

# Observation and study on the balance function and control ability of stroke patients treated with Bobath technique combined with suspension weight loss training

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**Abstract:** To observe the therapeutic effect of Bobath technique combined with suspension weight loss training on balance function and trunk control ability in stroke patients. 61 patients clinically diagnosed with stroke were divided into an observation group and a treatment group. The observation group used Bobath technique, while the treatment group received combined suspension weight loss training on the basis of the observation group. Compared with the observation group, the treatment group had higher Berg and Sheikh scores ( $P < 0.05$ ). The implementation of suspension weight loss training combined with Bobath therapy for stroke patients can improve their balance function and trunk control ability, improve prognosis, and has promotional value in clinical practice. Bobath technique combined with suspension weight loss training can Improving balance and control abilities in stroke patients.

**Keywords:** Bobath technique, suspension weight loss training, stroke

At present, the number of stroke patients in China ranks first in the world, and its incidence rate still shows a significant upward trend. Balance and walking dysfunction is one of the common sequelae of stroke[1-2]. The survey shows that the highest incidence of balance dysfunction after stroke is 83%, and the proportion of stroke patients who meet the walking speed and endurance of daily life is less than 10%[3-4]. In the 1940s, foreign physical therapists began using Bobath therapy to treat cerebral palsy related diseases. Bobath therapy can promote the normalization of abnormally increased muscle tone and inhibit abnormal posture reflexes to promote functional recovery[5-6]. However, its efficacy has reached a bottleneck period now, and the treatment plan needs to be optimized. Suspension weight loss training is a gradually emerging lower limb training method in recent years, which has been widely used in the field of rehabilitation and has been proven to have certain therapeutic effects on the recovery of limb function in stroke patients[7-8]. The aim of this study is to observe the effects of suspension weight loss combined with core muscle group training on balance and walking function in stroke patients. The current report is as follows.

## 1. Materials and Methods

### 1.1 General information

61 stroke patients were selected from the Traditional Chinese Medicine Rehabilitation Department of Gaoming District People's Hospital in Foshan City from August 2022 to October 2023, including 35 males and 26 females; The average age is (64.19±6.38) years old; The inclusion criteria include: ① Diagnostic criteria refer to the "Chinese Guidelines for the Diagnosis and Treatment of Acute Ischemic Stroke 2018" and "Chinese Guidelines for the Diagnosis and Treatment of Cerebral Hemorrhage 2019", confirmed through imaging examination; ② Disease duration≤6 months; ③ Age range from 40 to 80 years old; ④ Hemiplegic patients with no residual limb dysfunction, Berg balance scale score≤30 points, Sheikh trunk control ability score≤40 points; ⑤ The condition is stable and can cooperate with physical examination. And exclusion criteria: ① Balance disorders caused by other diseases; ② Patients with combined important organ failure; ③ The patient suffers from bone and joint diseases that affect standing; ④ Patients with loss of consciousness; ⑤ The patient voluntarily withdrew from the trial, lost follow-up, or died from various other reasons. This study was reviewed and approved by the hospital's medical ethics committee, and the patient signed an informed consent form. The research subjects were

divided into a treatment group and a control group using a random number table method. There was no statistically significant difference in general clinical data such as gender, stroke type, paralyzed side, age, and disease course between the two groups of patients ( $p > 0.05$ ).

### 1.2 Treatment methods

Control group: Bobath rehabilitation training treatment is based on certain manual operations to suppress abnormal postures, improve abnormal movement patterns, and facilitate the recovery of limb motor function, including whole body muscle massage, limb joint activity, bed position change, gait balance in standing and walking, occupational therapy, etc. Patient treatment frequency: once a day, 30 minutes each time, 5 days a week, 2 days off, for a total of 4 weeks.

