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Electroacupuncture For Post-Stroke Foot Drop And Pain: A Case Report

By Maria Linder, LAc, EAMP, and Rhys May, LAc, EAMP

Abstract

This case report evaluates the effectiveness of electroacupuncture for the treatment of right leg hemiparesis and chronic pain in a patient with a 30-year history of post-stroke sequelae. During 94 treatments, the patient demonstrated significant improvements, including a reduction in pain, as measured by a Visual Analogue Scale (VAS) score from 0 to 10 (with 10 being worst), and a restoration of sensation in areas previously affected by numbness. These clinical improvements suggest potential nerve function repair, as evidenced by the patient's increased sensitivity to electrical needle stimulation. This sensory restoration is consistent with recent findings in biomedicine that low-level electro-stimulation can promote peripheral nerve growth. Furthermore, the patient's emotional and psychological state improved, moving from irritability and depression to greater engagement with hobbies and social plans, highlighting the profound impact of chronic pain on mood and personality. The electroacupuncture protocol targeted points along the Foot Channel of Yang Brightness and Lesser Yang, considering traditional Chinese medicine (TCM) principles regarding the flow of gi and its relationship to physical and emotional health. While the case's strengths include the reproducibility of treatment across different clinicians and consistent point selection, limitations include the volume of treatments, variations in treatment settings, and the absence of consistent biomedical monitoring. Despite these challenges, the case supports the potential of electroacupuncture as a promising intervention for chronic post-stroke pain and functional recovery, even many years following a cerebrovascular accident.

Keywords: case report, electroacupuncture, post-stroke foot drop, nerve plasticity, traditional Chinese medicine (TCM), stroke, acupuncture therapy

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Introduction

From 2017-2020, approximately 3.2 million Americans had a stroke (Tsao et al., 2023). It is estimated that around 50-85% of stroke victims have symptoms of foot drop immediately after a stroke, with 20-30% of those patients suffering long-term effects that require additional therapy (Olney & Richards, 1996; Li et al., 2018; Chisholm et al., 2013). Foot drop, or hemiparetic gait pattern, can arise from changes in muscle contractions' expected timing and intensity (Sheffler & Chase, 2015.) Stroke-induced peroneal nerve lesions disrupt communication along motor neural pathways that allow dorsiflexion. This condition is significantly activity-restricting and painful, reducing the quality of life (QoL) (Carolus et al., 2019).

There is currently a large amount of evidence for the use of electroacupuncture for chronic pain, post-stroke rehabilitation, and to increase foot strength (Gao et al., 2022; Zhang et al., 2014; Shen et al., 2023; Tourillon et al., 2023). This case report seeks to add to the growing body of evidence.

This case report presents an effective use of electroacupuncture for the treatment of pain and lack of motor function affecting a patient 30 years post cerebrovascular accident (CVA). This treatment methodology could be used to help stroke patients experiencing altered gait and pain due to lower limb hemiparesis and associated decrease in QoL.

Case Description

The patient experienced a cerebrovascular accident (CVA) at the age of 37 in 1993, initially presenting to her healthcare team with significant weakness on the entire right side of her body, which subsequently led to persistent foot drop and severe pain as a sequela. Foot pain, described as sharp and constant with numbness and tingling, worsened with cold, and the foot felt cold to the touch.

The patient reported that her pain never improved after the stroke despite a peroneal nerve reroute surgery, as well as physical therapy and heat applications. Following the procedure, she reported residual symptoms, including pronounced erythema, edema, and severe pain described as a "burning ice" sensation. In 2009, she sought medical attention for right knee pain, attributed to her altered gait and right foot weakness resulting from the stroke. During this consultation, she noted that lifting her right foot elicited

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medial flexion, and she could not achieve the foot rotation needed for a standard walking step.

In 2012, the patient was involved in a scooter accident that resulted in injuries to both lower limbs, including a left metacarpal fracture and tissue injury to the right, which was initially also thought to be a fracture. This incident further exacerbated her pre-existing gait difficulties and pain. Additionally, she was diagnosed with breast cancer in June 2013, undergoing lumpectomy in July of the same year. At the initial intake, she reported not seeing a doctor since 2015.

