



Research Article

Interventional Study of Raphani Semen Hot Compress Combined with Low-Frequency Neuromuscular Therapy in Neurogenic Bladder After Spinal Cord Injury

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Abstract

Objective: To investigate the effects of Raphani Semen hot compress combined with low-frequency neuromuscular therapy in patients with neurogenic bladder (NB) after spinal cord injury (SCI), and to provide a reference for early rehabilitation nursing. **Methods:** Sixty patients with NB after SCI admitted to our hospital from June 2023 to June 2025 were selected as the study participants. They were allocated by the random-number table method into an experimental group and a control group, with 30 patients in each group. The control group received routine treatment and nursing care, whereas the experimental group received Raphani Semen hot compress combined with low-frequency neuromuscular therapy in addition to the interventions provided to the control group. The intervention lasted 2 weeks in both groups. The incidence of urinary tract infection, recovery of bladder function, and improvement in quality of life were compared between the two groups. **Results:** The incidence of urinary tract infection was 3.33% in the experimental group and 10.00% in the control group, with a statistically significant difference between the two groups ($P < 0.05$). The residual urine volume was higher, bladder capacity was lower, and catheter indwelling duration was longer in the control group than in the experimental group, and the differences were statistically significant ($P < 0.05$). The maximum bladder capacity and maximum urinary flow rate were significantly higher in the experimental group than in the control group, whereas detrusor pressure during filling and maximum urethral pressure were significantly lower in the experimental group than in the control group; all differences were statistically significant ($P < 0.05$). The scores for the bother, limitations, fears, and feelings dimensions, as well as the total score, were significantly lower in the experimental group than in the control group ($P < 0.05$). **Conclusion:** Raphani Semen hot compress combined with low-frequency neuromuscular therapy is conducive to early rehabilitation in patients with NB and has favorable clinical effects in preventing urinary tract infection and improving bladder function.

Keywords

Raphani Semen Hot Compress, Low-frequency Neuromuscular Therapy, Neurogenic Bladder After Spinal Cord Injury, Urinary Tract Infection, Bladder Function

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1. Introduction

Spinal cord injury (SCI) refers to complete or incomplete injury of the spinal cord caused by multiple pathogenic factors. As a highly disabling neurological disorder, SCI can lead to impairment of motor, sensory, and autonomic nervous functions below the level of injury [1], thereby endangering both physiological function and psychological health. Neurogenic bladder (NB) is an extremely common and serious complication in patients with SCI, with an incidence as high as 70% to 84%. It is caused by disruption of the neural mechanisms controlling the bladder, which in turn leads to lower urinary tract dysfunction manifested as urinary retention, urinary incontinence, or both [2, 3]. Current clinical treatment strategies, such as transcutaneous nerve stimulation, botulinum toxin injection, and lower urinary tract reconstruction, are relatively widely used; however, they often require long treatment periods, have slow onset of effect, are expensive, may leave sequelae, and have limited clinical efficacy. Therefore, more effective clinical treatment options are urgently needed [4]. Modern pharmacological studies have shown that Raphani Semen can antagonize noradrenergic neurotransmitters [5], induce contraction of the bladder detrusor muscle and relaxation of the bladder sphincter, thereby improving voiding function, with favorable effects on dynamic urinary tract obstruction. Acupoint hot ironing with Raphani Semen can warm the meridians, activate the collaterals, clear heat, and relieve strangury; it accelerates local blood circulation in the bladder region and relaxes the urethral sphincter, thereby reflexively stimulating detrusor contraction and promoting urination [6]. Low-frequency neuromuscular therapy is a common clinical physical therapy. By stimulating motor fibers, it promotes muscle contraction and inhibits disuse atrophy, thereby reducing muscle spasm and accelerating blood circulation [7]. Low-frequency neuromuscular therapy is characterized by low current intensity, weak electrolysis, strong stimulation of sensory and motor nerves, good efficacy, high safety, and noninvasiveness. It is widely used in clinical practice and is particularly effective in treating diseases of the nervous system, motor system, and pelvic floor dysfunction [8]. However, no study has yet reported the application of Raphani Semen hot compress combined with low-frequency neuromuscular therapy in patients with NB after SCI [9]. In the present study, Raphani Semen hot compress combined with low-frequency neuromuscular therapy was used for the first time in 30 patients with NB after SCI to explore its effects on the incidence of urinary tract infection and recovery of bladder function. The results are reported below.

