

# Observation on therapeutic effect of aligned acupuncture for lumbar intervertebral disc herniation

## 排针刺法治疗腰椎间盘突出症疗效观察

Yu Li-zhong (余利忠)<sup>1</sup>, Li Miao-dan (李妙丹)<sup>1</sup>, Lou Shu-zhe (娄淑哲)<sup>1</sup>, Mao Jing (毛静)<sup>1</sup>, Sun Zuo-qian (孙作乾)<sup>1</sup>, He Tian-you (何天有)<sup>2</sup>, Yan Xing-ke (严兴科)<sup>2</sup>

<sup>1</sup> Zaozhuang Vocational College of Science and Technology, Tengzhou 277500, China

<sup>2</sup> School of Acupuncture and Tuina, Gansu University of Traditional Chinese Medicine, Lanzhou 730000, China

### Abstract

**Objective:** To observe the clinical effects of aligned needling therapy for lumbar intervertebral disc herniation (LIDH).

**Methods:** A total of 80 cases with LIDH in conformity with the inclusion criteria were randomly divided into a treatment group or a control group by their visit order, 40 cases in each group. The points from the Governor Vessel, L<sub>1</sub>-L<sub>5</sub> Jiaji (EX-B 2) points, from the first lateral line of the Bladder Meridian, Huantiao (GB 30), Weizhong (BL 40) and Yanglingquan (GB 34) were selected for acupuncture in the treatment group. Shenshu (BL 23), Dachangshu (BL 25), Ashi (Extra) points and Weizhong (BL 40) were used for routine acupuncture in the control group. The clinical effects of the two groups after 2-course treatments and recurrence rates three months later were observed. The pain severity before and after treatments was assessed by visual analog scale (VAS). The improvement of the patient's pathological situation was evaluated by the performance assessment of lumbar disease treatment from Japanese Orthopedic Association (JOA).

**Results:** After the treatment for two courses, there was no dropped-out case in the two groups. The curative rates and total effective rates were respectively 32.5% and 92.5% in the treatment group versus respectively 12.5% and 82.5% in the control group. The differences in the curative rates and total effective rates between the two groups were statistically significant (both  $P < 0.01$ ). After the treatment, VAS and JOA scores remarkably declined in the patients of the two groups, with statistical differences in comparison with those of the same group before treatment (both  $P < 0.05$ ). In follow-up check of three months, the recurrence rate was 10.7% in the cured and remarkably effective cases in the treatment group and was 29.4% in the control group. The recurrence rates of the two groups were statistically different ( $P < 0.05$ ).

**Conclusion:** The aligned needling technique is remarkable in the clinical effects, obvious in the analgesic effects and low in the recurrence rate in the treatment of LIDH.

**Keywords:** Acupuncture Therapy; Low Back Pain; Intervertebral Disc Displacement; Points, Governor Vessel; Points, Bladder Meridian; Visual Analog Scale; Pain Measurement

**【摘要】目的:** 观察排针刺法治疗腰椎间盘突出症(lumbar intervertebral disc herniation, LIDH)的临床疗效。**方法:** 将符合纳入标准的 80 例 LIDH 患者按就诊顺序随机分为治疗组和对照组, 每组 40 例。治疗组选取 L<sub>1</sub>-L<sub>5</sub> 的督脉穴、夹脊穴、膀胱经第一侧线穴及环跳、委中、阳陵泉进行针刺治疗; 对照组选取肾俞、大肠俞、腰阳关、阿是穴、委中进行常规针刺治疗。观察 2 个疗程后两组临床疗效和 3 个月后复发率情况。采用视觉模拟量表(visual analog scale, VAS)评价治疗前后疼痛程度, 根据日本骨科协会(Japanese Orthopedic Association, JOA)腰椎疾患治疗成绩评分表评价患者病情改善情况。**结果:** 经过 2 个疗程治疗, 两组无脱落病例。治疗组的治愈率和总有效率分别是 32.5% 和 92.5%, 对照组分别是 12.5% 和 82.5%, 两组治愈率及总有效率差异均有统计学意义(均  $P < 0.01$ )。治疗后两组患者的 VAS 和 JOA 评分均显著降低, 与本组治疗前均有统计学差异(均  $P < 0.05$ )。随访 3 个月, 治疗组愈显病例的复发率为 10.7%, 对照组为 29.4%, 两组复发率有统计学差异( $P < 0.05$ )。**结论:** 排针刺法治疗 LIDH 临床疗效显著, 止痛效果明显, 且复发率低。

