

# MOTOR SKILLS ANALYSIS IN CHINESE BOXING STUDENT TRAINING



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ANÁLISE DE DESTREZA MOTORA NO TREINO ESTUDANTIL DO BOXE CHINÊS

ANÁLISIS DE LA DESTREZA MOTORA EN EL ENTRENAMIENTO ESTUDIANTIL DE BOXEO CHINO

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## ABSTRACT

**Introduction:** In recent years, martial arts have become optional in colleges and universities. The main purpose is to improve students' physical quality and sports ability by teaching them basic skills, which also aids in self-defense awareness. It is believed that there is some influence on motor skills that can also benefit activities of daily living. **Objective:** Evaluate the influences of Chinese boxing training on the motor skills of practicing college students. **Methods:** Twenty college student volunteers were selected for the experiment, and divided equally into experimental and control groups. The experimental group performed systematic Chinese boxing training during the training time, while the control group received no physical training other than basic physical education activities during the same period. The students' balance and coordination abilities were tested before and after the experiment to analyze motor skills, and the relevant data were recorded. **Results:** After eight weeks of Chinese boxing training, the HCT time of the experimental group decreased significantly, from 10.77 to 9.98, while in the control group, there was no significant difference. **Conclusion:** Special Chinese boxing training can improve the motor skills ability of students. It evidenced the importance of designing training plans according to the actual situation of students in daily training, seeking to improve the overall physical quality of students in an integral way. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** Martial Arts; Boxing; Motor Skills.

## RESUMO

**Introdução:** Nos últimos anos, as artes marciais tornaram-se um curso optativo em faculdades e universidades. Com o principal objetivo de melhorar a qualidade física e a capacidade esportiva dos alunos através do ensino de suas habilidades básicas, também auxilia na consciência de autodefesa. Acredita-se que haja alguma influência sobre a destreza motora que também possa beneficiar as atividades de vida diária. **Objetivo:** Avaliar as influências do treinamento de boxe chinês sobre a destreza motora dos estudantes universitários praticantes. **Métodos:** Foram selecionados 20 universitários voluntários para o experimento, divididos igualmente em grupo experimental e controle. O grupo experimental efetuou treinamento sistemático de boxe chinês durante o tempo de treinamento, enquanto o grupo de controle não recebeu nenhum outro treinamento físico além das atividades básicas de educação física durante o mesmo período. Para analisar a destreza motora, a capacidade de equilíbrio e destreza dos estudantes foi testada antes e depois do experimento, e os dados relevantes foram registrados. **Resultados:** Após 8 semanas de treinamento de boxe chinês, o tempo de HCT do grupo experimental diminuiu significativamente, de 10,77 para 9,98, enquanto no grupo controle não houve diferença significativa. **Conclusão:** O treinamento especial de boxe chinês pode melhorar a capacidade da destreza motora dos estudantes. Evidenciou-se a importância de elaborar planos de treinamento de acordo com a situação real dos alunos no treinamento diário, buscando melhorar a qualidade física geral dos alunos de forma integral. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Artes Marciais; Boxe; Destreza Motora.

## RESUMEN

**Introducción:** En los últimos años, las artes marciales se han convertido en una asignatura optativa en colegios y universidades. Con el objetivo principal de mejorar la calidad física y la capacidad deportiva de los alumnos mediante la enseñanza de sus habilidades básicas, también ayuda a tomar conciencia de la defensa personal. Se cree que existe cierta influencia en la destreza motora que también puede beneficiar a las actividades de la vida diaria. **Objetivo:** Evaluar las influencias del entrenamiento de boxeo chino en la destreza motora de estudiantes universitarios practicantes. **Métodos:** Se seleccionaron veinte estudiantes universitarios voluntarios para el experimento, divididos a partes iguales en grupo experimental y grupo de control. El grupo experimental realizó un entrenamiento sistemático de boxeo chino durante el tiempo de entrenamiento, mientras que el grupo de control no recibió ningún otro entrenamiento físico aparte de las actividades básicas de educación física durante el mismo periodo. Para analizar la coordinación motriz, se comprobó la capacidad de equilibrio y coordinación de los alumnos antes y después del experimento, y se registraron los datos pertinentes. **Resultados:** Tras 8 semanas de entrenamiento de boxeo chino, el tiempo de HCT del grupo experimental disminuyó significativamente de 10,77 a 9,98, mientras que en el grupo de control no hubo diferencias significativas. **Conclusión:** El entrenamiento especial