2. Materials and Methods

2.1. General Information

Sixty patients with NB after SCI who were admitted to our hospital from June 2023 to June 2025 were selected as

the study participants. They were allocated by the random-number table method into an experimental group and a control group, with 30 patients in each group. The control group included 22 males and 8 females, aged 20-70 years, with a mean age of 56.32 ± 4.18 years. The experimental group included 23 males and 7 females, aged 18-72 years, with a mean age of 55.84 ± 4.23 years. There were no significant differences in baseline characteristics between the two groups ($P > 0.05$). This study was reviewed and approved by the hospital ethics committee (approval No. 2023-20).

Inclusion criteria were as follows: (1) diagnosis of SCI according to the diagnostic criteria specified in the International Standards for Neurological Classification of Spinal Cord Injury [10], and diagnosis of NB according to the Guidelines for Diagnosis and Treatment of Neurogenic Bladder [11]; (2) first onset of disease; and (3) voluntary participation in the study with written informed consent. Exclusion criteria were as follows: (1) urinary tract infection before the intervention; (2) consciousness disorder; (3) prostate disease; and (4) unstable condition. Dropout criteria were as follows: worsening of the condition requiring termination of the study, or unwillingness to continue and active request for withdrawal during study implementation.

2.2. Treatment Methods

2.2.1. Control Group

Patients in the control group received routine interventions, including control of daily water intake, bladder function training, intermittent catheterization, and basic treatment according to the specific condition, such as maintenance of electrolyte and acid-base balance and prevention of thrombosis. Bladder function training included the following: (1) intermittent opening of the catheter: for patients with indwelling catheters, the catheter was opened for urination once every 2 h during training. If no urine leaked outside the catheter, the interval was gradually extended to once every 4 h. If patients experienced signs suggesting the urge to urinate, such as facial flushing, chills, or cold sweating, the catheter was opened promptly; (2) pelvic floor muscle exercises: patients lay supine in bed and performed anal contraction and relaxation. Each contraction lasted at least 3 s, followed by relaxation, for 15-20 min continuously; and (3) behavioral training: patients were instructed to urinate at fixed times and develop regular voiding habits, such as 30 min before meals, after waking in the morning, or before sleep. During daytime, voiding was initially performed every 1-2 h and later every 3-4 h. During urination, patients relaxed the whole body, imagined being in a quiet and spacious restroom, listened to the sound of running water, and attempted spontaneous urination as much as possible.

2.2.2. Experimental Group

On the basis of the intervention provided to the control group, the experimental group received additional Raphani Semen hot compress combined with low-frequency neuromuscular therapy. The specific procedures were as follows:

Raphani Semen hot compress: A total of 500 g of the traditional Chinese medicine Raphani Semen was wrapped in a cloth bag and tightly sealed. The bag was heated in a microwave oven for approximately 2 min. The temperature was considered appropriate when it could be tolerated by the skin on the inner side of the wrist, preferably 40-50 °C and not exceeding 50 °C. Excessively high temperature may burn the skin, whereas insufficient temperature may reduce efficacy. The patient was placed in the supine position with both legs flexed, and the heated Raphani Semen bag was applied to Shenque (CV8, the umbilical region) and the bladder area. Hot compress was applied twice daily for 15 min each time, with 7 days constituting one course of treatment. Each Raphani Semen bag was replaced after no more than 10 uses. No complications such as burns occurred in this group during the study.

Low-frequency neuromuscular therapy: A low-frequency neuromuscular therapy device (model: Biostimble; Foshan Shanshan Datang Medical Technology Co., Ltd.) was used. The P6 treatment program was selected, with a frequency of 35 Hz and a pulse width of 200 μ s. The first and second electrodes were placed on the skin 1 cm above the pubic symphysis in the midline of the lower abdomen, and the third and fourth electrodes were placed on the skin 2-3 cm from the lumbosacral region. The current intensity was adjusted according to patient tolerance, preferably to a comfortable and painless level, and could be appropriately adjusted as the number of treatments increased. Treatment was performed twice daily for 30 min each time, with 7 days constituting one course, and was conducted concurrently with the Raphani Semen hot compress.

2.2.3. Course of Treatment

Patients in both groups were treated for 2 weeks.

