

# Analysis on the Effect of Modified Taijiquan on Stroke Patients in Rehabilitation of Movement Function

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**Abstract: Objective:** To evaluate the effect of modified Taijiquan on rehabilitation of movement function in stroke patients. **Methods:** A total of 34 patients from Neurology and Rehabilitation Clinic or Hospitalized Patients from March 2016 to January 2017 were randomly divided into observation group and control group. The control group was treated with modern rehabilitation techniques, mainly using Bobath rehabilitation technique, which played a role in enhancing muscle strength and activating passive joints. The observation groups of 17 patients in the control group were given the modified Taijiquan rehabilitation exercise. Improved international standard routines Taijiquan include: starting, reeling brachial, hug kneeling, flock, wild horse mane, and cloud hand and so on. The safety of rehabilitation techniques was evaluated by recording the body temperature, respiratory rate, heart rate, blood pressure and other indicators. The therapeutic effect was evaluated by FMA scale and Berg balance scale. **Results:** After treatment with different rehabilitation techniques, the two groups of patients had different degrees of improvement. The FAM upper limb, lower limb, total score and Berg score of the observation group were significantly higher than those of the control group, the difference was statistically significant ( $P < 0.05$ ). **Conclusion:** The improved tai chi rehabilitation technique can significantly improve the limb function and balance ability of stroke patients, improve the quality of life and enrich the rehabilitation therapy of stroke hemiplegia patients.

**Key words:** improved Taijiquan; stroke; function; recovery; effect

Stroke or cerebrovascular accident (CVA) is a more common neurological disease. It has high morbidity and disability cases; the annual incidence of new patients were to the tune of millions of which nearly 70% to 80% of the patients due to disability loss the ability to live independently, seriously affecting the quality of life, as a result brought a heavier psychological and economic burden to the patients and their families<sup>1</sup>. Once the disease occurs, the patient's movement, feeling, swallowing, emotional control and other aspects will become obstacles. For stroke patients, movement

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dysfunction is the most direct factor in the ability to live and improve the quality of life, and movement disorders are not only on the side of the limb, its lower limb activity, trunk control and balance ability will also be affected.

Taijiquan as an important intangible cultural heritage of our country is one of the most popular physical training of middle-aged and old people. Its action is flexible and stable, and the rhythm is slow and coherent. As a whole, it is characterized by stretch and generous, relaxed and natural combined with hard and soft features<sup>2</sup>. The exercise entails the need to use ideas to guide the action, at the same time with the stability of the rhythm of breathing, the consciousness, action and breathing must be closely synchronized to achieve a spirit of relaxation and balance of the body. There are studies<sup>3</sup> that Tai Chi in the promotion of health has significant advantages; long-term regular tai chi practice can increase aerobic capacity, muscle strength, balance and will maintain a spirit of pleasure, improving also the quality of life. It also has a unique effect on the nervous system diseases, cardiovascular Disease, orthopedic diseases, chronic obstructive pulmonary disease and breast cancer. However, stroke patients are often accompanied by movement dysfunction; there is a certain degree of difficulty to complete the whole package of Tai Chi. This group of research on the basis and principle of strengthening the function of rehabilitation medicine attempts to modify tai chi action and to explore the modified Taijiquan stroke patients with movement function recovery effect.

## 1. Materials and methods

### 1.1. General information

In this study, patients in March 2016 ~ Jan 2017 in our hospital neurology and rehabilitation clinics or hospitalized patients totaled 34 cases. And 17 cases were divided into observation group and control group by randomized single-blind method. Observation group: 10 males, 7 females; aged 32 to 68 years old, the mean age ( $43.5 \pm 4.7$ ) years old; the total score of FMA ( $51.64 \pm 21.82$ ) and the total score of Berg ( $32.91 \pm 6.37$ ). The control group: 11 males, 6 females; aged 31 to 68 years old, the mean age was ( $42.8 \pm 5.1$ ) years; the total score of FMA ( $51.29 \pm 21.75$ ) and the total score of Berg ( $33.06 \pm 5.65$ ). There was no statistically significant difference between the two groups ( $P > 0.05$ ). All patients in this trial signed informed consent and were accredited by the hospital ethics.

Inclusion criteria: ① consistent with Chinese medicine stroke and Western diagnostic criteria for stroke, and the brain CT or MRI scan confirmed; ② the initial onset or previous episodes but with no neurological dysfunction; ③ post-onset vital signs tend to smooth within 6 months ; ④ with hemiplegia symptoms, but can stand alone.

Exclusion criteria: ① onset time in more than 6 months; ② there was no hemiplegia; ③ previous history of cerebral infarction, but the MRS score of more than 2 points; ④ heart, liver, kidney and other vital organs facing serious dysfunction; ⑤ associated with cognitive impairment or visually impaired persons; ⑥ accompanied by cervical lumbar spine, bone and joint movement diseases.

### 1.2 Treatment

The control group: to give modern rehabilitation techniques, the main application of Bobath rehabilitation technology, play a role in enhancing muscle strength, activate passive joints. 1 time / day, 5 times / week, adhere to training for 1 month.

