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# Experimental Analysis of the Influence of Wushu Teaching on Male College Students in China

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**Abstract**

The decline of college students' physical fitness in China has always been one of the major problems plaguing China's education, in general and physical education, in particular. This decline is attributed to the inadequacy of physical education (PE) in colleges. Wushu as a kind of martial arts is an important course of college PE in China, attracting lots of male college students. However, the routine teaching of traditional Wushu courses lacks exercises, failing to enhance the physical health of students. To reform the teaching methods of Wushu, this paper proposes an innovative Wushu teaching method under the Chinese Health Sports Course Mode (CHSCM to simplify the routine teaching of Wushu and emphasize on strengthening physical fitness and arranging lots of exercises without exhausting the students and improving their physical fitness. In this direction, a 12-week experiment was carried out to compare the effects of the proposed innovative teaching method with the traditional teaching method of Wushu. The results show that: (1) the male college students trained by the innovative method achieved much better body shape, physical function, and physical fitness than those trained by the traditional method, because the latter method does not offer enough exercise volume or classroom training; (2) despite being inferior to the innovative method, the traditional method significantly improved the flexibility in physical fitness; (3) Wushu teaching should combine flexibility and muscle strength, and maintain certain exercise intensity and duration.

**Keywords:** Wushu teaching; male college students; physical fitness; experimental analysis

## Introduction

The physical well-being or physical fitness of college students influences a wide range of lie activities. At the micro-level, physical fitness affects the prospects of each college student and the happiness and prosperity of his/her family. At the macro level, the physical well-being of college students plays a major role in the future of their country. Since the reform and opening-up era, China has grown into world's second-largest economy (Gao, 2020; Geng, 2020; Lu, 2020; D. T. Yang, 2012). The economic growth has resulted in abundance supply of resources and material and significantly improved the dietary nutrition of the Chinese. However, improved nutrition has also brought serious issues among college students such as obesity. Every five years, the obesity rate of Chinese college students increases by 2-3% (Jiang, Peng, Yang, Cottrell, & Li, 2018). Owing to obesity, there has been a continuous decline in physical fitness of the college students (Batsis, Zbehlik, Pidgeon, & Bartels, 2015).

According to the physical health data released by the Chinese Ministry of Education in 2014, the physical fitness indices (e.g., explosiveness, endurance, and strength) of college students have fallen below those of middle school students (Jin & Liu, 2019; Prior & Curtner-Smith, 2020). Physiology results also suggest that falling physical fitness is an abnormal phenomenon in the age of 20s, which is the growing stage of college students. Therefore, some researchers have coined this problem as "20-year-old phenomenon" of physical fitness development among college students (Weng, Qi, & Tang, 2021). In addition, lack of physical exercise has also caused the physical decline of college students in China.

It is therefore important to improve physical fitness and take care of the physical well-being of college students. This can be achieved only by protecting them from physical diseases and through physical education (PE) (Alexander & Shareck, 2021; Guo; Tong, 2020; B. Yang, 2020). The current PE teaching in Chinese colleges has failed to meet the training goals of sports skills, interest training, and exercise volume. In some colleges, PE has a limited impact on the physique of students. There is also inadequate PE facilities and infrastructure to ensure the physical fitness of college students. For this reason, it was necessary to explore the extent to which PE teaching can improve students' physical fitness in the current times.

Among all PE course in Chinese colleges, Wushu or martial arts is the only PE course that carries unique features of Chinese culture and is widely popular among college students (Liu, 2018). There are very few studies to show how the study of Wushu and the use of modern scientific methods affect students' physical fitness. Studies that ae available mainly focus on training aspects, techniques/tactics, sports injuries, and Wushu competitions, aiming to select professional athletes for national and international competitions. Due to physical and psychological features, male college students are more likely to choose Wushu courses, which feature fierce confrontation and high physical requirements.

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This paper selected a few nonprofessional male college students to practice Wushu for 12 weeks and measured their physical indices before and after the practice. A total of three indices, all of which are widely used in academia, were adopted, namely, body shape, physical function and physical fitness (Gilewski & Sitek, 2017). Based on the measured data, the authors discussed which teaching method could most effectively promote the physical fitness of college students. The findings of the study would enable college authorities to reform the Wushu teaching in their long-term PE curriculum and design teaching programs that would improve students' physical fitness in both theoretical and practical ways.

