A Review Study of Acupuncture, Moxibustion, Tui-na Combined with Rehabilitation Training in the Treatment of Paraplegic Injuries

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Abstract: One of the common diseases in trauma surgery is spinal cord injury. Young adults are mainly the victims of this disease. Unpredictability, suddenness, accidental nature and high disability rate are the characteristics of this disease, which greatly affects the quality of life of patients and increases the burden of family members. In recent years, the incidence of accidents such as traffic accidents and falls from height has increased, and its prevalence is increasing year by year. A comprehensive study was conducted to investigate the differences in the efficacy of acupuncture and massage combined with rehabilitation training and the current international standard rehabilitation training for the recovery of paraplegia due to traumatic spinal cord injury (SCI), in order to explore a safe and effective combination of traditional and modern innovative rehabilitation treatment options for the clinical treatment of this disease. Both rehabilitation training and acupuncture and massage combined with rehabilitation training can improve SS, MS, ADL and CF in traumatic paraplegia patients; in the long term, acupuncture and massage combined with rehabilitation training can significantly improve ADL and CF in traumatic paraplegia patients, and the long term effect is better than the control group. Acupuncture and Tuina combined with rehabilitation training is a safe and effective treatment option for traumatic paraplegia.

1. Introduction

The spinal cord, as a low central nerve, is also a peripheral nerve center for sympathetic and parasympathetic nerves. Spinal cord injury not only weakens or even loses the feedback of the connections between the limbs, viscera and the brain, but also weakens or even loses the sympathetic and parasympathetic connections between the viscera (e.g., bladder, rectum, etc.) and the spinal cord [1]. Severe motor impairment makes it necessary for the vast majority of patients to obtain functional assistance in their daily lives, and the limitation and loss of basic life activities due to motor dysfunction is a major factor affecting patients' ability to care for themselves and their quality of life, as well as bringing a great burden of life to their families. How to repair the injured spinal cord, promote axonal regeneration after injury and restore the feasibility of motor function is an important element actively explored by scholars from various countries [2].

There is no historical breakthrough in the medications available for the treatment of recovering traumatic paraplegia. The primary treatment options for patients recovering from traumatic paraplegia are modern rehabilitation training, physical therapy and rehabilitation engineering interventions. Sitting up, standing, walking, transferring [3], wheelchair training and ADL training can significantly improve motor function and quality of life in patients recovering from traumatic paraplegia.

Relevant clinical statistical literature illustrates that approximately 55% of SCI patients exhibit functional incompleteness and that histological and MRI examinations show that 65% of patients who exhibit functional transverse injury have a small amount of tissue and axons that are exempt from damage at the site of injury [4].When the spinal cord is injured, functional reconstruction can be achieved by altering the synaptic transmission efficiency of existing pathways, forming new pathways through lateral sprouting and structural rearrangement, and activating undamaged nerve conduction pathways that existed before the injury and were functionally quiescent [5].The spinal cord receives sensory impulses from peripheral nerve receptors upward to the upper sensory centers and receives impulses from the upper centers, acting as a relay station for impulse transmission. In fact, the spinal cord itself has a function similar to that of the upper center in generating impulses. After a transverse injury to the thoracic spinal cord, the central plexus generator (CPG) of the thoracic spinal cord remodels its structure and function to elicit impulses and innervate the lower extremity muscles. Studies have confirmed that functional training can increase CPG plasticity changes.

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2. Selection of research subjects and experimental methods

2.1. Selection criteria

(1) Patients with traumatic paraplegia, classified as thoracic medulla (T3-L2), lumbar expansion (L1-S2), etc. that can lead to motor dysfunction of the lower extremities, with injuries at these spinal cord levels. (2) Age 18 to 70 years old. (3) Conscious and mentally normal, no serious heart, liver, or kidney disease, and no virulent infectious disease such as tuberculosis or hepatitis. (4) Have not received any other relevant treatment within the last two weeks. (5) Voluntary participation, can actively cooperate with the study and participate in the whole course of treatment. (6) Patients and their families signed the informed consent form and agreed to the treatment plan. Patients who do not meet all of the above 6 criteria will not be included.

2.2. Experimental method

The study was conducted using the randomized control principle, and cases were screened strictly according to the diagnostic, inclusion, and exclusion criteria described above, and random numbers were obtained to guide the completion of the trial after the total number of observed cases was determined.