Treatment group: Perform suspension assisted core muscle group strengthening training for 30 minutes on the basis of routine Bobath rehabilitation training. Once a day, 5 days a week, for a total of 4 weeks. Suspension core stability training. Rehabilitation therapists design appropriate suspension plans for patients based on the biomechanical relationships between suspension points, support points, and movement axes, including trunk and upper limb placement, pelvic core stability training, scapular stability training, and upper limb closure chain training. Action 1: The patient lies on their healthy side and uses a suspension device to suspend the affected upper limb. Rehabilitation therapists adjust the suspension point and shoulder joint movement axis based on the shoulder flexion and extension function of the affected upper limb, making it easier for the affected upper limb to bend, extend, or control. Action 2: The patient is lying on their back, bending their body 90 degrees forward and bending their elbows. Using the elbow joint of the forearm as the fulcrum, actively control the flexion, extension, horizontal adduction, and abduction of the affected shoulder, and enhance the stability of the shoulder joint. Action 3: Shoulder stabilization and weight training. The patient is in a prone position, with both shoulders and elbows bent and supported on the bed. A support strap is used to connect a hard rope and hang it on the abdominal ilium, knees, and ankle joints. This way, the patient relies solely on the weight of their elbows and forearms to complete the upper limb closed chain movement. Action 4: Double bridge training. By strengthening the stability of the patient's trunk core, control the pelvic position. The patient is placed in a supine position, and the rehabilitation therapist uses a support strap attached to the knee or ankle joint hard rope to fix it. The patient is asked to lift the pelvis, with each group for 30 seconds and repeated 6 times. Rehabilitation therapists guide patients to undergo routine rehabilitation training: while lying in bed, pay attention to the function of the affected limb, guide them to actively and passively move, and provide appropriate stimulation to the affected limb in a timely manner. Rehabilitation therapists guide patients to perform standing center of gravity transfer training, walking training, up and down stairs, and weight bearing training on the affected side to improve trunk control ability.

### 1.3 Evaluation methods

Before and after 4 weeks of treatment, the balance and walking function of two groups of patients were compared, including Sheikh trunk control ability score and Berg balance function score. Sheikh trunk control ability score was positively correlated with trunk control ability, and Berg balance function score was positively correlated with balance function.

### 1.4 Statistical methods

SPSS 25.0 statistical software was used for data analysis. Measurement data is expressed as mean  $\pm$  standard deviation. The comparison of inter group measurement data adopts t-test; Comparison of count data using  $\chi^2$  Inspection. Assuming  $p < 0.05$ , the difference is statistically significant.

## 2. Results

Table 1: Comparison of Berg score and Sheikh score between two groups of patients

	n	Berg		Sheikh	
		Before	After	Before	After
Control	30	22.76 $\pm$ 5.14	39.18 $\pm$ 4.52	32.74 $\pm$ 5.51	52.38 $\pm$ 2.14
Treatment	31	22.87 $\pm$ 5.27	46.34 $\pm$ 5.18	33.10 $\pm$ 5.34	68.17 $\pm$ 3.75
t		0.193	5.123	0.067	12.317
p		0.897	<0.001	0.831	<0.001

Before intervention, there was no statistically significant difference between the Berg score and Sheikh score between the two groups ( $p>0.05$ ); After intervention, the Berg score and Sheikh score of the treatment group were higher than those of the control group, and the difference was statistically significant ( $p<0.05$ ).Table 1.

### 3. Discussion

Brain function remodeling is the physiological basis for the rehabilitation of stroke hemiplegic patients, and plasticity mechanisms include activity dependent reconnection and synaptic reinforcement to compensate for lost function due to tissue damage [9-11]. Bobath therapy is a commonly used rehabilitation training program for stroke hemiplegic patients, with two main characteristics: on the one hand, it helps patients improve limb movement by controlling key points at the center, proximal, and distal ends [12]. On the other hand, the balance reaction of patients is induced through induction and reflection. Progressiveness small range balance activities are induced to change to normal mode, and various movement control training is gradually carried out, ultimately promoting the overall and comprehensive rehabilitation of patients' functions [13-14].

Suspension weight loss not only reduces the risk of falls during rehabilitation training for stroke patients, eliminates their anxiety and fear, but also allows patients to undergo rehabilitation training without independent walking ability, increases the level of phosphorylated protein kinase C in the lesion area, improves neuronal excitability and brain plasticity, increases proprioceptive input and dynamic sensory input information, improves stroke patients' walking speed and stride, and enhances endurance, Improve balance function [15]. Research has shown that using suspension weight loss training, using a suspension belt to suspend parts of the body, can help stroke patients transition from unstable to a balanced state, strengthen trunk muscles and affected limb motor function, enhance core muscle group strength, and improve body movement and balance function [16]. Core muscle group training can improve the lower limb control ability of patients through the transmission of muscle strength in the core area, laying the foundation for patients to actively and reasonably adjust their center of gravity and establish stable walking function when standing [17].

### 4. Conclusions

This study investigated the effects of suspension weight loss training combined with Bobath therapy on balance and walking function in stroke patients. The results showed that compared with the observation group, the treatment group had higher Berg and Sheikh scores ( $p<0.05$ ). The implementation of suspension weight loss training combined with Bobath therapy for stroke patients can improve their balance function and trunk control ability, improve prognosis, and has promotional value in clinical practice. The implementation of suspension weight loss training combined with Bobath therapy for stroke patients can improve their balance function and trunk control ability, improve prognosis, and has promotional value in clinical practice.

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