This study aimed to report the effect of Korean medical treatment including miniscalpel acupuncture on 2 patients who underwent surgery for rotator cuff tear. They were treated for almost 4 weeks at the Department of Acupuncture and Moxibustion, Dong-Eui University Korean Medicine Hospital. Visual analog scale (VAS), and range of movement (ROM) were used to evaluate treatment effects. In both patients, shoulder pain and restriction of shoulder joint movement improved after miniscalpel acupuncture treatment. In Case 1, shoulder pain decreased from a VAS score 8 to a VAS score 3, and ROM of the shoulder improved from flexion 100° to 160°, extension 10° to 30°, abduction 90° to 130°, adduction 10° to 40°, internal rotation 10° to 50°, and external rotation 10° to 50°. In Case 2, shoulder pain, which was rated a VAS score 8 at first-visit, disappeared, and ROM of the shoulder recovered to normal range. These results suggest miniscalpel acupuncture may contribute to the recovery process after rotator cuff tear surgery.

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**ABSTRACT**

This study aimed to report the effect of Korean medical treatment including miniscalpel acupuncture on 2 patients who underwent surgery for rotator cuff tear. They were treated for almost 4 weeks at the Department of Acupuncture and Moxibustion, Dong-Eui University Korean Medicine Hospital. Visual analog scale (VAS), and range of movement (ROM) were used to evaluate treatment effects. In both patients, shoulder pain and restriction of shoulder joint movement improved after miniscalpel acupuncture treatment. In Case 1, shoulder pain decreased from a VAS score 8 to a VAS score 3, and ROM of the shoulder improved from flexion 100° to 160°, extension 10° to 30°, abduction 90° to 130°, adduction 10° to 40°, internal rotation 10° to 50°, and external rotation 10° to 50°. In Case 2, shoulder pain, which was rated a VAS score 8 at first-visit, disappeared, and ROM of the shoulder recovered to normal range. These results suggest miniscalpel acupuncture may contribute to the recovery process after rotator cuff tear surgery.

**Introduction**

The rotator cuff consists of four muscles; the supraspinatus, infraspinatus, subscapularis, and teres minor. The humeral head is covered by muscles, which rotate the arm and stabilize the humeral head in the joint [1].

Rotator cuff tear (RCT) is a common injury that is responsible for 50% of shoulder joint pain, and usually occurs in individuals aged 40 years or more. Most patients have a history of traumatic damage or repetitive overuse of the muscles [2]. RCT symptoms are shoulder pain and restriction of movement of the shoulder joint. The pain worsens in the night time, and active movement is restricted, whereas passive movement is normal [1]. There are conservative and surgical treatments for RCT.

Surgical treatment is considered for RCT either when there has been no improvement after 3-6 months using conservative treatment, or depending on the degree of the tear and motion disorder. After surgical treatment, management with braces and rehabilitation is required for several months to restore normal shoulder function. In addition, shoulder pain and joint stiffness are often reported despite successful surgery [3,4]. The studies of surgical methods which focus on the better clinical outcome and a low re-rupture rate have been reported. However, treatment for patients with complications such as shoulder pain and joint stiffness after RCT surgery is insufficient [5,6].

In Korean medical treatment, various treatments such as herbal medicine, acupuncture, pharmacopuncture, and moxibustion, have been reported in patients after RCT surgery [3,7]. However, reports on miniscalpel acupuncture are scarce. It has been reported that miniscalpel acupuncture has a better outcome on musculoskeletal pain compared with regular acupuncture treatment [6,7]. It can recover the original kinetic state, and promote blood circulation to the lesion by peeling the chronically damaged soft tissue of the muscles, tendon sheath, and...
ligament [10].

Here, we report the clinical effects of miniscalpel acupuncture, acupuncture and herbal medicine in 2 patients who visited the Department of Acupuncture and Moxibustion, Dong-Eui University Korean Medicine Hospital for shoulder pain and range of movement (ROM) restriction after RCT surgery.