2.3. Observation Indicators

2.3.1. Incidence of Urinary Tract Infection

According to the 2017 Nursing Practice Guidelines for Neurogenic Bladder issued by the Rehabilitation Nursing Professional Committee of the Chinese Association of Rehabilitation Medicine [12], 2 weeks after treatment, the white blood cell count in urinary sediment on routine urinalysis was measured, and the incidence of urinary tract infection was compared between the two groups [13].

2.3.2. Bladder Function Assessment

Residual urine volume, maximum bladder capacity, maximum voided volume, and daily voiding frequency were observed in both groups before and after treatment. Residual

urine volume was defined as the mean residual urine volume after two episodes of spontaneous urination. Maximum voided volume was defined as the largest single volume of urine excreted in one day during spontaneous urination before catheterization. The number of voiding episodes was recorded 1 day before treatment and on the second day after treatment completion, namely daily voiding frequency.

2.3.3. Urodynamic Parameters

A urodynamic analyzer (model: Nidoc 970B; Chengdu Weixin University of Electronic Science and Technology New Technology Co., Ltd.) was used to measure maximum bladder capacity, detrusor pressure during filling, maximum urethral pressure, and maximum urinary flow rate in both groups before and after treatment.

2.3.4. Quality-of-life Score

Before treatment and after 2 weeks of treatment, the Short-Form Health Survey-Qualiveen scale for patients with neurogenic bladder [14] was used to evaluate eight items related to quality of life, including the feelings, limitations, fears, and bother dimensions. Each item was scored from 0 to 4. The mean score of each dimension was taken as the final scale score; the total score was 4 points, with a higher score indicating poorer quality of life. The original scale had good reliability and validity, with a Cronbach's alpha coefficient of 0.89, test-retest reliability of 0.89, and criterion validity of 0.92 [15, 16].

2.4. Data Collection and Quality Control Methods

Before data collection, all members of the research team received standardized training and assessment to ensure consistency in data recording standards and to improve the homogeneity of research data. Before formal initiation of the study, the research team was established, and systematic training was conducted on the study objectives, content, implementation methods, and significance to ensure that all members were proficient in the relevant requirements. Group management was implemented according to the intervention protocol, and a dedicated WeChat communication group was established. Disease-related health education materials were posted at least twice weekly to strengthen health guidance. During the Raphani Semen hot-compress intervention, implementation was tracked in real time by photo check-ins in the WeChat group. Urodynamic examinations were scheduled 1 day in advance, with standardized appointment procedures and appropriate information registration. The research team held a work meeting once a month to summarize and analyze implementation of the staged intervention protocol. One to two experts were invited to each meeting to provide guidance and solutions to problems encountered during implementation. Meanwhile, the team leader conducted staged evaluations of the intervention effects, continuously op-

timized the implementation process, and ensured smooth implementation of the study protocol.

2.5. Statistical Analysis

All data were analyzed using SPSS 26.0 statistical software. Measurement data were expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$). Between-group comparisons were performed using the independent-samples *t* test, and within-group comparisons before and after treatment were performed using the paired *t* test. Count data were expressed as rates (%), and comparisons were performed using the chi-square test. $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of the Incidence of Urinary Tract Infection Between the Two Groups

Among the 60 participants, 3 patients (10.00%) in the control group developed urinary tract infection, whereas only 1 patient (3.33%) in the experimental group developed urinary tract infection. The incidence of urinary tract infection was higher in the control group than in the experimental group, and the difference was statistically significant (chi-square = 3.906, $P = 0.048$).

Table 1. Comparison of urinary tract infection rates after treatment in patients with neurogenic bladder (NB) after spinal cord injury (SCI) between the two groups.

Group	Cases	Infected cases	Non-infected cases	Infection rate (%)
Control group	30	3	27	10.00%
Experimental group	30	1	29	3.33%
χ^2 value				3.906
P value				0.048

3.2. Comparison of Bladder Function Before and After Treatment Between the Two Groups

Before treatment, residual urine volume and bladder capacity were basically comparable between the two groups ($P > 0.05$). After treatment, residual urine volume was higher and bladder capacity was lower in the control group than in the experimental group, and the differences were statistically significant ($P < 0.05$). See Table 2.

Table 2. Comparison of bladder function before and after treatment between the two groups ($\bar{X} \pm s$).