**Descriptores:** Artes Marciales; Boxeo; Destreza Motora.

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## INTRODUCTION

Martial arts originated from the military war activities in ancient China, and has been handed down for thousands of years.<sup>1</sup> At the same time, it also has a broad mass base. Wushu is both antagonistic and pays attention to the use of routines and techniques. Sanda is one of the most antagonistic, and also stresses the application of skills, with the main movements of kicking, punching and defense.<sup>2</sup> Over the years, Wushu Sanda has become a major in some colleges and universities. For students of related majors, the training effect is obvious. It can not only effectively increase the health level of learners, but also improve the overall sports ability.<sup>3</sup> In recent years, martial arts has become a sports elective course and club project in many colleges and universities. The main purpose is to improve the physical quality and sports ability of students through the teaching of basic skills of martial arts sanda, and at the same time improve the self-defense awareness and self-protection level of student groups.<sup>4</sup> Therefore, the main starting point of Wushu Sanda training in schools is the overall health level and sports awareness of students rather than competitive confrontation. In the process of training, Wushu Sanda should pay attention to movement coordination, and use reasonable offensive and defensive techniques to suppress the other side and protect themselves.<sup>5</sup> Based on this, this paper takes the influence of martial arts sanda on the students' coordination ability of physical movement as the main research content.<sup>6</sup> Through the research on the characteristics of martial arts sanda, combined with the students' physical fitness and physical exercise needs, it sets up a control experiment to analyze the students' coordination and balance ability before and after the martial arts sanda training, and provides a certain reference plan for the school to carry out the martial arts sanda course next step.<sup>7</sup>

## METHOD

### Subject of experiment

In the experiment, we designed an 8-week controlled experiment according to the research purpose of this paper through the analysis of the collected research data related to wushu sanda training, and the interview and investigation of some wushu sanda coaches and athletes. The study and all the participants were reviewed and approved by Ethics Committee of Northeast Normal University (NO.2020NTNU095ZD). The subjects were 20 non martial arts freshmen from a college of physical education, 10 male and 10 female. According to the prior investigation, the selected students have no injuries or diseases in the past three months, and are in good health, meeting the basic requirements of Wushu Sanda training. At the same time, I have a certain understanding of this experiment and have signed a voluntary participation agreement. As all the students are from the same grade, the statistics show that the basic conditions of the selected students in age, height and weight are similar, meeting the requirements of the experiment. The specific statistical data are shown in Table 1.

### Experimental methods

Before the experiment, 20 students were randomly divided into two groups, 10 in each group, 5 boys and 5 girls. The duration of the

**Table 1.** Basic information of the experimental group and the control group.

Group	Experience group	Control group
Age/year	18.70±0.543	19.03±0.439
Height/cm	175.63±6.489	171.24±6.226
Weight/kg	62.62±4.504	61.83±5.165

experiment was 8 weeks, and the experiment was matched to the relevant professional physical training schedule according to the teaching schedule of the grade curriculum. The physical fitness frequency is 4 times a week, 2 class hours each time, 40 minutes each class hour. The students in the experimental group carried out systematic martial arts sanda training within the training time, while the control group had no other sports training except routine physical education activities within the same time. Before and after the experiment, the balance ability and coordination ability of the students were tested, and relevant data were recorded and analyzed.

### Experimental test indicators

This paper tests the balance ability and coordination ability of the students before and after the experiment.

The YBT test method is used to test the balance ability. YBT test method can evaluate the balance ability of athletes. This test can measure the stability ability of upper and lower limbs as well as the left and right balance, so as to evaluate the injury risk of athletes. It is highly practical. In this paper, in addition to the YBT score, the students' balance ability test indexes also include the test of dynamic balance and static balance ability. The dynamic balance ability is mainly measured by three evaluation indexes: standing up with time, standing in situ with eyes closed, and walking on the balance beam. The static balance ability is mainly measured by two indexes: enhanced Romberg test and standing on one leg with eyes closed. The maximum duration of standing with eyes closed on one leg is 30 seconds.