## Literature Review

Wushu or Kungfu, a hard and soft and complete martial art (Jee & Eun, 2018; Singh, Singh, & Thingnam, 2020) and a full-contact sport has a long history in the field of Chinese martial arts. "Wushu" is one of the suitable terms for all martial arts in relation to China, though kung fu and Wushu are originally same terms. In the last thirty years of Chinese martial arts history, Wushu in Mainland China has been reorganized with the aim to achieve a universal standard of training for this discipline. Wushu is not designed for any fight or self-defense; it is designed to train people for physical art. Most people have a misconception that it is designed for fight or self-defense, but Wushu is practiced exclusively as a performance art, and therefore, also has a relation with the art of dance. Wushu is also a traditional dance in China. It is also one of the important physical exercises (Hasanloei, Asadpour, & Karvani, 2017) since its training is designed to maintain physical fitness as well. Among college students, Wushu has gained an important place as it influences their physical fitness. Wushu is also an important activity that can release stress and increase students' performance. Students in educational institutions face a significant level of stress and therefore Wushu helps in reducing the level of stress. The academic performance of students is also linked with the physical activities in which Wushu holds an important place.

Several previous studies also mentioned an important relationship between student's education and Wushu. Wushu is most important for physical education studies (Huang, Wang, & Hu, 2020; Liu, 2018) and common among college students (W. Wang, 2019) for its several benefits in relation to physical fitness. The innovative methods in Wushu teaching help students achieve better body shape along with better physical functions. The physical functionality also improves as a result of better level of fitness showing how human physical functions have important relationships with physical fitness (Griffith et al., 2009; Urbanek et al., 2018). Additionally, Wushu teaching has the potential to promote combined flexibility and muscle strength required in classroom teaching. Hence, among the Chinese colleges, Wushu training has an important role to maintain physical fitness.

The World Health Organization Physical Activity Guidelines, 2020 suggests that young students are generally at a critical stage of growth, although their muscle strength, muscle endurance, flexibility, cardiorespiratory endurance, and body composition depend on the specific gender, age, and growth level. The physical growth of young students could be affected by moderate to high-intensity physical activity and sedentary behavior (Bull et al., 2020). To acquire substantial health benefits, young people should engage in activities of at least moderate intensity (Fan, 2020). PE provides students with opportunities of physical activities. Improving physical activities through PE has been considered as an important measure to promote the physical growth of students. To measure moderate-intensity physical activities objectively, the curriculum intervention on the physical health of adolescents in school highlights the manipulation of the quantitative aspects (number, intensity, duration, and frequency) (Rosenkranz, Ridley, Guagliano, & Rosenkranz, 2021).

In order to curb the continuous decline of students' physical and mental health, Prof. Ji Liu of East China Normal University integrated the concepts of advanced foreign PE curriculums into China's PE curriculum reform, and proposed the Chinese Health Sports Course Mode (CHSCM) according to the requirements of the national curriculum standard:

(1) PE classroom teaching should focus on the exercise load, physical fitness exercises, and sports skills of the students, and bid farewell to the so-called "no-sweating" classes.

(2) PE teachers should implement precise lectures and enough exercises in class and create real and complex learning scenarios.

(3) Rather than frequent pauses made during explanations, demonstrations and student management, teachers should spend more time in guiding class and the students how to exercise continuously.

(4) The students should be guided to learn and practice structured sports skills through confrontative, demonstrative, or competitive exercises of both individual and combined techniques.

(5) Every PE class should be supported by diverse and compensatory physical exercises, and meet three criteria: the exercise density of around 75%; the exercise intensity should fall within medium-to-high range; the mean heart rate should reach 140-160 beats/ min.

The previous research on the CHSCM mainly deals with the theoretical and practical bases for establishing the key points (Penga, Qiaoa, Sabrib, Atazadehb, & Rajabifardb), the evaluation of exemplary courses (Standage, Gillison, Ntoumanis, & Treasure, 2012), and the analysis of key points (McKay et al., 2000). Nevertheless, there is a research gap in the study of Wushu classroom teaching under the CHSCM. To fill up this gap, this paper aims to revive the principles of Wushu teaching under the CHSCM, simplify the routine teaching of Wushu, stress on strengthening physical fitness, arrange lots of exercises

without exhausting the students, and improve the teaching programs to improve students' physical fitness. Under these principles, an innovative teaching method for Wushu was developed, and compared with the traditional method through a 12-week experiment. The results show that the proposed innovative method can effectively promote the physique of college students.

## Methodology

### Sample

A sample of 60 undergraduate male students was selected for this study from the Jilin Institute of Chemical Technology. Their age was around 20.12±0.91 years. None of them had any previous experience in Wushu, which was an optional course at this college. None of them had suffered from any physical illness, as was evident from a physical examination organized by the college. Two groups, test group and control group, were formed with 30 students allocated to each group. The test group was taught through the innovative Wushu teaching method while the control group continued with the traditional method of teaching.