**【关键词】** 针刺疗法; 腰痛; 椎间盘移位; 穴位, 督脉; 穴位, 膀胱经; 视觉模拟量表; 疼痛测量

**【中图分类号】** R246.2 **【文献标志码】** A

**Author:** Yu li-zhong, M.M., associate professor

**Corresponding Author:** Yan Xing-ke, M.D., professor.

E-mail: yanxingke@126.com

Lumbar intervertebral disc herniation (LIDH) refers to a disease caused by degeneration of the lumbar fiber ring or rupture due to traumatic injury, leading to herniation of the nucleus pulposus, and irritating or compressing the spinal cord and spinal nerve root, and further causing the nerve root inflammation, nutritional disturbance and conductivity damage, compression of the nerve root, disturbance of microcirculation of the peripheral tissues, congestion, edema and proliferation and adhesion of the fibrous tissues, and finally presenting lumbar pain, sciatica and even obvious neurological disorders<sup>[1]</sup>. Currently, in the treatment of LIDH, non-surgical methods are often used for this condition, accounting for about 80%-90%, and the surgical treatment is needed in only less than 10% of LIDH patients<sup>[2]</sup>. In non-surgical therapies, acupuncture is safe and can produce positive and long-term effect. We treated this disease with aligned needling technique, in comparison with the routine acupuncture treatment. Now, the report is given as follows.

## 1 Clinical Materials

### 1.1 Diagnostic criteria

The diagnostic criteria for this study was established in reference to *Lumbar Disc Herniation*<sup>[3]</sup> and *Criteria of Diagnosis and Therapeutic Effects of Diseases and Syndromes in Traditional Chinese Medicine*<sup>[4]</sup>: traumatic injury in the low back, chronic strain or extraction of pathogenic cold and dampness; occurring in the young adults, low back pain radiating to the buttock and lower limb, pain aggravated by increased abdominal pressure, scoliosis; disappearance of the lumbar physical curve, tenderness lateral to the lumbar vertebra of the pathological change, radiating to the lower limb, motor impairment in the low back; hyperesthesia or hypoesthesia in the innervations area of the involved lower limb, possible muscular atrophy in the long duration; positive in the straight leg-raising or strengthened test, decrease or disappearance of the knee and heel tendon reflex, decreased extension of the big toe; scoliosis shown in X-ray examination, disappearance of the physiological lordosis of the lumbar vertebrae, possible stenosis in the pathological change of the intervertebral disc. CT scan can show the

location and severity of the intervertebral disc herniation.

### 1.2 Inclusion criteria

In conformity with the above diagnostic criteria of LIDH; aged between 30 and 65 years old; willing to accept acupuncture treatment; without any other treatment or discontinuation of other therapy; with the diagnosis confirmed by CT scan or MRI examination of lumbar intervertebral disc.

### 1.3 Exclusion criteria

Those not in conformity with the above diagnostic and inclusion criteria of LIDH; serious neurological disorders due to severe herniation of the nucleus pulposus; those with lumbar tuberculosis or tumor, or spinal canal stenosis, and those complicated with serious cardiac, cerebral and renal diseases; those with mental disorders; and those receiving other treatments.

### 1.4 Rejecting criteria

Poor compliance, influencing the therapeutic effects; serious adverse reaction improper for continuous treatment; subjects unable to finish the treatment due to various reasons; and those whose therapeutic effects were unable to be evaluated due to incomplete information.

### 1.5 Statistical management

The data were processed by the SPSS 17.0 version statistical software. The measurement data were expressed by mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ). The paired *t*-test was adopted. Chi-square test was used for the counting data. The two sided test was used.  $P < 0.05$  indicated a statistical significance in the difference.

