indicating the most severe pain (pain on admission) and 0 indicating no pain. The level of pain at 7 am every day was used as a baseline¹²⁾.

2) Range of motion and physical examinations

Shoulder active range of motion (ROM) for abduction and flexion was assessed every day at 7 am.

Excessive shoulder motion was not performed when pain was severe.

Table 1. Herbal Medicine Prescription

Case Number	Duration of treatment	Prescription
Case 1	8/1/2016–8/11/2016	Seokyung Decoction (舒經湯) (<i>Curcumae Longae Rhizoma</i> 8 g, <i>Puerariae Radix</i> · <i>Atractylodis Rhizoma Alba</i> · <i>Angelicae Gigantis Radix</i> · <i>Paeoniae Radix Alba</i> · <i>Kalopanax Cortex</i> 4 g, <i>Zingiberis Rhizoma Crudus</i> 3 g, <i>Glycyrrhizae Radix</i> · <i>Osterici Radix</i> 2 g)
	8/12/2016–8/21/2016	Banhagumchul Decoction (半夏芩朮湯) (<i>Atractylodis Rhizoma</i> 6 g, <i>Pinelliae Rhizoma</i> 4 g, <i>Cyperi Rhizoma</i> · <i>Arisaematis Rhizoma</i> · <i>Atractylodis Rhizoma Alba</i> 3 g, <i>Citri Pericarpium</i> · <i>Hoelen</i> 2 g, <i>Clematidis Radix et Rhizoma</i> · <i>Glycyrrhizae Radix</i> 1 g)
	8/22/2016	Ssanghwa Decoction (雙和湯) (<i>Paeoniae Radix Alba</i> 10 g, <i>Rehmanniae Radix Preparata</i> · <i>Angelicae Gigantis Radix</i> · <i>Astragali Radix</i> · <i>Cnidii Rhizoma</i> 4 g, <i>Cinnamomi Cortex</i> · <i>Glycyrrhizae Radix</i> · <i>Zingiberis Rhizoma Crudus</i> · <i>Puerariae Radix</i> 3 g, <i>Jujubae Fructus</i> 2 g)
Case 2	8/13/2016–8/30/2016	Ojeok Powder extract granule (五積散) Ojeok Powder (五積散) (<i>Atractylodis Rhizoma Alba</i> 8 g, <i>Perillae Herba</i> · <i>Angelicae Gigantis Radix</i> · <i>Puerariae Radix</i> · <i>Paeoniae Radix Alba</i> · <i>Pinelliae Rhizoma</i> · <i>Citri Pericarpium</i> 4 g, <i>Zingiberis Rhizoma</i> · <i>Cinnamomi Cortex</i> · <i>Platycodi Radix</i> · <i>Hoelen</i> · <i>Angelicae Dahuricae Radix</i> · <i>Aurantii Immaturus Fructus</i> · <i>Magnoliae Cortex</i> · <i>Cnidii Rhizoma</i> 3 g, <i>Glycyrrhizae Radix</i> 2 g)
Case 3	9/9/2016–9/25/2016	
	9/25/2016–9/30/2016	Seokyung Decoction (舒經湯) (<i>Curcumae Longae Rhizoma</i> 8 g, <i>Puerariae Radix</i> · <i>Atractylodis Rhizoma Alba</i> · <i>Angelicae Gigantis Radix</i> · <i>Paeoniae Radix Alba</i> · <i>Kalopanax Cortex</i> 4 g, <i>Zingiberis Rhizoma Crudus</i> 3 g, <i>Glycyrrhizae Radix</i> · <i>Osterici Radix</i> 2 g)

III. Cases

1. Case 1

1) Patient

Baek ○ ○, M/51

2) Chief complaint

Right shoulder pain

3) Onset date

July 10th, 2016

4) Medical history

No particular history.

5) History of present illness

Right shoulder pain developed after a fall during exercise on July 10th, 2016. On July 18th, 2016, a right rotator cuff tear was diagnosed using X-ray, computed tomography (CT), and magnetic resonance imaging (MRI) performed at another medical institute. The patient underwent arthroscopic rotator cuff repair, acromioplasty, biceps tenotomy, and minimally invasive fixation on July 22nd, 2016.

