



Case Report

Cervical and Lumbar Herniated Nucleus Pulposus Resorption after Acupotomy with Integrative Korean Medicine Treatment: A Case Series of Two Patients



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ABSTRACT

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The aim of this study was to report on the resorption of herniated nucleus pulposus following acupotomy treatment. Two patients were treated with acupotomy which included integrative Korean Medicine treatment, for either cervical, or lumbar herniated nucleus pulposus. Magnetic Resonance Imaging was used to produce images before and after (several months) treatment. The Numerical Rating Scale scores and Range of Motion were used to assess the patients at admission and discharge. In both cases, substantial resorption of the respective herniated disc was observed in the magnetic resonance images, with a decrease in the Numerical Rating Scale score. Range of Motion improved in 1 case. This study shows that acupotomy treatment may be a clinically effective treatment for herniated nucleus pulposus resorption and pain relief.

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Introduction

Herniated nucleus pulposus (HNP) is a condition resulting from biochemical and physical changes in the spinal disc tissue caused by degeneration in old age, or acute external pressure. These changes in the spinal disc tissue cause protrusions into the spinal canal, putting pressure on the dura mater or the nerve root, thus inducing neurological pain symptoms [1]. HNP is generally diagnosed by radiological examination, such as computed tomography (CT) or magnetic resonance imaging (MRI), together with patient symptoms and a physical examination. Treatment of HNP, includes conservative therapies or surgery, performed according to the progression of patient symptoms, and the degree of disc herniation according to radiological examination.

Acupotomy is an intervention that combines acupuncture therapy of traditional Korean Medicine with the surgical therapy of Western medicine. The aim is recovery of function to a normal active state by detaching the adhesions and nodes, of the damaged

soft tissue [2]. In the last decade, numerous clinical trials have been conducted looking at the effectiveness of conservative Korean Medicine treatment on cervical and lumbar HNP, where acupotomy interventions have resulted in improvements [3-5]. However, few studies in Korea have reported follow-up radiological changes (CT or MRI) after acupotomy. The objective of this case series was to report clinically meaningful changes observed by MRI after acupotomy and integrative Korean Medicine treatment of cervical and lumbar HNP. This study was exempted from Institutional Review Board (IRB) deliberation (IRB No.: DJDSKH-18-E-18-1).

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Treatment methods

Acupotomy

Acupotomy was administered 2 or 3 times per week during the

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hospital stay. A disposable acupotomy needle was used (Hansung Meditech, Ltd., Korea), with a flat blade at the end of the needle (1.2 × 60 mm). Acupuncture points were located in a supine position. GV14, GV16, GB12, and GB20 were selected for cervical HNP, and GV03, BL23, BL24, and BL25 were selected for lumbar HNP. Intervention was performed on the adhesive area, and the hard area of the soft tissue of the erector spinae muscle, near the acupuncture points. The intervention area was disinfected before and after the treatment, and was covered with gauze and bandage following the intervention to prevent infection. The acupotomy intervention was performed by a board-certified specialist for acupuncture and moxibustion, with 24 years of clinical experience, and 5 years of experience in acupotomy. The practitioner of acupotomy did not engage in the evaluation of the acupotomy treatment. Before treatment, the practitioner explained acupotomy treatment to the patients prior to the intervention, and a written consent form was completed by the participants.

Acupuncture

Acupuncture was performed twice a day at acupoints on sites near the lesion, in the morning and in the afternoon, every day except for the day when acupotomy was performed, during the admission period. The needles used were 0.20 × 30, or 0.25 × 30 mm disposable filiform needles, sterilized by gamma rays (Dong-Bang Medical Ltd., Korea). The acupoints that were selected for lower back pain were BL23, BL24, BL25, BL26, BL52, and GB30, and the acupoints that were selected for neck pain were BL10, BL11, SI9, SI11, SI12, SI13, SI14, SI15, GB20, and GB21. [6]. The needles remained in situ for 15 minutes.