At the initial re-evaluation appointment for acupuncture in 2023, clinicians observed notable abnormalities in her gait: steppage needing assistance from walking canes, redness, swelling, and pain in the right foot. She rated the pain at a 9/10, with 10 being the most severe on the VAS (Ferreira-Valente, 2011). Furthermore, it was noted that she presented with facial erythema and displayed an agitated effect. She has a history of uterine prolapse, which caused incontinence when lying supine, and she expressed a preference for drinking ice water. Her tongue was dusky and slightly swollen, with red prickles on the tip and a thin white coating with 65% sublingual distension. The pulse was wiry and rapid.

Diagnostic Assessment

In Chinese medicine, stroke's main pathological factor is wind, which can be either internal in nature or from an external source. Factors include improper diet, emotional stress, prolonged exhaustion, sudden change of weather, and blood stasis. Apichai notes, "When wind and phlegm block the flow of Qi and blood or disturb the mind, the meridians may be afflicted, resulting in stroke and hemiplegia" (2021, p. 310). Two primary manifestations of stroke, open or closed, involve meridian trajectory with zang-fu organs (Apichai, 2021; Maciocia, 2022). Long-term post-stroke sequelae in the form of hemiplegia follow four patterns: qi deficiency causing qi and blood stasis, Liver yang rising involving a Liver and Kidney yin deficiency, wind-phlegm, or phlegm damp accumulation (Apichai, 2021; Maciocia, 2022). When sequelae occur, it is essential to address the root of the disease as the cause of lingering effects.

While we do not have clinical information at the time of the stroke, other factors suggest a diagnosis of wind phlegm attack. The patient currently manifests a phlegm-damp constitution in the body habitus. Additionally, with the patient's long-term struggle with depression and anxiety, a history of breast cancer, and a hallmark wiry pulse, a Liver qi stagnation picture starts to

emerge. When Liver qi stagnation turns into Liver fire, the excess heat will consume yin, resulting in Liver and Kidney yin deficiency. Yang has an upward movement; Liver yang rises. Yin and yang are out of balance.

Therapeutic Intervention

Treatment occurred in teaching clinics at the Bastyr Center for Natural Health in Seattle, Washington. Per request, the patient received acupuncture while seated in a reclined chair and maintained consistency in point selection and treatment methodology. In her acupuncture experiences prior to this case report, she had found that electroacupuncture at high intensity was the only modality that provided meaningful pain relief. At the time of this report, there had been a total of 94 visits over two years.

The treatment protocol involved the use of MAC 1.0 cun needles on the leg, foot, and hands, while Seirin 0.5 cun needles were chosen for the face and head. Both needle gauges and retention time varied with every treatment. Needle retention was between 30 to 60 minutes. Using four leads, the foot and leg acupoints were stimulated with a Pantheon 8c Pro electroacupuncture machine.

Initial treatments - Visits 3-14 (Table 1): The machine was set at 2 Hz milliamperage with a continuous waveform. Treatments consisted of core points (Table 1) given twice weekly. With a VAS-reported reduction in pain from a 9 to a 3, she reduced frequency to once weekly treatment at visit twenty-three. Treatments during this time were one-on-one clinician visits, which had longer intakes, and a supervising practitioner to assess tongue and pulse before the student clinician could commence treatment. The needle retention time at these visits lasted less than 30 minutes. A table is not included for treatments 15-44 as point selection varied tremendously.

Later treatments - Visits 45-95 (Table 2): About one year into treatment, the patient accommodated to the continuous setting, meaning the nervous system stopped responding to that habitual stimulus. Thus, a mixed waveform of 2/100 Hz was introduced. The patient started to report weeks with no pain and increased sensitivity. The treatment schedule was adjusted to once weekly for two consecutive weeks, then a week off. These later treatments occurred in a community-style acupuncture setting under a supervising practitioner, with patients receiving treatment seated in reclining chairs in a group setting. Community acupuncture intakes are much shorter to encourage quiet



throughout the space, resulting in a longer needle retention time, which averaged 45 minutes for this patient.

Table 1

Core Points from Visits 3-14: 6 week period

All points are bilateral unless noted otherwise using a standard electro-acupuncture setting: 2 Hz of continuous waveform.

