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Analysis of Sleep Quality Improvement in Patients with Lumbar Disc Herniation Following Auricular Acupuncture Combined with Chinese Herbal Medicine Packing Therapy

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Abstract: Objective: To evaluate the nursing effects of auricular seed therapy combined with Chinese herbal poultice treatment for patients with lumbar disc herniation (LDH). *Method:* A total of 80 patients with LDH were randomly divided into two groups. The combined group received auricular acupuncture with seed application combined with Chinese herbal poultice therapy, while the reference group received auricular acupuncture with seed application alone. The therapeutic outcomes of both groups were compared. *Results:* The combined intervention group demonstrated decreased sleep quality scores, reduced pain neurotransmitter levels, and improved lumbar spine function scores post-intervention, with significant intergroup differences ($p < 0.05$). *Conclusion:* Auricular seed therapy combined with Chinese herbal poultice care effectively improves sleep quality and lumbar spine function while alleviating pain perception in patients with lumbar disc herniation, indicating superior therapeutic efficacy.

Keywords: Auricular acupressure with seed application; Chinese herbal poultice therapy; Lumbar disc herniation; Sleep quality

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1. Introduction

LDH is an orthopedic condition characterized by typical symptoms such as low back pain, cauda equina syndrome, and numbness in the lower limbs. Its etiology involves lumbar disc degeneration leading to nucleus pulposus protrusion and compression of surrounding nerves. The condition has a prolonged course and can significantly impact patients' quality of life over the long term [1]. Additionally, patients with LDH experience more severe chronic pain symptoms, which can lead to psychological distress such as anxiety and irritability, thereby reducing their sleep quality. The conventional treatment for this condition involves conservative approaches like oral medication and physical traction. While these methods can alleviate symptoms, their long-term efficacy

remains suboptimal. Therefore, nursing interventions for these patients primarily involve lifestyle guidance, pain management, and rehabilitation training. Clinical practice has revealed that conventional nursing measures are relatively limited and struggle to meet patients' increasingly complex care needs [2]. In contrast, traditional Chinese medicine possesses extensive experience in managing LDH and can utilize distinctive TCM nursing techniques to improve patient outcomes. Ear acupuncture with bean-sized pressure seeds and herbal poultice therapy are both commonly employed TCM nursing methods. The former stimulates ear acupuncture points to promote blood circulation, unblock meridians, and regulate Qi and blood; the latter generates a thermal effect to reduce swelling, relieve pain, and activate blood circulation to resolve stasis. The combination of these two approaches demonstrates superior efficacy in alleviating pain symptoms and improving sleep quality, exhibiting a synergistic mechanism. Based on this, this study enrolled 80 patients with LDH to evaluate the therapeutic effects of auricular seed therapy combined with Chinese herbal poultice care.

2. Materials and methods

2.1. General information

A total of 80 LDH patients admitted between August 2022 and August 2025 were selected and randomly assigned. The combined group included 40 patients, comprising 23 males and 17 females. Their ages ranged from 36 to 77 years, with a mean age of (51.78 ± 4.19) years. The control group included 40 patients, comprising 24 males and 16 females. Their ages ranged from 34 to 76 years, with a mean age of 51.63 ± 4.22 years. Comparison of the above data between groups yielded $p > 0.05$.

2.1.1. Inclusion criteria

(1) Diagnosed with LDH based on imaging studies;
(2) First episode;
(3) Normal mental status and language expression;
(4) Fully informed about the study.

2.1.2. Exclusion criteria

(1) History of lumbar surgery;
(2) Other joint diseases;
(3) Immune system deficiencies;
(4) Malignant tumors;
(5) Chronic pain caused by other reasons;
(6) Withdrawal from the study.

2.2. Method

Both groups received standard care including surgical treatment, medication guidance, and functional training, with strict bed rest required for patients. Control group received auricular seed therapy: Points selected included Subcortex, Shenmen, Lumbosacral Vertebrae, and the sciatic nerve area, along with corresponding liver and kidney zones. Disinfect the above points with 75% alcohol. Apply Wangbuluxing seeds (0.5 × 0.5 cm) onto medical adhesive tape and affix them to the designated points. Knead or press each point for 1–2 minutes, three times daily.