Case Report

Subjects

There were 2 patients who were admitted to the Department of Acupuncture and Moxibustion, Dong-Eui University Korean Medicine Hospital on October 22, 2018 and were discharged on November 17, 2018 after RCT surgery. The patients received miniscalpel acupuncture 4 times, and they also received herbal medicine, and regular acupuncture throughout their hospital stay. This study is a retrospective chart review and approved for exemption from deliberation by the Institutional Review Board (IRB) of Dong-Eui University Korean Medicine Hospital (IRB No.: 2019-03).

Treatment methods

Miniscalpelacupuncture

Prior to treatment, the patients were provided with comprehensive information about the procedure, and patients who agreed to the procedure were treated with miniscalpel acupuncture. Following the first treatment, subsequent treatment sessions were conducted at intervals of 5-8 days. The treatment interval was adjusted according to the patients’ symptoms and conditions.

To prevent infection, the practitioner wore sterilized gloves and a mask, and the treatment area was sterilized with betadine. The miniscalpel acupuncture points were: LI14, L15, L16, TE14, TE15, SI10, SI12, SI13, GB21, LU01, LU02 and tender points of the rotator cuff. The procedure was performed in the recumbent position. Sterilized, disposable miniscalpels (0.5 mm × 50 mm; DongBang Acupuncture Inc., Korea) were used. The miniscalpel was inserted parallel to the nearby muscle and ligaments, at a depth of 20-40 mm, and the adhered soft tissue was peeled and the miniscalpel pulled out. After the procedure, the patient was informed about possible side effects such as temporary discomfort, hemorrhage, dizziness, cold sweat, and palpitation. The miniscalpel acupuncture was performed by a Korean medicine doctor with over 2 years of clinical practice (Table 1).

Acupuncture

Acupuncture was performed once every day during the hospital stay, and the needle retention time was approximately 30 minutes. Sterilized, disposable needles (0.25 mm × 40 mm; DongBang Acupuncture Inc., Korea) were used. The acupuncture points were: Shinkwan (Dong’s acupuncture), ST40 of the normal side, and LI11, SI03, TE03 of the affected side.

Herbal medicine treatment

Seokyung decoction was prescribed to both patients from October 22. In Case 1, the medicine was changed to Kaegyeol-seokyung decoction on October 24 and maintained until discharge day on November 17. In Case 2, Seokyung decoction was maintained during the hospital stay. The medicine was taken 3 times a day (Table 2).

Evaluation methods

Visual analog scale (VAS)

VAS was used to evaluate the intensity of subjective pain. The patient’s level of pain was assessed on a scale of 0 to 10 using a 10 cm measuring instrument. 0 represented no pain, and 10 represented the worst pain imaginable. VAS was used to evaluate the patient at the first-visit and every day after miniscalpel acupuncture was performed for a total of 5 times.

ROM

Active ROM of the right shoulder joint was measured. The angles were measured by moving flexion, extension, abduction, adduction, external rotation, and internal rotation, to the maximum extent. Evaluation was performed at the first-visit and every day after miniscalpel acupuncture, for a total of 5 times.

Case 1

Patient

Song00, F/61

Chief complaint

Right shoulder pain and ROM restriction

Onset

February 2018

Past history

- Left RCT, calcific tendinitis- 2012 op.

Present illness

Shoulder pain occurred whilst playing tennis in February 2018. The patient did not receive medical treatment and rested at home for 2 months. As the pain worsened, the patient sought medical treatment at a local hospital and was diagnosed with RCT using magnetic resonance imaging (MRI). The patient received a steroid injection in her right arm and she underwent physical therapy for 3 months, but showed no improvement in symptoms. On August 10, the patient underwent arthroscopic surgery at a local hospital. After the surgery, shoulder pain and ROM restriction persisted despite rehabilitation. On August 24, the patient was admitted to local Korean medicine hospital, and was treated with herbal medicine, acupuncture, and rehabilitation for a month, without significant improvement. She visited the Department of Acupuncture and Moxibustion, Dong-Eui University Korean Medicine Hospital on October 22, 2018.