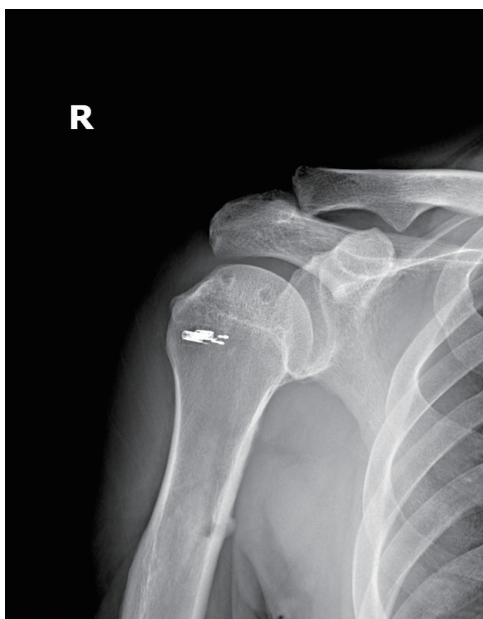


Fig. 1. AP view on X-ray of right shoulder joint in the case 1

Following discharge on July 29th, 2016, the patient was admitted to the outpatient acupuncture medicine department on August 1st 2016.

6) Duration of treatment

August 1st 2016 to August 23rd 2016 (23 days of hospital treatment)

7) Findings on initial examination

(1) Physical examination

Apley 1: 0(-), 2: N/A, 3: N/A

ROM (Flexion 25° / Abduction 35° / Extension 35° / External rotation 15°)

(2) Major examinations

① Right Shoulder X-ray (8/1/2016) (Fig. 1)

Postoperative pinning at right humerus, neck

② Lab (8/1/2016)

No particular findings

(3) Other findings

The patient complained of nocturnal pain and piercing pain at the time of admission, and had difficulty sleeping due to shoulder joint pain. 淡紅白苔脈平. Digestion, urine, and stool were all normal.

8) Treatment progress

(1) Hospital treatment progress

The NRS score showed gradual improvement. The score decreased to 4 on August 5th, but increased to 6 on August 9th, and did not change until discharge (Fig. 2).

There was no change in the ROM for the first few days after admission, but abduction increased to 40° on August 9th and flexion increased to 40° on August 17th. On August 23rd, flexion was 75° and abduction was 70° (Fig. 3).

Nocturnal pain started to slowly decrease from August 2nd, and the pattern of pain changed from piercing pain to pain mostly with activities.

(2) Outpatient treatment progress

The patient received a total of 6 outpatient treat-

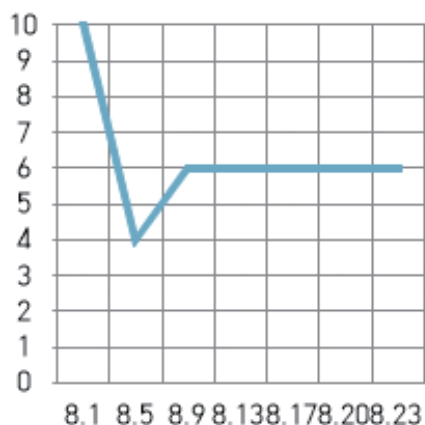


Fig. 2. Change of NRS in the case 1

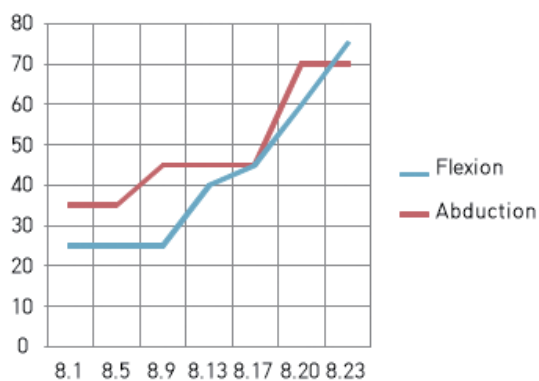


Fig. 3. Change of ROM in the case 1

ments after discharge, and the ROM gradually increased during treatment. The evaluation on September 5th showed recovery of flexion to 180° and abduction to 180°, and treatment was terminated.

