REFLEXES OF TRAINING IN THE ABDOMINAL CORE ON STUDENTS' PHYSICAL COORDINATION

REFLEXOS DO TREINO NO CENTRO ABDOMINAL SOBRE A COORDENAÇÃO FÍSICA DE ALUNOS

REFLEJOS DEL ENTRENAMIENTO EN EL NÚCLEO ABDOMINAL EN LA COORDINACIÓN FÍSICA DE LOS ALUMNOS

Original Article
Artigo Original
Artículo Original

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ABSTRACT

Introduction: Currently, the physical quality of college students has been declining, contrary to China's goal of building a strong and competitive country for sports. Therefore, developing certain plans to improve students' physical quality and coordination ability is necessary. Objective: Study the reflection of muscle strength training in the abdominal core by aerobic gymnastics on students' physical coordination ability. Methods: 36 volunteers were randomly divided into experimental and control groups. The explosive strength of the central regions and the body coordination and balance ability of the two groups of students were measured before and after the experiment, and the data were classified. Results: In the experimental group, the value of supine, incline, right side, left side, jump 360 °, and single foot rotation 360 ° were improved. The evolution of the experimental group was much higher than the control group. Conclusion: Muscular strength training in the abdominal core with aerobic gymnastics can effectively regulate students' physical quality and movement coordination, thus establishing a good physical basis for daily work, studies, and routine. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Gymnastics; Abdominal Core; Resistance Training.

RESUMO

Introdução: Atualmente, a qualidade física dos estudantes universitários vem diminuindo, o que contraria o objetivo da China em construir um país forte e competitivo para o esporte. Portanto, é necessário apresentar certos planos para melhorar a qualidade física e a capacidade de coordenação dos estudantes. Objetivo: Estudar o reflexo do treinamento da força muscular no centro abdominal por ginástica aeróbica na capacidade de coordenação física dos estudantes. Métodos: 36 voluntários foram divididos aleatoriamente em grupo experimental e grupo de controle. A força explosiva das regiões centrais e a capacidade de coordenação e equilíbrio corporal dos dois grupos de estudantes foram medidas antes e depois do experimento, sendo os dados classificados. Resultados: No grupo experimental, o valor de supino, inclinado, lado direito, lado esquerdo, salto 360° e rotação de um único pé 360° foram melhorados. A evolução do grupo experimental foi muito maior do que a do grupo de controle. Conclusão: O treinamento de força muscular no centro abdominal com ginástica aeróbica pode efetivamente regular a qualidade física e a coordenação de movimentos dos alunos, estabelecendo assim uma boa base física para o trabalho diário, estudos e rotina. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores*: Ginástica; Centro Abdominal; Treinamento de Força.*

RESUMEN

Introducción: En la actualidad, la calidad física de los estudiantes universitarios ha ido disminuyendo, lo que va en contra del objetivo de China de construir un país fuerte y competitivo para el deporte. Por lo tanto, es necesario idear ciertos planes para mejorar la calidad física y la capacidad de coordinación de los alumnos. Objetivo: Estudiar el reflejo del entrenamiento de la fuerza muscular en el núcleo abdominal mediante la gimnasia aeróbica en la capacidad de coordinación física de los alumnos. Métodos: 36 voluntarios fueron divididos aleatoriamente en grupo experimental y grupo de control. Se midió la fuerza explosiva de las regiones centrales y la coordinación corporal y la capacidad de equilibrio de los dos grupos de estudiantes antes y después del experimento, y se clasificaron los datos. Resultados: En el grupo experimental, se mejoró el valor de la posición supina, la inclinación, el lado derecho, el lado izquierdo, el salto de 360° y la rotación de un solo pie de 360°. La evolución del grupo experimental fue muy superior a la del grupo de control. Conclusión: El entrenamiento de la fuerza muscular en el núcleo abdominal con gimnasia aeróbica puede regular eficazmente la calidad física y la coordinación de los movimientos de los alumnos, estableciendo así una buena base física para el trabajo diario, los estudios y la rutina. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Gimnasia; Núcleo Abdominal Entrenamiento de Fuerza.*

DOI: http://dx.doi.org/10.1590/1517-8692202329012022_0545 Article received on 09/21/2022 accepted on 10/21/2022

