

# Acupuncture for Refractory Lumbar Sprain: Case Study

Chi-Chuan Tseng<sup>1,2,\*</sup>, Alan Tseng<sup>3</sup>, Mao-Feng Sun<sup>4,5</sup>

<sup>1</sup>Division of Chinese Medicine, Chang Gung Memorial Hospital, Chiayi, Taiwan

<sup>2</sup>School of Traditional Chinese Medicine, Chang Gung University, Taoyuan, Taiwan

<sup>3</sup>Department of Medical Biophysics, University of Toronto, Toronto, Canada

<sup>4</sup>Department of Acupuncture, China Medical University Hospital, Taichung, Taiwan

<sup>5</sup>School of Chinese Medicine, China Medical University, Taichung, Taiwan

**Objective:** Lumbar muscle strains and sprains (LS) are the most common causes of acute low back pain. Current treatments for LS include drug, physical, and acupuncture treatments but they are not effective in all cases. This case study describes the application of acupuncture and active movement for LS. **Clinical features:** Two patients presented with acute LS caused by physical injury and did not respond to drug treatments. Both patients had reduced ranges of motions and pain affecting qualities of life. **Intervention and outcome measurements:** We developed a treatment based on LI3 (Sanjian) point acupuncture combined with active movement. Two treatment sessions were performed in one week. Evaluations were conducted at baseline, after the second session, and 2 months after the final treatment using the Visual Analogue Scale (VAS) and the Roland-Morris Disability Questionnaire (RMDQ). The patients reported less pain after treatment and had no pain at follow-up. No adverse effects were observed. **Conclusion:** The combination of acupuncture with active motion may reduce pain perception and facilitate movement in LS patients. The described treatment could be safe, simple, and cost-effective for LS patients who do not respond to drug treatments. Larger studies are needed to extend beyond these two cases.

**Key words:** Lumbar muscle strains and sprains, low back pain, acupuncture, LI3

Received 20 April 2016

Accepted 27 June 2016

Available online 1 June 2017

\*Correspondence: Chi-Chuan Tseng, Division of Chinese Medicine, Chang Gung Memorial Hospital, No. 6, West Sec., Chia-Pu Rd., Pu-Tzu City, Chiayi Hsien, Taiwan, R.O.C., Tel: +886-5-3621000 ext. 2064, E-mail: [acupmox@gmail.com](mailto:acupmox@gmail.com)

## 1. Introduction

Acute low back pain is a difficult problem for many patients. Nearly a third of patients do not recover within a year and up to 10–15% of cases develop into chronic low back pain. Slow recovery and recurrence are common [1–3]. Acute low back pain is most commonly caused by lumbar muscle strains and sprains (LS) which can be caused by overexertion, poor posture, and trauma. In LS, the pain can trigger muscle spasms and more pain [4,5], which leads to decreased quality of life, inability to work, and an economic burden on society [6,7]. Therefore, the treatment of LS pain is important to general practitioners, physiotherapists, and occupational therapists.

Current strategies for treating LS include drug, physical, and acupuncture treatments. Drugs include nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, corticosteroids, paracetamol, opioids, and antidepressants [8]. However, they are not effective in all cases and may lead to side effects or substance dependence. Physical therapies such as ultrasound, shortwaves, and transcutaneous electrical stimulation can be useful but their long-term efficacies have not been thoroughly assessed in acute LS patients [9]. Finally, acupuncture can be effective for chronic LS [10] but it is not known whether it can benefit patients refractory to drug therapy.

This case study presents the diagnosis, treatment, and outcomes of two acute LS patients who did not respond to drug therapy but who were subsequently treated with acupuncture. Possible mechanisms and advantages of our treatment are discussed.

## 2. Intervention and Outcome Measurements

Our treatment strategy is based on acupuncture combined with active movement. For acupuncture, we selected the LI3 (Sanjian) point based on previous clinical experience [11]. LI3 is located on the depression radial and proximal to the second metacarpophalangeal joint of a loose fist and has been associated with relaxation of muscles in the *Classic of Difficulties (Nan Jing)* [12].