Point	Reason
Yintang	Calms the spirit for irritability, as well as wind reduction.
LI 4	Moves Liver qi; master point of the face; reduces wind from the head. Contraindicated in pregnancy.
LR 3	Pacify internal Liver wind; move Liver qi. Combined with LI 4 to open the four gates (LR 3 and LI 4 bilaterally).
ST 36	Tonify Stomach and Spleen qi.
SP 9	Harmonizes Spleen qi and reduces dampness.
SP 6	Harmonizes and nourishes yin on the Spleen, Liver, and Kidney channels. Contraindicated in pregnancy.
ST 8	Channel trajectory, wind-induced hemiplegia, and headaches.
Points	Intensity
Points were chosen for channel trajectory and location of numbness and pain	
R ST 44 / R ST 40	
R GB 40 / R GB 41	Starting intensity: 2.0 - 3.0
R LR 3 / R KD 1	Ending intensity: 2.0 - 4.0

* Intensity noted is a range as intensity varied from treatment to treatment.

Table 2

Core Points from Visits 45 - 95 Current: 1 year period All points are bilateral unless noted otherwise using a standard electro-acupuncture setting: 2/100 Hz, mixed waveform.

Point	Reason
Du 20	Influences the yang of the body, as it is the meeting point of the governing channels with Triple Burner, Gallbladder, Urinary Bladder, and Liver channels.
Yintang	Calms the spirit for irritability, as well as wind reduction.
GB 14	Treatment causing occasional frontal headaches, the point was added both as the opposite end of the channel and to address wind heat rising.
ST 6	Addresses wind, regardless of source; patient clenches jaw.
LI 11	Heat in the body; addresses hemiplegia
LR 3	Pacify internal Liver wind; move Liver qi.
Points	Intensity
Points were chosen for channel trajectory and location of numbness and pain	
R ST 40 / R ashi 3 cun superior to ST 40	starting intensity: 3.5-4.0 ending intensity: 4.0-4.5
R GB 41 / R ST 41	starting intensity: 2.0-2.5 ending intensity: 3.0-4.0
R GB 39 / R GB 40	starting intensity: 2.0-2.5 ending intensity: 3.0-4.0
R LR 3 / R KI 1	starting intensity: 1.5-2.0 ending intensity: 2.1-4.0

* Intensity noted is a range as intensity varied from treatment to treatment.

Safety Considerations

This patient received unusually high-intensity stimulation with electroacupuncture per their request. Maximum intensity settings are not recommended for patients with numbness, as over-stimulation could destroy the growing nerves, ultimately causing a setback in regrowth and healing. Intensity will fluctuate from patient to patient, but stimulation should be gentle enough that they could theoretically take a nice nap during treatment.

Outcomes

The patient sought consistent acupuncture care over two years, during which she experienced a gradual and sustained reduction in pain. Treatment sessions were reduced from once a week to skipping one week after every two treatments without increasing a flare in pain, which was measured through an increase to a VAS of 4 from a 2. Additionally, the patient reported a decreased need for high-intensity to achieve therapeutic efficacy. The intensity settings on the electroacupuncture machine, which had initially averaged 4.5, were reduced to an average of 2.0 or lower. This change coincided with the patient's increased sensation at specific acupuncture points, including KI 1, LR 3, and GB 41.

While the primary focus of treatment was the patient's foot drop and associated pain, occasional jaw tension was noted as a secondary concern. Objective charting revealed the presence of a tight masseter muscle, indicating some jaw-related discomfort, which was addressed intermittently during treatment. The location of the jaw pain was at the opposite end of the Stomach channel from the treatment for foot drop.

Due to the positive outcomes observed with electroacupuncture, the patient strongly preferred this modality over other forms of treatment. She found the acupuncture regimen to be effective in managing her pain, and due to her previous experiences, including failed surgery to repair the foot drop, she was not interested in seeking care from biomedical providers.

