

## Effects of Embedding Therapy on Frozen Shoulder : A Prospective Study

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**Objectives:** The aim of this study was to observe the effect of Embedding therapy on frozen shoulder.

**Methods:** 57 patients with frozen shoulder were treated with Embedding therapy. It was performed once a day, once per a week. 15~20 Embedding thread were used in one time Embedding therapy. The total number of Embedding therapy was 10. Trapezius muscle including the Gyeonjeong (GB<sub>21</sub>), Deltoid muscle including the Nosu (SI<sub>10</sub>), Supraspinatus muscle including the Byeongpung (SI<sub>12</sub>), Infraspinatus muscle including the Cheonjong (SI<sub>11</sub>) and gokwon(SI<sub>13</sub>), Lavator scapular muscle including the Gyeonjunsu (SI<sub>15</sub>), Rhomboides major muscle including the Pungmun (BL<sub>12</sub>), Rhomboides minor muscle including the Daejeo (BL<sub>11</sub>) and Teres major muscle including the Gyeonjeong (SI<sub>19</sub>). VAS scale, SPADI scale and ROM were compared between before and after treatment to evaluate the effect of Embedding therapy.

**Results:** VAS scale decreased significantly (p=0.003). SPADI Scale decreased significantly (pain (p=0.006), disability(p=0.005)). ROM angle range increased significantly(flexion (p=0.005), extension(p=0.005), abduction(p=0.003), adduction(p=0.003), external rotation (p=0.005), internalrotation(p=0.005)). 29.8% patients were very much satisfied, 62.0% patients were satisfied and 8.0% patients were answered so so about Embedding therapy.

**Conclusion:** The Embedding therapy could be effective to improve symptoms of frozen shoulder.

**Key Words** : frozen shoulder, shoulder pain, Embedding therapy, Korean medicine

### Introduction

Osipgyeon, frozen shoulder and adhesive capsulitis are synonymous. It means certain diseases that accompanied by limitation of motion of the shoulder joints. It is difficult to describes the cause of this disease.<sup>1)</sup> Among the musculoskeletal degenerative diseases, frozen shoulder can appear before and after 50 years old by unknown cause, and the pain is progressed in the shoulder joint and is accompanied by severe limitation of motion<sup>2)</sup>. The pain and

movement disorders in the shoulder can cause a lot of trouble in daily life.

The general treatments of frozen shoulder are hot pack, transcutaneous electrical nerve stimulation (TENS), interferential current therapy(ICT), ultra sound therapy, active joint movement, passive expansion exercise and a lot of kinds of exercise in western medicine. The most important part of the treatments is restoration of the range of motion by the stretching.

In Korean medicine, electric acupuncture<sup>3)</sup>,

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moxibustion treatment<sup>4)</sup>, treatment by the Korean medicine in cooperation with the western medicine<sup>5-7)</sup>, Pharmacopuncture treatment<sup>8)</sup> and acupuncture<sup>9)</sup> have been performed at frozen shoulder.

Embedding Therapy is also known as Meridian point burial therapy or Medication thread burial therapy. The principle of this treatment that medication thread continue remain to under the skin so the effect lasts longer<sup>10)</sup>.

Lee's embedding therapy study<sup>11)</sup> was reported about Improvement Against Facial Wrinkles, Han<sup>12)</sup> reported the efficacy of embedding therapy to facial palsy, Yoon's embedding therapy study<sup>13)</sup> was reported about Androgenetic alopecia in woman, Bae's embedding therapy study<sup>14)</sup> was reported about chronic tension type Headache, Lee's embedding therapy study<sup>15)</sup> was reported about lumbar disc herniation and Lee's embedding therapy study<sup>16)</sup> was reported about shoulder pain in behcet disease. Like this, embedding therapy was reported used in not only cosmetic surgery but also musculoskeletal diseases.

Thus, the study of embedding therapy have been studied in various fields. But study about embedding therapy for frozen shoulder has not yet been reported.

So we carried out embedding therapy to frozen shoulder and report the results.