All enrolled patients were divided into two groups according to the randomization allocation principle: Group A: treatment group, using acupuncture and massage combined with rehabilitation training treatment program; Group B: control group, using rehabilitation training treatment program. Parallel control was performed between the two groups.

3. Research Process and Treatment Protocols

3.1. Research Process

(1) Patient selection: meet the diagnostic criteria, inclusion criteria, exclusion criteria and sign the informed consent form.

(2) Envelope opening: After identifying the selected patients, complete the case observation registration form. The ASIA classification, ASIA sensory score, and ASIA motor score are performed first, then the level and degree of impairment is determined, the patient is grouped according to the randomized grouping scheme in the envelope and the patient's disposition is determined, all records are filled out completely, and all forms are properly managed [6].

(3) Clinical treatment: After the enrolled patients were completed, other rehabilitation assessments, such as MBI and FCA, were further refined. Treatment was carried out according to the treatment protocols of both groups. Record in detail any possible accidents and safety indicators during the treatment process. Complete case report forms consistently and accurately as required. Record discharges and rejections [7].

(4) Follow-up patients: Patients were evaluated for rehabilitation once before treatment, once at 1 month of treatment, once at 2 months of treatment, once at 3 months of treatment, and once at the follow-up visit, and the case observation form was filled out uniformly and accurately.

(5) Statistical analysis: Based on information data, timely completion of identification, statistics and analysis methods.

3.2. Treatment options

The control group used the current international rehabilitation training treatment program, and the treatment group used "acupuncture, moxibustion, and massage" combined with rehabilitation training treatment program [8].

4. Experimental results

4.1. Effect of "acupuncture and massage" combined with rehabilitation training on sensory and motor functions of traumatic paraplegic patients

The effects of acupuncture and massage combined with rehabilitation training on the sensory and motor functions of traumatic paraplegic patients and the comparison of acupuncture, light touch and motor scores between the two groups before and after treatment are shown in Table 1, Table 2 and Table 3.

Table 1. Comparison of acupuncture sensation scores between the two groups before and after treatment (X±s, points)

Group	Before treatment	1 month	2 months	3 months
Control group	76.24±15.76	82.34±14.12	83.52±14.98	83.61±14.81
Treatment group	74.97±10.58	79.59±12.91	81.12±12.90	81.76±13.01
T	0.625	0.659	0.512	0.485
P	0.562	0.498	0.569	0.681

Table 2. Comparison of light touch scores between the two groups before and after treatment (X±s, points)

Group	Before treatment	1 month	2 months	3 months
Control group	76.24±15.76	82.34±14.12	83.52±14.98	83.61±14.81
Treatment group	74.97±10.58	79.59±12.91	81.12±12.90	81.76±13.01
T	0.625	0.659	0.512	0.485
P	0.562	0.498	0.569	0.681

Table 3. Comparison of exercise scores between the two groups before and after treatment (X±s, points)

Group	Before treatment	1 month	2 months	3 months
Control group	55.32±14.89	63.02±17.38	64.35±19.03	65.97±19.38
Treatment group	56.48±13.36	61.29±16.01	62.83±16.11	63.25±15.76
T	0.219	0.523	0.498	0.629
P	0.849	0.612	0.529	0.531

As can be seen from Tables 1, 2, and 3: Within the two groups, the needle sensation score in the control group increased from 76.24±15.76 before treatment to 83.95±15.01 at follow-up, and the difference was statistically significant at paired t-test, P<0.05. The light touch score increased from 76.51±13.95 before treatment to 81.61±15.13 at follow-up, and the difference was statistically significant at paired t-test, P<0.05. The MS score increased from 55.32±13.89 before treatment to 65.97±19.38, and the difference was p<0.05 by paired t-test, which was statistically significant. At follow-up, the needle sensation score in the treatment group increased from 74.97±10.58 before treatment to 82.69±13.01, and the difference was statistically significant by paired t-test, p<0.05. The light touch sensation score increased from 73.95±12.03 before treatment to 81.72±13.25, and the difference was statistically significant by paired t-test, p<0. 05; MS increased from MS increased from 56.48±13.36 before treatment to 63.45±15.86, and the difference was statistically significant by paired t-test, P<0. 05, which means that the treatment was effective in both groups [9].

4.2. Effect of acupuncture and massage combined with modern rehabilitation on MBI and FCA scores in patients with traumatic spinal cord injury

MBI and FCA scores of the two groups before and after treatment.

