Acupuncture for Refractory Lumbar Sprain: Case Study

Chi-Chuan Tseng\textsuperscript{1,2,*}, Alan Tseng\textsuperscript{3}, Mao-Feng Sun\textsuperscript{4,5}

\textsuperscript{1}Division of Chinese Medicine, Chang Gung Memorial Hospital, Chiayi, Taiwan
\textsuperscript{2}School of Traditional Chinese Medicine, Chang Gung University, Taoyuan, Taiwan
\textsuperscript{3}Department of Medical Biophysics, University of Toronto, Toronto, Canada
\textsuperscript{4}Department of Acupuncture, China Medical University Hospital, Taichung, Taiwan
\textsuperscript{5}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

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

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

Fig. 1. Insertion of the acupuncture needle at acupuncture point LI3 (Sanjian).
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 acupunc-ture 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

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Author Disclosure Statement

No competing financial interests exist.

References


針刺治療難癒性腰扭傷—病例研究

曾啟權 1,2,*、曾國倫 3、孫茂峰 4,5

1 嘉義長庚紀念醫院中醫科，嘉義，台灣
2 長庚大學醫學院中醫系，桃園，台灣
3 多倫多大學醫學生物物理研究所，多倫多，加拿大
4 中國醫藥大學附設醫院針灸科，台中，台灣
5 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

* 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