2. Case 2

1) Patient

Park ○○, M/56

2) Chief complaint

Right shoulder pain

3) Onset date

August 1st, 2016

4) Medical history

No particular history other than appendectomy

5) History of the present illness

Right shoulder pain developed during daily activity on August 1st, 2016, and a right rotator cuff tear was diagnosed with X-ray and MRI performed at another medical institute. The patient underwent rotator cuff repair on August 4th, 2016. Following discharge on August 13th, 2016, the patient was admitted to the outpatient acupuncture medicine department.

6) Duration of treatment

August 13th 2016 to August 30th 2016 (18 days of hospital treatment)

7) Findings on initial examination

(1) Physical examination

Apley 1: 20(+), 2: N/A, 3: N/A

ROM (Flexion 30° / Abduction 15° / Extension 45° / External rotation 5°)

(2) Major examinations

- ① Right Shoulder X-ray (8/16/2016) (Fig. 4)
- Rotator cuff nailing

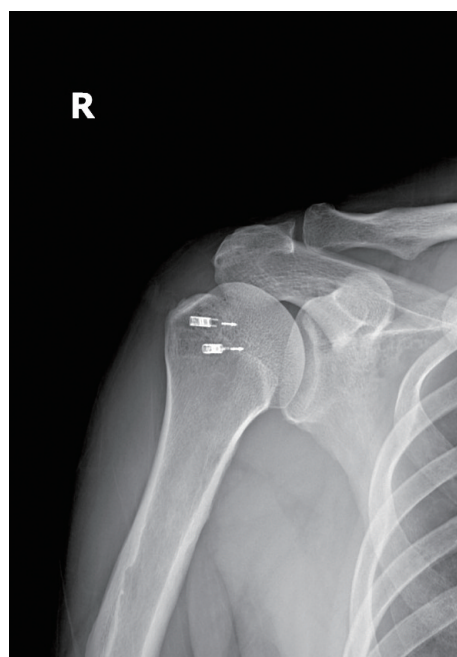


Fig. 4. AP view on X-ray of right shoulder joint in the case 2

② Lab (8/1/2016)

No particular findings

(3) Other findings

The patient complained of nocturnal pain, and had difficulty performing light daily activities such as brushing teeth, due to restricted shoulder ROM. 淡紅黃苔 脈平. Digestion was normal, stool was relatively hard, and urine was normal.

8) Treatment progress

(1) Hospital treatment progress

The NRS score decreased to 8 on August 19th, and to 7 on August 28th, and did not show further change until discharge (Fig. 5).

There was no change in ROM for the first few days after admission. On August 23rd, flexion increased to 35° and abduction increased to 40°. Flexion increased to 40° on August 24th, and flexion and abduction increased to 50° and 70°, respectively, on August 25th. Flexion and abduction increased to 70° and 85°, respectively, on August 27th, with no further change until discharge (Fig. 6).

Nocturnal pain slowly decreased from August 17th, and the patient was subsequently able to perform light daily activities.

(2) Outpatient treatment progress

The patient received 4 outpatient treatments after discharge. The ROM gradually increased

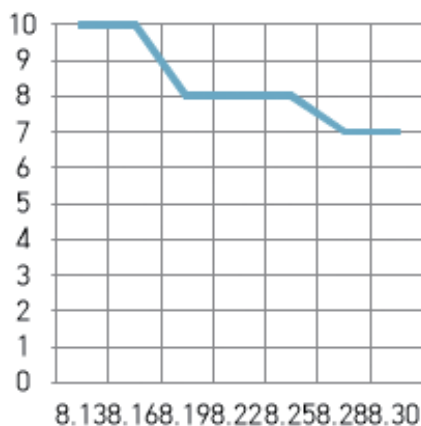


Fig. 5. Change of NRS in the case 2

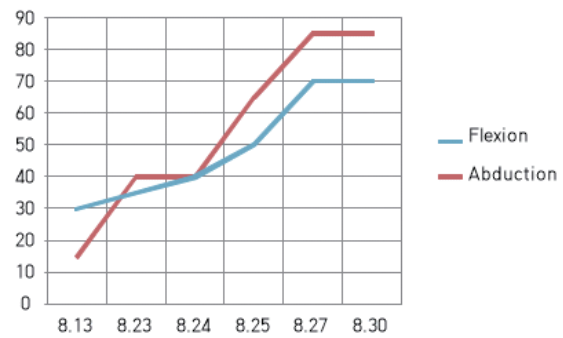


Fig. 6. Change of ROM in the case 2

during outpatient treatment, and the evaluation on October 25th showed flexion 130° and abduction 100°.