### 1.6 General data

Totally, 80 patients were all recruited from the outpatient and inpatient of the Acupuncture Department of our hospital from October of 2012 to December of 2013 and were randomly divided into a treatment group and a control group by their visit order, 40 cases in each group. Before treatment, the between-group differences were not statistically significant in gender, age, duration, the performance assessment of lumbar disease treatment from Japanese Orthopedic Association (JOA) and visual analog scale (VAS), (all  $P > 0.05$ ), indicating that the two groups were comparable (Table1).

**Table 1. Comparison of general data between the two groups**

Group	<i>n</i>	Gender (case)		Average age ( $\bar{x} \pm s$ , year)	Average duration ( $\bar{x} \pm s$ , day)	JOA score ( $\bar{x} \pm s$ , point)	VAS score ( $\bar{x} \pm s$ , point)
		Male	Female				
Treatment	40	23	17	49.8 $\pm$ 11.2	67.0 $\pm$ 15.0	14.00 $\pm$ 3.18	5.28 $\pm$ 1.55
Control	40	21	19	49.6 $\pm$ 10.7	66.8 $\pm$ 15.7	14.28 $\pm$ 3.70	5.23 $\pm$ 1.62

## 2 Therapeutic Methods

### 2.1 Treatment group

Major points: Mingmen (GV 4), Ashi point (below the spinous process of the third lumbar vertebra), Yaoyangquan (GV 3), Ashi point (below the spinous process of the fifth lumbar vertebra), L<sub>1-5</sub> Jiaji (EX-B 2) points, Shenshu (BL 23), Qihai (BL 24), Dachangshu (BL 25), Guanyuanshu (BL 26), and Xiaochangshu (BL 27).

Adjunct points: Zhibian (BL 54), Huantiao (GB 30), Yinmen (BL 37), Weizhong (BL 40), Chengshan (BL 57) and Kunlun (BL 60) were added for Foot Taiyang Meridian pattern; Huantiao (GB 30), Fengshi (GB 31), Yanglingquan (GB 34), Feiyang (BL 58), Xuanzhong (GB 39) and Xiashi (GB 43) were added for Foot Shaoyang pattern.

Method: Huatuo brand acupuncture needles of 0.30 mm in diameter and 25-50 mm in length were selected. After the patient took a prone position and routine disinfection by 75% alcohol cotton, the points of the Governor Vessel were punctured firstly, and then bilateral Jiaji (EX-B 2) points were punctured obliquely. Afterward, the points on the first lateral line of the Bladder Meridian were punctured bilaterally, to form an aligned needling. Finally, the rest points were punctured perpendicularly. After the arrival of the needling sensation in various points, Mingmen (GV 4), Shenshu (BL 23), Qihai (BL 24) and Guanyuanshu (BL 26) were manipulated with twisting technique for reinforcing method, and L<sub>1-5</sub> Jiaji (EX-B2) points were manipulated with the twisting needling technique for reducing method. The needling technique was applied to each point for 20 s, and even reinforcing-reducing manipulation with twisting needling technique was applied to the rest points, till the tolerable sore and distending sensation appeared in the local areas. The needles were manipulated once every 10 min and retained for 30 min. The treatment was given once every other day and ten sessions made one course. A 2-3 d rest was given between two courses.

### 2.2 Control group

Major points: Shenshu (BL 23), Dachangshu (BL 25), Yaoyangquan (GV 3), Ashi point (Extra), Weizhong (BL 40)<sup>[5]</sup>.

Adjunct points: Moxibustion at Dazhui (GV 14) were added for cold and damp pattern; Geshu (BL 17) for blood stasis pattern; Mingmen (GV 4) for kidney deficiency pattern.