A sterile disposable stainless steel acupuncture needle 25 mm in length and 0.30 mm diameter was inserted 1 cun vertically and directly below the lower border of the metacarpal bone

(Fig. 1). The needle was then manipulated by rapid small-amplitude lifting and thrusting movements for 1 minute to produce a *de qi* sensation. Patients were instructed to perform flexion, extension, lateral flexion, and rotation of their backs as far as they comfortably could while the needle remained in place for 20 minutes. The above treatment session was repeated twice per week for one week.

Evaluations were conducted at baseline before treatment, after the second session, and 2 months after the final treatment. The primary outcome was pain measured on a Visual Analogue Scale (VAS). VAS is a 11-point scale with 0 meaning no pain and 10 meaning the worst imaginable pain [13,14]. The secondary outcome was functional impairment measured using the Roland-Morris Disability Questionnaire (RMDQ) [15]. RMDQ is 24-item questionnaire. Scores range from 0 to 24 with higher scores indicating greater physical disability. VAS and RMDQ have been shown to be valid and reliable scales for measuring pain and disability [16–18].

## 3. Case Reports

We performed the above interventions on two LS patients. The outcome measurements before and after the treatments are shown in Table 1.

### 3.1. Case 1

A 43-year-old woman arrived at our clinic complaining of severe low back pain. The back pain developed after she lifted a heavy object. She could not maintain normal posture. The pain intensified with right rotation and flexion of the back which made it difficult for her to sleep and to get dressed. The pain persisted despite 3 weeks of rehabilitation and treatment with NSAIDs and muscle relaxants. She had no past history or family history of low back pain.

Physical examination revealed tenderness to palpation in the lower back and a loss of normal lumbar lordosis. The lumbar spine range of motion was moderately reduced in all directions. She was diagnosed with acute LS.

The acupuncture modality was performed as described. After the first session, the patient reported decreased back pain and could maintain normal posture and sleep without disturbance. She reported no adverse effects during the treatment. After the second session, she no longer felt any pain and was able to return to regular activity (Table 1).



**Fig. 1. Insertion of the acupuncture needle at acupuncture point LI3 (Sanjian).**

**Table 1. Patient histories and outcomes of the acupuncture treatment for the two LS cases.**

	Patient 1	Patient 2
Age	43	20
Gender	Female	Male
Chief complaint	Severe low back pain exacerbated by right rotation and flexion of the back	Severe low back pain exacerbated by all back movements especially extension and right rotation
Onset of symptoms	Sudden injury after lifting heavy objects	Sudden injury after road-traffic accident
Previous treatments	Rehabilitation NSAIDs, muscle relaxants	NSAIDs, muscle relaxants corticosteroids, paracetamol
Time between onset of symptoms and acupuncture therapy evaluation	3 weeks	5 weeks
<b>VAS scores</b>		
At baseline	8	8
Directly after two treatments	1	2
2 months after completion of treatments	0	0
<b>RMDQ scores</b>		
At baseline	19	15
Directly after two treatments	0	3
2 months after completion of treatments	0	0

VAS, Visual Analogue Scale. RMDQ, Roland-Morris Disability Questionnaire.

### 3.2. Case 2

A 20-year-old man arrived at our clinic after experiencing 5 weeks of severe low back pain. The pain developed after a road-traffic accident. Any movement of his back aggravated the pain especially extension and right rotation. The pain limited his daily activities including his ability to work. He received NSAIDs, muscle relaxants, corticosteroids, and paracetamol from the emergency and orthopedic departments but they did not improve his pain. He was otherwise healthy.

On physical examination, lumbar rotation was reduced approximately 15 degrees bilaterally. Extension was restricted by 10 degrees and reliably reproduced his pain. There were spasms in the paraspinal muscles and point tenderness to firm palpation over the sacroiliac joint. Neurologic examination and nerve root stress tests were negative. The patient was diagnosed with acute LS.

We performed the acupuncture modality. After completing 2 sessions, the patient's VAS and RMDQ ratings decreased (Table 1). Lumbar rotation improved to 25 degrees bilaterally and extension of the lumbar spine improved to 30 degrees. The patient reported no symptoms at follow-up 2 months after completing the treatments.

## 4. Discussion

The two patients described in this study share common features. Their conditions arise from external trauma rather than another neurological condition. Furthermore, they had reduced lumbar range of motions and severe pain which affected their qualities of life as reflected in their baseline VAS and RMDQ scores (Table 1). Importantly, their pain did not respond to conventional drug treatments.