Symptoms of first-visit

The pain, which was rated as a VAS score 4, occurred around the rotator cuff, in a stable state. The pain increased to a V AS score 8 when the right arm was pressed, flexed, abducted and raised above the head, and when the arm was rotated internally and moved backward (ROM: flexion 100°, extension 10°, abduction 90°, adduction 10°, internal rotation 10°, external rotation 10°).

Radiological findings

The MRI of the patient's shoulder was taken on August 7, 2018 at a local hospital. The finding was a partial tear of the supraspinatus and infraspinatus (Fig. 1).

Treatment progress

The shoulder pain, which was a VAS score 4 in a stable state, disappeared after the 3rd miniscalpel acupuncture treatment.
Table 1. Miniscalpel Acupuncture Details Based on the STRICTA 2010 Checklist [11].

<table>
<thead>
<tr>
<th>Item</th>
<th>Detail</th>
</tr>
</thead>
</table>
| 1. Acupuncture rationale | 1a) Style of acupuncture  
- Miniscalpel acupuncture  
1b) Reasoning for treatment provided, based on historical context, literature sources, and/or consensus methods, with references where appropriate  
- Textbook [10,14]  
- Clinical experience  
- Consensus by the experts in acupuncture  
1c) Extent to which treatment was varied  
- Fixed points plus optional points according to symptoms |
| 2. Details of needling | 2a) Number of needle insertions per subject per session (mean and range where relevant)  
- From 11 to 15  
2b) Names (or location if no standard name) of points used (uni/bilateral)  
- LI14, LI15, LI16, TE14, TE15, SI10, SI12, SI13, GB21, LU01, LU02 and tender points of the rotator cuff (Affected side)  
2c) Depth of insertion, based on a specified unit of measurement, or on a particular tissue level  
- From 20 to 40 mm  
2d) Response sought (e.g., de qi or muscle twitch response)  
- ‘De qi’ sensation  
2e) Needle stimulation (e.g., manual, electrical)  
- Manual stimulation: peeling off the adhesion of soft tissue by needling.  
2f) Needle retention time  
- No retention time  
2g) Needle type (diameter, length, and manufacturer or material)  
- Sterilized, disposable miniscalpels (0.5 mm × 50 mm; DongBang Acupuncture Inc., Korea) |
| 3. Treatment regimen | 3a) Number of treatment sessions  
- Four treatment sessions  
3b) Frequency and duration of treatment sessions  
- Once weekly for 4 weeks, 20 minutes for each session |
| 4. Other components of treatment | 4a) Details of other interventions administered to the acupuncture group (e.g., moxibustion, cupping, herbs, exercises, lifestyle advice)  
- Acupuncture  
- Herbal medicine treatment  
4b) Setting and context of treatment, including instructions to practitioners, and information and explanations to patients  
- How to procedure  
- Possible response after the treatment |
| 5. Practitioner background | 5a) Description of participating acupuncturists (qualification or professional affiliation, years in acupuncture practice, other relevant experience)  
- Korean medicine doctor with over 2 years of clinical practice |
| 6. Control or comparator interventions | 6a) Rationale for the control or comparator in the context of the research question, with sources that justify this choice  
- No control or comparator interventions  
6b) Precise description of the control or comparator. If sham acupuncture or any other type of acupuncture-like control is used, provide details as for items 1 to 3 above  
- No control or comparator interventions |
Furthermore, pain on movement of the arm decreased from a VAS score 8 to a VAS score 3, and shoulder ROM improved (Table 3), so it became possible for her arm to flex, abduct and raise above the head, and rotate internally and move backward.

