

Analysis and Research on Exercise Habits of College Students in Improving Students' Physical Fitness in Table Tennis Elective Course

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Key Words: college students; exercise habits; table tennis elective course; physical fitness of students; analysis and research

Abstract. In this paper, the current decline trend of college students' physical fitness has been analyzed. The students in table tennis elective course are taken as the research objects. The test data of the students' physical fitness in table tennis elective course have been conducted the statistical analysis and the experimental verification to find out the reasons and some rationalization proposals have been also provided for the exercise habits of college students in time, modes and strength.

Introduction

In 2002, the Ministry of Education promulgated the "Measures for the Implementation of Standards for Students' Physical Health (Trial Scheme)", which requires the students to establish the concept of "health first" and actively participate in sports as well as strive to "exercise an hour a day, healthy work for 50 years and have a happy life for a lifetime". This is sufficient to explain the concern degree of our country on the importance of the students' physical health. After entering the college, the students should have more time to participate in the physical exercise without the heavy learning tasks. However, the test scores of students in table tennis elective course have indicated that the physical fitness of college students are not improved as expected and the physical fitness of some students are reduced in different degrees. Therefore, the related research is necessary so as to find out the decline reasons of the students' physical fitness in table tennis elective course as well as provide some reasonable recommendations.

Research Objects and Methods

Research Objects

There are 997 undergraduate college students in grade 2014 and grade 2015 from North China Electric Power University, Beijing University of Agriculture, Beijing University of Posts and Telecommunications and other universities.

Research Methods

Literature Review Method

It is required to consult the relevant materials in General Administration of Sport of China and Sports Science Research Institute of the State Sports General Administration, have an interview with the professors in Beijing Sport University and Capital University of Physical Education and Sports and research the related papers in Tianjin University of Sport, Shanghai University of Sport and Shandong Sport University.

Questionnaire Survey Method

In this paper, a "Survey of College Students' Exercise Habits" has been designed for the 997 college students so as to learn about the current situation of the college students' physical exercise and the

college students' physical fitness as well as carry out the relevant research.

Release and collection of questionnaire

In September 2014, the questionnaires are issued to the college students in North China Electric Power University and Beijing University of Agriculture. There are 997 "Survey of College Students' Exercise Habits" that are issued, in which 963 are collected. The recovery rate is 96.59%. In the recovered 963 survey questionnaires, excluding the invalid questionnaires, the total number of the valid questionnaires is 945 and the effective rate is 98.13%.

Measurement of Physical Fitness

According to the "National Student Physical Health Standards", 300 college students in North China Electric Power University have conducted the physical fitness measurement. In view of the current situation of the college students' physical fitness in our country, the research has been carried out.

Experimental Methodology

It is required to design the experiment for the 210 college students in the table tennis elective course in North China Electric Power University so as to carry out the experimental research of the influence of physical exercise on the college students' health.

Data Statistics

All the data obtained by questionnaires, measuring scale and physical fitness measurement should be put into the computers. The relevant data of the survey research and the experiment study should be conducted the descriptive statistics, the variance analysis, the test and the correlation analysis through employing the SPSS software.

Analysis and Comparison

Based on the literature research, the experience summary, the questionnaire survey, the physical fitness measurement and the experimental study, it is necessary to conduct the analysis, the comparison and the rational thinking so as to get some regular knowledge and beneficial enlightenment.

Results and Analysis

Influence of Physical Exercise Time on the Students' Physical Fitness in Table Tennis Elective Course

The exercise time of college students is estimated by taking a month as a benchmark and taking the hour as the unit, which will be denoted as the abscissa. The difference between the test scores in 2015 and the test scores in 2014 is considered as the ordinate.

The Longer the Total Exercise Time is, the More Obvious the Improvement of the Physical Test Performance Will be.

Relationship between the exercise time and the difference of 50m running performance. It is found that the total exercise time is negatively correlated with the difference in 50m running, that is the longer the exercise time is, the more the 50m running performance will be improved. Therefore, it can be concluded that the physical exercise is significantly related with the performance of students' physical fitness test.

Developing the Good Rest and Diet Habits and the Proper Exercise Habits

Relationship between the exercise time and the difference of 1000m running performance. It is found that in the 800m running and the 1000m running, there is little relationship between the total exercise time and the difference, that is the performance of 800m running and 1000m running is not improved when the exercise time is longer. This is attributed to the unhealthy rest and diet habits or the unreasonable exercise habits of college students, which requires the further study.

Formulating the Reasonable Exercise Methods to Meet the Requirements of Sit and Reach so As to Improve the Waist and Abdominal Muscles of Students in Table Tennis Elective Course

Relationship between the exercise time and the difference of the sit and reach performance .it is found that in the sit and reach, the total exercise time is negatively correlated with the difference, which is contrary to the original hypothesis. This may be because the existing exercise forms cannot effectively meet the exercise requirements demanded by the sit and reach. The exercise methods should be further improved.

The Longer the Total Time of the Standing Long Jump is, the More Quickly the Footwork Performance of Students in Table Tennis Elective Course Will be Improved.