### Data Collection Methods

### Documentation

The Chinese and foreign documents on Wushu, physical function, and sports physiology were examined and consulted in-depth to build a theoretical foundation of this study. Shreds of evidence from these documents and empirical literature were gathered to support the idea of the current study. Consequently, an empirical analysis was carried out to derive the final results.

### Interview

To ensure the accuracy of this research, the research team also interviewed experts on psychology and Wushu before selecting the survey objects, rating scale, test methods, statistical methods, and analysis strategies. Five of these experts confirmed that the innovative method achieved 90%-100% of the expected effect suggesting that the validity and reliability of the research methods.

### Test Method

(1) Instruments: The test instruments included the height and weight tester, vital capacity tester, standing long jump tester, grip dynamometer, and sit-and-reach tester.
(2) Indices: The main indices included Body shape: body mass index (BMI), waist circumference (W), and chest circumference (B); Physical function: resting heart rate (RHR), vital capacity (VC), and step test (ST); Physical fitness: standing long jump (SLJ), site-and-reach (SR), and 1,000 m running (1,000m).
(3) Time: The test lasted for approximately 4 months from March 2021 to June 2021, one class per week of 90 minutes each.
(4) Control variables: The test group and control group were taught strictly under the innovative (*Wushu*) and traditional methods respectively. The test group members were not allowed to attend any other sports activity other than the teaching contents. During the test, all subjects lived and learned normally without any dietary control.
(5) Exercise intensity: The exercise intensity was set to 50%-80% of the maximum oxygen uptake ($VO_{2max}$) or 65%-90% of the maximum heart rate. The mean RHR of the test group was 73.4 beats/min. According to the cassette formula (Ren et al., 2020), the target heart rate at the exercise intensity of 50%-85% $VO_{2max}$ is 136.5-174.6 beats/min.
(6) Test contents: Table 1 shows the traditional teaching contents for the control group while Table 2 presents the innovative teaching contents for the test group. Both Table 1 and Table 2 are divided into the preparation part, basic part and end part.
Following the principle of "arranging lots of exercises without exhausting the students", the body and breathing of the students were monitored in real-time to adapt and balance their body function to the training purpose, and thus make full use of the limited time in class. The purpose of this innovative teaching method was to improve the students' understanding and recognition of Wushu, and provide them an experience of the cultural connotations of Wushu techniques, and enhance their enthusiasm about Wushu.

### Statistical Methods

The survey data on psychology and physical fitness before and after the test were statistically analyzed on SPSS 11.5 for Windows 12.0 (Y.-G. Yang, Song, Shao, Liang, & Wang, 2020). The analysis was provided a useful data support for subsequent results analysis.

## Results and Analysis

### Pre-Test Analysis

### Body Shape

Table 3 shows the pre-test data on the body shape of the two groups. The body shape was mainly characterized by height, weight, waist circumference, chest circumference, and BMI index (Cho et al., 2021). As shown in Figure 3, the test group and the control group differed slightly in these physical indices of male college students prior to the test, with the insignificant differences in the t-test ($P>0.05$). The members of the two groups were basically of the same body shape before the test (Qi et al., 2012).

### Physical Function

The physical function was characterized by the RHR that reflected the heart function (Colosio, Lievens, Pogliaghi, Bourgois, & Boone, 2020), the VC that reflected the respiratory function (Mlinac & Steadman-Wood, 2020), and the ST that reflected the comprehensive functions of the heart and lungs (Reuben & Siu, 1990). As shown in Table 4, the test group and the control group had no significant difference in the three indices ($P>0.05$) prior to the test. The two groups were similar in physical function before the test.