Herbal acupuncture

Herbal acupuncture (pharmacopuncture) was administered every other day. Either Soyeom pharmacopuncture or bee venom B4 (Korean Pharmacopuncture Research Institute, Ltd. Republic of Korea) was prescribed according to the patients' symptoms. In Case 1, Soyeom pharmacopuncture was prescribed and bee venom B4 was prescribed for Case 2. Hard areas on BL23, BL24, BL25, and BL26 on both sides of the lumbar spine and BL10, BL11, and GB21 on both sides of the cervical spine were selected, and 0.5 mL of the pharmacopuncture agent was injected on an acupoint, a total of 1 mL per session.

Herbal medicine

Herbal medicine was prescribed following the pattern diagnosis of the patient and 3 packages of herbal decoction (120 mL/package) were given per day to take 1 hour after a meal. The composition of herbal medicines prescribed for each patient during hospitalization are shown in Tables 1, 2.

Moxibustion

Indirect moxibustion was administered on the GB21 of BL23 of both sides using charcoal moxa cones (Dong-Bang Medical Ltd., Korea) once daily.

Physical therapy

Interference current therapy, microwave, and hot packs were administered for 30 minutes daily on the neck, and on the back.

Table 1. Herbal Composition for Case 1.

Bangpungdongseong-decotation 1 d		Oyaksungi-decotation 3 d	
Talcum	6 g	Ephedrae Herba	4 g
Glycyrrhizae Radix et Rhizoma	5 g	nidii Rhizoma	4 g
Gypsum Fibrosum	3 g	Angelicae Dahuricae Radix	4 g
Scutellariae Radix	3 g	Batryticatus Bombyx	4 g
Platycodonis Radix	3 g	Aurantii Fructus Immaturus	4 g
Saposhnikoviae Radix	2 g	Platycodonis Radix	4 g
nidii Rhizoma	2 g	Osterici seu Notopterygii Radix et Rhizoma	4 g
Angelicae Gigantis Radix	2 g	Araliae Continentalis Radix	4 g
Paeonia lactiflora Pallas	2 g	Chaenomelis Fructus	4 g
Rhei Radix et Rhizoma	2 g	Poria Sclerotium	4 g
Ephedrae Herba	2 g	Zingiberis Rhizoma	2 g
Menthae Herba	2 g	Glycyrrhizae Radix et Rhizoma	1 g
Forsythiae Fructus	2 g	Cinnamomi Ramulus	4 g
Natrii Sulfas	2 g	Zingiberis Rhizoma Recens	8 g
Schizonepetae Spica	1 g		
Attractylodis Rhizoma Alba	1 g		
Gardeniae Fructus	1 g		

Table 2. Herbal Composition for Case 2.

Whallak-decotation 9 d		Ssanghwa-decotation 9 d		Daebangpoong-decotation 10 d	
Chaenomelis Fructus	10 g	Zingiberis Rhizoma Recens	8 g	Astragali Radix	12 g
Chelidonii Herba	10 g	Paeoniae Radix	8 g	Angelicae Gigantis Radix	6 g
Corydalis Tuber	8 g	Angelicae Gigantis Radix	8 g	Paeoniae Radix	6 g
Osterici seu Notopterygii Radix et Rhizoma	8 g	Cnidii Rhizoma	8 g	Atractylodis Rhizoma Alba	6 g
Clematidis Radix	6 g	Astragali Radix	8 g	Eucommiae Cortex	6 g
Araliae Continentalis Radix	6 g	Atractylodis Rhizoma Alba	8 g	Dipsaci Radix	6 g
Angelicae Gigantis Radix	6 g	Amomi Fructus	8 g	Gentianae Macrophyllae Radix	6 g
Rehmanniae Radix	6 g	Massa Medicata Fermentata	8 g	Gastrodiae Rhizoma	6 g
Paeonia lactiflora Pallas	6 g	Hordei Fructus Germinatus	8 g	Clematidis Radix	6 g
Atractylodis Rhizoma	6 g	Zizyphi Fructus	8 g	Achyranthis Radix	6 g
Citri Unshius Pericarpium	4 g	Rehmanniae Radix Preparata	4 g	Linderae Radix	6 g
Olibanum	4 g	Citri Unshius Pericarpium	4 g	Saposhnikoviae Radix	6 g
Myrrha	4 g	Cinnamomi Ramulus	4 g	Osterici seu Notopterygii Radix et Rhizoma	6 g
Carthami Flos	3 g	Glycyrrhizae Radix et Rhizoma	4 g	Lycii Fructus	6 g
Amomi Fructus	3 g	Linderae Radix	4 g	Cnidii Rhizoma	6 g
		Eucommiae Cortex	4 g	Cinnamomi Ramulus	4 g
		Chaenomelis Fructus	4 g	Rehmanniae Radix Preparata	4 g
		Dipsaci Radix	4 g	Dioscoreae Rhizoma	4 g
		Crataegi Fructus	4 g	Olibanum	2 g
				Myrrha	2 g