Relationship between the exercise time and the difference of the standing long jump performance. it is found that in the standing long jump, the total exercise time is positively correlated with the difference, that is the longer the exercise time is, the farther the standing long jump will be. It can be concluded that the physical exercise is significantly related to the physical fitness test performance of college students. The longer the total exercise time is, the more the performance will be improved.

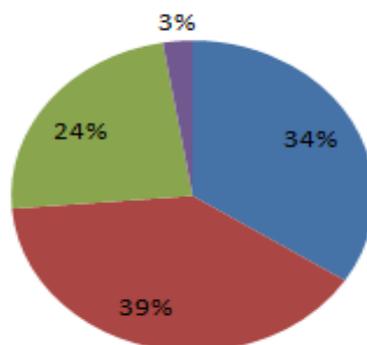
The Longer the Exercise Time of Pull-Ups (sit-ups) is, the More Quickly the Strength of Upper Limbs of Students in Table tennis Elective Course will be Improved.

Relationship between the exercise time and the difference of the pull-up performance.it is found that in the pull-ups (sit-ups), the total exercise time is positively correlated with the difference, that is the longer the exercise time is, the more quickly the number of pull-ups (sit-ups) will be improved. It can be concluded that the physical exercise is significantly related to the physical fitness test performance of college students. The longer the total exercise time is, the more the performance will be improved.

Overall, the physical exercise can significantly improve the physical fitness of students in the table tennis elective course. The appropriate exercise can effectively improve the physical fitness and the sports test scores of students. However, in the 203 valid questionnaires, only 7.69% of the students will ensure the exercise and 87.18% of the students depend on the situation. It is indicated that the students in table tennis elective course generally believe the exercise is not a necessary thing and it is just an unessential activity.

Of all the students, only 2.56% of the students can participate in the table tennis exercise every day. Most students choose to take the table tennis exercise for one or two times a week. The exercise time and the frequency are insufficient. It is indicated that the cognitive level of college students on the importance of table tennis exercise is not enough.

Influence of the Intensity of Physical Exercise on the Students’ Physical Fitness in Table Tennis Elective Course



(Figure 1 The different somatosensory proportions of students after 800m/1000m running test)

The different somatosensory proportions of the surveyed students after 800m/1000m running test are summarized above, in which only 34% of the students have no physical discomfort after the test

and 66% of the students have the out-force, the abdominal pain, the vomiting and other phenomena. Therefore, it is urgent to strengthen the intensity of the students' physical exercises in table tennis elective course and improve the exercise ways.

Influence of physical exercise on the physiological basis of the students in table tennis elective course

The process of physiological effect respiration produced by the physical exercise on the respiratory system refers to the process of gas exchange of human environment. It is also the process of supplying the oxygen required by the metabolism of human tissue cells and discharging the carbon dioxide. The respiratory system has great potential. Generally speaking, the pulmonary ventilation volume of people is 6-8L per minute when they are quiet. When they participate in the vigorous exercise, the pulmonary ventilation volume can be as high as 120 per minute, which indicates that the physical exercise can greatly improve the respiratory function and effectively improve the heart and lung function of body as well as reduce the risk of cardiovascular disease.

The physiological effect circulatory system produced by the physical exercise on the circulatory system is composed of the heart, the blood vessels and the lymph tissue. The heart is the organ of power. The blood vessels and the lymph tissues are the organs of transportation. The lymph tissue also has a defensive function. Through the activity of the circulatory system, the body will supply the blood to the body tissue. The blood can transport the oxygen absorbed by the respiratory system and the nutrient absorbed by the digestive system to the various tissues and organs of body so as to maintain the vitality of life. If the heart function is not good and the transportation system is fault, the body metabolism and the life activity will be seriously threatened.

Therefore, the heart is the most important organ of human body. The functions of heart and blood vessels can determine the health and the fitness levels of people to a great extent. According to the findings of exercise physiology, the heart volume of athletes is larger than the one of ordinary people. When they are quiet, the pulse rate per minute is lower than the one of ordinary people and the stroke volume is higher than the one of ordinary people. They can quickly adapt to the needs of strenuous exercise and can be quickly recovered after the exercise. For the ordinary people, they can output 5000ml blood per minute when they are quiet. When they participate in the strenuous exercise, they can output 20000ml blood. However, for the trained athletes, they can output 35000ml per minute. The heart volume, the lung volume and the hemoglobin content are significantly increased. And they are strongly correlated with the maximal oxygen uptake. The oxygen uptake is dropped with an average of 29% for the girls who have stopped exercising for several years, but there is no significant change in heart volume, which indicates that the exercise during adolescence has a profound effect on the cardiorespiratory function of adults. Ike Raum found that when an 11 year old boy is trained after half a year, the aerobic working capacity is increased by 15%. After 2 years of training, the aerobic working capacity is increased by 55%, the heart volume is increased by 45% and the vital capacity is increased by 54%, which may be much higher than the adolescent boys of the same age. The treadmill is employed to test and determine the maximum oxygen uptake. The greater the activity volume of subjects is, the more powerful the function will be. The strength is the greatest in adolescence, which shows that the effect of physical exercise is the most obvious at the adolescent stage and it is the best period of physical exercise. These facts indicate that the table tennis exercise has good effect on the physical fitness.