## RESULTS

### Influence of Wushu Sanda Training on Body Balance Ability

Before training, the balance ability of the students in the experimental group and the control group was tested and compared. The specific data results are shown in Table 2.

It can be seen from the data in Table 2 that before the training, there was little difference in the body balance ability between the two groups of students, and they passed the T value and P value tests. There was no statistically significant difference between the groups, which met the requirements of the experimental sample in this paper, and further research could be carried out.

After 8 weeks of martial arts sanda and general physical training, students in the experimental group and the control group were tested on their balance ability. The statistical results of each index after training are shown in Table 3.

Through the analysis of the data in Table 3, it can be concluded that after eight weeks of training, except for no significant growth in the balance beam walking index, the two groups of students have improved in

**Table 2.** Analysis of the balance ability of the two groups of students before training.

Group	Index	Experimental group before training	Control group before training
Dynamic equilibrium	Timed rise and walk (s)	5.17±0.316	5.34±0.248
	Step in situ with eyes closed (s)	5.40±0.498	5.37±0.434
	Balance beam walking (s)	14.19±2.339	13.73±1.556
Static equilibrium	Strengthen Romberg test	23.53±4.361	24.34±3.818
	Stand on one leg with eyes closed (s)	9.28±0.459	9.27±0.641
YBT score	Left leg (min)	117.87±5.120	115.82±5.787
	Right leg (min)	118.30±6.931	119.17±5.818

**Table 3.** The influence of wushu sanda training on students' balance ability.

Group	Index	Experimental group after training	Control group after training
Dynamic equilibrium	Timed rise and walk (s)	5.37±0.299	5.01±0.414
	Step in situ with eyes closed (s)	5.58±0.478	5.54±0.417
	Balance beam walking (s)	13.94±2.352	13.77±1.326
Static equilibrium	Strengthen Romberg test	33.62±3.710	30.23±3.269
	Stand on one leg with eyes closed (s)	10.33±0.429	10.90±0.405
YBT score	Left leg (min)	123.67±5.199	116.73±5.739
	Right leg (min)	125.17±7.006	120.91±5.846

other dynamic and static balance indicators to varying degrees. Among them, it can be clearly seen that the enhanced Romberg test index and the overall YBT score of the experimental group have increased significantly compared with other indicators. The strengthened Romberg test index increased from 23.53 ± 4.361 before training to 33.62 ± 3.710. In the YBT index, the left leg score increased from 117.87 ± 5.120 before training to 123.67 ± 5.199 after training, and the right leg score increased from 118.30 ± 6.931 before training to 125.17 ± 7.006. In other indicators, the improvement of standing with eyes closed on one leg was larger, from 9.28 ± 0.459s before training to 10.33 ± 0.429s after training; The standing step with eyes closed increased from 5.40 ± 0.498s before training to 5.58 ± 0.478s. Although the training results of the control group also showed different levels of improvement, the overall increase was slightly smaller than that of the experimental group, and the average increase in the enhanced Romberg test index was slightly larger, from 24.34 ± 3.818 before training to 30.23 ± 3.269.

### Influence of Wushu Sanda Training on Body Coordination

Before the training, the coordination ability of the students in the experimental group and the control group was tested and compared by HCT and routine drill scores. The results of the scores before the test are shown in Table 4.

The data in Table 4 can show that there is no significant difference in the physical coordination ability between the two groups of students before the training, and they have passed the T value and P value tests, meeting the sample requirements of this experiment.

After eight weeks of martial arts sanda and general physical training, students in the experimental group and the control group were tested on HCT and routine drills to evaluate the changes in their coordination ability. The test results are shown in Table 5.