After 1 week of our acupuncture modality, both patients had much lower disability scores and had completely recovered 2 months after the last treatment session (Table 1). It is likely that the recovery was a result of the acupuncture treatment rather than spontaneous resolution since the patients did not improve before the acupuncture treatment. Furthermore, the rapid recovery is not typical of acute low back pain [2].

The rapid improvement of acute LS may not be limited to our treatments, as Lin et al [19] have also found a significant reduction in VAS and RMDQ scores in patients with acute LS treated with a combination of Yintang (EX-HN

3) acupuncture and active movement. However, these patients had lumbar sprains for less than 3 days prior to treatment and hence are not comparable with our described cases.

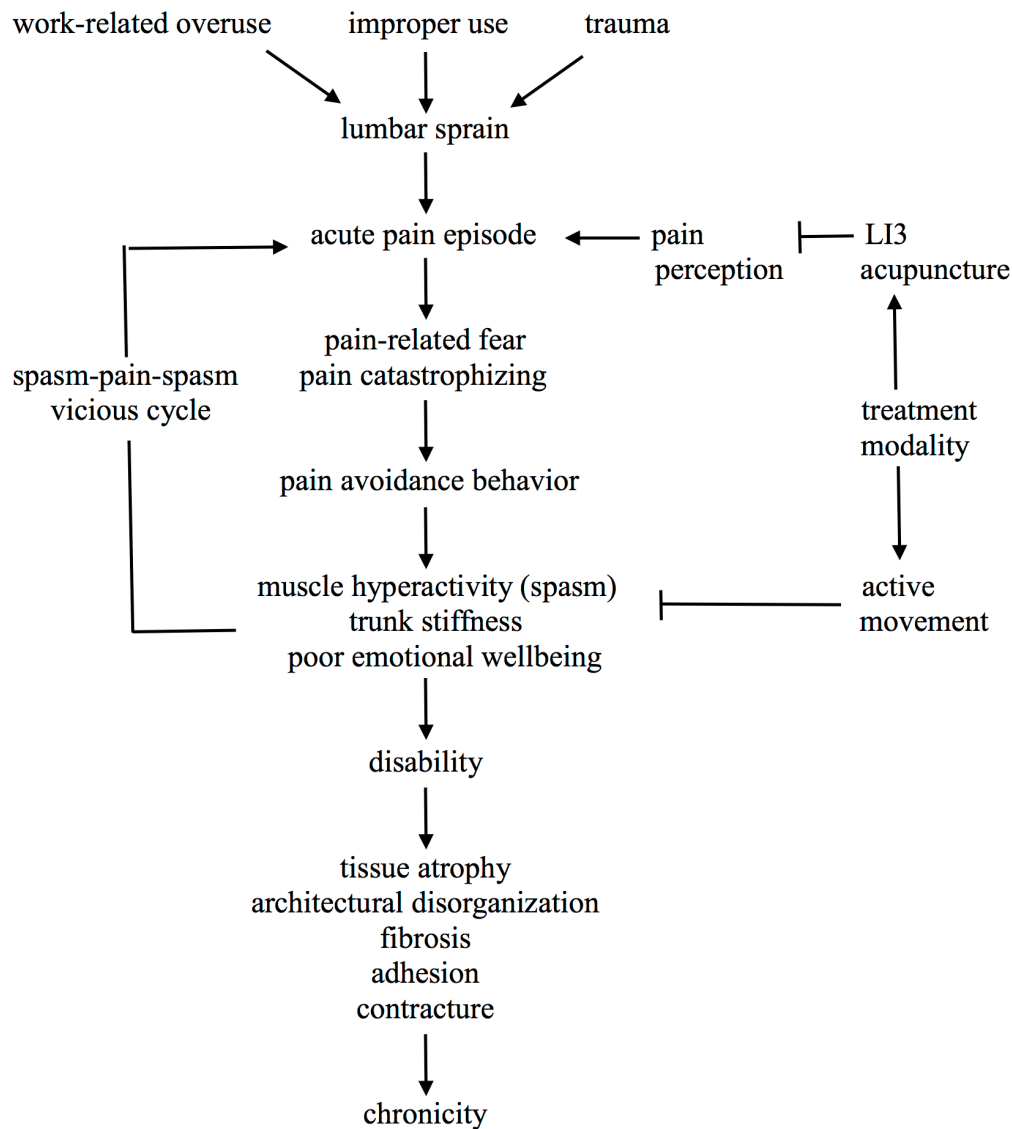
Other studies used more intensive treatments with multiple acupuncture points. Yuan *et al.* [20] found that acute LS acupuncture case studies use a median of 10 points with treatments repeated up to 6 times per week. There was also a report of bloodletting acupuncture at the BL40 point (Weizhong) or at the SI3 point (Houxi) [21]. Another study demonstrated that electroacupuncture at the bilateral SI3, EX-B2 (Jiaji), and Ashi points can decrease muscle tension, improve blood circulation, and raise skin temperature in acute LS [22]. However, these treatments are complex and the use of multiple acupuncture points may overstimulate the dorsal horn and aggravate the pain instead of relieving it [23].