3. Case 3

1) Patient

Lee ○○, M/56

2) Chief complaint

Left shoulder pain

3) Onset date

June 30th, 2016

4) Medical history

No particular history other than hyperlipidemia and appendectomy

5) History of present illness

While receiving treatment at another medical institute following a car accident on June 30th, 2016, the patient was diagnosed with a left rotator cuff tear by shoulder MRI on August 22nd, 2016. After surgery, the patient received hospital treatment until September 9th, 2016, and was admitted to the outpatient acupuncture medicine department on September 9th, 2016.

6) Duration of treatment

September 9th, 2016 to October 1st, 2016 (23 days of hospital treatment)

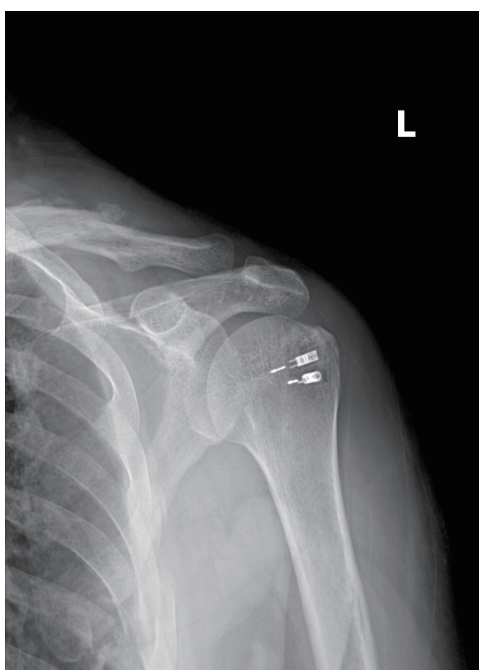


Fig. 7. AP view on X-ray of left shoulder joint in the case 3

7) Findings on initial examination

(1) Physical examination

Apley 1: 28(+), 2: N/A, 3: N/A

ROM (Flexion 40° / Abduction 60° / Extension 30° / External rotation 35°)

(2) Major examinations

① Left Shoulder X-ray (9/10/2016) (Fig. 7)

Pinning (Rotator cuff surgery)

② Lab (9/10/2016)

No particular findings

(3) Other findings

The patient had difficulty performing daily activities such as tooth brushing or face washing due to shoulder pain. 淡紅白苔 脈數. Digestion, stool, and urine were all normal.

8) Treatment progress

(1) Hospital treatment progress

The NRS score decreased to 3 on September 17th

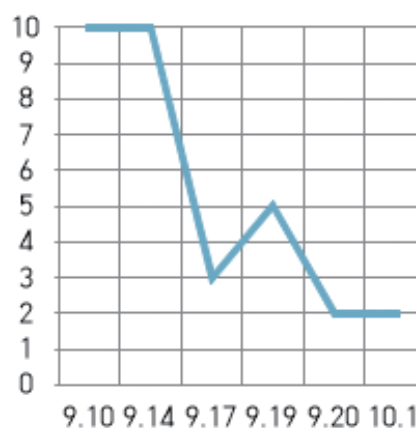


Fig. 8. Change of NRS in the case 3

and increased to 5 on September 19th. The score then decreased to 2 on September 20th and showed no further change until discharge (Fig. 8).

There were no changes in ROM for the first 2 weeks after admission. Flexion increased to 80° on September 24th and abduction increased to 80° on September 30th. Flexion and abduction were both 80° on October 1st (Fig. 9).

Discomfort with light activity decreased.

(2) Outpatient treatment progress

Increase in ROM was observed during outpatient treatment after discharge. The outpatient evaluation showed flexion 125° and abduction 95°. The patient is still undergoing outpatient treatment.