**Case 2**

**Patient**
Yu 00, F/61

**Chief complaint**
Right shoulder pain and ROM restriction

**Onset**
December 2017

**Past history**
Non specific

**Present illness**
Shoulder pain occurred during exercising in December 2017. The patient did not receive medical treatment and the pain persisted. On April 2018, the patient was diagnosed with RCT using an MRI at a local hospital, and underwent arthroscopic surgery. However, the ROM of the shoulder joint worsened whilst wearing the shoulder brace. The patient received rehabilitation for 5 months, but no significant improvement was seen. She visited the Department of Acupuncture and Moxibustion, Dong-Eui

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**Table 2. Composition of Herbal Medicine.**

<table>
<thead>
<tr>
<th>Prescription</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seokyung decoction</td>
<td>Curcumae Longae Rhizoma 8g, Puerariae Radix, Atractylodis Rhizoma Alba, Angelicae Gigantis Radix, Paoniae Radix Alba, Kalopanaxis Cortex 4g, Zingiberis Rhizoma Crudus 3g, Glycyrrhizae Radix, Osterici Radix 2g</td>
</tr>
<tr>
<td>Kaegyeol-Seokyung decoction</td>
<td>Pinelliae Rhizoma, Atractyloidis Rhizoma Alba, Cnidii Rhizoma, Angelicae Gigantis Radix, Osterici Radix, Cypri Rhizoma, Citri Pericarpium, Arisaematis Rhizoma, Linderae Radix, Zingiberis Rhizoma Crudus, Perillafrutescens 4g, Cinnamomi Ramulus, Glycyrrhizae Radix 2g</td>
</tr>
</tbody>
</table>

**Table 3. Progress in the Treatment of Case 1.**

<table>
<thead>
<tr>
<th></th>
<th>Oct 22</th>
<th>Oct 26</th>
<th>Oct 31</th>
<th>Nov 7</th>
<th>Nov 15</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>VAS (motion)</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexion</td>
<td>100</td>
<td>100</td>
<td>120</td>
<td>150</td>
<td>160</td>
</tr>
<tr>
<td>Extension</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>30</td>
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<tr>
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<td>90</td>
<td>100</td>
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<tr>
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<td>10</td>
<td>10</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>External rotation</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>50</td>
</tr>
</tbody>
</table>

ROM, range of movement; VAS, visual analog scale.

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**Fig. 1.** Shoulder MRI of Case 1. (A) Axial, (B) Coronal. MRI, magnetic resonance imaging.

**Fig. 2.** Shoulder MRI of Case 2. (A) Axial, (B) coronal. MRI, magnetic resonance imaging.
University Korean Medicine Hospital on October 22, 2018.

**Symptoms of first-visit**

The pain which was rated as a VAS score 2, occurred around the greater tuberosity of the humerus, acromion, and acromioclavicular joint in a stable state. Pain increased to a VAS score 8 whilst exercising to the maximum range of the shoulder (ROM: flexion 100°, extension 30°, abduction 90°, adduction 40°, internal rotation 40°, external rotation 40°).

**Radiological findings**

An MRI of the shoulder was taken on April 26, 2018 at a local hospital. The findings were a full-thickness tear with a Grade 1 retraction of the supraspinatus, mid to posterior portion, and a low-grade articular surface partial-thickness tear of the infraspinatus, inferior portion (Fig. 2).

**Treatment progress**

Shoulder pain, which was rated as a VAS score 2 in the stable state and a VAS score 8 during shoulder movement at the first-visit, disappeared. In addition, shoulder ROM improved from flexion 100° to 170°, extension 30° to 45°, abduction 90° to 150°, adduction 40° to 40°, internal rotation 40° to 90°, and external rotation 40° to 70° (Table 4). After the treatment, the patient had normal function of the shoulder.

**Discussion**

The aim of RCT surgery is to stabilize the shoulder joint by placing the humeral head in the center of the joint, thereby facilitating the restoration of normal function to the shoulder. The larger the tear size, the more difficult it is to manage symptoms with conservative treatment. In addition, over time, the tear size increases and tissue regression often occurs. Even after the surgical procedure, it is often difficult to move, and pain is experienced [12] so appropriate rehabilitation after surgery is needed. Approximately 6 months of rehabilitation is recommended to restore normal function to the shoulder. Korean medical treatment may improve the efficiency of rehabilitation and help restore function to the shoulder.