**Table 1.**
*Traditional teaching contents for the control group*

| Parts | Contents | Organization pattern | Load | Time (min) | Heart rate (beats/min) |
|---|---|---|---|---|---|
| **Preparation part** | Barehand exercises; 400-800m jogging | Collective | Free exercises (4×8 shots); jogging (2 laps) | 10 | 80-100 |
| **Basic part** | Week 1<br>(1) Basic skills: learning basic hand shapes and step patterns; (2) Three-way Changquan, styles 1-2<br>Week 2<br>(1) Basic skills: kicking, punching and footwork combination; (2) Review: the contents of the previous lessons; (3) Learning: Three-way Changquan, styles 3-4<br>Week 3<br>(1) Basic skills: kicking, punching and footwork combination; (2) Review: the contents of the previous lessons; (3) Learning: Three-way Changquan, styles 5-6 | Grouping | (1) Basic skills: 4-6 groups (10 moves/group)<br>(2) Review: 4-6 groups<br>(3) Learning: 8-10 groups | 70 | 90-170 |
| | Week 8<br>(1) Basic skills: kicking, punching and footwork combination; (2) Review: the contents of the previous lesson; (3) Learning: Three-way Changquan, styles 15-16<br>Week 9<br>Review and practice the whole set of Changquan<br>Week 10<br>Review and practice the whole set of Changquan | Grouping and collective | (1) Review: 8-10 groups<br>(2) Practicing: 12-14 groups | | 100-180 |
| | Week 11<br>Exam | Grouping | No-load requirement | | Do not test |
| | Week 12<br>Make-up exams and theory, mobility | Collective | | | |
| **End part** | Organization, relaxation, and summary | Collective | Barehand exercise (4×8 shots) | 10 | 75-85 |

The control group was thus taught the contents of the traditional Wushu teaching method which focuses on routines. The course content intended to make students understand and recognize Wushu and experience the Chinese culture of Wushu.

**Table 2.**
*Innovative teaching contents for the test group*

| Parts | Contents | Organization pattern | Load | Time (min) | Heart rate (beats/min) |
|---|---|---|---|---|---|
| **Preparation part** | Special warm-up: basic skills (kick, punch, and footwork combination), Sanda footwork combination | Collective | 4-6 groups (10 moves/group) | 10 | 100-120 |
| **Basic part** | Week 1<br>(1) Fighting: learning boxing, legs, and target shooting; (2) learning three-way Changquan, styles 1-2<br>Week 2<br>(1) Fighting: a combination of boxing and target shooting; (2) Review: routines; (3) Learning: routines, styles 3-4<br>Week 3<br>(1) Fighting: a combination of boxing and shooting; (2) Review: routines; (3) Learning: routines, styles 5-6<br>Week 8<br>(1) Fighting: a combination of boxing methods and shooting; (2) Review: routines; (3) Learning: routines, styles 15-16 | Grouping and matching | (1) Fighting: 3-4 groups of cyclic practice method (1 min/group)<br>(2) Review: 4-6 groups<br>(3) Learning: 8-10 groups | 70 | 100-170 |
| | Week 9<br>1min free target shooting, actual combat, and practicing a full set of Changquan<br>Week 10<br>1min free target shooting, actual combat, and practicing a full set of Changquan | Grouping, matching and collective | (1) Free target shooting: 3-4 groups (1 min/group)<br>(2) Actual combat: 5-6 groups (2 min/group)<br>(3) Practicing a complete set of Changquan: 3-4 groups | | 100-180 |
| | Week 11<br>Exam: 1min free target shooting, and three-way Changquan, styles 1-16 | Grouping | No-load requirement | | 120-160 |
| | Week 12<br>Make-up exams and theory, mobility | Collective | | | Do not test |
| **End part** | Baduanjin relaxation and summary | Collective | Baduanjin (1 set) | 10 | 75 -85 |

On the other hand, the test group was taught the contents of the innovative Wushu teaching method. This innovative approach integrated Wushu techniques like fighting, routines, and health, which were distributed into different section of the class. The prominent features of this approach included extensive lectures and practices, reviewing what is learned through practice, and arranging lots of exercises without exhausting the students.

During the experiment, a large number of exercises (Lee, Burgeson, Fulton, & Spain, 2007) were implemented through cyclic training (Figure 1). Specifically, the 30 students in the test group were divided into two equal teams. Each team performed the prescribed actions from the starting point to the stop point, took a break, and then walked back to the starting point to start the next cycle of training. In this way, the students could practice throughout the class.

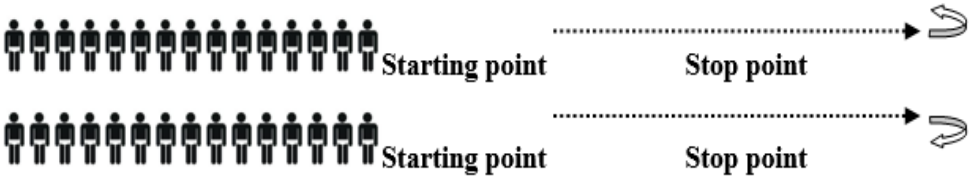


*Figure 1.* Schematic diagram of cyclic training

**Table 3.**

*Pre-test data on the body shape of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **Weight/kg** | 63.23 | 2.21 | 62.12 | 2.78 | >0.05 |
| **Height/cm** | 172.35 | 5.21 | 173.12 | 5.12 | >0.05 |
| **BMI** | 21.29 | 1.09 | 20.73 | 0.59 | >0.05 |
| **W/cm** | 75.18 | 2.32 | 75.56 | 3.46 | >0.05 |
| **B/cm** | 86.16 | 2.13 | 87.10 | 2.52 | >0.05 |