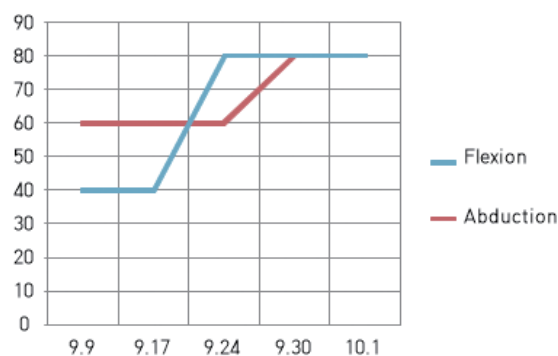


Fig. 9. Change of ROM in the case 3

IV. Discussion and conclusion

The shoulder has the most activity among all joints in the human body. Because the articular capsule is loose and is highly dependent on ligaments and muscles for motion, it can be easily exposed to soft tissue friction or damage. The muscles mainly involved in shoulder joint motion are the subscapularis, supraspinatus, infraspinatus, and teres minor, which comprise the rotator cuff. Degeneration or tear of a tendon attached to the rotator cuff is a common cause of shoulder joint motion restriction³⁾.

Symptoms of a rotator cuff tear include pain in the deltoid area and pain on shoulder flexion. The probability of a tear increases with age, and the incidence is highest after the age of 40²⁾.

Surgical treatment of a rotator cuff tear requires consideration of the patient's age, occupation, activity, restriction of ROM, severity and duration of pain, expectation for therapeutic effect, and the patient's request²⁾. When the symptoms of a rotator cuff tear persist for more than one year, the size of the tear is larger than 1 cm², or when severe dysfunction or deterioration of muscle strength is present, early surgery is recommended. The main purpose of surgery is pain reduction, and the minor objective is to promote normal positioning of the humeral head on the glenoid cavity by suppressing the progression of rotator cuff damage and promoting the recovery of shoulder joint function²⁾.

There are various surgical methods of rotator cuff repair. Suture anchors are widely used for stability; arthroscopy technique has advanced, and has largely replaced the traditional method of open repair, with arthroscopic acromioplasty and decompression as well as mini-open repair and suturing^{2,13)}. Ko et al.¹³⁾ and Kim et al.¹⁴⁾ reported the effects of arthroscopic mini-open repair on pain and ROM.

The purpose of rehabilitation after rotator cuff repair is to promote healing of tissue and minimize

stiffness. Among various rehabilitation methods, a program of stepwise treatment divided into 5 stages over 22–26 weeks is considered standard. Stage 1 comprises the first 6 weeks postoperatively, during which passive ROM exercise is performed while the patient wears a brace to protect the repair site, prevent muscle stiffness, and manage pain. Stage 2 comprises the second 6 weeks postoperatively, during which rehabilitation focuses on ROM exercise. Subsequent rehabilitation treatment proceeds until stage 5, with the goal of returning patients to work, daily activities, and sports¹⁵⁾. Among complications that occur in the early stage of rehabilitation after rotator cuff repair, retears and postoperative stiffness can develop, causing difficulty in the selection of an early rehabilitation program^{15,16)}. However, as postoperative stiffness can now be treated with recent advances in surgical methods, a rehabilitation program that prevents retears by focusing on tissue healing through absolute fixation in the first 6 weeks postoperatively has been promoted¹⁵⁾.

The patients in the present 3 cases were prescribed absolute fixation during the first 6 weeks, and passive exercise was not performed due to severe pain with shoulder movement. Recent evaluations of rehabilitation programs suggested that Korean medicine treatment aids in the healing of shoulder joints, and promotes muscle relaxation during the absolute fixation stage, thereby promoting recovery after surgery.

Acupuncture treatment was performed to relax the muscles by promoting blood circulation¹⁾. 肩井 (GB21), 臂臑 (LI14), 臑俞 (SI10), 曲池 (LI11), and 秉風 (SI12), associated with the trapezius and deltoid, 中府 (LU01) and 雲門 (LU02), associated with the pectoral muscles, 天府 (LU03), associated with the biceps brachii, and 曲垣 (SI13), associated with the supraspinatus, were used for treatment^{1,9–11,17)}.

