

## Original Article

# Dance combined with magnetic pulse stimulates the ability of walk and balance in elder people

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**Abstract:** Objective: Observe the treatment effect on elderly people's waling and balance ability under the stimulation and intervention of waving dance combined with magnetic pulse. Method: 96 elderly people are Involved in the research and the random number table method is divided into observation group and control group; there are 48 people in each group. The control group on the basis of routine daily activities increase waving dance for training treatment; the observation group take training treatment together with the control group, plus magnetic pulse for stimulation treatment. Inspection and control shall be made to relevant indicators of subject's walk and balance ability at the time when they are selected and after they go through 6-month treatment. Result: after 6-month treatment, we found that indicators of walk and balance ability of these two groups of patients have been improved to different extent compared to those indicators when selected (all  $P < 0.05$ ). While the observation group have more significant improvement effect when compared to the improvement effect made by the contract group. Most of indicators are obviously superior to that of the control group ( $P < 0.05$ ). The differences have statistics significance. Conclusion: waving dance could obviously improve elderly people's walk and balance ability, and the improvement effect could be ever more significant when combined treatment with magnetic pulse stimulation. Such effect is obviously better than the effect improved only by waving dance.

**Keywords:** Elderly people, walk, balance, dance, magnetic pulse, combined, effect

## Introduction

When people are ageing, each function of the body declines significantly, especially in the aged stage, the ability of walk is not flexible, faltering become an important obstacle for the elderly in daily life. Related research results suggest that the factors in the poor walk ability of elderly people are mostly related to the fact that the elderly people themselves decline in their physical and body function besides the pathological and other disease reasons [1, 2]. The important factors to cause the elderly people faltering and declining in walk ability are muscle atrophy, weakened strength attenuation and the coordinated ability, etc. [3-5]. Reports have pointed out that the elderly people's walk ability and balance function could be significantly improved through necessary muscle force and training in coordinating ability [6-9]. This study sets about waving dance on human lower limb muscle strength training and

the improvement of human body coordination, at the same time it combined with magnetic pulse stimulation treatment which could help the body relax and improve internal circulation to have auxiliary therapeutic effect, conduct combined practical treatment to observe its effect. After practice and contract, we found that this combined treatment is better than effect made only through waving dance training, and the method is simple, subjects are willing to accept. Now reports are as follows.

## Information and method

### Research information

The authors select 96 elderly people from age 75 to 80 as research object at 4 communities located at Lichuan County, Enshi City. Among them, there are 25 males and 71 females. They took practical treatment from March 2012 to September 2012. Inclusion criteria: through

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**Table 1.** General situation comparison of the selected object in two groups ( $\bar{x}\pm s$ , n=48)

Group	Sex (males/females)	Height (cm)	Weight (kg)	Age (years old)
the control group	12/36	165.2±5.93	57.5±4.77	75.8±6.31
the observation group	13/35	164.9±5.37	58.1±5.18	76.3±6.72

Note:  $P>0.05$ .

investigating the personal information, all selected objects neither had professional waving dance training nor had magnetic pulse stimulation treatment before taking part in besides routine activities; spirit is in good condition, with good understanding of language ability; No obstacle in limb exercise. Exclusion criteria: already excluded senile dementia, Parkinson's disease, traumatic brain injuries, except for stroke, lower limb joints or postoperative fracture with severe waist and leg pains and so on, and patients obviously suffered from heart disease, high blood pressure and dizziness and other diseases, are not easy to accept waving dance training. Selected objects are informed and consent. Random number table method divided the selected objects into the observation group and control group, for 48 cases in each group. With the control group have 12 males and 36 females, with average age of 75.8±6.31 years old; the observation group has 13 males and 35 females, with average age of 76.3±6.72 years old. Two selected groups of objects had their general information conducted statistic analysis. The differences have no statistics significance ( $P>0.05$ ) with comparability. Please see **Table 1**.

### *Treatment method*

The control group: carry out waving dance training based on daily activities without any other auxiliary treatment. Waving dance training contents include: "rush for monkey", "drag pheasant tail", "rhinoceros watch moon", "eagle fly", "toad jump" and more than ten actions in total. They accept the training twice a day, morning and night. and each training lasts about 35 minutes. The constant training lasts 6 months in total. The observation group: on the basis of waving dance training treatment together with the control group, conduct magnetic pulse stimulation for auxiliary treatment after training every time. Magnetic pulse stimulation treatment method is as follows: choose ZP-5 computer pulse therapeutic apparatus (produced by Zhengzhou Zhongbo Health In-

dustry Development Co., Ltd.), use the power of AV220V, 50 hz/DC12V. When conducting treatment, four pulse wave patches are used on the subject's legs that are the position of calf's "Chengshan xue" (Please see **Figure 1A** and **1B**) and thigh's "Yinmen xue" (Please see **Figure 1C** and **1D**). Adjust the intensity of therapeutic apparatus pulse according to the sensitivity the patient feel the pulse wave. Average intensity is set to 400-600 mT, pulse frequency of 40-60 times/min, 20 minutes per one time treatment. A total combined treatment lasts for six months totally.