The postoperative rehabilitation protocol for RCT is divided into 3 stages. The goal of Stage 1 is to control pain using a shoulder brace and medication for approximately 6 weeks, according to the severity of the tear, and to recover the shoulder ROM with 140° flexion, 40° external rotation, and 60° abduction by passive joint movement. The aim of Stage 2 (6-12 weeks after surgery) is to remove the shoulder brace, and to improve the shoulder ROM to 160° flexion, 60° external rotation and 90° abduction with active assistance, or when active joint movement is performed. At Stage 3 (4-6 months after surgery), the aim is restoring ROM to the same degree as the contralateral side, and strengthening the rotator cuff with passive joint motion, active assistance, and active joint motion, without shoulder joint pain or tenderness [2,13].

The patients in this study were at Stage 3 of the postoperative rehabilitation protocol for RCT. However, both patients complained of ROM limitation and shoulder pain, and despite continuous rehabilitation treatment, neither patient had passed Stage 1 of the postoperative rehabilitation protocol.

Miniscalpel acupuncture alleviates dysfunction by exfoliating adhesion and scarring between soft tissues. In addition, pain can be controlled by removing tension and pressure on the lesion tissue. Also, it has the advantage of improving circulation of the blood to the lesion tissue, and thus the speed of recovery at the site of treatment [14,15]. In this study, the miniscalpel acupuncture points were the internal and external portions of the infraspinous region of scapula, where the rotator cuff originates, and the tender points of the supraspinous fossa, TE14, TE15, SI10, SI12, SI13 and GB21. The anterior, middle and posterior parts of the deltoid near the humerus, where the rotation cuff is inserted, LI14, LI15 and LI16 were treated. In addition, LU01 and LU02 were used to treat the anterior tender points of the pectoralis major, pectoralis minor, and subclavicular region.

In Case 1, the shoulder pain, which was a VAS score 4 in a stable state, disappeared, and pain during movement of the arm decreased from a VAS score 8 to a VAS score 3. Furthermore, shoulder ROM improved from flexion 100° to 160°, extension 10° to 30°, abduction 90° to 130°, adduction 10° to 40°, internal rotation 10° to 50°, and external rotation 10° to 50°. The patient complained of severe shoulder pain and ROM limitations when the right arm was internally rotated, it was impossible to position her arms

### Table 4. Progress in the Treatment of Case 2.

<table>
<thead>
<tr>
<th></th>
<th>Oct 22</th>
<th>Oct 26</th>
<th>Oct 31</th>
<th>Nov 7</th>
<th>Nov 15</th>
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<tbody>
<tr>
<td>VAS (stable)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>VAS (motion)</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexion</td>
<td>100</td>
<td>100</td>
<td>150</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>Extension</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Abduction</td>
<td>90</td>
<td>90</td>
<td>140</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Adduction</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>External rotation</td>
<td>40</td>
<td>40</td>
<td>70</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>40</td>
<td>40</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

ROM, range of movement; VAS, visual analog scale.
backward. After the treatment, it became possible for her to grasp both hands behind her back. In Case 2, shoulder pain, which was rated as a VAS score 2 in the stable state and a VAS score 8 during shoulder movement at the first-visit, disappeared, and shoulder ROM recovered from flexion 100°, extension 30°, abduction 90°, adduction 40°, internal rotation 40°, and external rotation 40° to the normal range after treatment.

In this study, Korean medical treatment including miniscalpel acupuncture may have had positive clinical effects on pain relief and recovery of shoulder ROM after RCT surgery. However, because we observed only 2 cases in this study, the conclusion of this study cannot be generalized. Further, this study had some limitations, one of which was that other assessment tools had to be used to measure shoulder disability, such as shoulder pain and disability index, for more systemic evaluation in addition to VAS and ROM. Another limitation is that there was no control group in this study, and therefore comparison with other treatment tools could not be done. In the future, systematically-designed large scale randomized controlled trials should be conducted to study the effects of miniscalpel acupuncture after RCT surgery.

Conflicts of Interest
The authors have no conflicts of interest to declare.

References