Table 4. Comparison of MBI scores between the two groups before and after treatment (X±s, points)

Group	Before treatment	1 month	2 months	3 months
Control group	35.56±27.31	47.11±28.31	52.82±25.98	56.02±25.99
Treatment group	32.85±22.76	53.01±20.41	63.21±28.82	65.81±16.31
T	0.506	-0.802	-1.356	-1.342
P	0.579	0.869	0.972	0.925

Table 5. Comparison of FCA scores between the two groups before and after treatment (X±s, points)

Group	Before treatment	1 month	2 months	3 months
Control group	55.33±17.23	65.49±16.42	70.21±16.98	75.38±17.78
Treatment group	54.21±16.53	67.72±16.15	75.42±14.52	80.20±11.62
T	0.268	-0.048	-0.869	-1.031
P	0.814	0.969	0.391	0.298

As can be seen from Tables 4 and 5, within the two groups, the MBI of the control group increased from 35.56±27.31 before treatment to 58.12±26.01 at follow-up, and the difference was statistically significant at P<0.05 by paired t-test, while the FCA increased from 55.33±17.23 before treatment to 78.82±18.95 at follow-up, and the difference was statistically significant at P<0. 05 by paired t-test. statistically significant. At follow-up, the MBI in the treatment group increased from 32.85±22.76 before treatment to 69.21±14.58, and the difference was statistically significant by paired t-test, p<0.05. The FCA increased from 54.21±16.53 before treatment to 83.69±8.98, and the difference was statistically significant by paired t-test, p<0. 05; that is, the treatment was effective in both groups. However, the comparison of MBI and FCA between the two groups at several assessment time points was not statistically significant by two-sample t-test (P > 0. 05), so the improvement of ADL and FC in the treatment group was not better than that in the control group.

The MBI and FCA scores of each patient at different time points were connected to draw a trend diagram, and a three-level model with fixed measurement time was established. The optimal model was obtained by comparative analysis of deviance, and the Wald test was performed on each coefficient of the optimal model. The results showed that the differences between β3 (TT1) and β4 (BT1) of the optimal model were statistically significant (P < 0.05), indicating that both groups had a linear growth trend with the extension of time; the differences between β5 (T1*TT1) and β6 (B1*BT1) were statistically significant (P < 0.05), suggesting that the two groups had different growth trends with time, and the coefficients were positive, It indicates that the MBI and FCA values of the observation group increased more over time. This means that there was no difference in the near-term treatment effect between the two groups, but the long-term effect was better in the observation group.

Although acupuncture and massage combined with rehabilitation training for traumatic paraplegia is relatively safe, the indications and contraindications for acupuncture and massage should be strictly controlled. The characteristics of bilateral lower limb paralysis are completely different for people with different levels of injury in the thoracic medulla (T3-T12) and lumbar expansion (L1-S2), so the force and know-how of acupuncture and massage techniques should be strictly grasped according to the characteristics of different paralysis in pushing and pressing treatment. Different directions, angles and depths of needle entry, etc. should be

grasped during acupuncture according to the characteristics of each acupuncture point. Throughout the study, no significant abnormalities were seen in the laboratory tests before and after treatment in both groups, and no adverse reactions occurred in the acupuncture and tuina combined with modern and contemporary rehabilitation groups, the acupuncture and tuina combined with modern rehabilitation group and the modern rehabilitation group.

5. Conclusions

1. Analysis of the trend of index changes showed that as the treatment progressed, the five internationally recognized indexes of acupuncture, light touch, MS and MBI [10], and FCA began to produce effects in both groups at the end of one month of treatment, with the first three indexes rising to their peak at the end of three sessions and then entering a plateau; however, the last two indexes continued to increase linearly.

2. Both acupuncture and massage combined with rehabilitation training and rehabilitation training alone can improve SS, MS and ADL [11], FC in patients with traumatic paraplegia. however, there is no difference in the efficacy of these two methods compared over time on MS and SS scores.

3. Over time, acupuncture and massage combined with rehabilitation training could more significantly improve ADL and CF in patients with traumatic paraplegia [12], which was significantly better than the control group in terms of long-term treatment effects [13].

4. In conclusion, acupuncture and massage combined with rehabilitation training has very valuable clinical and theoretical values in the treatment of traumatic paraplegia patients, and is a simple, safe, innovative and effective treatment method combining Chinese and Western medicine [14].

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