

# Study on the Effectiveness of Exercise Posture Therapy for Cervical Spine Curvature Abnormality

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**ABSTRACT.** In this paper, 100 patients with abnormal cervical curvature were randomly selected from the patients with abnormal cervical curvature of Guangdong Xinmiao Scoliosis Prevention Center by investigating the effectiveness of exercise posture therapy on cervical abnormal curvature. They were divided into a control group and an experiment. Group, 100 patients in the experimental group underwent X-ray film angle measurement, and randomly selected 50 teaching-related sports postures for treatment. The results showed that the cervical spine physiological curvature was abnormal at the initial diagnosis. After three months of exercise posture treatment, 38 patients had obvious symptoms, and the symptoms of the remaining 12 patients gradually improved after six months. Therefore, it can be considered that posture therapy can be an effective treatment method for correcting abnormal curvature of the human cervical spine and can achieve long-term stable effects.

**KEYWORDS:** Abnormal cervical curvature, exercise posture therapy, effectiveness

## 1. Introduction

The occurrence of abnormal cervical curvature is an early sign and symbol of cervical spondylosis. The stability of the human spine, effective maintenance of motor function and quality of life all depend on the normal cervical physiological curvature to maintain. The normal physiological curvature of the cervical spine is also important for increasing the elasticity of the cervical spine, reducing and buffering the shock of gravity, and preventing damage to the spinal cord and brain[1]. In daily life, people often have abnormal cervical curvature due to long-term bad work, study, games, bad posture habits and other factors. Since the development of this kind of disease is relatively hidden, and the initial stage is not painful and itchy, people are often too busy to take care of it. In recent years, many developed countries have begun to screen primary and secondary school students. The degree is abnormal, reducing unnecessary economic burden for people. In recent years, a variety of treatment methods have also emerged, including manual

massage, traction, acupuncture, surgery and other treatment methods[2]. Since 2008, Guangdong Xinmiao Scoliosis Prevention Center has established a set of sports posture treatment methods for cervical spine curvature abnormalities, try to avoid affecting patients' normal life time and work and rest, and at the same time reduce part of the financial burden for patients. Acupuncture and other passive methods into active self-body training. This article explores the effectiveness of exercise posture therapy on abnormal cervical spine curvature, and aims to provide an effective theoretical basis for the treatment of abnormal cervical spine curvature.

## 2. Research objects and methods

### 2.1 Research object

The subjects of this study were indication patients randomly selected from all patients with abnormal cervical curvature in the Guangdong Xinmiao Scoliosis Prevention Center. A total of 100 patients with abnormal cervical curvature were included in this group. All cases had X-ray film cervical spine angle curvature changes: mild abnormality, cervical spine curvature straightened; severe abnormality, cervical spine curvature recurve symptom. See Table 1 below for details.

*Table 1 Classification of abnormal cervical spine curvature in 100 patients (N = 100)*

	number of people	Percentage of people (%)
Cervical spine curvature vertical	22	22%
Cervical curvature reflex	78	78%
Total	100	100%

### 2.2 Research methods

#### 2.2.1 Literature data method

This subject was studied by consulting literatures and books on abnormal cervical spine curvature, and reviewing the relevant electronic papers on cervical spine curvature abnormalities in China. To summarize the background and treatment of abnormal cervical spine curvature patients. Provide a fuller theoretical basis for the paper.

#### 2.2.2 Expert interview method

Professor Yang Junlin and Professor Huang Zifang of the Department of Spine Surgery, the First Affiliated Hospital of Sun Yat-sen University visited and

discussed the motion therapy and posture therapy for cervical curvature straightening and cervical curvature recurve. Gained valuable experience, and made substantial suggestions and methods for the abnormal cervical spine curvature.

### 2.2.3 Teaching experiment method

Through teaching experiments to verify the practical value of "exercise posture therapy for cervical spine curvature abnormality", theoretical analysis of the experimental results. Teaching experiment time: completed from June 2019 to November 2019, the experiment will be conducted for half a year.

Experimental design: In this experiment, 100 patients were randomly selected from the patients with abnormal cervical curvature in the Xinmiao Scoliosis Prevention Center of Guangdong Province, including 22 patients with cervical spine curvature straightening, 78 patients with cervical spine curvature recurvature, from the cervical spine. The two groups of patients with straightened curvature and abnormal cervical curvature were randomly divided into two groups: experimental group and control group (see Table 2 below for the specific experimental group and control group).

At the beginning of the experiment, the experimental group learned the exercise posture therapy for abnormal cervical pillow curvature, and practiced at home for the next three months, practicing for 30 minutes every day, and regularly uploading photos of autonomous training every weekend. Review every three months, review twice. The teaching location is: Guangdong Xinmiao Scoliosis Prevention Center.

The control group didn't do any training during the six-month experiment and didn't interfere in daily life. The time was carried out with the experimental group, and it was rechecked every three months for a total of twice.