### *Evaluation of therapeutic efficiency*

*Walking ability test:* (1) 800 meters length test on foot, ask all subjects to walk fast on the ground and measure the required duration (in seconds) for waling 800 meters. The shorter the time, the better relatively good ability to walk; (2) normal stride test, ask all the subjects to walk 100 steps on flat ground along a straight line under the normal condition, and measure each subject's walk distance. The average stride length (in cm) shall be calculated by measured walk distance which is divided by 100 steps. The larger stride length is, the better subject's ability of walk will be. (3) test made by walking on the balance beam, subjects stand at one end of the balance beam with 20 meters long. They immediately walk fast once hearing the order of "start". Measure the time length walking on the balance beam from one end to another. If the subject falls down from the balance beam during walking, this test fails. It needs to recalculate time. Each subject could repeat testing for 3 times (in seconds). The shorter the walk time is the better ability of walk and balance will be.

*Balance ability test:* (1) The static balance test, the domestic PH-A type balance function detector shall be adopted for test. Test for 30 seconds by closing eyes. Test contents include: swing index, peripheral area, length of shaking trajectory, trajectory length of unit area and

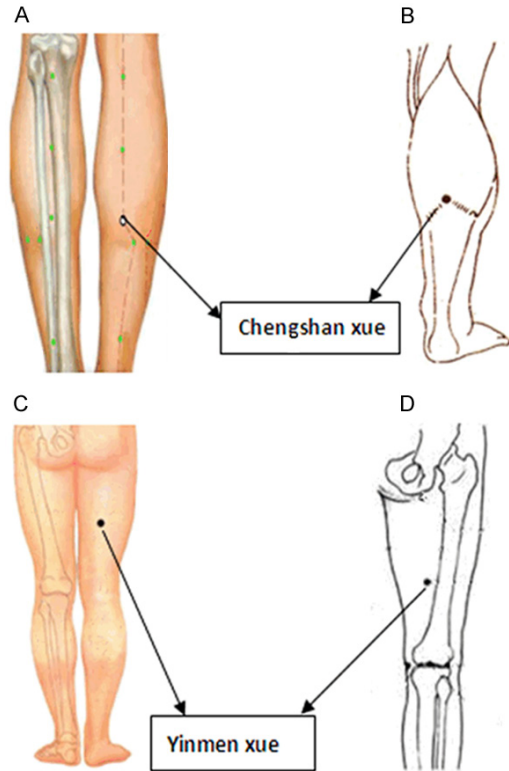


Figure 1. Acupoint location map.

rectangle area etc. to reflect the index of human body static balance ability. (2) the test of dynamic balance ability, march on the spot by closing eyes, the subjects stand on the central of a circle of 40 cm in diameter with eyes closure. They shall step on the spot with frequency of 120 steps per minute once hearing the order of “start”. Keep stepping until the feet are out of or touching the circle line. Record the duration in seconds.

#### Statistics analysis

Adopt SPSS13.0 to have data processed. Data acquired from this research shall be shown by ( $\bar{x} \pm s$ ). Comparison of measuring information shall adopt t for test.  $P < 0.05$  shows that the differences have statistics significance.

#### Results

(1) After practical treatment for 6 months respectively, 2 groups of objects made great improvement compared to the time when selected, all  $P < 0.05$ . (2) Compared the improved effect of the observation group with that of the control group, we found that walk ability index

of the observation group improved significantly, all  $P < 0.05$ ; besides that the differences of sway index and marching on the spot with eye closure have not statistics significance, other improved effect of balance ability index in the observation group is also better than that of the contract group ( $P < 0.05$ ). Please see Table 2 for comparison of these two sets of data.

#### Discussion

When people are into old age, muscle strength, balance ability and other function index decreased significantly. Some research pointed out that the muscle strength of 65 years old man is only equivalent to 50% of a 20 years old one. Among them, that the lower limb muscle strength decreased significantly is an important cause for old people to fall down [10, 11]. On how to improve the ability to walk of old people so as to prevent from falling, some studies pointed out that except for taking necessary strength training, it's also essential to improve the elderly's balance or coordination through the way of corresponding function training, such as Beijersbergen, Kalyani etc. It confirmed in the research, it could effectively keep the elderly's sports balance organs and muscles in good condition through sports exercise to improve balance and muscle strength, which have great significance in preventing from falling and some movement disorder [12, 13]. Waving dance is originated in ancient traditional dance of Tujia, located in Enshi, China. It integrated dance, art with sports fitness, called “Oriental disco”. The body action mainly relies on production and labor, daily life and fighting. People do exercise through twisting, turning, bending, squatting and other movements. It requires muscles in each part of the whole body to be in tension and relaxation alternate and close coordination with upper and lower limbs. Waving dance, therefore, not only do good exercise effect to the body in various parts of the muscle group, especially lower limb muscle group, but also, be more conducive to improve body coordination. After the control group in the research went through 6-month waving dance training and treatment, we found that subjects had obviously improved their ability to walk and balance compared to the time when they are selected, all  $P < 0.05$ . The differences have statistical significance. It indicates that 6-month waving dance has obvious effect to improve the elderly people's ability to walk