**Table 4.**

*Pre-test data on physical function of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **RHR** | 78 | 3.8 | 77 | 3.4 | >0.05 |
| **VC/mL** | 3,920 | 457.15 | 3887 | 506.29 | >0.05 |
| **ST** | 55.9 | 1.32 | 55.65 | 1.78 | >0.05 |

**Physical fitness**

The physical fitness was measured by common test items, such as SLJ, SR, and 1,000 m (Ortega, Ruiz, Castillo, & Sjöström, 2008). As shown in Table 5, the male college students of the two groups were similar in SLJ, SR, and 1,000 m before the test (P>0.05).

**Table 5.**

*Pre-test data on physical fitness of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **SLJ /cm** | 218 | 17 | 222 | 20 | > 0.05 |
| **SR /cm** | 4.32 | 1.12 | 4.41 | 1.06 | > 0.05 |
| **1,000 m/s** | 257" | 16" | 252" | 18" | > 0.05 |

## Post-Test Analysis

**Body Shape**

Table 6 shows the t-test results on body shape indices of the two groups after the test. After being taught by the innovative method, the test group achieved significant changes in BMI, waist circumference, and chest circumference (Figures 2-5). As for the control group, there was no marked difference in weight, BMI, or waist circumference, after being taught by the traditional method.

**Table 6.**

*Post-test data on the body shape of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **Weight/kg** | 63.06 | 2.01 | 61.79 | 2.13 | >0.05 |
| **Height/cm** | 171.32 | 4.92 | 174.01 | 5.01 | >0.05 |
| **BMI** | 20.8 | 0.5 | 20.4 | 0.9 | >0.05 |
| **W/cm** | 84.18 | 2.01 | 75.56 | 2.46 | >0.05 |
| **B/cm** | 85.36 | 2.37 | 89.91 | 2.12 | >0.05 |

