THE EFFECTIVENESS OF LASER ACUPUNCTURE COMBINED WITH ACUPRESSURE MASSAGE IN PATIENTS SUFFERING FROM LOW BACK PAIN DUE TO SPONDYLOSIS

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Abstract

Objectives: To evaluate the effectiveness of laser acupuncture (LA) combined with acupressure massage in treating low back pain, focusing on pain intensity, functional disability, and lumbar range of motion. ***Methods:*** An uncontrolled, randomized, clinical trial was conducted to compare the effectiveness before and after treatment in 30 volunteered patients aged ≥ 38 diagnosed with low back pain due to spondylosis, regardless of gender or occupation, at the Traditional Medicine Department, Military Hospital 103. ***Results:*** Combining the LA method with acupressure massage showed good effectiveness, with a success rate of 96.7%. The pain level, according to the Visual Analogue Scale (VAS), improved significantly after 14 days of treatment, decreasing from an average of 5.4 ± 1.886 to 1.17 ± 1.234 ($p < 0.05$). The lumbar spine expansion and daily activity limitation measured by the Oswestry Disability Index (ODI) significantly improved. ***Conclusion:*** The treating method using LA combined with acupressure massage has been proven to be an efficient adjunct therapy in treating low back pain due to spondylosis.

Keywords: Laser acupuncture; Acupressure massage; Low back pain; Spondylosis; Lumbar spine degeneration.

INTRODUCTION

Low back pain is a pain syndrome characterized by the compression or irritation of nerve roots in the lumbar region of the spine, with an average prevalence in the general population ranging from 5 - 10%. According to Christopher E Alexander (2025), this syndrome is the leading cause of disability among individuals aged 45 and older in developed countries [1].

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The symptoms include lower back pain that radiates down the lower extremities along the compressed nerve roots, accompanied by numbness and burning sensations along the sciatic nerve pathway [2].

From a traditional medicine perspective, low back pain due to spondylosis is described within the scope of "Bi syndrome" with the disease name "Yao Tong". Treatment in traditional medicine includes both pharmacological and non-pharmacological methods such as acupuncture, electroacupuncture, hydro-acupuncture, acupressure massage, moxibustion, and qigong. In recent years, the integration of traditional and modern medicine has garnered increasing attention, with more combined techniques being applied, including LA. LA is becoming a reliable treatment method by leveraging the biological stimulation effects of laser light combined with acupuncture point theory according to traditional medical theory, which unblocks meridians, harmonizes Qi, and relieves pain. However, there is still insufficient evidence to evaluate the efficacy of this method, so we conducted the research to: *Assess the effectiveness of the laser method combined with acupressure massage to treat low back pain due to spondylosis.*

MATERIALS AND METHODS

1. Subjects

Including 30 patients aged ≥ 38 years, regardless of gender or occupation, diagnosed with low back pain due to spondylosis came for examination and treatment at the Traditional Medicine Department, Military Hospital 103. In traditional medicine, patients were diagnosed with "Yao Tong" due to liver and kidney Ying deficiency. Patients voluntarily participated and complied with the treatment regimen and did not apply other treatments during the period, which comprised data related to the 6-month period from June 2024 to December 2024.

* *Exclusion criteria:* Patients with a history of allergies; pregnant women; spinal tuberculosis; cancer; surgical indications or severe chronic diseases (liver, kidney, heart failure, severe hypertension, diabetes, etc.).

* *Criteria for treatment discontinuation:* Patients who refused to continue; did not adhere to treatment, or experienced side effects (increased pain, skin redness, itching, burning, etc.).

* *Research materials:* Laserneedle touch (manufactured and developed by the Laserneedle GmbH Company of the Federal Republic of Germany, consisting of 10 laser emitters, including 7 red light emitters with a wavelength of 658nm and 3 blue light emitters with a

wavelength of 405nm); measuring tape; VAS; ODI questionnaire.

2. Methods

* *Research design:* An uncontrolled, randomized, clinical trial comparing effectiveness before and after the treatment.

* *Research sample size:* 30 patients.

* *Procedure:*

- Clinical examination and imaging (X-ray of the lumbar spine).

- Patient selection.

- Treatment protocol:

+ LA: 1 time a day, continuous for 15 minutes in 14 days (except Saturday and Sunday). Using eye protection glasses for both patients and medical staff. Acupuncture formula: Ashi point, Jiaji L4-L5, Jiaji L5-S1, Weizhong (bilateral). Using 7 red light emitters with a wavelength of 658nm at a frequency of 935.5Hz and a power density of 4.07 W/cm^2 for 15 minutes.