Evaluation

To evaluate the severity of the neck pain, lower back pain, and radiating pain on the upper and lower limb for cervical and lumbar HNP patients, the 3 scales used are as follows.

Magnetic resonance imaging

MRI is the radiological examination that can confirm the diagnosis of HNP. Imaging was performed by the Department of Radiology at local clinics. A follow-up MRI was taken 9 to 13 months after hospitalization and was read by a radiologist.

Numerical rating scale

Numerical rating scale (NRS) is a scoring method to quantify the subjective severity of pain felt by the patient on a scale of 0 to 10. The worst imaginable pain is scored as 10, and the pain-free state is scored as 0 [7]. Evaluation was performed at 7 AM daily when the patient felt stable.

Range of motion

ROM measures the range of motion of the cervical and lumbar spines and the existence of pain in active movement. Flexion,

extension, lateral bending, and rotation movements of the cervical and lumbar spines were measured at 7 AM daily. The angle of ROM was recorded, and the + sign was marked when there was pain while movement.

Case 1

Participant

Kim ○○ (Female, 49 years old)

Diagnosis

- ① HNP, C4-5, central, mild protruded disc
- ② HNP, C6-7, left paracentral, moderate extruded disc

Chief complaint

Neck pain, shoulder pain, back pain, left arm pain, and numbness

Onset and cause

First onset in January, 2017 with symptoms that worsened on June 8, 2017 after using a massage chair.

Present status

No specific intervention after the onset.

Treatment period

The patient was admitted to the Dunsan Korean Medicine hospital from June 12, 2017 to June 16, 2017 for 5 days.

Progress (Fig. 1, Table 3)

The first findings on June 12, 2017 were a NRS of 10 and cervical spine ROM of Flexion 45°, Extension 55°, Lateral bending 45° (+)/45° (+), and Rotation 60°/60° (+) during physical examination. Numbness appeared in the neck area and along the left arm on Spurling's test.

Acupotomy was performed on the neck area 3 times (June 13, 14, 16 2017). The NRS of neck, shoulder and back pain was reduced to 5 at the end of hospitalization on June 16, 2017, while the numbness and pain on the left arm were unchanged from admission. The neck ROM was also the same as that recorded at admission.

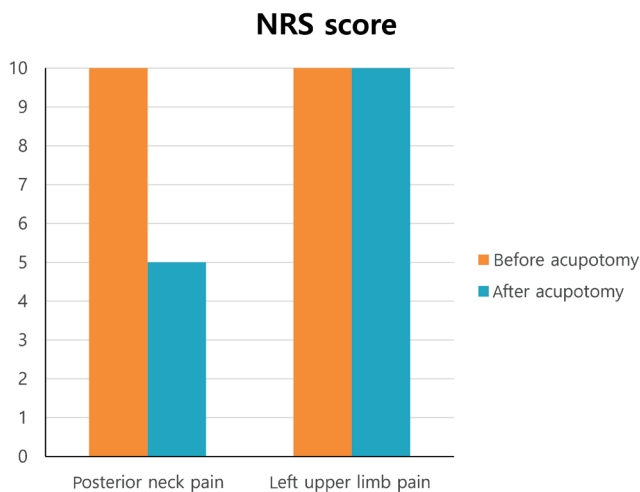


Fig. 1. The change of NRS at before and after acupotomy treatment in Case 1. NRS, numerical rating scale.