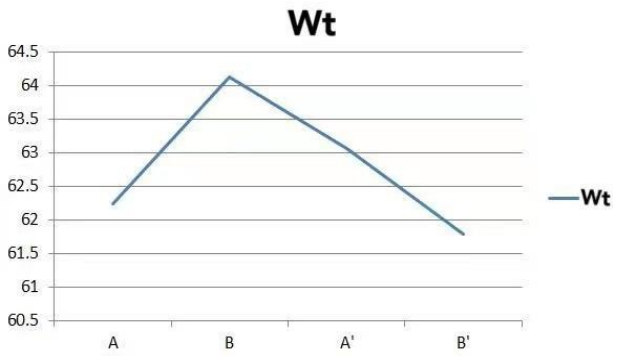


*Figure 2.* Post-test weights between the two groups

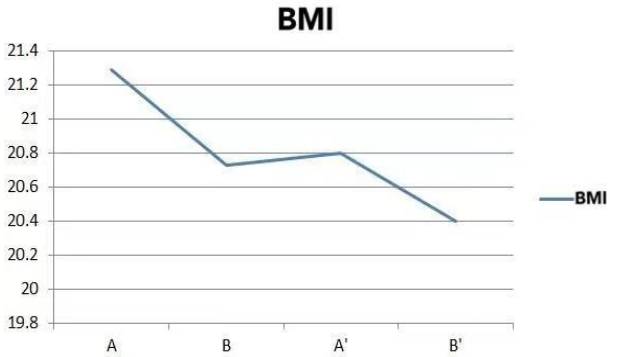


*Figure 3.* Post-test BMIs between the two groups

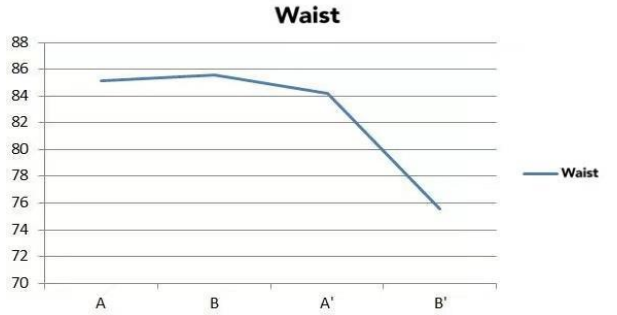


*Figure 4.* Post-test waist circumferences between the two groups

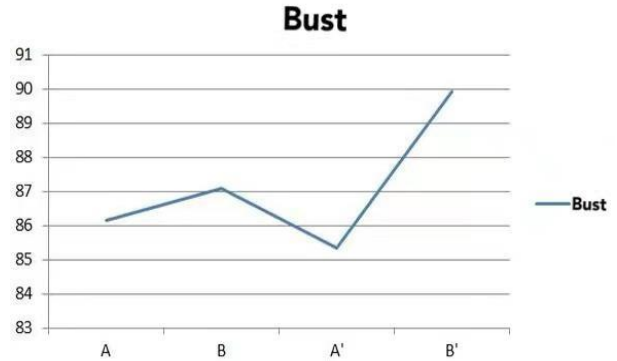


*Figure 5.* Post-test chest circumferences between the two groups

Note: A, A', B, and B' in all figures represent the control group before the test, the control group after the test, the test group before the test, and the test group after the test, respectively.

The reason for the changes in the test group is that the innovative method integrated confrontative exercises. The increased amount and intensity of exercise greatly enhanced the endurance and strength of the students. As a result, the male college students managed to reduce their waist circumference and control their weight. The significant changes also came from the special auxiliary training in warm-up activities, which improved the qualities like sensitivity and flexibility. The results show that the innovative method positively affects the body shape of male college students. By contrast, the traditional method wastes too much time repeating routine exercises. The lack of exercise volume and intensity impedes the changes in body shape indices.

**Physical Function**

After the 12-week test, the test group and the control group varied significantly in physical function indices (Table 7), namely, RHR, VC, and ST (Figures 6-8). Through the test, the RHR of the test group dropped deeply, while the VC and ST surged up. This is because the innovative method incorporated many offensive and defensive exercises like fighting, target shooting, which improved the cardio and lung functions of male college students (Farrington, 2020). In the control group, the VC and ST values increased, and the RHR decreased, but none of the three indices changed significantly.

**Table 7.**

*Post-test data on physical function of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **RHR** | 77 | 4.1 | 74 | 3.2 | >0.05 |
| **VC/ml** | 4123 | 426.78 | 4315 | 457.42 | >0.05 |
| **ST** | 57.3 | 1.07 | 61.92 | 1.36 | >0.05 |

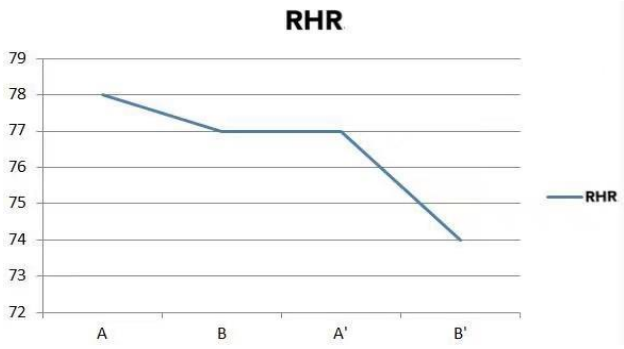


*Figure 6.* Post-test RHRs between the two groups

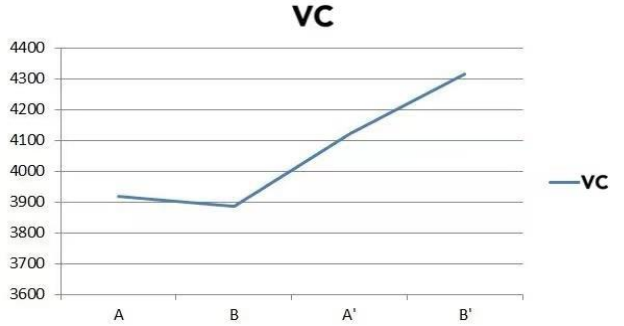


*Figure 7.* Post-test VCs between the two groups

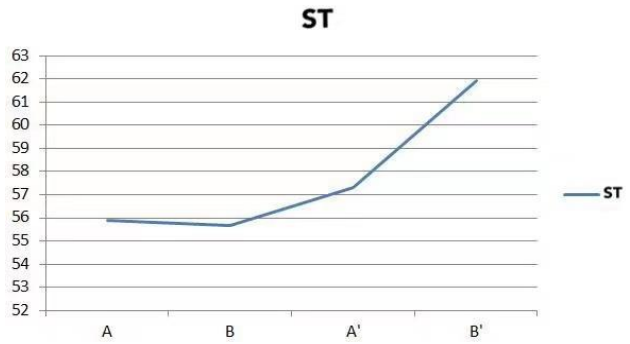


*Figure 8.* Post-test STs between the two groups

The results are the evidence that, the traditional method can promote physical function to a certain extent only. However, the promoting effect is not obvious, due to the limited class time and exercise volume.