+ Acupressure massage: According to the Traditional Medicine Technical Process of The Ministry of Health in 2013, these movements include rubbing, squeezing, rolling, pressing, acupressure, distribution, and lumbar spine exercise. 1 time a day for 15 consecutive minutes in 14 days (except Saturday and Sunday).

- The indicators are monitored and evaluated before treatment and at D7 and D14.

- Observing any side effects.

* *Research criteria:*

General characteristics of the research subjects include age, gender, occupation, and duration of pain.

Clinical criteria: Conducting evaluation at the time D0, D7, and D14.

- Evaluating the level of pain according to the VAS. The VAS score from 1 - 10 according to the level of pain: The patient was selected with $3 \leq VAS \leq 8$.

- Measurement of lumbar spine expansion (Schober's test) is classified into 4 levels: Good, fair, moderate, and poor. Normally, the daily index ranges from 14 - 16cm, a measurement of less than 14cm is considered abnormal.

- Assessment of daily activity limitation using the ODI questionnaire: This consists of 10 questions evaluating the extent of daily activity limitation in patients diagnosed with low back pain. The assessment focuses on 8 out of 10 activities: Pain intensity, self-care, lifting, walking, sitting, standing, sleeping, and social activities. Each activity is scored from 0 - 5, with a total score ranging from 0 - 40. A higher score indicates greater impairment in daily functioning. The functional limitation index is calculated based on the Oswestry Disability:

ODI% = (Actual score / Theoretical score) * 100%

- Clinical symptoms in traditional medicine: Irritability, hot flashes, wiry pulse, red tongue, and yellow coating.

- The overall effectiveness of the treatment was based on the comparison of the total scores (VAS, Schober index, and ODI) before and after treatment.

* *Statistical analysis:*

The data analysis in this study was conducted using SPSS version 27.0. The results are shown in the form of average value ± standard deviation and percentage. The Nonparametric Wilcoxon matched-pairs signed-rank Test and Friedman Test were used at each time point compared to D0. The research results are considered statistically significant when $p < 0.05$.

3. Ethics

The research complied with all regulations and has been approved for use and publication according to the instructions of the Traditional Medicine Department, Military Hospital 103. Patient personal information is used exclusively for research purposes. The authors declare to have no conflicts of interest in the research.

RESULTS

1. General characteristics of the research subjects

Table 1. General characteristics of the research subjects.

Criteria		Frequency (n)	Percentage (%)
Sex	Female	17	39.4
	Male	13	51.5
Age (year)	< 40	4	13.3
	40 - 59	18	66.7
	≥ 60	6	20
	Average age (year, $\overline{X} \pm SD$)	60.37 ± 11.19	
Duration of pain (month)	≤ 3	5	16.7
	3 - 6	7	23.3
	≥ 6	18	60
Occupation	Manual labor	19	63.3
	Intellectual labor	11	36.7

The study included 30 patients, consisting of 17 females and 13 males. The average age was 60.37 ± 11.19, ranging from 36 - 75 years old. The highest disease prevalence was observed in the 40 - 59 age group, accounting for 66.7%. The majority of affected individuals were manual laborers. 60% of patients had been suffering from the disease for more than 6 months.

2. Evaluation of treatment effectiveness

Table 2. Classification of pain intensity.

Day	Pain levels (%)				p
	Severe pain	Moderate pain	Mild pain	No pain	
D0	36.7	43.3	20	0	
D7	0	33.3	53.4	13.3	< 0.001
D14	0	3.3	46.7	50	< 0.001

The changes in pain intensity occurred early at D7 compared to D0 ($p < 0.05$). After 14 days of treatment, the pain intensity decreased markedly, with a statistically significant difference ($p < 0.05$).

Table 3. Changes in average VAS, Schober index, and ODI % before and after treatment.

Scale	D0 ($\bar{X} \pm SD$)	D7 ($\bar{X} \pm SD$)	D14 ($\bar{X} \pm SD$)	p
VAS	5.4 ± 1.886	2.8 ± 1.919	1.17 ± 1.234	< 0.001
Schober index (cm)	13.15 ± 0.464	13.75 ± 0.548	14.38 ± 0.741	< 0.001
ODI (%)	66.4 ± 18.226	42.75 ± 19.79	26.75 ± 11.27	< 0.001

The average VAS score and ODI % showed a decreasing trend over the follow-up period, whereas the average Schober index gradually rose. The differences between the pre-treatment time point (D0) and the post-treatment time points (D7, D14) were statistically significant ($p < 0.05$).