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**Table 2.** Index of walk and balance ability control the time when these two sets of objects are selected with after 6-month treatment ( $\bar{x} \pm s$ , n=48)

Index	the control group (12 males, 36 females)		the observation group (13 males, 35 females)	
	when selected	after 6 months	when selected	after 6 months
walk time of 800meters (s)	832.1±58.4	795.4±54.9 <sup>a</sup>	829.3±60.2	771.9±55.3 <sup>a,b</sup>
walk stride under normal condition (cm)	33.9±6.71	37.2±5.22 <sup>a</sup>	34.2±6.85	39.8±5.96 <sup>a,b</sup>
walk time on balance beam (s)	47.4±5.39	44.1±5.27 <sup>a</sup>	47.1±5.40	41.3±5.33 <sup>a,b</sup>
sway index (cm)	1.84±0.37	1.63±0.35 <sup>a</sup>	1.82±0.39	1.58±0.36 <sup>a</sup>
length of shaking trajectory (cm)	175.2±32.1	163.2±31.9 <sup>a</sup>	173.8±32.8	154.2±30.5 <sup>a,b</sup>
peripheral area (cm <sup>2</sup> )	2.15±0.30	2.69±0.28 <sup>a</sup>	2.13±0.31	2.30±0.29 <sup>a,b</sup>
rectangle area (cm <sup>2</sup> )	4.32±0.96	3.72±0.89 <sup>a</sup>	4.17±0.91	3.25±0.76 <sup>a,b</sup>
trajectory length of unit area (cm)	2.52±0.36	2.73±0.35 <sup>a</sup>	2.54±0.40	3.84±0.37 <sup>a,b</sup>
marching on the spot with eye closure (s)	6.77±3.30	8.62±3.34 <sup>a</sup>	6.80±3.37	9.07±3.35 <sup>a</sup>

Note: after 6 months, these two sets of object control with the time when they selected, <sup>a</sup>P<0.05; The improved effect of the observation group control with that of the control group, <sup>b</sup>P<0.05.

and balance. It's also consistent with the result of relevant research that the muscle strength and coordination skill training can improve old people's exercise ability, and prevent from falling down.

Magnetic pulse therapy has the stimulation effect to the human body by which magnetic pulse therapeutic apparatus make impulse current through the electromagnet coil, which results in different frequency and waveform of the pulse magnetic field [14, 15]. Related studies suggest that pulse wave generated from such methods as acupuncture, gua sha, massage, and massaging could be influence human body, then achieve overall treatment effect of dredge meridian, promoting the circulation of qi, activating blood, improving nerve function, restoring and regulating the body's immune. In promoting the body's metabolism and restore, it can cause the local vessel expansion to enhance blood and lymph circulation, so as to improve local tissue nutrition state, promote cell metabolism, and accelerate the pathological product discharge and absorption [16-18]. Research results of modern medicine also confirmed that the magnetic pulse wave directly effects on the human body, which can make local tissue cells to have reaction, ion transfer, molecular vibration and waterlogging, membrane potential, membrane permeability and the body's PH change, local vasodilation, blood circulation acceleration, nerve excitement or suppress and adjustment of the nerve function, and promote gland secretion, motivate the release body's internal analgesic substance to have good analgesia effect. Meanwhile, the magnetic pulse technique such as scrapping,

massage, can also have good relaxation effect on stimulating muscle group to avoid the fatigue accumulation, which is good for subjects more actively to participate in training and other activities [19-22]. This research by using waving dance combined with magnetic pulse exciting, conducts practical study on objects in the observation group. The experimental data in **Table 2** shows that after treatment for 6 months, we found that curative effect evaluation index in the observation group is obviously better than improved effect at the time when they are selected and the control group. It has more obvious difference ( $P<0.05$ ), compared with the time when they are selected. Compared with improved effect of the control group, besides that the differences of sway index and marching on the spot with eye closure have not statistics significance, other index are also better than that of the contract group ( $P<0.05$ ). Investigate the reasons for obvious improvement, except for waving dance could have good muscle strength and coordination exercises on trainer's body. Physical and chemical effects that various kinds of magnetic pulse stimulate the body can not only promote the local blood circulation to accelerate, metabolism acceleration is beneficial to improve body function, but also make the subjects have their tired lower limbs relaxed after waving dance training, so as to effectively avoid the fatigue accumulation, be conducive to tolerance in later training and improving training motivation or training quality. Therefore, the results suggest in case that the elderly people take combination and intervention treatment which is combined waving dance with magnetic pulse stimulation, the curative effect is better than that only treated with wav-

ing dance training. And the simple and workable combination treatment makes organic combination of body's physical and chemical effects and relaxation acquired from body training and instrument. It's good for the elderly people to accept in mind and body, it is worth for implementation and promotion.

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### Disclosure of conflict of interest

None.

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