**Table 8.**

*Post-test data on physical fitness of the two groups*

| Test items | Control group | | Test group | | P-value |
|---|---|---|---|---|---|
| | Mean value | Standard deviation | Mean value | Standard deviation | |
| **SLJ/cm** | 220 | 10 | 245 | 9 | >0.05 |
| **SR/cm** | 6.32 | 0.45 | 7.21 | 0.32 | >0.05 |
| **1,000m/s** | 255" | 13" | 239" | 10" | >0.05 |


*Figure 9.* Post-test SLJs between the two groups


*Figure 10.* Post-test SRs between the two groups

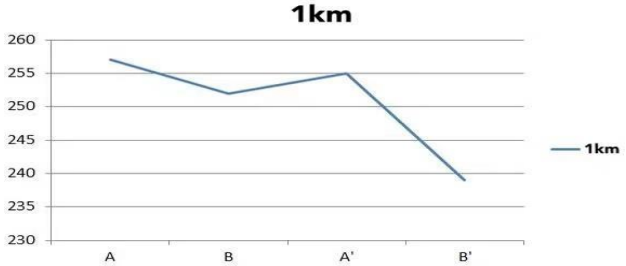


*Figure 11.* Post-test 1,000 m/s between the two groups

### Physical Fitness

As shown in Table 8, the test group and the control group differed significantly in all three indices of physical fitness, namely, SLJ, SR, and 1,000 m (Figures 9-11). In the control group, SR was the only index that changed obviously through the test; the other two indices did not vary significantly. On the contrary, the innovative method exerted a major influence on all three indices, especially on the SLJ (leg strength) and 1,000 m (endurance). The traditional method had a relatively prominent effect on improving flexibility (R. Wang & Jia, 2020), as indicated by the data on SR. Overall, the innovative method outperformed the traditional method in improving the strength, endurance, and flexibility of male college students than the traditional method.

## Discussion

### Influence of Exercise Intensity on Physical Health

The PE curriculum of the United States (US) emphasizes the proportion (≥50%) of high-intensity exercise in class and holds that good learning results are indispensable from medium-to-high intensity exercise (Zarrett et al., 2021) investigated the effect of exercise intensity on energy consumption and physical health of adolescents, and found that exercises of the intensity with 60% HR (140-160 beats/min) can effectively increase the energy consumed in exercise, as evidenced by the changes in indices like 1,000 m, SR, and VC. The experiments carried out by Lerma, Costa-Castelló, Griñó, and Sanchis (2019) also proved that exercises of moderate intensity on sports skills and physical fitness can effectively improve the body composition, cardiorespiratory function, muscle strength, endurance, flexibility, and speed of adolescents, and can be called the most suitable combined exercise method.

Our innovative method stresses special exercises, increases the exercise amount, and guarantees the efficiency of class hours, providing a suitable way to improve the body shape and physical fitness of the male college students of the test group. Through the test, the test group members witnessed significant changes in all three indices of body shape, physical function, and physical fitness, suggesting that the innovative method indeed promotes the physique of male college students. This is in line with the suggestions of Prof. Ji Liu for improving the physical well-being of Chinese students (solving the physical and mental health problems through sufficient physical movements that consume the energy of skeletal muscles). Besides, the finding that the RHR should reach 140-160bpm per class is consistent with

Ji Liu's idea (2019). This further proves the scientific nature and reasonability of the innovative method.

**Comparison with Related Methods**

Buzzachera, Correale, and Liberali (2020) pointed out that exercise intensity and duration are important to muscle strength and endurance, cardiorespiratory endurance, and flexibility of major muscle groups. Christiansen et al. (2019) compared the physical health indices of middle school students after exercise of different lengths and intensities, and made the following discoveries: (1) high-intensity exercise that lasts at least 10 min and medium-intensity exercise that continues for at least 15 min can effectively improve the body composition, muscle strength, and muscle endurance of students; (2) medium-to-high intensity exercise that lasts at least 5 min promotes the cardiopulmonary function of students; (3) the duration and intensity of exercise have no major impact on flexibility development. Therefore, the physical health of adolescents can be effectively improved through medium-to-high load exercise that lasts at least 10 min.Ilyasova and Erzhanov (2014) investigated the impact of energy consumption and physical fitness on young people, and identified high exercise intensity and density as the main means to optimize PE; Yet, teaching links like warm-up activities and relaxation cannot reach moderate-to-high intensity.