Table 4. Changes in Schober Index before and after treatment.

Schober index (cm)	D0		D7		D14		p
	n	%	n	%	n	%	
≥ 14/10 - 16/10	0	0	1	3.3	17	56.6	< 0.001
≥ 13/10 - 14/10	8	26.7	17	56.7	11	36.7	< 0.001
≥ 12/10 - 13/10	13	43.3	8	26.7	2	6.7	< 0.001
< 12/10	9	30	4	13.3	0	0	< 0.001

Before treatment, lumbar spine expansion assessed by the Schober test was classified as moderate and poor in 73.3% of patients. After 7 days, this rate decreased to 40%, and by the end of the treatment period, no patients had poor lumbar spine expansion.

Table 5. Changes in clinical symptoms before and after treatment.

Symptoms	D0		D7		D14	
	n	%	n	%	n	%
Irritability	22	73.3	9	30	0	0
Hot flashes	17	56.7	11	36.7	3	10
Wiry pulse	25	83.3	16	53.3	7	23.3
Red tongue, yellow coating	20	66.7	13	43.3	5	16.7

Before treatment, many patients exhibited the four characteristic symptoms of liver and kidney Yin deficiency. The symptoms improved significantly after 14 days, with no patient continuing to show irritability.

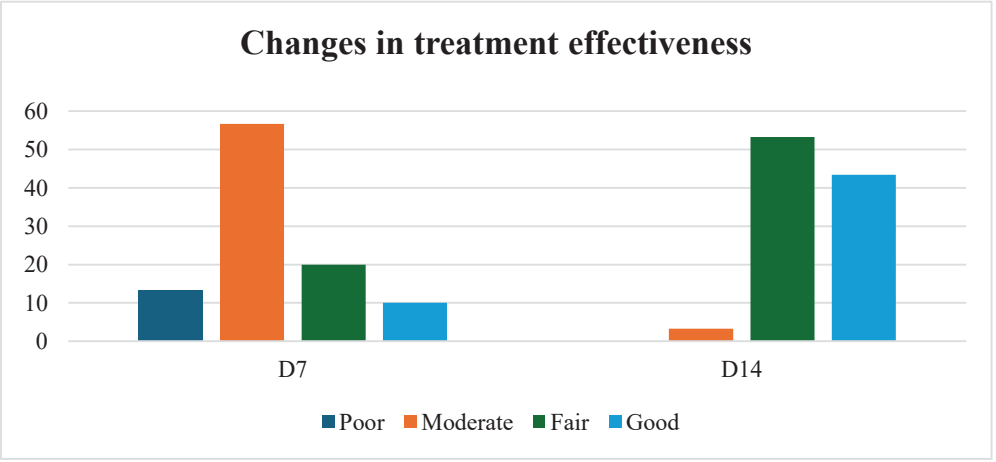

Chart 1. Overall treatment effectiveness.

Overall, treatment effectiveness after 7 days demonstrated a positive change, with 30% of the total patients achieving outcomes of fair and better. This rate increased to 96.7% after 14 days of treatment, and no patients had poor treatment outcomes.

DISCUSSION

Our study recorded a female proportion of 51.5%, which is 1.3 times higher than the male proportion (39.4%). Many studies indicate that women have a higher rate of spondylosis than men due to the effects of pregnancy and hormonal changes after menopause, leading to an estrogen deficiency that reduces calcium absorption - an important component in the structure of the spine. This finding is consistent with Davide Bizzoca's study (2023), which showed that the higher disease incidence in women is due to hormonal changes (estrogen and progesterone) during menstruation and pregnancy or to anatomical differences that may cause biological changes in the spine and pelvis, thereby increasing the likelihood of lower back pain [3].

The average age of the research patients was 60.37 ± 11.19, with 80% being under 60. This suggests that spondylosis is commonly observed among middle-aged workers. According to traditional medicine, when individuals over 40 years begin to enter a stage of senescence, the body's vital energy starts to decline, which results in Kidney Qi deficiency, accompanied by a gradual reduction of original Qi and weakened function of the internal organs (including the spleen, stomach, and kidneys). This decline leads to insufficient nourishment of the musculoskeletal system, which is a major contributor to the aging process of cartilage, joints, and ligament tissues.

