

자연분만 후 발생한 비골신경마비 환자에 대한 Muscle Energy Technique(MET)의 병행치료 효과 증례보고

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ABSTRACT

The Effects of Muscle Energy Technique (MET) for Peroneal Nerve Palsy after Normal Delivery: A Case Report

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Objectives: The purpose of this study is to evaluate the clinical effects of Muscle Energy Technique (MET) for peroneal nerve palsy after normal delivery.

Methods: Two patients with peroneal nerve palsy were treated with acupuncture, moxibustion, cupping and MET. MET was performed in piriform, gluteus medius, anterior tibial and adductor muscles. To evaluate the effect of MET, we analyzed Ankle dorsiflexion range of motion (ROM), Manual Muscle Test (MMT), Numerical Rating Scale (NRS) and Ankle Hindfoot Scale (AHS).

Results: In Case 1, ROM score was changed from -5 to 20, and MMT score was changed from 0 to 4. NRS score was changed from 5 to 1, and her AHS score was changed from 54 to 94 after treatment.

In Case 2, ROM score was changed from 0 to 20, and her MMT score was changed from 1 to 5. NRS score was changed from 4 to 1, and her AHS score was changed from 64 to 97 after treatment.

Conclusions: MET may be a useful treatment for patients who, shortly after childbirth or while breastfeeding, strongly refuse to treat the irritation.

Key Words: Muscle Energy Technique, Normal Delivery, Peroneal Nerve Palsy, Lithotomy Position, Korean Medicine

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I. Introduction

Normal delivery is usually done in lithotomy position. The lithotomy position is commonly used in urology and gynecology surgery. According to existing studies, this posture may lead to damage to sensory or motor nerves¹⁾. The cause of this damage is usually the compression or traction of the femoral nerve. This is also the cause of the damage of the peroneal nerve or obturator nerve. Among them, peroneal nerve palsy is most common. Typical symptoms of peroneal nerve palsy are foot drop, decreased sensation, and muscle weakness²⁾.

Foot drop is a condition in which dorsiflexion of the ankle joint is impossible³⁾. It may be accompanied by a decrease in the sensation of a specific body part. In addition, patients may complain of paresthesia or muscle weakness⁴⁾. The gait of patients with peroneal nerve palsy shows a special form, caused by the lack of dorsiflexion of the ankle joint, called steppage gait.

Causes of peroneal nerve palsy include injury, surgery, fracture, stroke, etc⁵⁾. A common feature of these causes is damage, compression, or traction to the nerves. Pulling or pressure on the nerves can cause peroneal nerve palsy.

Peroneal nerve palsy falls within the scope of Wei Symptoms (痿證) in Korean medicine. In Korean medicine, acupuncture, herbal medicine, physical therapy, taping therapy, etc. have been performed to

address Wei Symptoms (痿證). Therefore, these methods are also used in the treatment of peroneal nerve palsy. In addition, these days, various additional treatments have been attempted, such as electroacupuncture, sweet bee venom pharmacopuncture, and acupotomy therapy⁶⁻¹¹⁾.

Chuna manual therapy is one of the Korean medical treatments. It involves balancing the unbalanced state of musculoskeletal conditions¹²⁾. Among them, the Muscle Energy Technique (MET) is used for diseases associated with the muscles. By pulling the muscle, pain in the adhesive soft tissues is relieved. This action provides effective pain relief, muscle function recovery, and blood circulation improvement. In addition, it can be used for joint displacement, muscle injury, stiffness, and numbness. In clinical settings, MET is used to treat musculoskeletal disorders, such as acute lower back pain and nuchal pain¹³⁾.

It is estimated that the causes of peroneal nerve palsy are associated with the musculoskeletal system, and an analysis of previous studies suggests that MET is effective for peroneal nerve palsy. MET is able to simultaneously perform with any Korean treatment such as acupuncture, moxabution, cupping, etc. MET will be varied in the treatments on peroneal nerve palsy after normal delivery patients. However, studies on the effect of MET on peroneal nerve palsy are not enough. Thus, we performed MET on peroneal nerve palsy after normal delivery. And we report them.