Although foot drop and pain remained the primary complaints, clinicians observed a noteworthy improvement in the patient's overall affect as the treatments progressed. The patient initially presented with a tense demeanor, likely related to the chronic pain she had experienced for years. However, as her pain levels decreased, there was a positive shift in her personality. She became noticeably calmer, expressed joy more frequently, and even began to engage in conversations about her hobbies. These changes were documented in the clinical notes, with observations of reduced facial redness and a less wiry pulse, indicative of improved well-being.

Throughout the treatment, no adverse events were reported, although within the community acupuncture setting, the patient reacted to a strong odor from a nearby massage oil. She developed a headache as a result, prompting the supervisor to apply an additional acupuncture point, GB 14. This intervention was effective and relaxing, and the patient later requested the same point in subsequent sessions. The addition of this point coincided with a noticeable turnaround in effect.

From a pain management perspective (Figure 1), the patient's self-reported pain levels decreased significantly over the course of electroacupuncture therapy. Initially, her pain level was recorded at a VAS of 9; by visit 15, it decreased to 3-4. The pain levels plateaued at this point, requiring ongoing treatment to maintain the improvement. Over time, her pain level decreased to a VAS of 2. With continued maintenance therapy, the pain remained at this



level, with occasional reports of complete relief with a VAS of 0 during treatment sessions.



As treatment continued (Figure 2), the patient's sensitivity at the acupuncture points on her foot and leg gradually increased, allowing for a corresponding reduction in the intensity of the electrical stimulation. This trend reflected the patient's progressive improvement in pain management and overall condition. Notably, the patient's neurological function has also improved, with positive developments in pain management and restoring functional sensation.

Objective signs after 94 treatments include positive affect change, reductions in the required stimulation intensity, and observed ease of movement. The patient still used walking canes but no longer grimaced while taking steps. Clinicians used a goniometer to measure foot drop angle and reported that at rest, her foot angle was 110 degrees, with an ability to extend to 130 degrees. Unfortunately, no goniometer measurements exist at initial intake, and no previous patient records indicate measurements, including several podiatrist appointments, so an objective comparison of the angle of foot drop cannot be made.







Patient Perspective

After returning from long-term international travel, the patient faced significant physical and emotional challenges, having gone over seven years without acupuncture treatment. Upon resuming care with her previous clinical supervisor, she experienced gradual improvement, particularly in her leg and foot mobility, thanks to electroacupuncture. "I came back from [abroad] in 2022 absolutely shredded in every way and had not had treatments in, I believe, over 7 years[...] There was an easy rapport and trust."

However, when her preferred clinical supervisor was unavailable, the patient had to see other teams. She continued to assert her preferences, especially for electroacupuncture, which she had found effective. "I wasn't going to back down from my assertion that I had felt tremendous improvement from electrical treatments."

However, the teaching clinic's structure often clashed with her needs. In order to learn and be safe, student clinicians were required to make a TCM diagnosis and treatment plan and get approval from their supervisors before starting treatment. This process, combined with the patient's firm request for electroacupuncture, created friction and left her feeling frustrated and dismissed. "I would leave each treatment frustrated, devalued, devastated, and without hope that [the clinic] could offer me any relief from the pain I was experiencing [...] It was humiliating."

Eventually, the patient found rapport with a new clinical supervisor. This supervisor created an environment where listening was prioritized, which helped the patient feel heard and relaxed. The improved atmosphere allowed the patient to let down her defenses and benefit from the treatments. "There was a fun happiness that she [the supervisor] carried with her. Her eyes radiated humor and—I felt I could be real with this person and maybe healing could happen again. Even when we didn't do electricity, her choices of where the needles should go made a difference."

This clinical supervisor later led a community acupuncture shift, which offered a quicker, more streamlined process for treatment and longer needle retention time. The patient found this format much more enjoyable and beneficial, as it allowed her to receive the electroacupuncture she preferred without the lengthy intake and approval process. "It all turned on a dime, I was back into alignment with being heard and with being able to pay attention again to what was being said to me. Calmness came back to the sessions."

As a result, the patient's overall QoL improved. She felt more relaxed, had higher energy levels, and began re-engaging in the world. "I went from total isolation when I got back from Mongolia to a vibrant part of the music community[...] Everything has changed. My moods and depression have shifted. I am able to be in my life and consider expansion, not retreat."