All occupations can be affected by lumbar spine degeneration. According to our study, manual laborers exhibited a higher disease prevalence compared to intellectual workers, at 63.3% and 36.7%, respectively. This result is consistent with Jan Hartvigsen's study (2018) [4]. Manual laborers often engage in prolonged, heavy physical work and adopt improper postures, which lead to structural changes in the spine. These changes accelerate musculoskeletal degeneration, resulting in pain, muscle stiffness, and spinal deformity.

For patients with low back pain due to lumbar spine degeneration, pain is the most prominent and bothersome symptom, affecting daily activities, work, and quality of life, prompting them to seek medical care. Lumbar pain triggers a reflex contraction of the lumbar muscles, and as these muscles contract, the pain intensifies. When pain

is accompanied by stiffness in the paraspinal muscles, it further restricts lumbar spine mobility. Therefore, pain relief is the primary goal of treatment. Before treatment, we recorded that 43.3% of patients experienced moderate pain, and 36.7% experienced severe pain. After treatment, 50% of patients were pain-free, and none experienced severe pain. The average VAS score was 5.4 ± 1.886 before treatment and decreased to 1.17 ± 1.234 after 14 days - a statistically significant reduction ($p < 0.05$). These findings are consistent with the study by Do Thi Kim Ngan (2021), with the average VAS score after 20 days of treatment was 0.8 ± 0.6 [5]. Thus, the combination of LA and acupressure massage demonstrated clinically significant pain reduction. The analgesic mechanism of LA has been demonstrated through the biostimulatory effect of the photobiological reaction. LA is believed to influence the function of connective tissue cells (fibroblasts), accelerate connective tissue repair, and act as an anti-inflammatory agent by reducing prostaglandin synthesis. As the body absorbs the laser energy, cellular response processes are reorganized, resulting in several positive effects, including peripheral nerve blockade, inhibition of central synaptic nerve activity, modulation of central neurotransmitters, reduction of muscle spasm and edema, and enhancement of anti-inflammatory action. This aligns with the findings of Yousefi-Nooraie et al. (2008), which demonstrated that low-level laser therapy (LLLT) is beneficial in reducing pain and improving disability in patients with subacute or chronic nonspecific low back pain [6]. Moreover, acupressure massage, a form of physical stimulation applied directly to the skin, muscles, and sensory receptors, produces positive effects on multiple systems such as skin, muscles, tendons, joints, nervous system, circulatory system, digestive system, respiratory system, and metabolic processes. It enhances blood vessel and nerve activity in the skin, improves muscle nutrition, reduces muscle spasms, promotes muscle relaxation, increases the elasticity of tendons and ligaments, dilates peripheral blood vessels, improves local blood supply and oxygenation, alleviates tissue inflammation and edema, and promotes the secretion and circulation of joint synovial fluid. All of which are beneficial for managing musculoskeletal disorders.

Pain significantly affects daily life, with up to 80% of research subjects being assessed as having a moderate and poor quality of life. Consequently, rapidly and effectively addressing pain symptoms is the foremost priority for doctors.

CONCLUSION

A combination of LA and acupressure massage to treat low back pain due to spondylosis demonstrated good treatment effectiveness in terms of pain level, Schober index, and daily living function after 14 days of treatment. No adverse side effects were reported during the study.

REFERENCES

1. Alexander CE, et al. Lumbosacral radiculopathy: Treasure Island (FL) with ineligible companies. *StatPearls*. 2025.

2. Berry JA, et al. A review of low back pain, diagnosis, and treatment. *Cureus*. 2019; 11(10):5934.

3. Bizzoca D, et al. Gender-related issues in the management of low-back pain: A current concepts review. *Clin Pract*. 2023; 13(6):1360-1368.

4. Hartvigsen J, et al. What low back pain is and why we need to pay attention. *Lancet*. 2018; 391(10137):2356-2367.

5. Ngan DTK. Danh gia tac dung dieu tri cua phuong phap laser cham tren benh nhan hoi chung that lung hong do thoai hoa cot song. *Luan van thac si Y hoc*. Dai hoc Y Ha Noi. 2021.

6. Yousefi-Nooraie R, et al. Low level laser therapy for nonspecific low-back pain. *Cochrane Database Syst Rev*. 2008; 2008(2):5107.