II. Subjects and Method

1. Subjects

The research involved two patients who were hospitalized at the Acupuncture & Moxibustion Department of Semyung University Korean Medicine Hospital for peroneal nerve palsy after normal delivery from January 1, 2014 to December 31, 2014. They were diagnosed with peroneal nerve palsy, visited the Western Medicine Clinic for initial treatment. The symptoms began shortly after childbirth. The purpose of the study, procedures, and adverse reactions were explained to participants, and all participants agreed to participate voluntarily.

2. Treatment Method

1) MET

MET was performed once a day, five times per week during hospitalization. Treatment was done by a Korean medical doctor with more than three years of clinical experience. The doctor had completed the regular MET course.

(1) Piriform muscle

The patient lies in the supine position with the ipsilateral hip and knee joint bent. The foot is positioned on the other side of the outer knee. The operator's hands are in contact with the knee of the affected side and the hip joint adduction. The patient applies an outward force in response to the force of the operator. The patient contracts for 5-7 seconds, and then relaxes for

5-7 seconds. The operation is repeated seven times.

(2) Gluteus medius muscle

The patient lies in the prone position. The operator stands on the affected side of the patient. The operator palpates the sore point of the gluteus medius muscle. The operator holds the lower leg of the patient and pulls the hip joint of the patient. The operator searches for the position where the pain disappears. The operator stops the movement at that position. The patient breathes slowly while maintaining the breath of the patient for 7 seconds and repeats to slowly breathe. After the pain disappears, the hip joint is put back into place. The operation is repeated seven times.

(3) Anterior tibial muscle

The patient lies in the supine position. The operator stands on the affected side of the patient. The operator's hands are in contact with the dorsum of the foot of the affected side and the ankle joint plantarflexion. The patient applies a force to the dorsiflexion in response to the force of the operator. The patient contracts for 5-7 seconds and then relaxes for 5-7 seconds. The operation is repeated seven times.

(4) Adductor muscles

The patient lies in the supine position. The operator stands on the affected side of the patient. The operator's hands are in contact with the Anterior Superior Iliac Spine (ASIS) and knee joint of the affected side and the hip joint abduction.

The patient applies a force to the adduction in response to the force of the operator. The patient contracts for 5-7 seconds and then relaxes for 5-7 seconds. The operation is repeated seven times.

2) Acupuncture treatment

The acupuncture needles were disposable, stainless-steel filiform needles (0.30 mm×40 mm) from Dongbang Acupuncture. Following the meridian points, the acupuncture was operated at the Dokbi (ST₃₅), Joksamni (ST₃₆), Jogu (ST₃₈), Yangneungcheon (GB₃₄), Sinmaek (BL₆₂), Gollyun (BL₆₀), Taegye (KI₃), and Taechung (LR₃) of the affected patient. The acupuncture needle-retaining time was 15 min. These points were based on The Korean Acupuncture Textbook¹⁴. Acupuncture treatment was performed once a day while the patients were in the hospital.

3) Moxibustion and cupping treatment

Moxibustion treatment was performed around the tibialis anterior muscle. Following the meridian points, the moxibustion

treatment was operated at the Dokbi (ST₃₅), Joksamni (ST₃₆), Jogu (ST₃₈), Sanggeoheo (ST₃₇), and Hagggeoheo (ST₃₉) of the affected patient. The moxibustion operation was repeated five times, once per implementation. Cupping treatment was performed around the piriform muscle and gluteus medius muscle. Cupping treatment was performed five times per week while the patients were in the hospital.

3. Investigation Analytical Method

1) Ankle dorsiflexion range of motion (ROM)

The angle was measured while the patient was sitting astride. The angle was set to zero when the foot was horizontal.

2) Manual Muscle Test (MMT)

MMT was used to evaluate the muscle strength of the extensor hallucis longus muscle. MMT is composed of six steps (Table 1).