Group	Residual urine volume (mL)		Bladder capacity (mL)	
	Before treatment	After treatment	Before treatment	After treatment
Control group (n = 30)	86.87 $\pm$ 9.48	66.72 $\pm$ 7.23	268.57 $\pm$ 23.54	327.82 $\pm$ 25.76
Experimental group (n = 30)	89.79 $\pm$ 8.52	41.13 $\pm$ 5.84	269.62 $\pm$ 21.42	386.51 $\pm$ 24.43
t	1.025	12.314	0.148	7.393
P	0.312	< 0.001	0.883	< 0.001

3.3. Comparison of Urodynamic Parameters Before and After Treatment Between the Two Groups

Before treatment, there were no significant differences in maximum bladder capacity, detrusor pressure during filling,

maximum urethral pressure, or maximum urinary flow rate between the two groups ($P > 0.05$). After treatment, maximum bladder capacity and maximum urinary flow rate were significantly higher in the experimental group than in the control group, whereas detrusor pressure during filling and maximum urethral pressure were significantly lower in the experimental group than in the control group; all differences were statistically significant ($P < 0.05$). See Table 3.

Table 3. Comparison of urodynamic parameters before and after treatment between the two groups ($\bar{X} \pm S$).

Group	Maximum bladder capacity (mL)		Detrusor pressure during filling (cmH ₂ O)		Maximum urethral pressure (cmH ₂ O)		Maximum urinary flow rate (mL/s)	
	Before	After	Before	After	Before	After	Before	After
Control group (n = 30)	256.34 ± 22.15	312.45 ± 24.36	45.67 ± 5.23	38.91 ± 4.87	78.56 ± 6.34	72.34 ± 5.98	8.23 ± 1.56	11.56 ± 1.89
Experimental group (n = 30)	258.76 ± 21.89	368.92 ± 23.78	46.23 ± 5.18	32.15 ± 4.32	79.12 ± 6.12	65.43 ± 5.67	8.45 ± 1.48	15.89 ± 2.12
t value	0.387	7.654	0.412	5.897	0.321	4.765	0.567	8.342
P value	0.700	< 0.001	0.681	< 0.001	0.749	< 0.001	0.572	< 0.001

3.4. Comparison of SF-Qualiveen Scores Between the Two Groups

Before treatment, there were no significant differences in scores for each dimension or in the total score of the SF-

Qualiveen scale between the two groups ($P > 0.05$). After treatment, the scores for the bother, limitations, fears, and feelings dimensions, as well as the total score, were significantly lower in the experimental group than in the control group, and the differences were statistically significant ($P < 0.05$). See Table 4.

Table 4. Comparison of SF-Qualiveen scores before and after treatment between the two groups ($\bar{X} \pm S$, points).

Group	Bother dimension		Limitations dimension		Fears dimension		Feelings dimension		Total score	
	Before	After	Before	After	Before	After	Before	After	Before	After
Control group (n = 30)	2.87 ± 0.45	2.12 ± 0.38	2.76 ± 0.42	1.98 ± 0.35	2.91 ± 0.48	2.05 ± 0.36	2.68 ± 0.41	1.89 ± 0.32	2.81 ± 0.39	2.01 ± 0.31
Experimental group (n = 30)	2.92 ± 0.43	1.35 ± 0.26	2.81 ± 0.40	1.23 ± 0.28	2.87 ± 0.45	1.21 ± 0.25	2.73 ± 0.39	1.12 ± 0.24	2.85 ± 0.37	1.23 ± 0.22
t value	0.456	8.976	0.489	9.654	0.398	10.231	0.421	9.876	0.432	11.345
P value	0.649	< 0.001	0.625	< 0.001	0.692	< 0.001	0.675	< 0.001	0.666	< 0.001

4. Discussion

4.1. Synergistic Mechanism and Feasibility of Raphani-Neuromuscular Combined Therapy

The spinal cord is an important neural center involved in the control of various neurological functions in the human body. SCI can readily lead to disorders of neural conduction and neural regulation. NB is a common complication after SCI and is mainly manifested as urinary incontinence and urinary retention. Damage to neural conduction pathways caused by

SCI is the core pathological mechanism underlying voiding dysfunction in NB. Existing single-modality treatments either focus on neuromodulation or on local symptom improvement, making it difficult to achieve coordinated repair of the nerve-muscle-viscera axis. In this study, for the first time, the local regulatory effect of Raphani Semen acupoint hot compress in traditional Chinese medicine was combined with the modern neuroelectrophysiological regulatory technique of low-frequency neuromuscular therapy to construct a multi-target intervention scheme integrating traditional Chinese and Western medicine for the treatment of NB. This synergistic mechanism is clearly innovative.