## Subject and Method

### 1. Subject

The research involved 57 patients who visited the acupuncture & moxibustion department at Semyung University Hospital of Oriental Medicine for frozen shoulder from April 30, 2014 to February 28, 2015. They were diagnosed with frozen shoulder by physical examination or radiologic testing(X-ray, CT, MRI). Purpose of the study, procedures and adverse reactions were explained enough to participants and all participants agreed to voluntarily participated.

#### 1) Inclusion criteria

- ① Men and women, 40 years old or more and 70 or less
- ② The patient was complaining of pain and movement disorders in shoulder joint.
- ③ The patient was diagnosed with frozen shoulder by physical examination or radiologic testing (X-ray, CT, MRI)
- ④ The patient who who decide themselves to participation and agreement.

#### 2) Exclusion Criteria

- ① In association other disease showed up on the X-ray, CT or MRI.
- ② Patients with keloid, allergen or sensitive skin.
- ③ Getting a skin laser treatment or going to be
- ④ Patients with skin infections.
- ⑤ Other patient that doctor determines not suitable for this study

## 2. Treatment Method

### 1) Embedding therapy

Medical thread for Embedding therapy were purchased from Dongbangchimgusa(Korea). The specifications of the used medical thread is 3cm, 29Gauge. The medical procedure areas were based on the textbook on acupuncture<sup>10)</sup>. Trapezius muscle including the Gyeonjeong (GB<sub>21</sub>), Deltoid muscle including the Nosu (SI<sub>10</sub>), Supraspinatus muscle including the Byeongpung (SI<sub>12</sub>), Infraspinatus muscle including the Cheonjong (SI<sub>11</sub>) and gokwon(SI<sub>13</sub>), Lavator scapular muscle including the Gyeonjunsu (SI<sub>15</sub>), Rhomboides major muscle including the Pungmun (BL<sub>12</sub>), Rhomboides minor muscle including the Daejeo (BL<sub>11</sub>) and Teres major muscle including the Gyeonjeong (SI<sub>19</sub>).

Embedding therapy was performed once a day, once per a week. 15~20 Embedding thread were used in one time Embedding therapy. The total number of Embedding therapy was 10.

## 2) Acupuncture treatment

The acupuncture were disposable, stainless-steel filiform needles (0.30 mm x 40 mm) from Dongbang Acupuncture, Inc. Following the meridian points, the acupuncture was operated at the Gyeonu(LI<sub>15</sub>), Bino(LI<sub>14</sub>), Gyeongong(SI<sub>9</sub>), Nosu(SI<sub>10</sub>), Gyeollyo (TE<sub>14</sub>), Pungji(GB<sub>20</sub>) of the affected side before embedding therapy. It was performed once a day, three per a week. The acupuncture's retaining times were 15 min.

## 3. Investigation analytical method

In order to the general characteristics of patients and the effect of Embedding therapy, we investigated following:

- 1) Distribution of gender and age
- 2) VAS(Visual Analogue Scale) score before and after Embedding therapy,
- 3) SPADI(Shoulder Pain And Disability Index) scale before and after Embedding therapy
- 4) ROM(Range of Motion) before and after Embedding therapy
- 5) patients satisfaction

The data were expressed as mean  $\pm$  standard deviation and analyzed by using paired t test of SPSS 18.0 for windows program. Values of  $P < 0.05$  were considered as statistically significant. Patients satisfaction were described very much satisfied, satisfied, so so, dissatisfied and very much dissatisfied.

## Result

### 1. Distributions of gender and age

The 57 patients in this study were composed of 19 man and 38 women, and the distribution of gender and age is shown in Table 1.

**Table 1.** Distributions of patients

	Classification	Number
Gender	Male	19
	Female	38
Age	41-50	20
	51-60	27
	61-70	10

### 2. Distributions of frozen shoulder lesion.

The facial palsy was located on the left (Lt) side in 25 patients and on the right (Rt) side in 32 patients.

