



# Complex Korean Medicine Treatment for Posterior Ankle Impingement Syndrome: Case Report

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## 후방 발목 충돌 증후군 환자의 복합 한의진료 경과: 증례보고

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Posterior ankle impingement syndrome is one of the impingement syndromes characterized by posterior ankle pain that occurs during forced plantar flexion. This report presents a case of a 48-year-old PAIS patient with os trigonum syndrome accompanied by tenosynovitis of flexor hallucis longus. She was treated with complex Korean medicine to a good effect. The Numeric Rating Scale and the EuroQol 5-Dimension 5-Level were used to measure the impact of Korean medicine on the patient's pain and quality of life. Decreased NRS and increased EQ-5D-5L scores reflected improvement in her symptoms within 25 days. This study suggests complex Korean medicine treatment for PAIS may be beneficial for alleviating pain and improving quality of life.

**Key words** : os trigonum, posterior ankle impingement, flexor hallucis longus tenosynovitis, Korean medicine

### Introduction

Posterior ankle impingement syndrome (PAIS), characterized by posterior ankle pain, is a painful syndrome that leads to discomfort and disability in individuals<sup>1)</sup>. PAIS is caused by anatomic structures being caught between the bony surfaces of the calcaneus and tibia. Repetitive micro-trauma due to ankle motion may lead to inflammation evoking swelling, pain, and decreased range of motion in the ankle

over time<sup>2)</sup>. Os trigonum, an accessory bone derived from failed secondary ossification, is one of the most common osseous lesions related to PAIS<sup>3)</sup>. The prevalence of os trigonum was reported to be about 30%, more usual than previously reported<sup>4)</sup>. Medial to the os trigonum, the flexor hallucis longus (FHL) tendon passes between the medial and lateral tubercle of the talus. Thus, forceful plantar flexion of the ankle rubs the os trigonum against the FHL tendon sheath to induce FHL pathologies like degeneration and tearing<sup>5)</sup>.

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In the early stage of PAIS, conservative treatment to balance the muscles and prevent further pathological changes from the collision of the involved structures is recommended. Following failure to manage symptoms after conservative treatment, operative interventions to excise the impinging bone spur are indicated. However, there are some concerns about the safety of the surgical treatment because of the proximity of the neurovascular bundle. Minor complications like superficial infection and hematoma to severe neurological injuries can occur<sup>6</sup>. Thereby, we report a case that presented with PAIS where tenosynovitis of the FHL coexisted with the os trigonum to suggest complex Korean medicine as an alternative option for PAIS patients.

## Case Report

### 1. Medical history

A 48-year-old woman went to a Korean medicine hospital on May 21st, 2022, with a complaint of swelling

and pain in her right ankle which worsened after carrying a heavy load on April 15th, 2022. She described sharp pain on her ankle's medial side, which worsened when running and climbing stairs. Other than a 2-year-history of recurrent bilateral ankle sprains, she did not have a remarkable past medical history. Upon physical examination, tenderness was present on the posteromedial aspect of the ankle, in front of the Achilles tendon. The right ankle's ranges of motion were restricted to 20 degrees of plantar flexion and 10 degrees of dorsiflexion. To identify the presence of soft-tissue and osseous abnormalities, radiographs were taken. X-rays and magnetic resonance imaging of the right ankle joint were carried out to reveal os trigonum and fluid collection around the FHL tendon (Fig. 1). The diagnosis of PAIS was confirmed according to these findings. The patient made the decision to try complex Korean medicine and was hospitalized for 25 days.

### 2. Treatment

**1) Acupuncture/pharmacopuncture Treatment:** The patient was treated with acupuncture in 2 sessions a day using



**Fig. 1. Radiograph of the right ankle.** (A) Sagittal X-ray of the right ankle showing the os trigonum. (B) T1-weighted and fat saturation T2-weighted magnetic resonance images showing increased fluid collection around the posteromedial ankle tendons in the sagittal, coronal, and axial planes.

0.20×30 mm sterile stainless steel needles (Dongbang Acupuncture, Korea). The acupuncture needles were inserted into the acupoints of SP6, GB34, GB39, SP3, SP4, SP5, SP6, SP9, KI3, BL60, and Ashi points. Electroacupuncture (STN-330 Stratek, Anyang, Korea) was applied at SP3-SP6 and the

needles were retained for 10 minutes.