Discussion

This case report highlights the effectiveness of an electroacupuncture protocol for right leg hemiparesis, pain that affected a patient for 30 years, and meaningful improvement in QoL. Pain effectiveness was measured in the patient's reduction of a VAS score from 9 to 0. In addition to reduced pain, the patient began to have increased sensation in areas where she had previously only felt numbness, resulting in decreased intensity of electrical needle stimulation.

This case dealt with long-term nerve damage as a post-stroke sequelae. A continuous reduction in numbness and an increased sensitivity in response to stimulation suggest nerve regrowth, recognized as nerve plasticity. Nerve plasticity is a newer field in biomedicine, but recent studies show that low-level electro-stimulation will increase peripheral nerve growth and, thus, functional recovery of an area (Gordon, 2020; Juckett et al., 2022). Peripheral nerves grow very slowly at the rate of 1mm a day. The average length from knee to foot is approximately 610 mm; correspondingly, complete peripheral nerve regrowth could take 610 days.



The patient's change in demeanor from initial irritability to someone who excitedly discussed hobbies and other plans points to the significant influence of chronic pain and its effect on personality. Chronic pain has a notable relationship with depression, with up to 75% of people in chronic pain also being diagnosed with severe depression (Bair et al., 2003; Williams et al., 2003). Sheng et al. (2017) discuss how depression and pain may interrelate. "Studies have revealed considerable overlaps between pain and depression-induced neuroplasticity changes and neurobiological mechanism change."

Pain catastrophizing, the inability to focus away from painful stimuli, measurably thins gray matter when observed via magnetic resonance imaging (MRI) (Malfliet et al., 2017). These studies suggest a physical relationship between pain and mood.

From a TCM perspective, emotional factors such as anger and depression "surpass the ability of the organism to adequately adapt, will adversely affect the physiological functions of the human body, especially when there is a pre-existing hypersensitivity to them" (Xinnong et al., 2019, p. 313). The Liver organ system is predominantly associated with anger, and where there is anger, the qi will rise. The Liver also oversees the free flow of qi; when the qi stagnates, it will cause pain and depression. As the patient's qi began to flow freely, her emotions were no longer stuck. Anger relaxed its grip; depression ceased to predominate.

Points for this patient were chosen from the Foot Channel of Yang Brightness (Stomach) and Lesser Yang (Gallbladder). The affected location of the numbness and pain was along these two channels. Additionally, the patient had jaw pain at the opposite end of those channel trajectories, suggesting a full channel pathology.

Yang Brightness is known to be "full of yang qi...[points] are among the most important points to clear excess of yang in the form of...heat, which rises to disturb the Heart and spirit" (Deadman et al., 1998, p. 129). Lesser Yang has an interior-exterior connection to the Foot Channel of Absolute Yin (Liver); it regulates the Liver qi.

Strengths in this case report include the many student clinicians and supervisors who, despite their differences, replicated consistent treatment across the years. The point selection remained markedly similar for the area of injury, and core points had significant overlap from earlier to later treatments. Limitations of this case report include the challenge of replicability, mainly due to the number of treatment visits and the change of setting from individual room to community acupuncture, drastically altering the patient's treatment experience. Consistent measurements or updates from biomedical visits would have been helpful in quantifying treatment effects.

Despite these limitations, this case report shows promising results for the use of electroacupuncture in chronic post-CVA foot drop and pain.

Informed Consent

The patient provided written informed consent for the publication of this case report, and a copy is on file with the authors. There were minimal safety concerns during treatment, and no adverse events were reported.

References

Apichai, B. (2021). *Chinese medicine for lower body pain*. CRC Press.

Bair, M. J., Robinson, R. L., Katon, W., & Kroenke, K. (2003). Depression and pain comorbidity: A literature review. *Archives of Internal Medicine*, *163*(20), 2433–2445. <u>https://doi.org/10.1001/archinte.163.20.2433</u>

Carolus, A. E., Becker, M., Cuny, J., Smektala, R., Schmieder, K., & Brenke, C. (2019). The interdisciplinary management of foot drop. *Deutsches Arzteblatt International*, *116*(20), 347–354. <u>https://doi.org/10.3238/arztebl.2019.0347</u>

Chisholm, A. E., Perry, S. D., & McIlroy, W. E. (2013). Correlations between ankle-foot impairments and dropped foot gait deviations among stroke survivors. *Clinical Biomechanics*, *28*(9-10), 1049–1054. https://doi.org/10.1016/j.clinbiomech.2013.09.007

Deadman, P., Al-Khafaji, M., & Baker, K. (1998). *A manual of acupuncture.* Journal of Chinese Medicine Publications.