*Table 2 Semi-random selection comparison table in the classification of abnormal cervical curvature (N = 100)*

	Cervical curvature vertical	Cervical curvature	Total arch(person)
Experimental group(person)	11	39	50
Control group(person)	11	39	50
Total(person)	22	78	100

#### ***2.2.4 Mathematical Statistics***

Through the collation and analysis of the data of the experimental group and the control group, we can scientifically see the change trend of the abnormal curvature of the cervical spine of the two groups of experimental objects, and at the same time select representative statistical values based on the data, and make comparison and evaluation for the experiment provides a reliable basis, the experiment is more scientific and accurate.

#### ***2.2.5 Logic analysis***

This article integrates and analyzes the relevant data of cervical spine curvature abnormality, and produces targeted sports posture therapy, and verifies the important effect of sports posture on cervical spine curvature abnormality through experiments. According to the above methods, it can make more timely correlations recommendations to make exercise posture therapy more complete.

### **3. Discussion and analysis**

#### ***3.1 Analysis of medical principles of abnormal cervical curvature***

##### ***3.1.1 Causes of abnormal cervical curvature***

The abnormal nature of cervical curvature is its imbalance of biomechanics and changes in normal physiological structure. Many scholars believe that long-term bow is the most common cause of abnormal cervical curvature. Because bowing to study and working for too long, the neck muscles are stretched in a state of tension and spasm, which will cause chronic damage to the neck muscles for a long time, resulting in weakened cervical muscle strength and imbalance of cervical spine power balance, which affects static balance. Part of the reason is due to the usual acute neck muscle sprain and fibrous tissue inflammation in the neck and shoulder. This reason is caused by long-term poor posture and cold, etc, caused by inflammation of the joint capsule, ligament and facet. The pain will also make the neck muscles spasm reflexively to protect the affected joints, which will lead to abnormal curvature[3].

##### ***3.1.2 Medical principles of abnormal cervical curvature***

The human body has seven cervical vertebrae. When sitting or standing, the neck is upright when viewed from the side, but the actual internal cervical spine is a forward arc. This forward convex arc is medically referred to as the physiological

curvature of the cervical spine. Along the posterior edge of each vertebral body of the cervical spine, a continuous new curved curve is formed, which is called the normal cervical physiological curve of the human body[4]. The measurement method is to start from the posterior upper edge of the dentate process of the vertebral body, and connect each posterior edge of the vertebral body of the cervical vertebra into an arc in turn, and then start from the posterior upper edge of the dentate process to the seventh cervical vertebra. Make a straight line at the back and bottom edge, which reflects: the maximum distance from the highest point of the arc to this straight line is the value of the cervical spine physiological curve.

The stability of the normal physiological curvature of the human cervical spine is maintained by the body's two major systems, including the static system and the dynamic system. The two are closely related in structure and function, and work together to complete the biomechanical function of the cervical spine. Physiologically, the static system and the dynamic system complement each other, both of which are the structural basis of the other. They are indispensable. Both are also the motive force for cervical spine activity and muscular stability. In pathology, when the dynamic system has an imbalance in the dynamic balance of the lesion, the uneven force on the surrounding soft tissue damage will cause a certain degree of curvature change in the static system. When the static system has a curvature change that exceeds the normal cervical balance. Afterwards, the dynamic system will be further dysregulated, resulting in cervical spine disease[5].

### ***3.2 Design of exercise posture therapy for abnormal cervical curvature***

The therapy design consists of two movements. The two movements can be practiced in no sequence and can be combined. Among them, the action of "laying on the neck pillow" is 10 minutes each time, 2 times a day, it is recommended to take lunch break; the action of "prone kneeling position" is 30 seconds each time, 15 times a day; the recommended time is divided into early perform 5 times each in the middle and night to distribute exercise in life.

#### ***3.2.1 Lying on the neck pillow***

The yoga mat is flat on the ground, the patient is lying down, the body is relaxed, the breathing is adjusted to the normal state, the two arms are naturally relaxed on both sides of the body, the legs and knees are straightened together, the cervical spine treatment round pillow is placed on the neck, try to make head back. The flat neck pillow can be used during the normal sleep of the patient. The neck of the patient needs to be relaxed. In the most relaxed state of the patient, the round pillow will lift up the 7 vertebral bodies of the neck. It plays the role of reverse push, which not only ensures the effectiveness of the movement when the neck is relaxed, but also does not affect the patient's excessive life time.



*Figure. 1 Flat neck pillow*

### **3.2.2 Kneeling and looking up**

Knee up vertically with your legs on your back, support your upper limbs, lower your waist, and raise your head back (note that when your head is relaxed at the end of the movement, avoid the neck movements ending too quickly, causing secondary injury to the cervical spine). The kneeling position is an active therapy based on the physiological function of the normal spine of the human body. It requires the patient to actively press down the back spine to achieve the effect of raising the head as high as possible.