In contrast, our case study shows that a simpler, less intensive acupuncture treatment at a single point may be sufficient to decrease acute LS pain. While single-point acupuncture hasn't been widely described in the English language peer-reviewed scientific literature [20], we believe that LI3 acupuncture may relieve pain by reducing pain perception. Traditionally, LI3 has been described as a Shu-Stream point of the Large Intestine Meridian which affects joint pain and heaviness of the body [24]. LI3 is connected to large portions of the somatosensory cortex [25], the limbic area [26,27], and pain modulatory pathways [28]. Since acupuncture induces greater brain activity in those regions [29,30], LI3 acupuncture may induce diffuse noxious inhibitory control [31] and inhibit pain perception [32,33] (Fig. 2).

In addition, our treatment includes active movement which has been shown to be beneficial for LS patients [34,35]. Active movement prevents muscle stiffness [36] which could lead to chronic LS [37], spasms, and a vicious cycle of pain [38]. By using movement in combination with acupuncture, patients may experience less fear [23], less pain avoidance [39], and greater self-confidence [40] in LS recovery (Fig. 2).

In conclusion, we have successfully treated two LS patients who did not respond to drug treatments using LI3 acupuncture combined with active movement. Our treatment modality is simple, safe, and cost-effective. Larger studies with long-term follow-up will be needed to determine the efficacy of this treatment on refractory LS.





**Fig 2. A possible mechanism for the development of chronic LS from acute LS and its precipitating factors.** Our treatment modality combines LI3 acupuncture and active movement which could disrupt pain perception and muscle stiffness, respectively. Regular arrows represent progressions, blunt arrows inhibitions.

## Acknowledgments

Written informed consent was obtained from the patients for publication of this case report and accompanying images. This study was approved by the Institutional Review Board of the Chang Gung Medical Foundation (CGMF IRB No.: 104-4569B). The authors wish to thank Jason Tseng for his assistance in the preparation of the manuscript.

## Author Disclosure Statement

No competing financial interests exist.

## References

1. Balagué F, Mannion AF, Pellisé F, Cedraschi C. Non-specific low back pain. *Lancet*, 379:482–491, 2012.
2. Carey TS, Garrett JM, Jackman A, Hadler N. Recurrence and care seeking after acute back pain: results of a long-term follow-up study. North Carolina back pain project. *Med. Care*, 37:157–164, 1999.
3. Henschke N, Maher CG, Refshauge KM, *et al.* Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. *BMJ*, 337:a171, 2008.
4. Van Dieen JH, Cholewicki J, Radebold A. Trunk muscle recruitment patterns in patients with low back pain enhance the stability of the lumbar spine. *Spine*, 28:834,