Bee venom was used to reduce pain¹⁶⁾; 0.05–0.1 cc was injected at 穴位 of 肩髃 (LI15), 巨骨 (LI16), 肩髃 (TE14), 曲池 (LI11), 臂臑 (LI14), and 天府 (LU03), which are widely used to treat shoulder pain¹⁶⁾. Bee venom has anti-inflammatory, immunoregulatory,

and antioxidant effects, and improves blood circulation, and is therefore likely to be effective for pain management⁸⁾.

According to Korean medicine, the causes of shoulder joint pain are wind-cold-dampness, phlegm rheum (痰飲), and blood-stasis (瘀血). In case 1, based on the initial nocturnal pain and the patient's complaint on piercing pain, and after he was diagnosed as blood-stasis (瘀血), Seokyoung Decoction (舒經湯), which is used for the symptoms of it's can't raise shoulder because of qi blood stagnate in Meridian (氣血凝滯經絡 肩臂不舉), was administered. With symptom improvement after the administration of Seokyoung Decoction (舒經湯), phlegm rheum (痰飲) caused by spleen (脾) malfunction was observed, and Banhagumchul Decoction (半夏芩朮湯) was administered. Then, for recovery of muscle damage caused by all hurt of qi blood (氣血俱傷), Ssanghwa Decoction (雙和湯) was administered. In case 2, the patient complained of heaviness of the body and mild pain. After he was diagnosed as cold, insurance medicine Ojeok Powder extract granule (五積散) was administered. In case 3, the patient complained of heaviness of the body and mild pain. After he was diagnosed as cold, Ojeok Powder (五積散) was administered from September 9th to September 25th. During administration, nocturnal pain and piercing pain features were observed. After he was diagnosed as blood-stasis, Seokyoung Decoction (舒經湯) was administered from September 25th to September 30th.

In cases 1 and 2, the NRS score started to decrease after the reduction of nocturnal pain. The NRS score decreased from 10 to 6 in case 1, from 10 to 7 in case 2, and from 10 to 3 in case 3. An increase in ROM was observed after a period of treatment. During outpatient treatment, a decrease in NRS score and recovery of ROM were observed in case 1, and treatment was terminated. In cases 2 and 3, the NRS score decreased and the ROM gradually increased during outpatient treatment after hospital treatment ended. When the ROM was evaluated after 6 weeks of postoperative fixation, flexion of 112° was observed. After 4

weeks of exercise treatment, flexion increased to 128°¹⁸⁾. These results show the effects of Korean medicine on the increase in shoulder ROM.

In the present cases, the patients were within the early rehabilitation period of less than 6 weeks, and were discharged after they were instructed in absolute flexion. Therefore, we used Korean medicine to reduce pain and to shorten the rehabilitation period through treatment during absolute fixation. Previous studies showed the positive effects of acupuncture and bee venom on shoulder pain^{6,7)} and ROM⁷⁾. Thus, we presumed that Korean medicine treatment using acupuncture and bee venom would shorten the rehabilitation period by reducing pain and improving ROM in the present cases. In fact, increased ROM and pain reduction were observed, and the increase in shoulder ROM was relatively large, compared to that with exercise treatment based on Western medicine during the same treatment period. Korean medicine treatment was more effective for increasing ROM, and may contribute to a decrease in the duration of rehabilitation.

Use of complex Korean medicine treatment with acupuncture, bee venom, and herbal medicine led to pain reduction and increased ROM. This is likely because acupuncture, bee venom, moxibustion, cupping, and herbal medicine facilitated blood circulation in muscle and controlled inflammation of tissues surrounding the surgical site; these effects reduced pain in the early stage and influenced the strengthening and recovery of muscles and tendons^{1,6)}. Therefore, complex Korean medicine treatment during fixation may be beneficial for further rehabilitation. However, because our study only evaluated 3 cases, the results cannot be generalized. Multiple cases are needed to compare the therapeutic effects with those of Western medicine treatment. The effects of individual Korean medicine treatments, which comprised the complex Korean medicine treatment in this study, need to be assessed, and follow-up in a larger number of cases is required.

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