INTRODUCTION

In recent years, the state has gradually strengthened the detection of College Students' physical health level, and college students have become the focus of the state and society.[1] In the evaluation of the test results, it was found that the students' physical fitness continued to decline and the obesity index continued to rise. Although the physical development level of teenagers is improved, the improvement of physical quality is not proportional to the development level, which is not in line with the development goal of China's sports power and sports power.[2] Without a healthy body, we cannot contribute to the development of our country. For sports training, strong core strength can effectively improve sports performance and prevent sports injury. Due to physical limitations, most of the technical movements of sports can not be completed by a single muscle group, but need to be realized by multiple muscle groups.[3] In this process, the main role of the core muscle group is to strengthen the stability of the central parts of the human body, such as the spine and pelvis, and control and realize the balance of the body, so as to complete the transfer of the center of gravity while transferring the force. Aerobics is a sport that strives to keep a perfect body shape. Its process integrates dance, aesthetics and music. Due to the high technical nature of this movement, it puts forward higher requirements for the physical quality of the human body.[4] It controls the movement of the body's center of gravity through strong core strength, maintains the body balance, and enables the exerciser to correctly express the technical movements and connect smoothly.[5] This paper analyzes the importance of core strength training of aerobics and its influence on body balance, so as to provide data reference for students' training program design.

METHOD

In the selection of research objects, this paper conducted paid volunteer recruitment from sophomores in a university, and 60 volunteers were recruited. Through the screening of willing student volunteers, 36 volunteers were finally obtained. The study and all the participants were reviewed and approved by Ethics Committee of GuiLin Tourism University (NO. 2020GLTUXR09). They were randomly divided into the experimental group and the control group, with 18 people in each group. There was no significant difference in height, weight and age.

The experiment lasted for eight weeks. The 18 students in the control group normally carried out the optional courses of track and field sports according to the frequency of one hour for each class of two classes every week. They were required to train in a more positive attitude in each physical education class to ensure the effectiveness of the training. Other aspects were not required. The 18 students in the experimental group also carried out core strength training in aerobics at the frequency of two sessions per week and one hour in each class. The movements were relatively diverse, including but not limited to the supine foot pad, one leg straight knee lifting, supine foot pad pushing hip flexion and extension, bending double knee rolling ball in the prone position, side bending elbow single arm extension leg lifting, and supine bending elbow support leg lifting.

Before and after the experiment, the explosive force of the core parts and the ability of body coordination and balance of the two groups of students were measured, and the data were sorted out.

RESULTS

Influence of core muscle strength training of Aerobics on students' physical quality

The changes in physical fitness indicators before and after the experiment are shown in Table 1. In one minute before the experiment, you can complete the two ends of the back lying on your back (41.54 ± 7.2758), (43.63 ± 2.8419) a prone lying on both ends, (30.05 ± 1.5782) on the right side of the right side and (27.03 ± 1.7468) on the left side waist. rise. Within one minute after the experiment, you can complete the two ends of the back lying on your back, (54.07 ± 2.0146), the two ends of the prone, (34.98 ± 1.8869) on the right side of the right side and (32.95 ± 1.9801) a left side waist rise. Therefore, the core force training of the aerobics in this article can effectively improve the physical fitness indicators of the students of the experimental group, and P <0.01, indicating that there are extremely significant differences.

The changes in physical fitness indicators before and after the experiment of the control group are shown in Table 2. In one minute before the experiment, you can complete the two ends of the back lying on your back (44.34 ± 7.2758), (44.55 ± 2.8419), and the two ends of the prone lying down, (29.00 ± 1.5782) the right side of the right side and (27.83 ± 1.7468) on the left side waist rise. Within one minute after the experiment, you can complete the two ends of the back lying on your back (46.19 ± 2.2629), (47.82 ± 2.0146) a prone lying on both ends, (31.87 ± 1.8869), the right side of the right side and (29.31 ± 1.9801) a left side waist rise. The experimental results show that traditional physical education teaching can also enhance the physical fitness of students and improve the physical decline caused by the long -term sitting of students.

Comprehensively analyze Table 1 and table 2, and integrate the physical fitness indexes of the two groups after the experiment, as shown in Table 3. From Table 3, it can be clearly seen that the experimental group is much larger than the control group in such indicators as the number of supine two heads rising in 60 seconds, the number of prone two heads rising in 60 seconds, the number of right side waist rising in 60 seconds,

Table 1. Changes of physical fitness indexes of the experimental group before and after the experiment.