### 3. Vas score

Before Embedding therapy, Mean of Vas Scale is  $5.73 \pm 1.43$ . After Embedding therapy, Mean of Vas Scale  $3.36 \pm 1.38$  ( $P = 0.003$ ). In the paired t-test, the Vas Scale decreased significantly. Mean of Vas Scale changes is  $-2.36 \pm 1.57$ .(Table 2)

### 4. SPADI scale

Before Embedding therapy, Mean of SPADI(pain) scale is  $33.31 \pm 8.31$ . After Embedding therapy, Mean of SPADI(pain) scale  $26.43 \pm 8.31$  ( $P = 0.006$ ). Before Embedding therapy, Mean of SPADI (Disability) scale is  $37.35 \pm 7.50$ . After Embedding therapy, Mean of SPADI(Disability) scale  $32.07 \pm 7.39$  ( $P = 0.005$ ). In the paired t-test, the SPADI(pain) and SPADI (Disability) scale decreased significantly. Mean of SPADI scale (pain) changes is  $-6.87 \pm 7.61$ . And mean of SPADI scale(Disability) changes is  $-5.28 \pm 2.99$ .(Table 2)

### 4. ROM angle range

#### 1) Flexion angle range

Before embedding therapy, Mean of flexion angle range is  $132.80 \pm 20.83$ . After embedding therapy, Mean of flexion angle range is  $148.92 \pm 18.79$  ( $P = 0.005$ ). In the paired t-test, the flexion angle range increased significantly. Mean of flexion angle range changes is  $16.12 \pm 13.03$ .(Table 2)

2) Extension angle range

Before embedding therapy, Mean of extension angle range is 21.05±11.90. After embedding therapy, Mean of extension angle range is 25.77±12.44(P=0.005). In the paired t-test, the extension angle range increased significantly. Mean of extension angle range is 4.17±5.68.(Table 2)

3) Abduction angle range

Before embedding therapy, Mean of abduction angle range is 106.38±16.10. After embedding therapy, Mean of abduction angle range is 118.17±15.08 (P=0.003). In the paired t-test, the abduction angle range increased significantly. Mean of abduction angle range changes is 11.78±8.28.(Table 2)

4) Adduction angle range

Before embedding therapy, Mean of adduction angle range is 11.49±5.04. After embedding therapy, Mean of adduction angle range is 14.91±5.24(P=0.003). In the paired t-test, the adduction angle range increased significantly. Mean of adduction angle range changes is 3.42±2.55.(Table 2)

5) External rotation angle range

Before embedding therapy, Mean of external rotation

angle range is 37.56±6.86. After embedding therapy, Mean of external Rotation angle range is 44.24±6.32(P=0.005). In the paired t-test, the external Rotation angle range increased significantly. Mean of external Rotation angle range changes is 6.68±4.22.(Table 2)

6) Internal Rotation angle range

Before embedding therapy, Mean of internal rotation angle range is 44.92±6.78. After embedding therapy, Mean of internal rotation angle range is 47.15±7.03(P=0.005). In the paired t-test, the internal rotation angle range increased significantly. Mean of internal rotation angle range changes is 2.22±1.80. (Table 2)

5. patients satisfaction

26 patients were very much satisfied with the embedding therapy(29.8%). 54 patients were satisfied (62.0%) and 7 patients were so so(8.0%).

Discussion

The clinical characteristics of frozen shoulder is pain and limited range of motion<sup>17)</sup>. The duration of treatment is from weeks up to several months.

Table 2. The Change of VAS, SPADI and ROM before and after Treatment in Patients with frozen shoulder.

		Before treatment	After treatment	t	p-value
	VAS	5.73±1.43	3.36±1.38	11.339	0.00
SPADI	Pain	33.31±8.31	26.43±8.31	6.820	0.00
	Disability	37.35±7.50	32.07±7.39	13.296	0.00
ROM(°)	Flexion	132.80±20.83	148.92±2=18.79	-9.339	0.00
	Extension	21.05±11.90	25.77±12.44	-6.268	0.00
	Abduction	106.38±16.10	118.17±15.08	-10.738	0.00
	Adduction	11.49±5.04	14.91±5.24	-10.104	0.00
	External rotation	37.56±6.86	44.24±6.32	-11.940	0.00
	Internal rotation	44.92±6.78	47.15±7.03	-9.330	0.00

Vales are means±SD

Statistical significance was evaluate by paired t-test.

Sometimes symptoms disappear spontaneously. In some cases, shoulder joint movement is restricted permanently<sup>18</sup>.

Frozen Shoulder was mentioned in Huang Di Nei Jing(黃帝內經). Peculiar pathologicla product(Dam-eum, 痰飲) and negative energy like wind cold and wet are cause of frozen shoulder in Korean medicine<sup>10</sup>.

In Western medicine, several authorities has various views on the definition and cause of frozen shoulder.

Codman described frozen shoulder that common diseases which can cause shoulder pain and disability, and first used the term frozen Shoulder officially<sup>19</sup>.

Among many muscles, ligaments, and joints, coracoacromial ligaments and coracoid process build the coraco acromial arch, which locates just upper parts of rotator cuff, and it has bursa which can buffer the friction. If supinate your shoulder joint, rotator cuff is wedged between great tubercle and coraco-acromial arch so it can cuase damage and consistent damages can cause degeneration of ligamnets. Hammon reported that this can cause frozen Shoulder<sup>20</sup>, Paker also reported the degeneration of rotator cuff, bursa, biceps tendon, other tissues is the cause of frozen Shoulder, and it creates swelling, fibrosis, round cell infiltration, which limits the motion ranges<sup>21</sup>.

Embedding Therapy is that melting thread is embedded by using a specially designed needle. That melting thread also used as the material for surgical sutures for surgery<sup>22</sup>.

Embedding therapy is similar to continuous stimulation by acupuncture for a period of times. It can effect constantly while staying acupuncture points<sup>23</sup>. It is widely used for chronic diseases, musculoskeletal disorders, dermatology disorders and gynecological disorders in Korean medicine<sup>24</sup>.

In recent years, Embedding therapy has been used in the field of musculoskeletal degenerative diseases. Hong<sup>25</sup> reported the principles of Embedding therapy and Lee<sup>15</sup> explained that Embedding therapy

can be used in lumbar disc herniation. Lee<sup>16</sup> reported on its effectiveness on shoulder pain in behcet disease. But their studies were about some cases. There were no studies with Embedding therapy to treat frozen shoulder. So we tried to improve symptoms of frozen shoulder with Embedding therapy.

Research subjects are constituted by 19 man and 38 women. By age, 40s is 20, 50s is 27, and more than 61 is 10. 50s has the most percentage.

The frozen shoulder was located on the left (Lt) side in 25 patients and on the right (Rt) side in 32 patients.

The purpose of Embedding therapy on frozen shoulder is to improve shoulder joint movement and soften muscle stiffness. In order to objectively evaluate the effect of Embedding therapy, Scale that can accurately estimate the degree of frozen shoulder is necessary. Because VAS scale, SPADI and ROM are most often used for evaluate of frozen shoulder<sup>26</sup>, we used these scales and the results are as follows;

After Embedding therapy, mean of VAS scale changes was  $-2.36 \pm 1.57$ , SPADI(pain) was  $-6.87 \pm 7.61$ , SPADI(Disability) was  $-2.36 \pm 1.57$ , flexion angle range  $16.12 \pm 13.03$ , extension angle range  $4.71 \pm 5.68$ , abduction angle range  $11.78 \pm 8.28$ , adduction angle range  $3.42 \pm 2.55$ , external rotation angle range  $6.68 \pm 4.22$  and internal rotation angle range  $2.22 \pm 1.80$ . This changes were statistically significant. These results showing a similar effect as compared to other previous studies with the acupuncture or pharmacupuncture<sup>8,9</sup> on frozen shoulder.

Most patients felt very positive and just 8% patients answered 'so so' about Embedding therapy. There were no patients with a negative answer about Embedding therapy.

These results indicate that embedding therapy is a available method to treatment of complete frozen shoulder. In particular, this therapy may be useful for patients who do not frequently visit the hospital.

However, this study has a few limitations, including the number of patients that was small and a short treatment period. Large scale RCT (Randomized Controlled Trial) studies on frozen shoulder and embedding therapy needs to be performed.

### Conclusion

Through our research, we obtained the following conclusions: The embedding therapy change the VAS scale, SPADI scale and ROM in frozen shoulder. This changes were statistically significant. These results were similar therapeutic effect as compared to other previous studies about frozen shoulder. 92% of the patients were satisfied or very much satisfied with Embedding therapy. Embedding therapy can be used for complete frozen shoulder, And it is considered that this treatment is worthy of further studying.

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