Method: The same needle tools were selected. After routine disinfection, the perpendicular technique was applied. After the arrival of the needling sensation in points, Shenshu (BL 23) and Mingmen (GV 4) were manipulated by the twisting technique for reinforcing method. Ashi point (Extra), Weizhong (BL 40) and Geshu

(BL 17) were manipulated by the twisting technique for sedating method. The moderate needling technique was applied with the twisting manipulation at the rest points in small amplitude, till the tolerable sore and distending sensation appeared in the local areas. The retaining time of the needles and courses were similar to those in the treatment group.

The therapeutic effects were assessed after two courses of treatment in both groups. The recurrence situation was observed three months after treatment.

## 3 Observation of Therapeutic Effects

### 3.1 Items and methods of observation

#### 3.1.1 VAS score

VAS was used to assess the improving degree of pain. A straight ruler of 10 cm was marked with '0' on the left end, meaning no pain, and marked with '10' on the right end, meaning extreme pain. Then, the patients were told to mark their pain degree on the ruler. The marked value was the VAS score<sup>[6]</sup>. The assessment was processed before the treatment and after two courses of treatments in all patients.

#### 3.1.2 JOA score

JOA score included three parts: subjective symptoms, clinical examinations, and activities of daily living (ADL). The highest total score was 29 points. The higher the point was, the milder the patient's symptoms were.

### 3.2 Criteria of therapeutic effects

The criteria of the therapeutic effects in this study were established with reference to the relevant literature<sup>[7]</sup>.

Cure: The symptoms of low back pain and leg pain disappeared, and activity of the lumbar region became normal, without obvious tenderness and radiating pain to the lower limb, negative straight leg-raising test, able to restore the normal work.

Remarkable effect: The symptoms of low back pain and leg pain were obviously alleviated, and the activity of the lumbar region was basically normal. The tenderness in the low back and radiating pain to the lower limb were obviously alleviated. There was no obvious positive sign in the straight leg-raising test, and basically the patient could restore the normal work.

Improvement: The symptoms of low back pain and leg pain were alleviated, and the activity of the lumbar region was improved. The tenderness in the low back and radiating pain to the lower limb were slight. The straight leg-raising test was in weak positive. The symptoms and sign were somehow alleviated and the patient could partially restore the work.

Failure: No change in the major symptoms and signs, and no possibility to do the daily work.

### 3.3 Therapeutic results

#### 3.3.1 Comparison of the therapeutic effect between the two groups

There was no dropped-off case in both groups during the treatment. After two courses of treatment, the

differences in the curative rate and total effective rate between the two groups were statistically significant (both  $P < 0.05$ ), indicating that the therapeutic effects were better in the treatment group than in the control group (Table 2).

**Table 2. Comparison of therapeutic effects between the two groups (case)**

Group	<i>n</i>	Cure	Remarkable effect	Effect	Failure	Curative rate (%)	Total effective rate (%)
Treatment	40	13	15	9	3	32.5 <sup>1)</sup>	92.5 <sup>1)</sup>
Control	40	5	12	16	7	12.5	82.5

Note: Compared with the control group, 1)  $P < 0.05$

#### 3.3.2 Comparison of VAS score

After treatment, VAS scores declined in both groups. The difference before and after the treatment in the treatment group was statistically significant ( $P < 0.05$ ), and the difference was statistically significant between the two groups after treatment ( $P < 0.05$ ). But, in the control group, the difference between before and after treatment was not statistically significant ( $P > 0.05$ ), indicating that the improvement of pain was better in the treatment group than in the control group (Table 3).

**Table 3. Comparison of VAS score before and after treatment between the two groups ( $\bar{x} \pm s$ , point)**

Group	<i>n</i>	Before treatment	After treatment
Treatment	40	5.28±1.55	2.93±1.12 <sup>1)2)</sup>
Control	40	5.23±1.62	3.88±1.64

Note: Compared with the same group before treatment, 1)  $P < 0.05$ ; compared with the control group after treatment, 2)  $P < 0.05$

#### 3.3.3 Comparison of JOA score

After treatment, JOA scores were all elevated in both groups. The difference before and after the treatment was statistically significant in the treatment group ( $P < 0.05$ ), and the inter-group difference was also statistically significant ( $P < 0.05$ ). But, in comparison with those before the treatment in the control group, the difference was not statistically significant ( $P > 0.05$ ), indicating that the improvement of the symptoms and signs was better in the treatment group than that in the control group (Table 4).