Following the principle of precise lectures and enough exercises, this paper sets up the standard that the exercise density of the PE class must be around 75% (Ilyasova & Erzhanov, 2014). After the test, the control group members, too, witnessed changes in the indices of the physique of male college students. This means the traditional method can improve body shape, physical function, and physical fitness to a certain extent. However, the limited exercise amount and short training time in class constrain the effect of the traditional method, which is far poorer than that of the innovative method. It should be noted that the traditional method improved the flexibility index. To enhance the physical health of college students, Wushu teachers should combine flexibility and muscle strength in teaching practice and maintain certain exercise intensity and duration. In addition, our results echo the findings of Freedson, who used standard metabolic equivalent (MET) to classify exercise intensity, predict energy consumption, and evaluate the effects of light, moderate, and vigorous activities. Theoretically, cardiorespiratory endurance can be greatly improved if 50% of the class hours are occupied by moderate-to-high intensity exercise (Trost, Loprinzi, Moore, & Pfeiffer, 2011).

## Conclusion

Drawing on the merits of the results of the test and control groups of the study, this paper has succeeded in deriving from the CHSCM an innovative teaching method for Wushu courses in colleges. The findings show that the Wushu innovative method provides students with lots of practice time, such that they can imitate, practice, and master sports skills through cyclic training. Besides, intense exercises are arranged in this method to fully stimulate the body of students and realize the effect of the training. The proposed method can greatly facilitate the classroom teaching of PE, assure the exercise intensity in each Wushu class, and promote the health and exercise ability of college students.

During the 12-week test, the innovative method, which organically integrated the boring and monotonous routines in the traditional method with a dazzling array of exercises, made the teaching contents diverse and interesting. The male college students enjoyed the fun of fighting, continuously improved their Wushu skills, and gained the courage to participate in actual competitions. Instead of stressing the students, the high-volume exercises in the innovative method actually became the highlights of the Wushu class and received a great interest and attention from students. Unlike the traditional method, the innovative method offers the students a proper load stimulation and a good sports experience with the rich exercises, tactic training, and competitive activities, enabling them to form a correct attitude and value towards Wushu.

To teach Wushu to male college students, the teaching method must evoke their interests and adapt to their physiological features. Otherwise, the students cannot inherit the merits of Wushu or improve their physical health.

## Implications of the Study

The current study contributed significantly by proposing an innovative Wushu teaching method under the Chinese Health Sports Course Mode (CHSCM). It simplified the routine teaching of Wushu; stressed on strengthening physical fitness; arranged lots of exercises without exhausting the students; and improved the teaching programs to improve students' physical fitness. This is a unique study that identified the innovative Wushu teaching method. Several previous studies have considered the Wushu teaching (An, 2020; B. WANG, XU, & WU, 2017; Zhang, 2021), however, rarely has any study documented the innovative Wushu teaching method under the Chinese Health Sports Course Mode (CHSCM). This study has therefore filled the important literature gap by identifying theoretical as well as practical implications for academicians, curriculum designers and practitioners who work in the field of Wushu teaching. The teachers can now confidently utilize innovative Wushu teaching methods to teach Wushu in colleges. For male college students, the Wushu teaching method cater to their interest points and physiological features. The Wushu course reform fully reflects the dynamic and static features of Wushu, and replaces boring routine teaching with intense exercises. Colleges can now prepare suitable Wushu teaching programs that truly benefit the physical fitness of students. The research results provide a reference

for colleges to improve PE teaching, and improve the theories and practices of PE curriculum.

## Recommendations

Based on the research findings, a few suggestions and recommendations may be given to the relevant parties to reform the Wushu curriculum for Chinese college students. First, the teachers, academicians and physical trainers should renovate the teaching theories on Wushu and rationalize the teaching plans and methods rather than sticking to previous experience or cognition. Second, rational plans and methods must reflect the dynamic and static features of Wushu and replace the boring routines with high-intensity exercises. Such plans and methods should be scientifically developed related to the physical functions of impulsive and aggressive male college students to improve the teaching effect of Wushu. Third, the principle of precise lectures and enough exercises, which is advocated by the CHSCM, must be implemented in the classroom teaching of Wushu. The teachers should pay attention to the exercise load, physical exercise, and sports skills of their students, ensure that their physical activity could reach medium-to-high intensity (RHR: 140-160 beats/min), and say goodbye to the "no sweating" class. The study had a few limitations too. This study only selected male college students, without considering any female ones. Therefore, our innovative method might not necessarily apply to every college student. To enhance its universality, future work should include female college students into their research scope. Furthermore, a few college students of other programs often practice Wushu after classes, despite being asked not to do so. This issue should also be paid attention to in subsequent research.

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