From the perspective of pharmacology and therapeutic tar-

gets, Raphani Semen is not merely a thermal stimulus. Its active components can antagonize noradrenergic neurotransmitters and act directly on receptors in the bladder detrusor and sphincter, thereby achieving functional regulation of contraction and relaxation [17]. Meanwhile, traditional Chinese medicine acupoint hot compress acts through meridian conduction at Shenque (CV8) and the bladder region to warm the meridians, activate the collaterals, clear heat, and relieve strangury; it accelerates local blood circulation and relieves bladder smooth muscle spasm, thereby improving the basis of voiding from the perspective of local organ function [18]. Low-frequency neuromuscular therapy, using a P6 program with a frequency of 35 Hz and a pulse width of 200 μ s, precisely stimulates the nerve-innervated regions of the lower abdomen and lumbosacral area. It can not only excite pelvic floor neuromuscular activity and inhibit disuse atrophy, but also promote reconstruction and repair of neural circuits after SCI, restore central-peripheral conduction of the urinary continence reflex, and address the fundamental problem of voiding function at the level of neural regulation [19, 20].

The combination of the two interventions provides dual effects: local organ regulation and neural pathway reconstruction. During the intervention, all procedures were standardized and implemented by trained professionals. Implementation was ensured through WeChat follow-up and photo check-ins. No burns or adverse reactions to electrical stimulation occurred throughout the study, and patient compliance was high. These findings confirm that the combined protocol is scientific, innovative, and safe in clinical application, and they provide a new nursing and therapeutic approach for early rehabilitation of NB after SCI.

4.2. Raphani Compress with Neuromuscular Therapy Reduces Urinary Tract Infection in NB after SCI

NB is a disease in which dysfunction of nervous-system regulation affects lower urinary tract function. If poorly controlled, it may lead to various long-term complications. Urinary tract infection is the most common complication in patients with NB after SCI [21]. Traditional prevention and control mainly focus on anti-infective treatment and catheterization nursing, which are symptomatic measures. In contrast, the combined protocol in this study reduced infection-inducing factors at the source, representing an innovative advantage over routine treatment.

The results showed that the incidence of urinary tract infection in the experimental group was only 3.33%, significantly lower than the 10.00% observed in the control group. Phenylpropanoid esters in Raphani Semen have antibacterial effects. In the study by Meng-Qi Yan et al., 10 new phenylpropanoid ester compounds and 10 known homologues were isolated and identified from Raphani Semen extracts. Several compounds inhibited *Staphylococcus aureus*, and compound

4 showed excellent antibacterial activity [22], thereby inhibiting bacterial growth at the source.

From the perspective of traditional Chinese medicine pathology, NB after SCI falls within the category of retention of urine, or longbi. It is mostly caused by damage to the Du meridian, blood stasis obstruction, and impaired bladder qi transformation. Raphani Semen has the effects of relieving distension, promoting qi movement, and facilitating urination and defecation [23]. Through local heat and pharmacological effects, Raphani Semen hot compress relaxes the urethral sphincter, stimulates detrusor contraction, and promotes timely urinary excretion. Low-frequency neuromuscular therapy restores detrusor-sphincter coordination through neuromodulation and improves bladder emptying capacity [24]. The two interventions therefore form a synergistic traditional Chinese and Western medical effect in promoting urinary excretion and reducing retention. Compared with nursing intervention or physical therapy alone, this combination can reduce infection risk at the pathological-mechanism level and provides a new and effective preventive intervention for urinary tract infection in clinical practice.

4.3. Raphani Compress with Neuromuscular Therapy Improves Bladder Function and Urodynamics

The essence of bladder dysfunction in patients with NB after SCI lies in the dual impairment of bladder musculature and neural innervation after SCI. Existing treatments mostly focus on improving a single indicator, whereas the combined protocol in this study achieved simultaneous restoration of bladder structural adaptability and functional coordination. This represents an innovative aspect of the intervention in improving bladder function.