Replace the patches after 3 days and continue treatment for 4 weeks. The combined group received Chinese herbal poultice therapy alongside auricular acupuncture with seed pressure. The formula comprised: Chuan Niuxi (15 g), Chuanxiong (10 g), Du Huo (10 g), Fangfeng (10 g), Fengxian Tougucao (15 g), Guizhi (10 g), Qianghuo (10 g), Shenjincao (30 g), Weilingxian (10 g), Honghua (10 g), and Jingjie (10 g). The herbs were ground into powder and placed in gauze pouches. The pouches were boiled in water for 30 minutes, then 170 mL of yellow rice wine and 280 mL of aged vinegar were added. After simmering for another 15 minutes, the mixture was removed. Wrap the medicated pouch in a thick towel and place it on the patient's waist. Apply heat in a downward, clockwise motion, then position the pouch over the affected area. Each treatment lasts 30 minutes, administered twice daily for 4 weeks.

2.3. Observation indicators

(1) Sleep quality score

The Pittsburgh Sleep Quality Index (PSQI) was used, selecting three components: sleep duration, sleep disturbances, and sleep onset latency. Each component is scored from 0 to 3 points, with sleep quality scored negatively.

(2) Pain mediator levels

Blood samples were collected in the fasting state. Serotonin (5-HT) was measured using high-performance liquid chromatography (HPLC), while substance P (SP) was assessed via enzyme-linked immunosorbent assay (ELISA).

(3) Lumbar spine function score

The Japanese Orthopaedic Association (JOA) assessment score is used, comprising subjective symptoms (9 points), clinical signs (6 points), and limitations in daily activities (14 points). Lumbar spine function is scored positively.

2.4. Statistical analysis

Data were processed using SPSS 28.0 software. Quantitative variables underwent *t*-tests for comparison/analysis, while categorical variables underwent binary comparisons/tests. Statistical significance was defined as $p < 0.05$.

3. Results

3.1. Sleep quality scores compared between the two groups

The sleep quality score decreased after the joint nursing intervention, with a significant difference between groups ($p < 0.05$).

Table 1. Sleep quality scores compared between two groups [$\overline{x} \pm s$, points]

Grouping	Example count	Sleep duration		Sleep disorders		Time to fall asleep	
		Before nursing	After care	Before nursing	After care	Before nursing	After care
Joint group	40	2.03 ± 0.45	0.71 ± 0.19	1.95 ± 0.38	0.64 ± 0.17	1.92 ± 0.46	0.61 ± 0.15
Control group	40	2.01 ± 0.47	1.04 ± 0.22	1.97 ± 0.41	0.95 ± 0.20	1.90 ± 0.43	0.98 ± 0.19
t		0.194	7.180	0.226	7.469	0.201	9.667
p		0.846	0.000	0.822	0.000	0.841	0.000

3.2. Pain mediator levels compared between the two groups

Pain neurotransmitter levels decreased after combined group nursing, with a significant difference between groups ($p < 0.05$).

Table 2. Pain mediator levels compared between two groups [$\overline{x} \pm s$]

Grouping	Example count	5-HT (μmol/L)		SP (μg/mL)	
		Before nursing	After care	Before nursing	After care
Joint group	40	0.80 ± 0.19	0.34 ± 0.11	360.53 ± 28.74	208.65 ± 20.11
Control group	40	0.82 ± 0.21	0.49 ± 0.14	361.12 ± 29.03	265.98 ± 21.43
t		0.447	5.328	0.091	12.338
p		0.656	0.000	0.927	0.000

3.3. Comparison of lumbar function scores between the two groups

The lumbar spine function score increased after the combined group care intervention, with a significant difference between groups ($p < 0.05$).