Action name	Before	After	T	P
60 seconds to lie on both ends/one	41.54±7.2758	55.15±2.2629	-4.0626	0.0030
60 seconds to stand up at both ends/one	43.63±2.8419	54.07±2.0146	-14.3593	0.0000
60 seconds of right side waist/piece	30.05±1.5782	34.98±1.8869	-8.0943	0.0000
60 seconds left side waist up/piece	27.03±1.7468	32.95±1.9801	-10.8144	0.0000

Table 2. The physical fitness index changes before and after the experiment of the control group.

Action name	Before	After	T	P
60 seconds to lie on both ends/one	44.34±7.2758	46.19±2.2629	-1.7917	0.1108
60 seconds to stand up at both ends/one	44.55±2.8419	47.82±2.0146	-4.1709	0.0000
60 seconds of right side waist/piece	29.00±1.5782	31.87±1.8869	-4.2617	0.0000
60 seconds left side waist up/piece	27.83±1.7468	29.31±1.9801	-3.2024	0.0000

Table 3. Changes of physical fitness indexes of the experimental group and the control group after the experiment.

Action name	Test group	Control group	T	P
60 seconds to lie on both ends/one	44.34±7.2758	46.19±2.2629	-1.7917	0.1108
60 seconds to stand up at both ends/one	44.55±2.8419	47.82±2.0146	-4.1709	0.0000
60 seconds of right side waist/piece	29.00±1.5782	31.87±1.8869	-4.2617	0.0000
60 seconds left side waist up/piece	27.83±1.7468	29.31±1.9801	-3.2024	0.0000

and the number of left side waist rising in 60 seconds. However, the data results of the two groups before the start of the experiment are not much different. This shows that the core strength training mode of Aerobics proposed in this paper promotes the improvement of students' physical quality much more than the traditional track and field teaching mode. Therefore, the core strength training mode of Aerobics should be appropriately increased in college physical education teaching, so as to enhance the flexibility of students' body, improve their physical quality, and meet the study and life in a better state.

Influence of Aerobics core muscle strength training on students' physical coordination ability

The coordination ability of students' body is simply the ability of students to master some movements. Students have mastered the physical coordination ability, and can respond to various situations in time in life and reduce the occurrence of injury problems. Therefore, this ability is also very meaningful to enhance students' physical quality and promote their healthy growth. In the aspect of action selection of body coordination ability, jump is not only a common type of action in aerobics, but also requires students to have strong coordination ability and be able to complete swing and jump in an instant. Therefore, this paper selects two movements of jump 360 ° and single foot rotation 360 ° to explore the score changes of the related movements before and after the experiment.

Table 4 shows the changes of coordination action scores before and after the experiment in the experimental group. The score of jump 360 ° before the experiment was (4.45 ± 1.5907) and increased to (7.90 ± 1.4456) after the experiment, P = 0.0043, < 0.01, indicating that there was a significant difference. The score of 360 ° rotation of one foot before the experiment was (5.43 ± 1.6965) and increased to (7.29 ± 1.3498) after the experiment, P = 0.0342, < 0.05, indicating that there was a significant difference. Therefore, strengthening aerobics muscle strength training can effectively regulate the students' physical coordination ability and lay a good foundation for other sports activities.

The changes of coordination action scores before and after the experiment in the control group are shown in Table 5. The score of jump 360 ° before the experiment was (4.65 ± 1.6256) and increased to (6.28 ± 1.6125) after the experiment, P = 0.0131, < 0.05, indicating that there was a significant difference. After the experiment, the score of 360 ° rotation of one foot was (5.03 ± 1.8080) and increased to (5.69 ± 1.6345) after the experiment, P = 0.0245, < 0.05, indicating that there was a significant difference. It can be seen that the regular physical education teaching can also optimize the students' physical coordination, which is of certain significance.

Comprehensively analyze Table 4 and Table 5, and integrate the scores of coordination actions of the two groups after the experiment, as shown in Table 6. It can be clearly seen from table 6 that the experimental group is stronger than the control group in improving the scores of the two indicators, but the scores of the students in the two groups are still relatively low on the whole. The experimental group only gets about 7 points, and the control group still gets around 6 points of passing. After investigating the relevant reasons, the author found that although the students had carried out aerobics teaching training and routine physical training for 8 weeks, their cognition of Aerobics was relatively insufficient. Therefore, although the level of the experimental group was greatly improved after the systematic training, it was still an entry-level stage on the whole, and its action standard was limited. The control group itself lacks the training of aerobics. Therefore, although the regular physical education teaching can also improve the coordination ability, the score is always low.