Table 1. Manual Muscle Testing (MMT)

Grade	Definition
Grade 0 (Zero)	No contractile activity can be felt in the gravity eliminated position
Grade 1 (Trace)	The muscle/muscles can be palpated while the patient is performing the action in the gravity eliminated position
Grade 2 (Poor)	Patient has all or partial range of motion in the gravity eliminated position
Grade 3 (Fair)	Patient can tolerate no resistance but can perform the movement through the full range of motion
Grade 4 (Good)	Patient can hold the position against strong to moderate resistance, has full range motion
Grade 5 (Normal)	Patient can hold the position against maximum resistance and through complete range of motion

3) Numerical Rating Scale (NRS)

NRS is a tool to objectively measure the subjective symptoms of the patient. Symptoms of the patient are represented by a number from 0 to 10, where 0 is the absence of symptoms and 10 is the most severe symptoms.

4) Ankle Hindfoot Scale (AHS)

This is a measure for evaluating the ankle joint. The American Orthopedic Foot and Ankle Society created this in 1994. This evaluates the function and stability of the ankle joint. AHS consists of pain (40 points), function (50 points), and alignment (10 points). A perfect AHS score is 100 points.

Sensory NCV) (2014. 2. 7)

- (1) Low evoked potential amplitudes of left peroneal motor nerve
- (2) Normal amplitudes of superficial peroneal sensory nerve
- (3) Normal latencies of bilateral posterior tibial reflexes

- 10. Change of Ankle dorsiflexion range of motion ROM : Ankle dorsiflexion ROM was changed from -5 to 20 (Table 2).
- 11. Change of Manual muscle test (MMT) : MMT was changed from 0 to 20 (Table 2).
- 12. Change of Numerical Rating Scale (NRS) : NRS was changed from 5 to 1 (Table 2).
- 13. Change of Ankle Hindfoot Scale (AHS) : AHS was changed from 54 to 94 (Table 2).

III. Case Reports

Case 1

- 1. Name : Park ○○
- 2. Sex/Age : F/32
- 3. Chief complaint and current medical history : Lt. foot drop, gait disturbance, mild decreased sensation
- 4. Onset : 2014. 1. 7 (normal delivery)
- 5. Hospitalization period : 2014. 1. 27-2014. 2. 24
- 6. Past medical history : None
- 7. Obstetrical history 1-0-0-1
- 8. Family medical history : None
- 9. Result of medical examination
 - 1) Needle EMG (2014. 2. 4) : Reduced number of voluntary motor unit action potentials in mainly left S1 distributions
 - 2) Nerve conduction study (Motor NCV,

Table 2. The Change of ROM, MMT, NRS and AHS about Case 1

	1/27	2/3	2/10	2/17	2/14
Ankle dorsiflexion ROM	-5	0	5	14	20
MMT score	0	1	3	3	4
NRS score	5	5	4	2	1
AHS score	54	63	78	88	94

Case 2

- 1. Name : Byun ○○
- 2. Sex/Age : F/30
- 3. Chief complaint and current medical history : Lt. foot drop and gait disturbance
- 4. Onset : 2014. 6. 4 (normal delivery)
- 5. Hospitalization period : 2014. 7. 7-2014.

8. 8
6. Past medical history : None
7. Obstetrical history 1-0-0-1
8. Family medical history : None
9. Result of medical examination
- 1) Nerve conduction study (Motor NCV, Sensory NCV) (2014. 6. 19)
- (1) Normal amplitudes of superficial left peroneal motor & peroneal sensory nerve
- (2) Normal latencies of bilateral posterior tibial reflexes
10. Change of Ankle dorsiflexion range of motion (ROM) : Ankle dorsiflexion ROM was changed from 0 to 20 (Table 3).
11. Change of Manual muscle test (MMT) : MMT was changed from 1 to 5 (Table 3).
12. Change of Numerical Rating Scale (NRS) : NRS was changed from 4 to 1 (Table 3).
13. Change of Ankle Hindfoot Scale (AHS) : AHS was changed from 64 to 97 (Table 3).