Table 3. Comparison of lumbar function scores between the two groups [$\overline{x} \pm s$, points]

Grouping	Example count	Subjective symptoms		Clinical signs		Daily life is restricted	
		Before nursing	After care	Before nursing	After care	Before nursing	After care
Joint group	40	5.21 ± 1.09	7.31 ± 1.52	2.44 ± 0.53	4.23 ± 0.91	8.22 ± 1.46	11.49 ± 2.03
Control group	40	5.23 ± 1.13	6.08 ± 1.14	2.46 ± 0.57	3.64 ± 0.86	8.20 ± 1.51	9.78 ± 1.54
t		0.081	4.094	0.163	2.980	0.060	4.244
p		0.936	0.000	0.871	0.004	0.952	0.000

4. Discussion

LDH is a spinal surgical condition with a relatively high incidence rate. Its pathological manifestations include nerve root compression and lumbar disc degeneration. Patients commonly experience persistent and severe low back pain, which significantly impairs their daily functioning. At present, Western medical treatment for this condition primarily involves oral medications such as muscle relaxants and nonsteroidal anti-inflammatory drugs (NSAIDs), which take effect relatively quickly and can rapidly alleviate pain symptoms [3,4]. However, these medications carry a high risk of dependency and are associated with a significant relapse rate upon discontinuation. To enhance long-term clinical outcomes, patients with this condition typically receive nursing care services. Through structured rehabilitation exercises and personalized health guidance, these interventions gradually restore lumbar spine function and shorten the duration of LDH. However, conventional care is generally not very feasible, produces slow results, and cannot provide long-term improvement in patients' conditions.

Traditional Chinese medicine classifies LDH under the category of "low back pain". Its pathogenesis involves deficiency of liver and kidney essence, Qi stagnation, and blood stasis. The pathological location is in the lumbar region. External factors include invasion by wind, cold, dampness, and heat, as well as excessive fatigue. Internal factors stem from inadequate nourishment of the lumbar region, insufficiency of kidney essence, and obstruction of

collaterals [5]. The combined effects of these factors can impair kidney function, thereby damaging the tendons and meridians in the lower back. This leads to stagnation of Qi and blood, ultimately triggering the disease. Based on this, the intervention principles for LDH include relaxing tendons and unblocking meridians, as well as promoting blood circulation and resolving blood stasis. Ear acupressure with seeds and Chinese herbal poultice application are both commonly used distinctive TCM nursing techniques. Among these, ear acupressure with seeds is a safe, feasible, and convenient non-invasive nursing method. It stimulates the Shenmen acupoint and subcortical regions, inducing sensations such as soreness, distension, and numbness at the acupoints. This stimulation of ear acupoints facilitates the unblocking of meridians, regulates organ functions, dispels dampness and cold, and promotes the circulation of Qi and blood [6]. Herbal pouches integrate the efficacy of traditional Chinese medicine with thermal therapy. When applied as a heat pack to the lower back, the pouch facilitates transdermal absorption of herbal ingredients into the body, enabling consistent therapeutic effects.

Results showed that sleep quality scores and pain neurotransmitter levels decreased after the combined care intervention, with $p < 0.05$ between the two groups. The mechanism involves ear acupuncture seeds exerting sustained stimulation on nerve endings in the auricular region, thereby generating nerve impulses that transmit signals to various body parts. This induces physiological responses, activating the pain regulation system and exerting analgesic effects through neural reflex mechanisms, ultimately alleviating sleep disturbances caused by pain symptoms [7,8]. The auricular region features a dense network of blood vessels and lymphatics, forming vascular and lymphatic plexuses that connect to spinal nerves and cerebral cortex areas. Stimulating auricular points can influence these neural pathways, enhancing neurological function. This inhibits signal transmission in lumbar nerves, alleviating symptoms associated with LDH and improving patients' sleep quality. Chinese herbal poultice therapy utilizes the warming stimulation to facilitate the penetration of herbal components into tissues, regulating blood circulation in the lumbar region, improving the flow of Qi and blood, and alleviating pathological manifestations such as Qi and blood stagnation. The application of heat and pressure further promotes blood circulation, disperses stasis, warms meridians, and unblocks channels, thereby reducing muscle spasms and relieving pain sensations. Furthermore, the warmth helps maintain balance between the parasympathetic and sympathetic nervous systems, thereby relaxing the body and promoting faster sleep onset for patients. In the composition of Chinese herbal medicine packets, Sichuan Achyranthes root (Chuan Niuxi) nourishes the liver and kidneys; Ligusticum root (Chuanxiong) promotes blood circulation, strengthens tendons and bones, and directs the action downward; Angelica root (Duhuo) dispels dampness and alleviates pain; Fangfeng dispels wind and cold; Fengxian Tougucao alleviates pain, disperses stasis, and promotes blood circulation to relax tendons; Guizhi and Qianghuo eliminate dampness, relieve pain, and disperse cold; Shenjincao and Weilingxian unblock meridians to relieve pain; Honghua Schizonepeta reduces swelling and alleviates pain. The combined use of these herbs nourishes the liver and kidneys, promotes blood circulation, and alleviates pain. Coupled with the localized heating effect from warm compresses, this treatment regulates microcirculation in the lumbar region, accelerates the absorption of hematomas and exudate, thereby reducing pain intensity and improving sleep quality for patients.