Table 3. Progress in the Treatment of Case 1.

	2017.06.12 (before treatment)	2017.06.16 (after treatment)
Posterior neck		
Flexion	45°	45°
Extension	55°	55°
Lateral bending	45°(+)/45°(+)	45°(+)/45°(+)
Rotation	60°/60°(+)	60°/60°(+)
Spurling's test	-/+	-/+

Radiological findings

The cervical spine MRI was taken on June 12, 2017 at the Department of Radiology at a local clinic. The image showed moderate extrusion to the left paracentral direction at C6-7 level, which compressed the dural sac (Fig. 2).

Afterwards, MRI was taken on July 2, 2018 at the same clinic. The findings showed that the HNP at C6-7 level was reabsorbed considerably and improved to a mild protrusion state with decreased compression on the dural sac (Fig. 3).

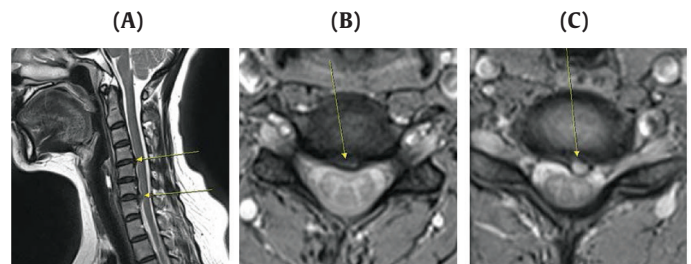


Fig. 2. Cervical spine MRI (T2-weighted image) of Case 1 on June 12, 2017. (A) Sagittal (B) Axial C4-5 (C) Axial C6-7. MRI, magnetic resonance imaging.

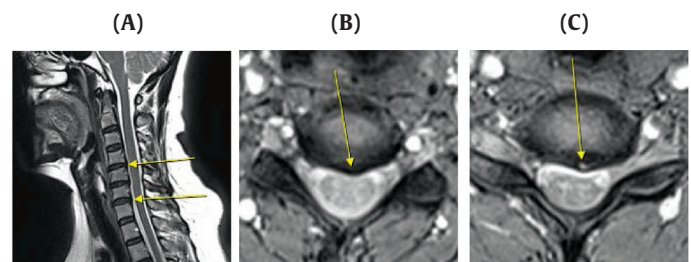


Fig. 3. Cervical spine MRI (T2-weighted image) of Case 1 on July 02, 2018. (A) Sagittal (B) Axial C4-5 (C) Axial C6-7. MRI, magnetic resonance imaging.

Case 2

Participant

Kim ○○ (Male, 48 years old)

Diagnosis

- ① Large extrusion with superior migration, L4-5
- ② Diffuse bulging disc, L1-2, L2-3, L5-S1

Chief complaint

Lower back pain (more pain on the right side than the left), right leg pain and numbness, and discomfort when flexing and extending the back.

Onset and cause

First onset around 2006, that worsened while climbing with a heavy load on September 30th 2017.

Present status

After the initial onset of the symptoms in 2006, the patient was diagnosed with stenosis and HNP by MRI taken at a local orthopedic clinic. He received nerve block once, in 2007, and received another nerve block in November, 2010 for the same symptoms at a local orthopedic clinic. On September 30, 2017, while climbing with a heavy load, the patient aggravated the old

injury. The pain did not subside after injecting and ingesting analgesics prescribed at a local orthopedics clinic on October 2, 2017.

Treatment period

The patient was hospitalized from October 8, 2017, to November 4, 2017 for 28 days.

Progress

The NRS score was 10 at the time of admission on October 2, 2017. The ROM of the back area was Flexion 30° (+), Extension 20° (+), Lateral bending 35°/35°, Rotation 45°/45°, SLR (Straight Leg Raising) test 40° (+)/60° (+) on physical examination.