Table 3. The Change of ROM, MMT, NRS and AHS about Case 2

	7/7	7/14	7/21	7/28	8/4
Ankle dorsiflexion ROM	0	5	15	20	20
MMT score	1	2	3	5	5
NRS score	4	4	3	2	1
AHS score	64	77	81	93	97

IV. Discussion

Foot drop can be caused by peroneal nerve palsy. The peroneal nerve includes nerve fibers L5 and S1. Therefore, it affects the associated muscles. Peroneal nerve palsy causes pressure neuropathy due to the pressure exerted from the outside or inside of the body¹⁵⁾. Peripheral nerve injury causes movement or sensory disorders in which nerves are distributed area¹⁶⁾. This disease requires a time of three months on average for complete recovery if treated conservatively. If there is no change in symptoms even after the three-month period after the onset, doctors consider Western medical surgery¹⁷⁾.

In previous studies, peroneal nerve palsy was primarily treated with acupuncture. Most previous peroneal nerve palsy cases used acupuncture with additional treatments in Korean medicine⁶⁻¹⁰⁾. Acupuncture was used to remove extravasated blood and to help with harmony of Qi-Blood (氣穴). In this study, acupuncture was operated at the Dokbi (ST₃₅), Joksamni (ST₃₆), Jogu (ST₃₈), Yangneungcheon (GB₃₄), Sinmaek (BL₆₂), Gollyun (BL₆₀), Taegye (KI₃), and Taechung (LR₃) of the affected patient. These meridian points have Meridian Muscle in the lower abdomen, legs, and hip muscles. These points also removes extravasated blood, harmony of Qi-Blood (氣穴) and relaxes muscles¹⁸⁾. So we chose these meridian points.

MET helps with the relaxation and strengthening of the muscles. It is widely used in chronic diseases and musculoskeletal

disorders in Korean medicine¹⁹). In recent years, MET has been used in the field of orthopedic diseases. In addition, in Ahn's study²⁰, MET was used in nuchal pain patients. In Kim's study¹³, MET was used in lower back pain patients. Moreover, in Ahn and Hong's^{21,22} studies, MET was used in frozen shoulder patients. Previous studies have used MET for foot drop due to HIVD²³. After a review of previous studies, it was inferred effective in peroneal nerve palsy. However, it is very low in relation to this article, and there are very few studies on this topic.

During childbirth, the mother contracts the muscles of the lower abdomen, legs, and hips. On admission, both patients' lower abdomen, leg, and hip muscles were rigid. The excessive use of these muscles is assumed to be the cause of peroneal nerve palsy after normal delivery, because a similar motivative case has been reported in previous papers²⁴. The purpose of MET for peroneal nerve palsy after normal delivery is to restore muscle movement, prevent strain, and promote nerve regeneration.

A scale that can accurately grasp the degree of paralysis in order to objectively evaluate the effect of treatment is necessary. Ankle ROM, MMT, NRS, and AHS are most often used for the evaluation of peroneal nerve palsy. Therefore, we employed these indicators.

In Case 1, she complained of Lt. foot drop, gait disturbance, and mild decreased sensation. She was unable to perform

dorsiflexion of the big toe. Symptoms occurred immediately after delivery. It was her first childbirth, and she gave birth to a girl at the end of 8 hours of labor. She was administered painkillers for a painless childbirth. She inquired about the symptoms to the responsible obstetrician. The doctor said she would feel better soon, but the symptoms did not change after three weeks. After declining birth sequelae, she visited our hospital. In obstetrics, it did not prescribe related symptoms. She did not undergo an examination or treatment at another hospital before visiting our hospital. she could not move her big toe and complained of feeling a little hypoesthesia. She had a tendency to drag her left leg. After treatment, her ROM score was changed from -5 to 20, and her MMT score was changed from 0 to 4. Her NRS score was changed from 5 to 1, and her AHS score was changed from 54 to 94.

In Case 2, she did not complain of decreased sensation. She could perform dorsiflexion of the big toe slightly. Symptoms occurred immediately after delivery. It was her first childbirth, and she gave birth to a girl at the end of 10 hours of labor. She was administered painkillers for a painless childbirth. She inquired about the symptoms to the responsible obstetrician. The doctor said they would be better soon, but the symptoms did not change after four weeks. After declining birth sequelae, she visited our hospital. In obstetrics, it

did not prescribe related symptoms. She received an orthopedic examination with normal results before coming to our hospital. she could perform dorsiflexion of the big toe slightly. She was capable of walking, and she did not have a tendency to drag leg either. However, her left leg was uncomfortable. After treatment, her ROM score was changed from 0 to 20, and her MMT score was changed from 1 to 5. Her NRS score was changed from 4 to 1, and her AHS score was changed from 64 to 97.