- 2003.
5. Roland MO. A critical review of the evidence for a pain-spasm-pain cycle in spinal disorders. *Clin. Biomech.*, 1:102–109, 1986.
6. Croft PR, Macfarlane GJ, Papageorgiou AC, Thomas E, Silman AJ. Outcome of low back pain in general practice: a prospective study. *BMJ*, 316:1356–1359, 1998.
7. Crow WT, Willis DR. Estimating cost of care for patients with acute low back pain: a retrospective review of patient records. *J. Am. Osteopath. Assoc.*, 109:229–233, 2009.
8. Casazza BA. Diagnosis and treatment of acute low back pain. *Am. Fam. Physician*, 85:343–350, 2012.
9. Lizier DT, Perez MV, Sakata RK. Exercises for treatment of nonspecific low back pain. *Rev. Bras. Anesthesiol.*, 62:838–846, 2012.
10. Manheimer E, White A, Berman B, Forys K, Ernst E. Meta-Analysis: Acupuncture for low back pain. *Ann. Intern. Med.*, 142:651–663, 2005.
11. Tseng CC, Sung MF, Chang HH. Effects of acupuncture at LI3 on chronic epicondylitis. *Zhongguo Zhen Jiu*, 26:510, 2006.
12. White A, Cummings M, Filshie J. An introduction to Western medical acupuncture. Churchill Livingstone Elsevier, London, p. 49, 2008.
13. White A. Measuring pain. *Acupunct. Med.*, 16:83–87, 1998.
14. Breivik EK, Björnsson GA, Skovlund E. A comparison of pain rating scales by sampling from clinical trial data. *Clin. J. Pain*, 16:22–28, 2000.
15. Roland M, Morris R. A study of the natural history of back pain. Part I: Development of a reliable and sensitive measure of disability in low back pain. *Spine*, 8:141–144, 1983.
16. Bijur PE, Silver W, Gallagher and EJ. Reliability of the visual analog scale for measurement of acute pain. *Acad. Emerg. Med.*, 8:1153–1157, 2001.
17. Stratford PW, Binkley JM. Measurement properties of the RM-18. A modified version of the Roland-Morris disability scale. *Spine*, 22:2416–2421, 1997.
18. Macedo LG, Maher CG, Latimer J, Hancock MJ, Machado LA, McAuley JH. Responsiveness of the 24-, 18- and 11-item versions of the Roland Morris Disability Questionnaire. *Eur. Spine J.*, 20:458–463, 2011.
19. Lin Ruizhu, Zhu Ning, Liu Jian, Li Xin-jian, Wang Yue, Zhang Jie, Xi Chaolei. Acupuncture-movement therapy for acute lumbar sprain: a randomized controlled clinical trial. *J. Tradit. Chin. Med.*, 36:19–25, 2016.
20. Yuan J, Park J, Kerr DP, McDonough SM. Treatment regimens of acupuncture for low back pain - a systematic review. *Complement. Ther. Med.*, 16:295–304, 2008.
21. Chen CJ, Tsai WC, Yen JH, Tsai JJ, Ou TT, Lin CC, Liu HW. Bloodletting acupuncture of the engorged vein around BL-40 (Wei-Chung) for acute lumbar sprain. *Am. J. Chin. Med.*, 29:387–391, 2001.
22. Fan YZ, Wu YC. Effect of electroacupuncture on muscle state and infrared thermo-gram changes in patients with acute lumbar muscle sprain. *J. Tradit. Chin. Med.*, 35:499–506, 2015.
23. Swinkels-Meewisse IE, Roelofs J, Oostendorp RA, Verbeek AL, Vlaeyen JW. Acute low back pain: pain-related fear and pain catastrophizing influence physical performance and perceived disability. *Pain*, 120:36–43, 2006.
24. Unschuld P. Nan-Ching — The Classic of Difficult Issues. University of California Press, pp. 474–617, 1986.
25. Bangert M, Schlaug G. Specialization of the specialized in features of external human brain morphology. *Eur. J. Neurosci.*, 24:1832–1834, 2006.
26. Kaas, JH. Topographic maps are fundamental to sensory processing. *Brain Res. Bull.*, 44: 107–112, 1997.
27. Bowsher D. Mechanisms of acupuncture, in “*Medical Acupuncture: A Western Scientific Approach*”, Filshie J and White A, Eds., pp. 69–82, Churchill Livingstone, Edinburgh, UK, 1998.
28. Roy M, Piché M, Chen JI, Peretz I, Rainville P. Cerebral and spinal modulation of pain by emotions. *Proc. Natl. Acad. Sci. USA*, 106:20900–20905, 2009.
29. Kaas, JH. Plasticity of sensory and motor maps in adult mammals. *Ann. Rev. Neurosci.*, 14:137–167, 1991.
30. Bradnam L. A biopsychosocial clinical reasoning model for Western acupuncture. *Phys. Ther. Rev.*, 16:138–146, 2011.
31. Le Bars D, Villanueva L, Bouhassira D, Willer JC. Diffuse noxious inhibitory controls (DNIC) in animals and in man. *Patologicheskaja fiziologija i eksperimental'naia terapija*, 4:55–65, 1991.
32. Fairhurst M, Wiech K, Dunckley P, Tracey I. Anticipatory brainstem activity predicts neural processing of pain in humans. *Pain*, 128:101–110, 2007.