Acupotomy was performed on the back area 7 times (October 18, 20, 23, 25, 27, 30, and November 3 2017). The NRS score for the right side back pain, was reduced to 2 and the NRS score for the right leg pain and numbness, reduced to 3 at the end of hospitalization on November 4, 2017. The ROM of the lumbar spine, and the physical examination were Flexion 60° (+), Extension 30° (+), Lateral bending 35°/35°, Rotation 45°/45°, and SLR 60° (+)/70° (+), showing improvement in the ROM of flexion and extension, and the angle of SLR test (Fig 4, Table 4).

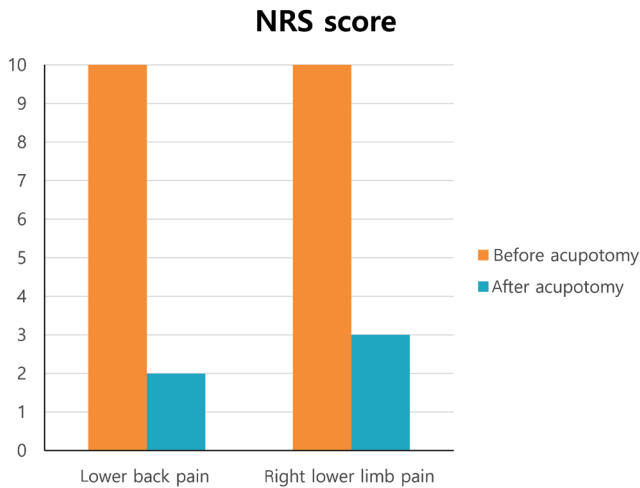


Fig. 4. The change of NRS before and after acupotomy treatment in Case 2. NRS, numerical rating scale.

Table 4. Progress in the Treatment of Case 2.

	2017.10.02 (before treatment)	2017.11.04 (after treatment)
Lower back		
Flexion	30° (+)	60° (+)
Extension	20° (+)	30° (+)
Lateral bending	35°/35°	35°/35°
Rotation	45°/45°	45°/45°
SLR test	40° (+)/60° (+)	60° (+)/70° (+)

SLR, straight leg raise test.

Radiology findings

The lumbar spine MRI was taken at the Department of Radiology of a local clinic on October 13, 2017. The image showed a large extrusion of disc, with superior migration at L4-5 level, which compressed the central canal, and the right side of the nerve root (Fig. 5).

In the MRI taken at the Department of Radiology at another clinic on July 25, 2018, the HNP on the L4-5 level was reabsorbed considerably to a mild protrusion state, and the severity of compression on the dural sac, and the right nerve root also decreased substantially (Fig. 6).

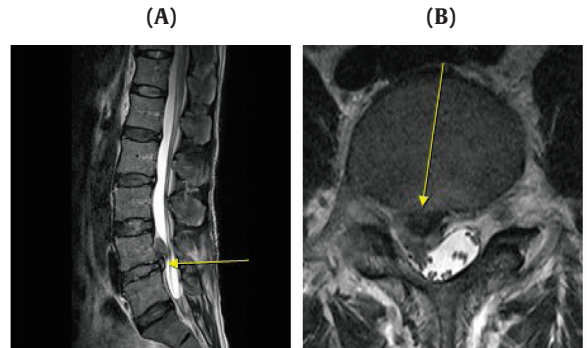


Fig. 5. Lumbar spine MRI (T2-weighted image) of Case 2 on Oct 13, 2017. (A) Sagittal (B) Axial L4-5. MRI, magnetic resonance imaging.