Although the number of cases in this study was small, the cases had slightly higher therapeutic effects as compared to previous studies. In Kim's study²³⁾, they used acupuncture, physiotherapy and herbal medicine for treatment. After 5 weeks of treatment, the range of motion (ROM) was almost normal. However, this study took four weeks to reach that state. An objective comparison is difficult because of the differences in the conditions and symptoms of the patients. However, MET may be a useful treatment for patients who have just experienced childbirth or are breastfeeding. MET is capable of suitably adjusted to the conditions of the patient and it is able to simultaneous perform with any Korean treatment. The effects related to the disease comes from

the stiffness in the muscles has been demonstrated in previous studies^{12,13)}.

This study included relatively few cases, so the statistical analysis was difficult. There were no side effects after treatment, and the patients were satisfied with the treatment. Judging from the results of this study, MET for peroneal nerve palsy after childbirth may be an effective treatment, and we hope that further studies on peroneal nerve palsy after childbirth and MET will be performed. This study will serve as important prior material for further research on MET for peroneal nerve palsy after childbirth.

IV. Conclusion

Through our research, we obtained the following conclusions. In these cases study, we found that MET can change the MMT and AHS scores of patients with peroneal nerve palsy after childbirth. The symptoms of both patients were improved. MET may be a useful treatment for patients of peroneal nerve palsy after childbirth.

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국문초록

목적: 자연분만 후 발생한 비골신경마비 환자에 대한 Muscle Energy Technique (MET)병행 치료가 족하수 증상감소 및 기능 회복에 미치는 영향을 알아보고자 한다.

방법: 환자들은 침, 뜸, 부항치료와 병행하여 하루 한번, 일주일에 5회 MET 치료를 받았다. MET는 piriform muscle, gluteus medius muscle, anterior tibial muscle, adductor muscles을 중심으로 시행하였으며 총 20회의 MET치료를 받았다. 효과 측정에는 Ankle dorsiflexion ROM, Manual Muscle Test, Numerical Rating Scale, Ankle Hindfoot Scale이 사용되었다.

결과: Case 1의 경우 MET병행치료 후 ROM은 -5에서 20으로 MMT는 0에서 4, NRS는 5에서 1, AHS는 54에서 94로 변화하였다.

Case 2의 경우 MET병행치료 후 ROM은 0에서 20으로 MMT는 1에서 5, NRS는 4에서 1, AHS는 64에서 97로 변화하였다.

결론: 본 연구에서 MET를 분만직후 발생한 비골신경마비로 인한 족하수 환자에게 침 뜸 부항 등 여러 치료와 병행하여 시행하여 증상 및 기능회복에 효과가 있었다. 기존의 연구와 비교하여 MET치료를 적용한 환자들의 치료 결과가 비슷하거나 치료기간을 단축시킨 것으로 미루어, MET는 분만 직후 발생한 비골신경마비 환자들에게 사용가능한 치료법이라 사료된다.