Ferreira-Valente, M. A., Pais-Ribeiro, J. L., & Jensen, M. P. (2011). Validity of four pain intensity rating scales. *Pain, 152*(10), 2399–2404. <u>https://doi.org/10.1016/j.pain.2011.07.005</u>

Gao, Y., Gang, X., Yuan, Y., Yin, K., & Gong, X. (2022). Efficacy and safety of acupuncture in the treatment of foot drop in post-stroke: A protocol for

systematic review and meta-analysis. *Medicine, 101*(40), Article e30994. <u>https://doi.org/10.1097/MD.000000000030994</u>

Gordon, T. (2020). Peripheral nerve regeneration and muscle reinnervation. *International Journal of Molecular Sciences, 21*(22), Article 8652. <u>https://doi.org/10.3390/ijms21228652</u>

Juckett, L., Saffari, T. M., Ormseth, B., Senger, J. L., & Moore, A. M. (2022). The effect of electrical stimulation on nerve regeneration following peripheral nerve injury. *Biomolecules, 12*(12), Article 1856. <u>https://doi.org/10.3390/biom12121856</u>

Li, S., Francisco, G. E., & Zhou, P. (2018). Post-stroke hemiplegic gait: New perspective and insights. *Frontiers in Physiology, 9*, Article 1021. <u>https://doi.org/10.3389/fphys.2018.01021</u>

Maciocia, G. (2022). The Practice of Chinese Medicine (3rd ed.). Elsevier.

Malfliet, A., Coppieters, I., Van Wilgen, P., Kregel, J., De Pauw, R., Dolphens, M., & Ickmans, K. (2017). Brain changes associated with cognitive and emotional factors in chronic pain: A systematic review. *European Journal of Pain, 21*(5), 769–786. <u>https://doi.org/10.1002/ejp.1003</u>

Olney, S. J., & Richards, C. L. (1996). Hemiparetic gait following stroke. Part I: Characteristics. *Gait & Posture, 4*, 136-148.

Sheffler, L. R., & Chae, J. (2015). Hemiparetic gait. *Physical Medicine and Rehabilitation Clinics of North America*, *2*6(4), 611–623. https://doi.org/10.1016/j.pmr.2015.06.006

Shen, Y., Hu, L., Ge, J., & Li, L. (2023). Effect of electroacupuncture treatment combined with rehabilitation care on serum sirt3 level and motor function in elderly patients with stroke hemiparesis. *Medicine, 102*(15), Article e33403. <u>https://doi.org/10.1097/MD.00000000033403</u>

Sheng, J., Liu, S., Wang, Y., Cui, R., & Zhang, X. (2017). The link between depression and chronic pain: Neural mechanisms in the brain. *Neural Plasticity*, 2017, Article 9724371. <u>https://doi.org/10.1155/2017/9724371</u>

Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Anderson, C. A. M., Arora, P., Avery, C. L., Baker-Smith, C. M., Beaton, A. Z., Boehme, A. K., Buxton, A. E., Commodore-Mensah, Y., Elkind, M. S. V., Evenson, K. R., Eze-Nliam, C., Fugar, S., Generoso, G., Heard, D. G., Hiremath, S., Ho, J. E., Kalani, R., ... American Heart Association Council on Epidemiology and Prevention Statistics

Committee and Stroke Statistics Subcommittee. (2023). Heart disease and stroke statistics-2023 update: A report from the American Heart Association. *Circulation, 147*(8), Article e93–e621. https://doi.org/10.1161/CIR.00000000001123

Tsur, A. (2007). Common peroneal neuropathy in patients after first-time stroke. *The Israel Medical Association Journal*, *9*(12), 866–869.