33. Zhao ZQ. Neural mechanism underlying acupuncture analgesia, *Prog. Neurobiol.*, 85:355–375, 2008.
34. Hagen KB, Hilde G, Jamtvedt G, Winnem M. Bed rest for acute low- back pain and sciatica. *Cochrane Database Syst. Rev.*, 4:CD001254, 2004.
35. Hagen KB, Hilde G, Jamtvedt G, Winnem M. Bed rest for acute low back pain and sciatica. *Cochrane Database Syst. Rev.*, 4:CD001254, 2004.
36. Karayannis NV, Smeets RJ, van den Hoorn W, Hodges PW. Fear of movement is related to trunk stiffness in low back pain. *PLoS One*, 8:e67779, 2013.
37. Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. *Pain*, 94:7–15, 2001.
38. McCarberg BH, Ruoff GE, Tenzer-Iglesias P, Weil AJ. Diagnosis and treatment of low-back pain because of paraspinous muscle spasm: a physician roundtable. *Pain Med.*, 12:S119–S127, 2011.
39. Jenkins EM, Borenstein DG: Exercise for the low back pain patient. *Baillieres Clin. Rheumatol.*, 8:191–197, 1994.
40. Waddell G, Feder G, Lewis M. Systematic reviews of bed rest and advice to stay active for acute low back pain. *Br. J. Gen. Pract.*, 47:647–652, 1997.

## 針刺治療難癒性腰扭傷—病例研究

曾啟權<sup>1,2,\*</sup>、曾國倫<sup>3</sup>、孫茂峰<sup>4,5</sup>

<sup>1</sup> 嘉義長庚紀念醫院中醫科，嘉義，台灣

<sup>2</sup> 長庚大學醫學院中醫系，桃園，台灣

<sup>3</sup> 多倫多大學醫學生物物理研究所，多倫多，加拿大

<sup>4</sup> 中國醫藥大學附設醫院針灸科，台中，台灣

<sup>5</sup> 中國醫藥大學中醫學院，台中，台灣

**目的：**腰扭傷是急性下背痛的最常見原因，現今治療腰扭傷的方法包括藥物、物理治療及針灸，但是並非全然有效。本病例研究的目的是說明針刺結合主動活動腰部的方法用來治療腰扭傷的應用前景。**臨床特徵：**兩位經過藥物治療無效的急性腰扭傷患者，主訴腰部活動功能減少及疼痛影響到日常生活的品質。**治療及結果：**我們採用針刺三間穴同時結合主動活動腰部的治療方法，總共一週治療兩次。在接受針刺前、兩次治療結束和兩個月後，分別利用視覺類比量表 (Visual Analogue Scale) 和羅蘭－摩理斯功能障礙問卷 (Roland-Morris Disability Questionnaire) 來評估療效。經過兩次治療後，患者的腰痛減少，而且在後續兩個月的追蹤，疼痛沒有再發生，也沒有出現任何的治療副作用。**結論：**結合針刺和主動活動腰部的治療方法，可能減少腰扭傷患者對於疼痛的感受，並且幫助腰部的活動；對於藥物治療無效的腰扭傷患者，是項安全、簡便及經濟有效的治療方式；未來需要進一步的擴大病例研究。

**關鍵字：**腰扭傷、腰背痛、針灸、三間穴

105 年 4 月 20 日受理

105 年 6 月 27 日接受刊載

106 年 6 月 1 日線上出版

\* 聯絡人：曾啟權，嘉義長庚醫院中醫科，613 嘉義縣朴子市嘉朴路西段 6 號，電話：05-3621000 分機 2064，電子郵件信箱：acupmox@gmail.com