중심단어: 근에너지기법, 자연분만, 비골신경마비, 족하수, 쇄석위

Reference

1. Warner MA, et al. Lower extremity motor neuropathy associated with surgery performed on patients in a lithotomy position. *Anesthesiology*. 1994;81:6-12.
2. Sawyer RJ, et al. Peripheral nerve injuries associated with anaesthesia. *Anaesthesia*. 2000;55:980-91.
3. Based Institute for Natural Society. *Mosby's Dictionary*. 1st rev. Seoul: Hyeonmunsa. 2002:766.
4. David JM. *Orthopedic physical therapy diagnostics*. 1st rev. Seoul:Hyeonmunsa. 1998:805.
5. Park WS, et al. Clinical Study on 2 Cases of Patients of Common Peroneal Nerve Palsy(Foot Drop) Improved by Motion Style Treatment. *The Journal of Korea CHUNA Manual Medicine for Spine & Nerves*. 2005;6(1):119-26.
6. Kim MS, et al. Case Report of Korean Medical Treatment on Acute Peroneal Nerve Palsy Patient Caused by Prolonged Immobilization. *JORM*. 2015;25(3):127-36.
7. Kim SH, et al. Case Study of Oriental Medicine Treatment with Acupotomy Therapy of the Peroneal Nerve Palsy through Ultrasound Case Report. *Journal of Pharmacopuncture*. 2011;14(1):87-95.
8. Chu MG, et al. A Clinical Case Study of Foot Drop Caused by Common Peroneal Neuropathy(CPN). *JORM*. 2007;17(3):217-30.
9. Han DN, et al. A Case Report of

- Foot Drop in Soyangin Improved with Sukjiwhanggosam-tang. *J Sasang Constitut Med.* 2009;21(1):270-7.
10. Choi JH, et al. A Case Report on Foot Drop Caused by Common Peroneal Nerve Palsy. *Journal of Oriental Neuropsychiatry.* 2004;15(1):149-53.
 11. Kim JA, et al. A Clinical study on Sitting Cross-Legged Patient Diagnosed as Peroneal Neuropathy. *The Journal of Korea CHUNA Manual Medicine for Spine & Nerves.* 2014;9(1):77-87.
 12. Korean society Chuna manual medicine for spine and nerves. *Chuna manual medicine.* 2nd rev. Seoul:Korean society Chuna manual medicine for spine and nerves. 2013:3-5.
 13. Kim SJ, et al. The Impacts of Muscle Energy Technique(MET) and Transcutaneous Electrical Nerve Stimulation(TENS) Performed on Elector Spinae Muscle of Acute Low Back Pain Patients on Pain and Meridian Electromyography. *JORM.* 2014;24(1):83-92.
 14. Korean Acupuncture & Moxibustion Society. *The acupuncture and moxibustion medicine.* 1st rev. Paju:Hanmimedicime. 2015:200, 625-9.
 15. Cuthbert SC, Goodheart GJ Jr. On the reliability and validity of manual muscle testing: a literature review. *Chiropractic & Osteopathy.* 2007;15(4):24-37.
 16. Lee JH, et. al. A Clinical Case Study of Lumbosacral Plexopathy Following Labour Heavy Burden and Drinking. *JORM.* 2002;13(1):151-60.
 17. Seoul National University Hospital Publication. *Medical resident Hand Book.* 1st rev. Seoul:Seoul National University Medical Publish. 1994:499.
 18. Society for Meridian and Acupoint. *Practice of acupuncture: A guidebook for college student.* 7th rev. Deajeon: Jongryeonamu publishing Co. 2015: 278-88, 396, 410.
 19. The Korean Academy of Oriental Rehabilitation Medical society. *Rehabilitation Medicine.* 2nd rev. Paju: Hanmimedicime. 2011:207-12.
 20. Ahn JM, et al. The Clinical Study of Muscle Energy Technique(MET) Performed on Sternocleidomastoid Muscle of Acute Nuchal Pain Patients on Meridian Electromyography. *JORM.* 2014;24(1):93-100.
 21. Ahn MS, et al. A Case Report of Frozen Shoulder with Muscular Acupuncture and Muscle Energy Technique. *The Journal of Korea CHUNA Manual Medicine for Spine & Nerves.* 2009; 4(2):137-48.
 22. Hong KE. Comprehension of Embedding Therapy Through Meridian Muscle System-Focused on Face. *The Acupuncture.* 2008;25(3):215-9.
 23. Chung JH, et al. Seven Cases Report on the Foot Drop Patients with Herniated Intervertebral Lumbar Disc by Muscle Energy Technique & Korean Traditional Medicine Therapy. *The Journal of Korea CHUNA Manual Medicine for Spine & Nerves.* 2014; 9(1):27-37.
 24. Kim SJ, et al. A Clinical Case Study

of Common Peroneal Nerve Palsy(Foot
Drop)after Natural Childbirth. JORM.

2000:10(2):27-36.