#### 3.3.4 Comparison of recurrence

The follow-up check was processed for three months for the cured cases and cases with the remarkable effect in the two groups. The recurrence rate was 10.7% in the treatment group and 29.4% in the control group. The difference in the recurrence rate between the two groups was statistically significant ( $P < 0.05$ ), indicating

that the long-term effect was better in the treatment group than that in the control group (Table 5).

**Table 4. Comparison of JOA score before and after treatment between the two groups ( $\bar{x} \pm s$ , point)**

Group	<i>n</i>	Before treatment	After treatment
Treatment	40	14.00±3.18	24.48±4.24 <sup>1)2)</sup>
Control	40	14.28±3.70	21.73±4.46

Note: Intra-group comparison, 1)  $P < 0.05$ ; compared with the control group after treatment, 2)  $P < 0.05$

**Table 5. Comparison of recurrence rate between the two groups (case)**

Group	<i>n</i>	Recurrence	Recurrence rate (%)
Treatment	28	3	10.7 <sup>1)</sup>
Control	17	5	29.4

Note: Compared with the control group, 1)  $P < 0.05$

## 4 Discussion

In Chinese medicine, LIDH falls under the category of Bi-Impediment syndrome. In terms of obstruction-induced pain, contributing factors include strain, trauma, and external contraction of wind, cold and dampness. In terms of malnourishment-induced pain, contributing factors include deficiency of qi and blood or deficiency of the liver and kidney. In summary, trauma and contraction of wind, cold and dampness are external factors, whereas kidney qi deficiency is the internal factor. Currently, non-surgical therapies in treating LIDH in China mainly include acupuncture, tuina, traction, physiotherapy, and sports therapy, etc. Most cases of LIDH can get remission or recovery by non-surgical therapies<sup>[7]</sup>. Among those non-surgical therapies, acupuncture treatment of LIDH is comparatively safe, and affirmative and persistent in its therapeutic effect and less in its side effect. Therefore, acupuncture occupies an irreplaceable important position in the conservative therapeutic methods for LIDH.

Aligned needling technique is a new acupuncture technique for the treatment of LIDH, summed up based upon the basic theory of Chinese medicine and modern thoughts of medical neurological and anatomical theory, and many years' clinical practice. As for the internal factor of insufficiency of the kidney qi in LIDH, the points are mainly selected from the Governor Vessel at the low back, Jiaji (EX-B 2) points, and from the first lateral line of the Bladder Meridian in this technique, for realizing the effects to support the body constitution, regulate qi and blood, dredge the collaterals and stop pain. The points of the Governor Vessel at the low back are locally-selected points, acting to dredge the local meridians, circulate qi and activate blood for realizing the analgesic effect that pain is gone while no obstruction exists<sup>[8-9]</sup>. Jiaji (EX-B 2) points are the sites for infusion of qi and blood in the human body and link with the Governor Vessel and are adjacent to the bladder meridian. Jiaji (EX-B 2) points involve spinal nerve root and arteriovenous vascular plexus, fast and strong in the needling sensation by acupuncture, to produce the effects to regulate the functions of the nerves and blood vessels and have a better effect for the pathological change of the spine or peripheral tissues<sup>[10-11]</sup>. The points on the first lateral line of the Bladder Meridian can be used to dredge local qi and blood, nourish the kidney and strengthen yang, and strengthen the kidney and consolidate body resistance. Judging from anatomy of the points, there are cutaneous and muscular branches of the posterior branches of the second and third lumbar nerve and fourth and fifth lumbar nerve in the shallow layer and deep layer under Shenshu (BL 23) and Dachangshu (BL 25). Therefore, acupuncture at these points can directly stimulate the posterior branches of L<sub>4</sub> and L<sub>5</sub> nerve root, effectively inhibit the excitement of the peripheral nerves, and reduce the irritation on the nerve root and improve the clinical symptoms, so as to realize the therapeutic purpose<sup>[12]</sup>. The points of the Bladder Meridian of Foot Taiyang and Gallbladder Meridian of Foot Shaoyang on the lower limb are the major points on the innervations of the sciatic nerve and have the effects to dredge the meridians and collaterals, circulate qi and activate blood.