Tourillon, R., Bothorel, H., McKeon, P. O., Gojanovic, B., & Fourchet, F. (2023). Effects of a single electrical stimulation session on foot force production, foot dome stability, and dynamic postural control. *Journal of Athletic Training, 58*(1), 51–59. <u>https://doi.org/10.4085/1062-6050-0561.21</u>

Williams, L. S., Jones, W. J., Shen, J., Robinson, R. L., Weinberger, M., & Kroenke, K. (2003). Prevalence and impact of depression and pain in neurology outpatients. *Journal of Neurology, Neurosurgery, and Psychiatry, 74*(11), 1587–1589. <u>https://doi.org/10.1136/jnnp.74.11.1587</u>

Xinnong, C., Wei, C., Mengye, C., Hongfeng, C., Kai, C., Huanbin, D., Yijun, G., Shuhuai, H., Most, H., Xiaoping, J., Yang, L., Dahe, L., White, P., Suling, T., Hongeai, W., Huizhu, W., Lufen, W., Wenjing, W., Xuetai, W., Yingying, W., Dawson, W., Hong, X., Huanze, X., Mingqiang, X., Jinshen, Y., Jiuling, Y., & Heming, Z. (Eds.). (2019). *Chinese acupuncture and moxibustion* (4th ed.). Foreign Language Press.

Zhang, R., Lao, L., Ren, K., & Berman, B. M. (2014). Mechanisms of acupuncture-electroacupuncture on persistent pain. *Anesthesiology, 120*(2), 482–503. <u>https://doi.org/10.1097/ALN.00000000000101</u>

Supplementary Material

Duncan, P. W. (1994). Stroke disability. *Physical Therapy*, *74*(5), 399–407. <u>https://doi.org/10.1093/ptj/74.5.399</u>

Hendricks, H. T., van Limbeek, J., Geurts, A. C., & Zwarts, M. J. (2002). Motor recovery after stroke: A systematic review of the literature. *Archives of Physical Medicine and Rehabilitation*, *83*(11), 1629–1637. https://doi.org/10.1053/apmr.2002.35473

Jaqueline da Cunha, M., Rech, K. D., Salazar, A. P., & Pagnussat, A. S. (2021). Functional electrical stimulation of the peroneal nerve improves post-stroke gait speed when combined with physiotherapy: A systematic review and meta-analysis. *Annals of Physical and Rehabilitation Medicine, 64*(1), Article 101388. <u>https://doi.org/10.1016/j.rehab.2020.03.012</u>

Junhua, Z., Menniti-Ippolito, F., Xiumei, G., Firenzuoli, F., Boli, Z., Massari, M., Hongcai, S., Yuhong, H., Ferrelli, R., Limin, H., Fauci, A., Guerra, R., & Raschetti, R. (2009). Complex traditional Chinese medicine for poststroke motor dysfunction: A systematic review. *Stroke*, *40*(8), 2797–2804. <u>https://doi.org/10.1161/STROKEAHA.109.555227</u>

Rasulić, L., Nikolić, Ž., Lepić, M., Savić, A., Vitošević, F., Novaković, N., Radojević, S., Mićić, A., Lepić, S., & Mandić-Rajčević, S. (2022). Useful functional recovery and quality of life after surgical treatment of peroneal nerve injuries. *Frontiers in Surgery, 9*, Article 1005483. <u>https://doi.org/10.3389/fsurg.2022.1005483</u>

Stewart, J. D. (2008). Foot drop: Where, why and what to do? *Practical Neurology*, *8*(3), 158–169. <u>https://doi.org/10.1136/jnnp.2008.149393</u>

Thibaut, A., Moissenet, F., Di Perri, C., Schreiber, C., Remacle, A., Kolanowski, E., Chantraine, F., Bernard, C., Hustinx, R., Tshibanda, J. F., Filipetti, P., Laureys, S., & Gosseries, O. (2017). Brain plasticity after implanted peroneal nerve electrical stimulation to improve gait in chronic stroke patients: Two case reports. *NeuroRehabilitation*, *40*(2), 251–258. https://doi.org/10.3233/NRE-161410

Tsur, A. (2007). Common peroneal neuropathy in patients after first-time stroke. *The Israel Medical Association Journal, 9*(12), 866–869.