Conclusions and Suggestions

Ensuring the Good Exercise Ways

It is appropriate for the college students to participate in the table tennis exercise for 40 minutes every day. The time from 3pm to 7pm is the time period that is suitable for exercise every day and it is suitable for the table tennis exercise. Before the table tennis exercise, it is required to slowly run and warm up for 10-20 minutes. Afterwards, it is demanded to play the table tennis for 40 minutes after running for 20-30 minutes. Finally, it is necessary to walk for 10 minutes. Then, the exercise effect can be achieved.

Before running, it is required to make the appropriate warm-up activities, such as stretching, high knee lifting, abdominal movement, moving ankle and wrist joints, etc. Afterwards, it is needed to run for 20-30 minutes from slow to fast and from fast to low. It must be required to maintain the deep and even breathing. According to their actual situation, it is necessary to adjust the speed and the time of running. It is not permitted to immediately stop after running. It is demanded to walk for 10 minutes and play the table tennis. Afterwards, some stretching exercises of limbs are taken to help relax.

Ensuring the Proper Strength Training

The college students should also guarantee the proper strength training, such as dumbbell lifting and pull-up activities. It is required to pay attention to the details such as low frequency, multiple groups, long displacement, slow speed and high density in the process of training. The low frequency and the multiple groups refer that the exercise in each round should be less, but more rounds are demanded in the training. The long displacement and the slow speed refer that the actions should be completely finished so as to fully stretch and contract the muscles. At the same time, it should try to slow down the speed of exercise so as to more effectively stimulate the muscles and obviously improve the hitting power and the explosive force of students in the process of practicing the various skills of table tennis.

Ensuring the reasonable Exercise Time

The selection of exercise time should vary from person to person. The endurance exercise for 5-10 minutes every day can improve the cardiovascular function. Recent studies have shown that the effect of exercise for 20- 30 minutes every day is the best. Obviously, the exercise time and the exercise intensity should not be separately discussed. The general principle is: if the exercise intensity is small, the exercise time should be long; if the exercise intensity is great, the exercise time should be short.

Ensuring the Proper Exercise Frequency

The exercise frequency refers to the times of exercise every week. According to the report, when the number of exercise times every week is more than 3 times, the increase of the maximum oxygen uptake will tend to be stable; when the number of exercise times is more than 5 times, the increase of the maximum oxygen uptake will be very small; when the number of exercise times is less than 2 times, there will have no change. Thus, the most suitable frequency of the exercise in a week refers to 3-4 times. But due to the accumulation of motion effect, the interval time should not exceed 3 days.

Ensuring the Proper Exercise Intensity and Monitoring

The exercise intensity is one of the most important factors in the four elements of exercise prescription and it is also the core problem of the quantification and the scientification of exercise prescription. The exercise intensity can be quantized according to the heart rate and the subjective sensation degree (RPE) in the process of exercise. The Japanese Ikegami thinks that the low heart rate has no significant effect on the body; the high heart rate is easy to produce the fatigue and the sports injuries. Therefore, the best heart rate range is: males who are 21-30 years old (females who are 18-25 years old): 150- 160 times/min; males who are 31-40 years old (females who are 26-35 years old): 140-150 times/min; males who are 41-50 years old (females who are 36-45 years old): 130-140 times/min; males who are 51-60 years old (females who are 46-55 years old): 120-130 times/min; males who are over the age of 61 (females who are over the age of 55): 100-120 times/min. In summary, the systematic and scientific physical exercise can improve the metabolism, the immune ability and the physical qualities of the body through improving the functions of the motion system, the respiratory system, the circulatory system and the nervous system so as to achieve the purposes of physical fitness and health promotion. Of course, the systematic and reasonable exercise should not only follow the principle of exercise physiology, but also cultivate the willpower and form the good moral will, namely the physical and mental health. Then, the

demands of the modern society can be satisfied.

Acknowledgment

This research was financially supported by the Fundamental Research Funds for Central University (Grant NO. JB2017079).

References

- [1] Zhao Xuegong. Research and Application of Endurance Exercise on Improving the Physiological Function of College Students. Department of Physical Education, Wuhan Polytechnic University.
- [2] Wu Jian. A Study of Cardiac Reserve and Sports Ability. Journal of Wuhan Institute of Physical Education.
- [3] QiaoYucheng. Forming Mechanism and Affecting Factors of Exercising Habits of Teenagers. Journal of Physical Education, School of Physical Education, Shanxi Normal University.
- [4] GengNing, Fang Min. Relationship between Exercise Behavior and Decisional Balance among High School Students. Journal of Shenyang Sport University.
- [5] Wang Bubiao, Hua Ming, Deng Shuxun et al. Exercise Physiology. Higher Education Press.