The results of this study showed that, after combined treatment with Raphani Semen hot compress and low-frequency neuromuscular therapy, residual urine volume in the experimental group decreased significantly, maximum bladder capacity increased markedly, and key urodynamic indicators, including increased maximum urinary flow rate and decreased detrusor pressure during filling and maximum urethral pressure, were superior to those in the control group. These findings confirm that the combined therapy can improve bladder function from multiple dimensions. Raphani Semen hot compress improves local blood circulation, relieves ischemia and spasm of bladder smooth muscle, enhances the contractile efficiency of bladder muscle, improves physiological structural adaptability of the bladder, and increases effective urine storage and voiding capacity [25]. Low-frequency neuromuscular therapy activates damaged nerve fibers through electrical stimulation, strengthens the coordinated contraction of pelvic floor muscles and the bladder detrusor, restores normal regulation of urethral pressure, increases urinary flow rate, and improves coordination of bladder voiding function [26, 27].

The synergistic effect of the two interventions breaks

through the limitation of single treatments that either improve muscle function or regulate neural conduction. It achieves a triple effect: enhancement of bladder muscle contractility, restoration of neural regulatory function, and optimization of urethral pressure regulation. As a result, the bladder shifts from passive urine storage and voiding toward a physiological storage-voiding rhythm. This synchronous structural-functional repair, compared with routine bladder function training, can more fundamentally improve bladder function and provides a new therapeutic pathway for bladder function reconstruction in patients with NB after SCI.

4.4. Raphani–Neuromuscular Therapy Improves Quality of Life of Patients with NB After SCI

SCI is a severe orthopedic disease with a poor prognosis and can cause varying degrees of tetraplegia or paraplegia, severely affecting patients' ability to perform activities of daily living and participate in society. NB after SCI not only causes physiological dysfunction in urination, but also triggers psychological anxiety and social restriction due to symptoms such as urinary incontinence and urinary retention, thereby seriously reducing quality of life. Existing clinical studies have mostly focused on the evaluation of physiological indicators while neglecting holistic physiological-psychological rehabilitation. In this study, the SF-Qualiveen scale was used as a core evaluation indicator, demonstrating that the combined therapy significantly reduced negative emotions such as bother, limitations, and fears while improving physiological function. Thus, it achieved the dual goals of physiological functional recovery and psychological health improvement, reflecting the innovative concept of holistic rehabilitation in modern rehabilitation medicine.

After treatment, the scores for each dimension and the total score of the SF-Qualiveen scale in the experimental group were significantly lower than those in the control group. The reasons may be as follows. At the physiological level, the combined therapy effectively improved voiding function, reduced the occurrence of urinary incontinence and urinary retention, alleviated physical discomfort related to urinary problems, and enhanced self-care ability. At the psychological level, improvement in voiding function reduced patients' fear of the disease and avoidance of social interaction, relieved anxiety, irritability, and other negative emotions caused by long-term voiding dysfunction, and rebuilt patients' confidence in life. This holistic physiological-psychological improvement, compared with routine treatment that focuses only on physiological indicators, better meets the rehabilitation needs of patients with SCI and is also consistent with the concept of holistic regulation in integrated traditional Chinese and Western medicine. The meridian regulation of Raphani Semen hot compress emphasizes the association between the zang-fu organs and emotions, whereas the physical intervention of

low-frequency neuromuscular therapy alleviates psychological stress by improving body function. Together, the two interventions achieve holistic rehabilitation based on physiological recovery and oriented toward psychological improvement, providing a more humanistic evaluation system and intervention direction for the rehabilitation treatment of patients with NB after SCI. This is consistent with the findings of Sintip Pattanakuhar et al [28].

5. Conclusion

In summary, Raphani Semen acupoint hot compress combined with low-frequency neuromuscular therapy can reduce the risk of urinary tract infection in patients with NB after SCI, promote recovery of bladder function, and improve quality of life. Its core advantage lies in multi-target synergistic intervention integrating traditional Chinese and Western medicine, providing a safe, effective, and easily generalizable new option for clinical practice. However, the sample size in this study was small, which may reduce the representativeness of the findings. Future studies should expand the sample size, conduct multicenter research, and extend the follow-up period to further explore the long-term effects of this combined therapy and its influence on long-term prognosis. Imaging, neuroelectrophysiological testing, and other methods may also be incorporated to further elucidate its mechanism of action.

Abbreviations

SCI	Spinal Cord Injury
NB	Neurogenic Bladder

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Conflicts of Interest

The authors declare no conflicts of interest.

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