Table 4. Changes in scores of coordinated movements before and after the experiment in the experimental group.

Action name	Before	After	T	P
Jump 360 °	4.45±1.5907	7.90±1.4456	5.5049	0.0043
Single -foot rotor 360 °	5.43±1.6965	7.29±1.3498	4.8445	0.0342

Table 5. Changes of coordination action scores before and after the experiment in the control group.

Action name	Before	After	T	P
Jump 360 °	4.65±1.6256	6.28±1.6125	3.3537	0.0131
Single -foot rotor 360 °	5.03±1.8080	5.69±1.6345	3.3179	0.0245

Table 6. Changes in scores of coordination actions in the experimental group and the control group after the experiment.

Action name	Test group	Control group	T	P
Jump 360 °	7.90±1.4456	6.28±1.6125	2.4592	0.0231
Single -foot rotor 360 °	7.29±1.3498	5.69±1.6345	2.7081	0.0112

DISCUSSION

Aerobics is a kind of sport with high difficulty and expressing human beauty. Its technical ability is the sum of natural characteristics such as human stability, beauty, strength and novelty. The exerciser must complete various technical movements such as swinging, bending, bending, turning, balancing, jumping, etc. the above-mentioned movements all put forward higher requirements for the physical quality of the athletes and require the athletes to control their body balance well. The process of balance adjustment will be affected by various parts of the body, including the brain, vision, vestibule and its own receptors. Core strength training can effectively maintain the body balance and enhance the self-regulation ability of athletes. Aerobics requires frequent changes in posture and speed, so it needs to constantly change the center of gravity of the body. During this process, the muscle groups of the human body will continue to contract and relax, requiring a high degree of coordination of the muscle groups. Through core strength training, we can train the stability, strength, balance and other qualities of deep and shallow core muscle groups. The purpose of training is to fully exercise vision, vestibule, proprioception and lower limb muscles, so as to coordinate multiple muscle groups to work together. Therefore, it is considered as proprioception training of dynamic core stabilizer and strength training of core motor muscles.

Aerobics core strength training can effectively improve the input and information integration of vestibular, visual and proprioceptive systems and the movement control ability of central nervous system effectors, so as to reduce the shift of body center of gravity, improve the body control ability in aerobics, effectively improve the function of neuromuscular work, and improve the dynamic balance ability.

CONCLUSION

Through the research of this paper, we can find that the core muscle strength training in aerobics can effectively regulate the physical quality and movement coordination of students, thus laying a good physical foundation in daily work, study and life. Through the research of this paper, we can find that although the conventional physical education teaching has the advantages of simple entry, low cost, easy learning, and has certain teaching achievements, compared with the core strength training of aerobics, there are still some defects in some targeted projects. Therefore, in the follow-up physical education teaching, physical education teachers should combine the actual needs of students, design combined learning methods, break the traditional teaching mode, actively optimize and improve the curriculum design, so as to provide better physical education for students.

All authors declare no potential conflict of interest related to this article

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. Xiang Ting: writing and execution. Zhuo Lin: data analysis and article reviews.

REFERENCES

1. Wilson OW, Holland KE, Elliott LD, Duffey M, Bopp M. The impact of the COVID-19 pandemic on US college students' physical activity and mental health. J Phys Act Health. 2021;18(3):272-8.
2. Wilson T, Milosevic A, Carroll M, Hart K, Hibbard S. Physical health status in relation to self-forgiveness and other-forgiveness in healthy college students. J Health Psychol. 2008;13(6):798-803.
3. Shinkle J, Nesser TW, Demchak TJ, McMannus DM. Effect of core strength on the measure of power in the extremities. J Strength Cond Res. 2012;26(2):373-80.
4. Hallage T, Krause MP, Haile L, Miculis CP, Nagle EF, Reis RS, et al. The effects of 12 weeks of step aerobics training on functional fitness of elderly women. J Strength Cond Res. 2010;24(8):2261-6.
5. