



## Case Report

# Effect of Complex Korean Medicine Treatment on Sacral Insufficiency Fracture: A Case Report

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## ABSTRACT

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Sacral insufficiency fractures (SIF) are a common, but often underdiagnosed source of lower back pain without apparent trauma. This report presents the clinical outcome of a 75-year-old female with SIF, and an underlying medical history of osteoporosis and rheumatoid arthritis. She was treated non-operatively, in-hospital, with Korean medicine. Patient progress was assessed using the numerical rating scale and self-reported symptoms. Post-treatment, the numerical rating scale score for pain in her hip decreased from 7 to 2. At admission, the patient was unable to sit, and could only walk 3 m with assistance. At discharge, she could sit for longer than 1 hour and walk further than 200 m unassisted. On the follow-up visit, the patient was asymptomatic, and x-ray scans showed ossification of the sacral and pubic fractures. These results suggest that, Korean medicine can effectively reduce pain and aid rehabilitation in patients with SIF, without the need for surgery.

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## Introduction

Sacral insufficiency fractures (SIF) have been described as a common, but often underdiagnosed cause of lower back pain and mobility, especially in elderly patients with osteoporosis [1-3]. Patients with osteoporosis have low bone mineral density, poor bone quality, and are susceptible to falling due to muscle weakness [4].

Patients with SIF present with vague symptoms, including lower back pain and buttock pain [5], while some may present with neurological deficits [1]. Additionally, SIF are difficult to diagnose using x-ray scans alone. These factors make a definitive diagnosis of SIF difficult to achieve [6,7].

### Past medical history

Conservative treatment options should be offered first to patients with SIF [6]. Contrary to previous studies, recent research suggests that early mobilization improves outcomes and reduces complications [8]. Several studies have reported the effectiveness of conservative treatment for fractures, including Korean medicine

treatment such as acupuncture, moxibustion, herbal medication, bee venom, and pharmacopuncture [9]. In Korea, there have been reports of pelvic fractures caused by apparent trauma or traffic accidents [9-12]. This case report describes the effectiveness of Korean medicine treatment for SIF in an elderly patient with osteoporosis.

## Case Report

### Patient

○○○ (F/75)

### Chief complaint

Pain in both hips and inner thighs.

Past medical history

Hospitalization on July 24<sup>th</sup>, 2019, due to systemic arthralgia, for 1 month, during which she was diagnosed with rheumatoid arthritis and osteoporosis, and steroid medication was prescribed.

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### Family history

None.

### Present illness

Early in November 2019 the patient started to experience spontaneous pain in her right hip whilst squatting. On November 15<sup>th</sup>, 2019 she had a magnetic resonance imaging (MRI) scan of the lumbar spine which showed spinal stenosis affecting L2-5. A nerve block injection was administered twice. She was then hospitalized in a Western hospital from November 25<sup>th</sup> until December 3<sup>rd</sup>, 2019, during which time, a bone scan, X-rays of the lumbar spine, pelvis, and hips, in addition to an MRI scan of the lumbar spine and sacrum were performed. She was diagnosed with SIF and spinal stenosis. After discharge, she visited the Korean Medicine hospital for treatment.

### Duration of treatment

December 3<sup>rd</sup>, 2019 to January 22<sup>nd</sup>, 2020 (51 days of hospitalization)

### Clinical chemistry

Laboratory investigations, including total blood count, routine biochemical tests, erythrocyte sedimentation rate, and C-reactive protein levels fell within normal limits. Urinalysis demonstrated the presence of 5-7 red blood cells per high power field, 7-10 white blood cells, 10-15 epithelial cells, and a few bacteria. With respect to the urinalysis, the patient was asymptomatic.

### Radiology

A bone scan, pelvic and lumbar MRI scans, and anteroposterior x-ray scans of the pelvis were taken (Figs. 1-4).

### Patient protection policy on patient information use

To protect the patient's personal information, medical records were obtained from the Institutional Review Board (no: DJUMC-2020-BM-02).

### Treatment

### Acupuncture

The acupuncture needles used were 0.25×30 mm and 30×40 mm stainless steel standardized, and disposable (Eastern acupuncture

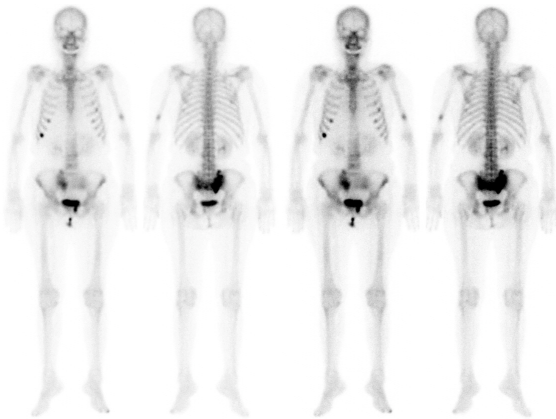


Fig. 1. A bone scan of the pelvis. The bone scan showed a pattern of vertical uptake in both alae with a horizontal component in the body of the sacrum, indicating an insufficiency fracture of the right ala. Increased bone production was also evident in the left pubic area (November 15<sup>th</sup>, 2019).

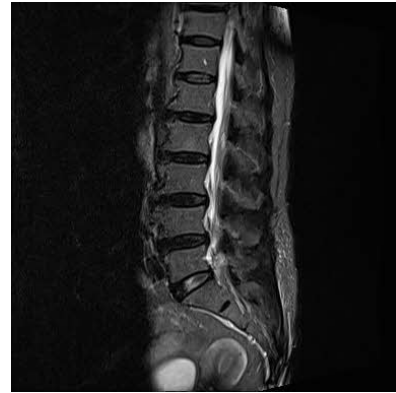


Fig. 3. Magnetic resonance images of the lumbar spine (15<sup>th</sup> November 2019). There were no new lesions observed except for underlying central spinal stenosis in L2-3, L3-4, and L4-5.

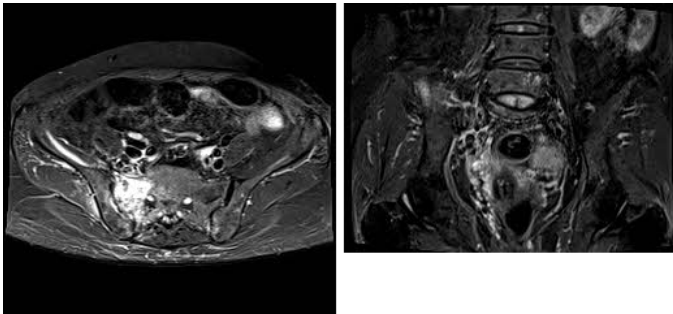


Fig. 2. Magnetic resonance images of the hip (15<sup>th</sup> November 2019). Axial (fat-saturated T2-weighted; left), and coronal (fat-saturated T2-weighted; right) images show a low-energy intensity lesion on the right sacrum and left pubis. A diffuse bone marrow edema involving the right sacral ala with a non-displaced fracture line was evident.



Fig. 4. Anteroposterior radiology scans of the pelvis (25<sup>th</sup> November 2019). Sacral and pubic fractures were hardly visible on the X-ray image. Low bone density was observed in the left superior ramus of the pubic symphysis due to the fracture.

equipment manufacturer, Boryung, Korea). Acupuncture was administered at BL27, BL28, BL29, BL30, BL31, BL32, BL33, BL34, BL35, BL36, BL37, BL53, BL54, GB29, GB30, LR9, and the tender points on tissues, including the gluteus muscle, piriformis, iliopsoas, adductor, and hamstrings, for 15 minutes twice daily.

### Pharmacopuncture

Pharmacopuncture was performed, once daily, on each day of hospitalization. Acupoints BL27, BL28, BL29, BL30, BL53, BL54, or trigger points around the hip were used. Aconitum ciliare decaysine pharmacopuncture (ADP) (Korean Pharmacopuncture Institute, Seoul, Korea) was administered just before acupuncture therapy. Doses of 0.05 to 0.1 mL were injected at each acupoint at a depth of between 1 cm to 1.2 cm. The maximum, total dose per treatment was 1.0 mL. This was administered using a 1.0 mL disposable syringe with needle (Jungrim Medical, Seoul, Korea, 30 G × 1.27cm, 12.7 mm needle).

### Bee venom (BV)

Due to the potential risks associated with the use of bee venom (delayed hypersensitivity reaction or anaphylaxis), informed consent was obtained from the patient prior to treatment. A hypersensitivity skin test to BV (1:20,000, 0.1 mL; Korean Pharmacopuncture Institute, Seoul, Korea) was performed, and

was negative. The concentration of BV administered was serially increased in the order of 1:20,000, 1:10,000, 1:5,000, 1:2,000, and sweet bee venom (SBV) 25% and SBV 50% were also used for intramuscular (IM) injections. The method of injection, either subcutaneous (SC) or IM injection, was chosen according to the site of the lesion. The volume injected also increased with each treatment if no hypersensitivity reaction occurred (Table 1). BV was substituted with SBV, if the patient felt pain from the IM injection of BV in the gluteus area. BV was injected using 30 G, 1 mL syringes.

### Herbal medicine

The patient took herbal medication 3 times daily. Whallaktang, Tongeodalchetang-gamibang (TDT-gamibang) and Ganghwalsokdintang-gamibang (GST-gamibang) were prescribed (Table 2).

### Physiotherapy

Transcutaneous electrical nerve stimulation (TENS) was applied once daily for 20 minutes in the region of BL37 to reduce pain and relieve tight muscles.

### Moxibustion treatment

Indirect electric moxibustion (Technoscience, Seoul, Korea) therapy was applied once daily at BL25, BL26, and BL36.

### Evaluation

#### Numerical rating scale

The patient's pain was assessed daily using the NRS. A score of 0 indicated no pain and 10 the most severe pain.

#### Subjective state of the patient

The patient's electronic medical records were reviewed to evaluate changes in the symptoms.

#### Radiological findings

X-ray scans of both hips were taken weekly during hospitalization, and on April 2<sup>nd</sup>, 2020 at the outpatient follow-up consultation.

#### Progress of the patient under treatment

##### Numeric rating scale

On admission, the patient complained of pain and rated her pain score as a NRS 7 in both her hips and inner hamstrings. Her pain was most severe in the supine position, causing sleep disturbances at night. From the 3<sup>rd</sup> day of treatment and onwards, the patient's hip pain started to decline (Fig. 5).

##### Walking and sitting positions

At admission, the patient was only able to use a wheelchair or walk 1 or 2 steps with assistance. Due to the intensity of pain, she could not remain in a seated position. On Day 3 after admission, she could walk 3 m using a walker, and on Day 9, she could remain seated for more than 10 minutes. On Day 25, she could walk unassisted for 3 m, and for 150 m using a walker. On Day 27, she walked 30 m, unassisted. On Day 30, she could sit for 20 minutes, but she suffered left posterior thigh pain. On Day 41, because her hip pain was greatly reduced, she could remain seated for 30 minutes. On Day 42, she tried to walk unassisted for 300 m, resting after every 100 m. On Day 48, she remained seated for 1 hour. At discharge, she could walk unassisted for more than 200 m. On the

Table 1. Bee Venom Injection Timetable.

Date	Injection site (method)	Bee venom concentration	Volume (mL)
10 <sup>th</sup> Dec 2019	Gluteus (IM)	20,000:1	0.4
11 <sup>th</sup> Dec 2019		10,000:1	0.4
12 <sup>th</sup> Dec 2019			0.6
13 <sup>th</sup> Dec 2019			0.8
14 <sup>th</sup> Dec 2019			1.0
16 <sup>th</sup> Dec 2019		5,000:1	0.6
17 <sup>th</sup> Dec 2019			0.8
18 <sup>th</sup> Dec 2019			1.0
19 <sup>th</sup> Dec 2019	Lumbar (SC)	10,000:1	0.4
20 <sup>th</sup> Dec 2019		5,000:1	0.4
21 <sup>st</sup> Dec 2019	Gluteus (IM), Lumbar (SC)	5,000:1, 2,000:1	1.0, 0.4
22 <sup>nd</sup> Dec 2019	Gluteus (IM)	SBV 10%	2.0
23 <sup>rd</sup> Dec 2019	Gluteus (IM), Lumbar (SC)	SBV 25%, 2000:1	2.0, 0.4
24 <sup>th</sup> Dec 2019	Gluteus (IM)	SBV 25%	2.0
26 <sup>th</sup> Dec 2019 2 <sup>nd</sup> Jan 2020, 3 <sup>rd</sup> , 6 <sup>th</sup> , 7 <sup>th</sup> , 10 <sup>th</sup>		SBV 50%	2.0
17 <sup>th</sup> Jan 2020		SBV 50%	1.0

IM, intramuscular; SBV, sweet bee venom; SC, subcutaneous.

Table 2. Herbal Composition of 3 Herbal Medications for Daily Dosage.

Whallak-tang 3 <sup>rd</sup> Dec 2019		Tongedolchetang-gamibang 4 <sup>th</sup> Dec 2019-15 <sup>th</sup> Dec 2019		Ganghwalsokdantang-gamibang 16 <sup>th</sup> Dec 2019-22 <sup>nd</sup> Jan 2020, 22 <sup>nd</sup> Jan 2020-29 <sup>th</sup> Jan 2020	
<i>Chaenomeles Fructus</i>	30	<i>Angelicae Gigantis Radix</i>	16	<i>Dipsaci Radix</i>	24
<i>Chelidonii Herba</i>	30	<i>Paeoniae Radix Alba</i>	16	<i>Eucommiae Cortex</i>	16
<i>Corydalis Tuber</i>	24	<i>Paeoniae Radix Rubra</i>	8	<i>Osterici Radix</i>	12
<i>Osterici Radix</i>	24	<i>Dipsaci Radix</i>	8	<i>Saposhnikovia Radix</i>	12
<i>Clematidis Radix</i>	18	<i>Persicae Semen</i>	8	<i>Angelicae Dahuricae Radix</i>	8
<i>Angelicae Pubescentis Radix</i>	18	<i>Achyranthis Radix</i>	6	<i>Asari Herba Cum Radix</i>	8
<i>Angelicae Gigantis Radix</i>	18	<i>Moutan Cortex</i>	6	<i>Achyranthis Radix</i>	8
<i>Rehmanniae Radix Siccus</i>	18	<i>Typhae Pollen</i>	6	<i>Gentianae Macrophyllae Radix</i>	8
<i>Paeoniae Radix Rubra</i>	18	<i>Ligustici Rhizoma</i>	6	<i>Rehmanniae Radix Preparat</i>	8
<i>Atractylodis Rhizoma</i>	12	<i>Carthami Novella</i>	4	<i>Angelicae Gigantis Radix</i>	8
<i>Citri Pericarpium</i>	12	<i>Schizonepetae Spica</i>	4	<i>Ginseng Radix</i>	8
<i>Olibanum</i>	12	<i>Glycyrrhizae Radix</i>	4	<i>Paeoniae Radix Alba</i>	8
<i>Myrrha</i>	9	<i>Perilla Herba</i>	4	<i>Clematidis Radix</i>	8
<i>Carthami Novella</i>	9			<i>Chaenomeles Fructus</i>	8
<i>Amomi Fuctus</i>	6			<i>Citri Pericarpium</i>	8
<i>Glycyrrhizae Radix</i>	12			<i>Poria(Hoelen)</i>	6
<i>Crataegii Fructus</i>	12			<i>Amomi Fuctus</i>	6
<i>Galli Stomachichum Corium</i>	12			<i>Aucklandiae Radix</i>	4
<i>Massa Medicata Fermentata</i>	12			<i>Cinnamomi Cortex Spissus</i>	4
<i>Hordei Fructus Germiniatu</i>	12			<i>Ligustici Rhizoma</i>	4
				<i>Corydalis Tuber</i>	4

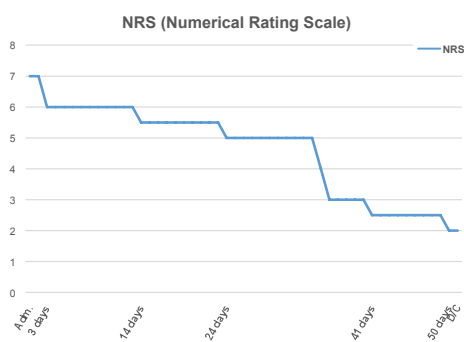


Fig. 5. Changes in the NRS Score for Pain. From Day 3, the patient's hip pain started to decline (NRS 6), and on Day 6 she could sleep without night pain. On Day 14, narcotic analgesics were stopped, the dosage of which had been tapered off since Day 8. Even though the analgesic effect ended, both the hip and leg pain had decreased to a NRS score of 5.5. On Day 24, her subjective pain during sitting was greatly improved. On Day 50, the pain of both hips had nearly disappeared.

Adm, admission date; D/C, discharge date



Fig. 6. X-ray of hips (left to right, top to bottom). January 3<sup>rd</sup>, 2020, January 10<sup>th</sup>, 2020, January 17<sup>th</sup>, 2020, April 2<sup>nd</sup>, 2020). X-ray images of the hips taken in January showed no significant differences. A follow-up X-ray taken in April showed an inhomogeneous pattern in the left superior ramus of the pubic bone due to a fracture with callus deposition. Compared to the images taken in January, this finding indicated that ossification of the fracture was progressing.

2<sup>nd</sup> April, the patient visited the outpatient clinic complaining of lumbago and numbness in both legs, which she had in her past medical history. She was able to walk for an hour restlessly and after walking she had hip pain on both sides which she rated as NRS 3.

#### Radiology findings

X-rays of the pelvis taken at admission and after treatment showed ossification of the fracture was progressing (Fig. 6).

#### Discussion

SIF commonly occurs in the elderly population and is often associated with conditions, such as rheumatoid arthritis, steroid-induced osteopenia, and osteoporosis. Due to nonspecific clinical symptoms, SIF can be misdiagnosed and improperly managed [1]. Most pelvic fractures are stable, non-displaced, low-energy fractures that can be treated conservatively with bed rest [12,13].

In this case report, a patient presenting with pain in both hips due to SIF, was successfully and conservatively treated using traditional Korean medicine. This patient had osteoporosis and rheumatoid arthritis, and was taking oral steroids, which were thought to have increased the risk of fracture. Although the patient's fracture involved more than 1 part of the pelvis, because the fracture state was stable, conservative medical management with Korean medicine was a safe option. Rehabilitation was also performed early in the course of treatment.

Under management, the patient's NRS score decreased from 7 to 2, and the duration for which she was able to remain seated increased from 0 to more than 1 hour by Day 48. At her outpatient appointment on the 2<sup>nd</sup> April, around 5 months later she could remain seated for as long as she desired. At admission, the patient was only capable of assisted walking and took absolute bed rest. After Day 27 of hospitalization, she had gradually increased her unassisted walking time. At discharge, she was able to walk unassisted for more than 200 m.

Bee venom was injected both SC and IM and the effects of both injection methods did not significantly differ according to a study of knee osteoarthritis patients [14]. In the treatment of this case, however, the method was chosen according to treatment site. The patient's main complaint was pain in both hips, but because she had a history of lumbar spinal stenosis, lumbar pain was also a target of treatment. Pharmacopuncture treatment incorporated the use of ADP. ADP has both anti-inflammatory and analgesic properties [15], and is used in treatment of arthralgia [16].

At admission, Whallak-tang was prescribed for alleviating severe pain and blood-activating. TDT-gamibang, used to cure pain from contusion, was then prescribed for 12 days to reduce the pain associated with the fracture [17]. As the NRS scores decreased with reduced pain, GST-gamibang was prescribed for the remainder of her stay in hospital. This herbal medication is known to strengthen the bones and muscle, and it effects osteoclast inhibition and activation and is used in the treatment and prevention of osteoporosis [18].

As SIF are a common, but often underdiagnosed condition in elderly patients, clinical practitioners should put SIF in the differential diagnosis of acute hip pain. Symptoms of SIF are nonspecific, such as diffuse pain, inguinal pain from anterior pelvic rim fracture, sacroiliac joint pain, or lower back pain from posterior pelvic rim fracture [19]. SIF are best diagnosed using a bone scan, while an MRI scan can aid in detection of peripheral tissue damage. As was observed in the present study, changes on anteroposterior x-ray scans are only seen after fracture union with callus formation [20].

This study is the first to report the management of a patient with SIF using traditional Korean medicine. Cases of pelvic fracture are rarely treated with traditional Korean medicine, and reports on conservative treatments are rare. This patient had suffered from SIF which occurred in early November, 2019. She was first treated with Western medicine for about a week and on December 3<sup>rd</sup>, 2019, she was treated by conservative Korean medicine treatment. She made an improvement in her condition and the level of pain she experienced reduced from an NRS score of 7 to 2. However, this report does have several limitations, in that it was limited to only 1 case, and complex treatments were performed simultaneously, making it difficult to determine the efficacy of each treatment method. Further studies are needed to substantiate the findings reported here.

#### Conflicts of Interest

The authors have no conflicts of interest to declare.

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