The patient received Shinbaro pharmacopuncture (Jaseng Wonoe Tangjunwon, Namyangju, Korea) once a day. Shinbaro pharmacopuncture was injected at BL60 and SP5 with disposable, 29-gauge, 12.7 mm needles on a 1 cc syringe

**Table 1.** Details of interventions using the STRICTA 2010 checklist.

Item	Details	
Acupuncture rationale	1a) Style of acupuncture (e.g. Traditional Chinese Medicine, Japanese, Korean, Western medical, Five Element, ear acupuncture, etc.)	Traditional Korean acupuncture
	1b) Reasoning for treatment provided, based on historical context, literature sources, and/or consensus methods, with references where appropriate	Literature and clinical experience of experts.
	1c) Extent to which treatment was varied	The acupuncture treatment varied over the course of the study to manage the patient's changes in pain and sleeping problems
Details of acupuncture	2a) Number of needle insertions per subject per session (mean and range where relevant)	8~16 needles
	2b) Names (or location if no standard name) of points used (uni/bilateral)	SP6, GB34, GB39, SP3, SP4, SP5, SP6, SP9, KI3, BL60, and Ashi points
	2c) Depth of insertion, based on a specified unit of measurement, or on a particular tissue level	1.0~2.5 cm
	2d) Responses sought (e.g., de qi or muscle twitch response)	De-qi sensation
	2e) Needle stimulation (e.g. manual or electrical)	Electrical stimulation
	2f) Needle retention time	10 minutes
	2g) Needle type (diameter, length, and manufacturer or material)	0.20×30 mm sterile stainless steel needles (Dongbang Acupuncture, Korea)
Treatment regimen	3a) Number of treatment sessions	42 sessions
	3b) Frequency and duration of treatment sessions	Twice a day
Other components of treatment	4a) Details of other interventions administered to the acupuncture group (e.g. moxibustion, cupping, herbs, exercises, lifestyle advice)	Pharmacopuncture treatment, moxibustion, cupping, herbal treatment
	4b) Setting and context of treatment, including instructions to practitioners and information and explanations to patients	Procedure of treatments and diagnosis.
Practitioner background	5) Description of participating acupuncturists (qualification or professional affiliation, years in acupuncture practice, other relevant experience)	3 Korean medicine doctor with 3-25 years of experience
Control or comparator intervention	6a) Rationale for the control or comparator in the context of the research question, with sources that justify the choice(s)	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

**Table 2.** The composition of herbal medicine.

Herbal medicine	Herbal components (g)
Chungshinbaro-Hwan	Poria (Hoelen) 0.15, Ginseng Radix 0.07, Achyranthes bidentata Bl. 0.04, Asini Gelatinum 0.02, Rehmanniae Radix 0.62, Cervi Cornus Colla 0.06 g, Mel 0.31, Cibotii Rhizoma 0.02, Eucommiae Cortex 0.02, Saposhnikovia Radix 0.01, Acanthopanax Cortex 0.01, Scolopendra Corpus 0.01, Atractylodis Rhizoma Alba 0.05, Atractylodis Rhizoma 0.02
Saengganggeosamtang	Pinelliae Ternatae Rhizoma 11.25, Zingiberis Rhizoma 7.5, Zizyphus Jujuba 7.5, Scutellariae Radix 5.66, Glycyrrhizae Radix 5.66g, Coptidis rhizoma 7.5

(Sungshim Medical, Bucheon, Korea) using up 0.2-1.0 ml per session (Table 1).

**2) Herbal Treatment:** The patient received oral administration of Chungshinbaro-Hwan (tablet) and Saengganggeo-samtang (decoction) three times a day, 30 minutes after each meal (Table 2).

## 2. Assessments

**1) Numeric Rating Scale:** The Numerical Rating Scale (NRS), an 11-point scale showing the degree of the respondent's pain, was used and NRS scores were taken every day to record the changes in pain intensity throughout treatment<sup>7</sup>.

**2) European Quality of Life-5 Dimensions:** The EuroQol 5-Dimension 5-Level (EQ-5D-5L) is an index for rating a patient's health-related quality of life in 5 categories<sup>8</sup>. The quality of life for the patient was taken by EQ-5D-5L at the period of admission, after 1 week, and at discharge.

## 3. Ethics statement

The medical records of the patient were acquired retrospectively and approved for use by the Institutional Review Board of Jaseng Hospital of Korean Medicine (IRB file no.:2022-07-007).

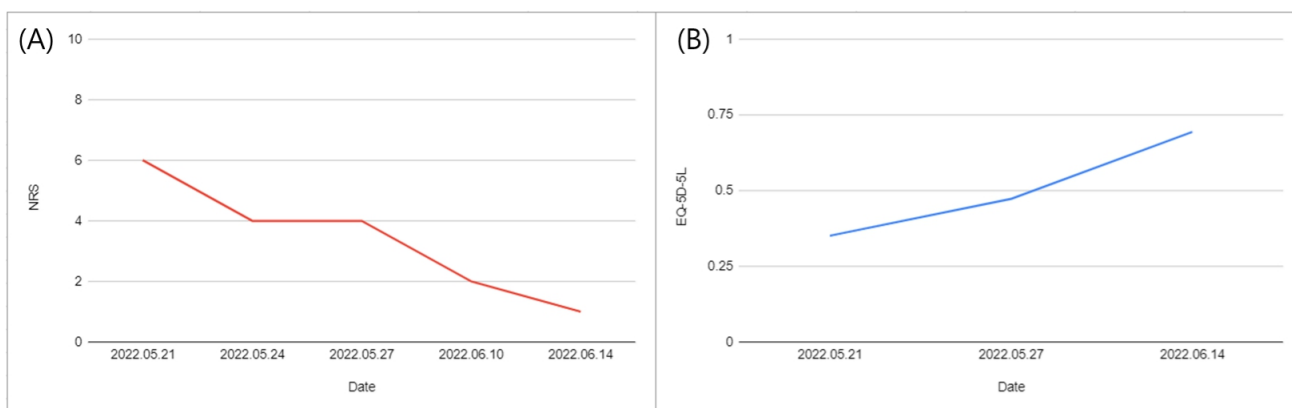
## 4. Progress note

On the 1st day of inpatient treatment, the patient initially rated her right ankle pain as 6/10 on the NRS and the