It is proven by the findings from this study that the curative rates and total effective rates are all higher in the treatment group than in the control group, and VAS and JOA scores are statistically different between the two groups (both  $P < 0.05$ ), and the recurrence rate is also lower in the treatment group. These results indicate that the short-term and long-term therapeutic effects of aligned needling technique are better than those of routine needling technique. Therefore, aligned needling technique is an effective method in the treatment of LIDH and needs popularizing.

# Conflict of Interest

There was no potential conflict of interest in this article.

# Acknowledgments

This work was supported by Project of Science and Technology Development Program of Tengzhou City, Shandong Province (山东省滕州市科学技术发展计划项目, No. 201310002); Science and Technology Project for Graduate Student Tutor in Institution of Higher Education of Gansu Province (甘肃省高等学校研究生导师科研项目, No. 11006-08).

# Statement of Informed Consent

Informed consent was obtained from all individual participants included in this study.

Received: 29 September 2015/Accepted: 25 October 2015

# References

- [1] Lü G, Wang XD. Pain and injury of nerve root. *Zhonghua Guke Zazhi*, 1996, 16(3): 182-183.
- [2] Fan Y, Xue LF, Meng XF. Effect analysis of warming acupuncture treatment on lumbar intervertebral disc herniation. *Zhongguo Zhongyiyao Xiandai Yuancheng Jiaoyu*, 2009, 7(6): 114-115.
- [3] Hu YG. *Lumbar Disc Herniation*. 3rd Edition. Beijing: People's Medical Publishing House, 2004: 236-237.
- [4] State Administration of Traditional Chinese Medicine. *Criteria of Diagnosis and Therapeutic Effects of Diseases and Syndromes in Traditional Chinese Medicine*. Nanjing: Nanjing University Press, 1994: 201-203.
- [5] Feng WX, Yuan HG, Wang Y. Treatment of 60 cases with lumbar intervertebral disc herniation with acupuncture plus modified rotating reduction. *Liaoning Zhongyiyao Daxue Xuebao*, 2009, 11(6): 194-195.
- [6] Randall LM, Ralph MB, Leighton C. *Physical Medicine and Rehabilitation*. Philadelphia: W.B. Saunders Company, 1996: 882.
- [7] Yang ZH, Sun JH, Ding H. Criteria of the evaluation of curative effect by marks methods for lumbar intervertebral disc herniation. *Jingyiatong Zazhi*, 1999, 20(1): 20-21.
- [8] Lü HL, Ren S, Li J. Fifty-six cases of lumbar intervertebral disc protrusion treated with acupuncture. *Henan Zhongyi Xueyuan Xuebao*, 2008, 23(3): 63.
- [9] Ding LL. Treatment of 66 cases with lumbar intervertebral disc herniation by four-needle lateral puncture. *Yunnan Zhongyi Zhongyao Zazhi*, 2006, 27(5): 26.
- [10] Zhang QR, Cheng JD, Ai Z. Treatment of lumbar intervertebral disc herniation by deep puncture of Jiaji (EX-B 2) points plus electric stimulation and its prognosis. *Zhongguo Zhen Jiu*, 2004, 24(4): 226.
- [11] He TY, Wang YM. *Treatment of Various Diseases by Huatuo Jiaji Points*. Beijing: Chinese Press of Traditional Chinese Medicine, 2007: 24-26.
- [12] Yi SX, Feng YS, Chang XR, Zeng XB, Lin YP. Controlled study on influence of pricking and electroacupuncture at Weizhong (BL 40) for lumbar intervertebral disc herniation in rabbit. *Zhongguo Zhongyiyao Keji*, 2008, 15(1): 9-10.

Translator: Huang Guo-qi (黄国琪)