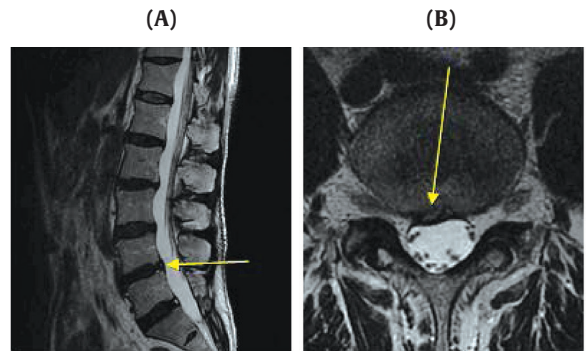


Fig. 6. Lumbar spine MRI (T2-weighted image) of Case 2 on July 25, 2018. (A) Sagittal (B) Axial L4-5. MRI, magnetic resonance imaging.

Discussion

Intervertebral discs are composed of the nucleus pulposus and the annulus fibrosus. The axial load on the spine is first received by the nucleus pulposus, and is delivered to the surrounding annulus fibrosus in the form of tensile force. If the property of the nucleus pulposus changes, by aging or acute external pressure, the annulus fibrosus receives the axial load directly, instead of tensile force, and the herniation of the disc tissue puts pressure on the dura mater or the nerve root, thus inducing neurological symptoms [8,9].

Acupotomy is a novel therapy that combines the Korean medical theory of acupuncture, and conventional medical surgery. It detaches, incises or amputates adhesions of damaged soft tissues and relieves the stubborn pain caused by them [10]. The neck and lower back sustain relatively heavy loads, and the soft tissues around them are easily damaged, and often adhere. Acupotomy may be attributed to aiding the process of herniated disc reabsorption by detaching the adhesion at the lesion, and

promoting inflammation and vasodilation of the tissues near the herniated disc [11]. Acupotomy has been considered as priority treatment for diseases of the cervical and lumbar spine [12].

Conservative Korean Medicine treatment of HNP is being practiced. In case reports that accompanied large dose pharmacopuncture [13], bee venom [14], and chuna [15] with Korean Medicine treatment, radiological change of the herniated disc was observed. Acupotomy has been shown to decrease pain [3-5], but to date there has not been a Korean clinical case reported that has compared radiological evidence of change before and after acupotomy using CT or MRI imaging. This study showed radiological change in the improvement of herniated disc symptoms in addition to NRS scores of pain severity, which decreased for both patients (cervical and lumbar HNP), when acupotomy and combined Korean Medicine treatment was performed.

However, the results of this study should be interpreted with caution due to several limitations. Firstly, in Case 1 the herniated disc was observed to be resorbed on the follow-up MRI 13 months later, and the NRS of neck pain at discharge was improved, but the ROM of the neck and the NRS of left arm pain at discharge did not change after acupotomy. This is because the ROM limitation of the neck was not severe at the beginning of the treatment, and 3 sessions of acupotomy during 5-day hospitalization was not enough to fully induce healing response after microtrauma. On the contrary, in Case 2, both radiological change in the follow-up MRI after 9 months, improvement in the ROM, and the NRS score of lower back and right limb pain at discharge were observed after 7 sessions of acupotomy during 28-day hospitalization.

Secondly, in this study the follow-up MRI images of Case 1 and 2 were taken 13 and 9 months after acupotomy, respectively. In recent studies utilizing CT and MRI, it was reported that herniated discs become reabsorbed with the passage of time [16], and 35% to 100% of the area of herniated discs shown on MRI decreased naturally in 3 to 40 months [17]. Therefore, the radiological changes of the herniated disc could not be entirely attributed to the effect of acupotomy treatment. Nevertheless, the value of this case study was to provide preliminary data on the radiological changes after acupotomy treatment, which may be a reference in future studies comparing natural changes with post-acupotomy changes.

Thirdly, since the number of cases is small and treatment was combined with integrated Korean Medicine therapies including acupuncture, pharmacopuncture, herbal medicine, moxibustion, and physical therapy it is difficult to verify the sole effect of acupotomy.

However, this study is clinically meaningful in that radiological change, as well as the effect on pain management was confirmed at the same time on cervical and lumbar HNP patients by administering acupotomy with integrative Korean Medicine treatment. Further study on the sole effect of acupotomy and radiological change on HNP is warranted.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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