*Figure. 2 Kneeling and looking up*

### ***3.3 The experimental results and analysis of the exercise posture therapy of the experimental group and the control group***

#### ***3.3.1 Experimental results of exercise posture therapy in experimental group and control group***

After three months of exercise posture therapy, the results of the first follow-up diagnosis showed that: of the 11 patients with vertical cervical curvature in the experimental group, 6 patients improved to normal physiological curvature, and 5 patients also showed improvement trends. Among the 39 patients with curvature recurve, 26 patients had a larger improvement range, and 13 patients had no significant changes. The 11 patients with vertical cervical curvature in the control group all aggravated to the recurve state. There was no change in the cases, and 34 patients had the phenomenon of aggravation. After the first review of the control group, the patients were found to be aggravating, and there was no sign of improvement; after the first review of the experimental group, the vertical patient's condition had improved for three months, but in the patients with reflex. Some patients didn't see the effect, some patients showed signs of improvement, but didn't fully return to normal, because after the exercise posture treatment, there were no patients who aggravated the condition; while patients with vertical curvature were all signs of improvement or complete recovery, by this proves that exercise posture

therapy has a significant therapeutic effect on patients with mild abnormalities in a short period of three months of treatment, and can play a controlling role in the development of patients with severe abnormalities. (The specific experimental results are shown in Table 3 below)

*Table 3 Analysis table of experimental results of experimental group and control group three months later (N = 100)*

		No change		Aggravate		Lighten		normal		total	
		Number of people	percentage								
test group	vertical	0	0%	0	0%	5	10%	6	12%	50	100%
	Back bow	13	26%	0	0%	26	52%	0	0%		
Control group	vertical	0	0%	11	22%	0	0%	0	0%	50	100%
	Back bow	5	10%	34	68%	0	0%	0	0%		

After six months of exercise posture therapy, the second follow-up diagnosis showed that eleven of patients with vertical cervical curvature in the experimental group improved to normal physiological curvature, and 39 patients with cervical curvature in the experimental group of the 33 patients, the improvement range was large, and 6 patients had no significant changes. The 11 patients with vertical cervical curvature in the control group all aggravated to the recurve state, 2 of the 39 patients with cervical curvature had no change, and 37 patients. There is a phenomenon of increased backbow. Among them, the control group still showed no signs of improvement. The curvature of patients with vertical cervical spine increased, and the number of patients with counterattack increased by three people compared with the first visit; the patients with vertical cervical vertebrae in the experimental group were all normal, and the patients with reverse arch compared with the first visit, The number of people without change decreased by 6 people, and there was no aggravated patient, and some patients have returned to normal. It can be seen that the cervical curvature abnormality must be treated with exercise posture therapy as soon as possible. While controlling the patient's cervical curvature no longer aggravated, it will further achieve the effect of restoring the normal physiological curvature of the cervical spine. (The specific experimental results are shown in Table 4 below)

*Table 4 Analysis table of experimental results of experimental group and control group after six months (N = 100)*

		No change		Aggravate		Lighten		normal		total	
		Number of people	percentage								
test group	vertical	0	0%	0	0%	0	0%	11	22%	50	100%
	Back bow	6	12%	0	0%	23	46%	10	20%		
Control group	vertical	0	0%	11	22%	0	0%	0	0%	50	100%
	Back bow	2	4%	37	74%	0	0%	0	0%		

#### 4. Conclusions and recommendations

##### 4.1 Conclusion

After the treatment of sports posture therapy, it is of great significance to the patient's cervical spine physiological curvature. The recovery rate of patients is 42%, the improvement rate is 46%, and 12% of cases develop without aggravation. This proves that sports posture therapy It has obvious effect on cervical spine curvature abnormality, and achieves the ideal treatment effect, and can better help patients with cervical spine curvature abnormality to be improved and recovered.

##### 4.2 Recommendation

###### 4.2.1 Prompt prevention of people with abnormal cervical curvature

Pay attention to your usual habits and try to correct your bad habits. For example, looking down at your phone for a long time and working at your desk for too long, you should always protect your cervical spine, do more head-ups, regularly observe your cervical curvature, and take care of yourself cervical spine.

###### 4.2.2 Patients with abnormal cervical curvature strengthen neck training

According to the action introduction of sports posture therapy, practice every day according to the time requirements and action requirements, and accumulate a period of regular follow-up visits. Secondly, when doing exercise posture treatment, you should pay attention to stable breathing to avoid patients performing after

strenuous exercise; exercise posture therapy can be carried out at the same time as learning and work; at the same time, the treatment time can be allocated to early, middle, and three stages late so that you can accumulate training throughout the day.

#### ***4.2.3 Can not relax after the abnormal curvature of the cervical spine improves***

After the abnormal curvature of the cervical spine is relieved, you should pay attention to your usual posture habits. You can pay attention to the height of the pillow when sleeping at night. It is recommended that the height of the neck of the cushion exceed the height of the head.

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