It can be seen from Table 5 that after 8 weeks of martial arts sanda training, the HCT time of the experimental group decreased significantly, from 10.77 ± 0.713 before training to 9.98 ± 0.122, while that of the control group only decreased slightly, from 10.99 ± 0.744 before training to 10.46 ± 0.144, which is not obvious in comparison. Before

**Table 4.** Analysis of the coordination ability of the two groups of students before training.

Index	Experimental group before training	Control group before training
HCT score	10.77±0.713	10.99±0.744
Score of routine drill	78.83±5.229	77.17±4.480

**Table 5.** The influence of wushu sanda training on students' coordination ability.

Index	Experimental group after training	Control group after training
HCT score	9.98±0.122	10.46±0.144
Score of routine drill	86.39±3.125	83.31±3.330

and after training, the scores of routine drills improved significantly. The experimental group increased from 78.83 ± 5.229 to 86.39 ± 3.125 before training, and the control group increased from 77.17 ± 4.480 to 83.31 ± 3.330 before training. The increase of the control group was smaller than that of the experimental group.

## DISCUSSION

Wushu Sanda and other sports emphasize lower limb stability, movement coordination and reaction speed. Therefore, after a certain period of Wushu Sanda training, the effect of improving students' body movement coordination ability is significant. In the experimental study of this paper, after 8 weeks of martial arts sanda training, the balance ability and coordination ability of the students in the experimental group have been improved to varying degrees compared with those before training. The balance and coordination of the body reflect the cooperation ability of different systems and joints in different parts of the body during exercise, which are the basis of sports technology to a large extent. The coordination ability of the body is a complex ability. It is not only a physical quality, but also a sports technology. It mainly depends on the neural function ability, action cognitive ability and the sensing ability of the nerves and muscles in various parts of the body. The improvement of body coordination means that individuals can more effectively respond to external stimuli, and make timely and agile responses, so as to resist danger and keep the balance of the whole body unaffected. It is of great significance to reduce the injury of sports individuals and maintain the standardization of movement. Therefore, after a period of martial arts sanda training, the students in the experimental group have a certain role in improving their coordination ability, which can help students effectively improve their overall sports ability and physical fitness.

The balance ability of the body is the ability to measure whether the human body can maintain a certain posture. Balance ability is divided into two dimensions: static balance and dynamic balance. Static balance refers to the balance ability of the human body when maintaining a specific static posture; Dynamic balance refers to the ability of human body to maintain body balance during exercise. The balance ability of the body is affected by vestibule, muscles, joints and other organs and systems, as well as the body's response and coordination ability to external stimuli. Therefore, after 8 weeks of martial arts training in this paper, it can be concluded that martial arts training plays a significant role in improving the balance ability of the students. At the same time, the experimental results show that the regular physical training can also improve students' balance ability to a certain extent. Because both special training and regular physical training will enhance students' muscle strength and physical quality. The enhancement of body muscle strength is an important basis for maintaining students' balance ability, especially the stability of lower limb strength, which is particularly important for such antagonistic sports as martial arts sanda. After systematic training, the

students first made some changes in muscle endurance and physical fitness, and then improved their overall balance ability. Therefore, in daily training, we should combine special training with routine physical training, and formulate training plans that conform to students' physical fitness according to their actual conditions, so as to improve their sports ability to the greatest extent.

## CONCLUSION

With the development of the times and the change of students' physique, as well as the concern of modern people about sub-health and physical health issues, the proportion of professional physical education in modern education is increasing. In order to attract students' interest in sports and cultivate their enthusiasm for exercise, wushu sanda and other sports events are gradually introduced into the physical learning and training of learning. The martial arts sanda in this study has a certain degree of antagonism and skill. In the training process, the athletes are required to pay attention to the coordination of actions, and they are required to respond quickly according to the attack and

position movement of the other side. Therefore, the overall balance ability and coordination ability of students can be improved to a large extent through systematic Wushu Sanda training. Wushu Sanda training also has a positive impact on the agility and stability of the body. The most important thing is to improve students' self-defence ability and response ability, and deal with various emergencies that may occur in daily life. Therefore, according to the experimental research and conclusions in this paper, the appropriate increase of Wushu Sanda training in the physical education curriculum of schools will have a significant impact on improving students' coordination ability and overall sports level. At the same time, we can also increase the interesting confrontation training in the process of martial arts sanda training, improve the students' sports enthusiasm and cultivate their active sports awareness on the premise of ensuring their safety, so as to develop healthy sports habits and improve their physical and mental health.

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The author declare no potential conflict of interest related to this article

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**AUTHORS' CONTRIBUTIONS:** The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Mingyang Li: writing and execution.

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