EQ-5D-5L score was 0.53 (Fig. 2). As treatment continued, she experienced improvement in pain and swelling. On May 24th, 2022, the 4th day of hospitalization, she reported that her pain had reduced to 4/10. On May 27th, 2022, she described her quality of life as slightly improved since her difficulty with walking and climbing stairs had been reduced. On June 10th, 2022, her pain and swelling were significantly alleviated. At the time of discharge, she experienced further alleviation in her overall symptoms, verified by an increased EQ-5D-5L score (0.694) and a decreased NRS score (1/10). She expressed satisfaction with the complex Korean medicine treatment and there were no adverse events during hospitalization.

## Discussion

PAIS is a clinical syndrome, distinguished by posterior ankle pain aggravated by hyperplantar flexion, for which awareness has increased to due imaging advances<sup>9</sup>. Although PAIS is mostly seen among dancers and athletes, this syndrome can even affect individuals who are not involved in sports or dancing. Once considered a syndrome, clinical examination and complete history of the patient should be checked. For differential diagnosis, MRI to assess anatomic variations such as accessory muscles and detect soft tissue pathologies is used<sup>10</sup>.



**Fig. 2.** The changes of outcomes before and after treatments. (A) Changes in NRS Score. (B) Changes in EQ-5D-5L Score.

When dealing with symptomatic PAIS, conservative therapy including rest, physiotherapy, and anti-inflammatory medication is considered to be the first option. This case of a PAIS patient who was confirmed to have an os trigonum accompanied by tenosynovitis of FHL also received Korean medicine as the first line of treatment.

Acupuncture, a traditional treatment originating from the meridian theory, has been reported to be safe and effective for ankle pain<sup>11)</sup>. Acupuncture may have helped relieve the patient's symptoms by enhancing the lesions' local blood supply and facilitating the repair of tendons and other soft tissues<sup>12)</sup>.

Pharmoacupuncture, a combination of two major elements of traditional Korean medicine, stimulates acupuncture points by injecting herbal extracts subcutaneously<sup>13)</sup>. Shinbaro pharmoacupuncture extracted from GCSB-5 (*Eucommia ulmoides* cortex, *Acanthopanax sessiliflorum* cortex, *Achyranthis bidentata* radix, *Saposhnikovia divaricata* radix, and *Cibotium barometz* rhizoma) is known to have anti-inflammation and nerve regenerating properties<sup>14,15)</sup>. When injected into the posteromedial region of the ankle, close to the tendons, it may help alleviate pain and recover the damage in the soft tissues.

Herbal medicine is made from extracting active ingredients from multiple herbs. Chungshinbaro-Hwan, whose precise mechanism has yet to be elucidated but there are some pharmacological studies on each component, includes Ginseng Radix, *Achyranthes bidentata* Bl., and *Rehmanniae Radix* which have been found to have anti-inflammatory effects<sup>16-18)</sup>. Additionally, the patient was given Saengganggeosamtang as she complained of difficulty sleeping. Saengganggeosamtang consists of 6 herbs among which *Pinelliae rhizoma* and *Zizyphus Jujuba* have been widely reported to improve sleep disorders by their sedative and anti-convulsive effects<sup>19,20)</sup>. As well as sleeping problems, all of the patient's other body systems were broadly obtained to reach the most appropriate prescription.

Some limitations of this study should be noted. First, it was a study of a single case for generalized results. Second, since this study had no control groups, there is no confidence in

being certain that the outcomes were due to the curative effect of the complex Korean medicine. Third, the sole therapeutic effect of each treatment could not be separated from the others since they were administered integrally.

However, this case study is significant in that this is the first time, to our knowledge, that a reported case with os trigonum complicated by tenosynovitis was treated with complex Korean medicine. During inpatient treatment, the patient's course of recovery was closely observed without experiencing any side effects. Hopefully, this study may provide a beginning for further exploring the use of Korean medicine for these types of syndromes. Further studies including randomized controlled trials with larger samples are needed to determine this study's findings.

## Conclusion

The current case report suggests that PAIS patients with os trigonum and FHL tendon lesions might benefit from treatment with complex Korean medicine.

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None.

## Data availability

The authors can provide upon reasonable request.

## Conflicts of Interest

The authors have declared that no conflicts of interest exists.

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