The lumbar function scores increased after combined group therapy, with a statistically significant difference between the two groups ($p < 0.05$). This improvement stems from the fact that the auricular acupoints selected for seed pressure therapy are all related to the lumbar region. The stimulation generated by pressing Wangbuluxing seeds regulates Qi and blood circulation while balancing Yin and Yang. This enhances blood flow to the lumbar area, increases nutrient supply, and consequently strengthens lumbar vertebral function. The herbal composition of traditional Chinese medicine poultices includes Sichuan cow knee, which contains

polysaccharides and sterols that promote the effective synthesis of collagen and proteoglycans, thereby repairing intervertebral discs. Sichuan lovage contains components such as ligustilidine, which effectively dilates blood vessels, regulates microcirculation in the lumbar disc region, and inhibits platelet aggregation. It also exhibits anti-neuroinflammatory effects, alleviating symptoms of nerve root edema. Angelica pubescens contains volatile oils and coumarins, which possess sedative and anti-inflammatory properties while reducing prostaglandin synthesis. *Saposhnikovia divaricata* contains components such as saponins, offering anti-inflammatory, analgesic, and antipyretic effects alongside immune-modulating functions. *Impatiens capensis* contains phenylpropanoid and flavonoid components that reduce the synthesis of substances such as prostaglandin E2 and cyclooxygenase-2, thereby inhibiting the expression of inflammatory mediators and exerting anti-inflammatory and analgesic effects. Additionally, this herb enhances tissue permeability, allowing active components from other Chinese herbal medicines to fully penetrate joints, ligaments, and other tissues. It also dilates blood vessels to improve blood supply, thereby alleviating tissue hypoxia or ischemia. Cinnamon twig contains components such as cinnamaldehyde, which exhibits anti-inflammatory and anti-allergic properties. Notopterygium contains volatile oils and other active constituents that reduce the secretion of inflammatory mediators, thereby exerting anti-inflammatory effects. *Scutellaria baicalensis* relaxes skeletal muscles, alleviating symptoms such as muscle spasms. *Dictamnus dasycarpus* relaxes smooth muscles and improves cartilage metabolic function. Safflower contains components such as crocin and hydroxycrocin A, which can inhibit platelet aggregation and enhance fibrinolytic activity. This reduces blood viscosity and regulates blood circulation around the lumbar intervertebral discs. Additionally, safflower can significantly scavenge free radicals and prevent oxidative stress, thereby protecting lumbar disc cells and improving lumbar mobility [9]. Schizonepeta has mild antispasmodic effects and can alleviate pain symptoms.

5. Conclusion

In summary, ear acupuncture combined with herbal poultice therapy demonstrates favorable outcomes for LDH patients. This approach effectively alleviates pain symptoms while simultaneously improving sleep quality and lumbar spine function, highlighting its significant therapeutic value.

Disclosure statement

The authors declare no conflict of interest.

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