Observation group: in the control group based on the improvement of taijiquan rehabilitation exercise, modified after the international standard Taijiquan include: starting, rewinding brachial, hug kneeling, flocking, wild horse mane, cloud hand and so on, each exercise lasts 1hr. As a result of stroke hemiplegia patients with different degrees of physical activity disorders through the modified Tai Chi exercise were guided by the professional trainers. Trainers who were familiar with the traditional tai chi mid-level rehabilitation division to guide but do not require patients in strict accordance with the tai chi action sequence and routine standards, only to maximize the completion of all sets of

routines of the standard posture, and thus promote physical function rehabilitation. 1 time / day, 5 times / week, adhere to exercise for 1 month.

### 1.3 Observe indicators

The safety and efficacy of the rehabilitation techniques were evaluated in the two groups. The safety of the rehabilitation technique was evaluated by recording the body temperature, respiratory rate, heart rate and blood pressure. The effect of the FMA scale and the Berg balance scale to evaluate, the higher the score, the better the treatment effect.

### 1.4 Statistical methods

All the valid data were analyzed by SPSS26.0 statistical software. The indexes of each group were expressed as mean  $\pm$  standard deviation ( $X \pm S$ ). The t test was used to check the data, X2 test was used for the difference,  $P < 0.05$  was significant and statistically significant.

## 2. Results

There were no significant differences in the upper limbs, lower limbs, total score and total score of FAM between the two groups before treatment. After treatment with different rehabilitation techniques, there were different degrees of improvement in the treatment group. Among the 17 patients of the observation group, the upper limbs, lower limbs, Berg was significantly higher than the control group, the difference was statistically significant ( $P < 0.05$ ), see Table 1.

Table 1 Comparison of FMA and Berg scores before and after treatment in both groups

Indicator	Group	n	Before treatment	After treatment	Difference
FMA Upper limb	Observation group	17	42.05 $\pm$ 14.27	52.05 $\pm$ 13.59	10.00 $\pm$ 5.35
	Control group	17	41.94 $\pm$ 15.66	45.23 $\pm$ 15.64	4.82 $\pm$ 3.56
FMA Lower limb	Observation group	17	20.91 $\pm$ 7.42	25.37 $\pm$ 7.43	4.58 $\pm$ 3.95
	Control group	17	20.17 $\pm$ 7.86	22.51 $\pm$ 6.84	2.74 $\pm$ 1.86
FMA Total	Observation group	17	51.64 $\pm$ 21.82	77.18 $\pm$ 19.45	12.62 $\pm$ 6.69
	Control group	17	51.29 $\pm$ 21.75	60.38 $\pm$ 20.47	7.48 $\pm$ 3.51
Berg Total	Observation group	17	32.91 $\pm$ 6.37	45.16 $\pm$ 6.45	9.57 $\pm$ 4.63
	Control group	17	33.06 $\pm$ 5.65	38.36 $\pm$ 5.72	5.29 $\pm$ 3.60

## 3. Discussion

Yu Minhua<sup>4</sup> and so on are relatively early on the application of Taijiquan in the feasibility of stroke hemiplegia rehabilitation, believing that tai chi techniques and modern rehabilitation medicine such as Bobath training and PNF training in a number of sports are bear many similarities. So, in the modern rehabilitation technology under the guidance of the theory, tai chi mechanics and training forms can be well integrated into the stroke of hemiplegia rehabilitation. There are foreign reports<sup>5</sup> Taijiquan on the rehabilitation of patients with stroke in the theoretical study that tai chi in lowering blood pressure, improve balance and coordination functions, improve the mood has a unique advantage, and the consistency of the purpose of treatment to protect the Tai Chi Boxing for stroke rehabilitation is practicable, safe and reliable. Zhang Huiying<sup>6</sup> and so on believe that the normative guidance based on Taijiquan footwork movement is simple and easy to learn, can effectively promote the recovery of patients with limb function, and enrich the rehabilitation of stroke patients with hemiplegia. Studies have found that<sup>7</sup> after the stroke, damage will be caused to the central nervous system plasticity and functional reorganization, long-term adherence to Taijiquan training will help the brain to restore remodeling and functional reorganization.

The main problem with stroke patients is the balance of coordination dysfunction, especially for the elderly. Often Tai Chi exercise can help the elderly to maintain lower limb function, improve lower limb muscle strength, and thus stabilize gait improve balance coordination function<sup>8</sup>. There are relevant meta-analysis<sup>9</sup> confirming that Tai Chi can to a certain extent help the elderly to avoid fall. It also helps in the elderly physical activity, disease pain, emotional awareness, sleep quality, social function, bad mood and other aspects of the overall physiological and psychological intervention by maintaining physical and mental health and improving the quality of life.

This study shows that modified tai chi rehabilitation technology can limit the improvement of limb function and balance in stroke patients. The improved version of Tai Chi practice emphasized more on the center of gravity of the lower limbs can improve the lower limb control and support capacity. Taijiquan action emphasized on eyes following limb movements, which in turn can improve the stroke patients' hand-eye coordination function and visual space ability adaptation. Taijiquan exercise requires relaxation, consciousness, with proper breathing and action coordination. Its actions are soothing and poised and can effectively relieve muscle tension, consequently contributing to the coordination of physical control; Taijiquan exercise execution involves the interaction of both sides of the limbs, thus improving the overall coordination of the limbs. In addition, this study has short research time with shortcomings of the number of cases collected. Follow-up study needs to expand the sample size and further explore the effects of modified Taijiquan on stroke hemiplegia patients in movement function and overall physical and mental health mechanism.

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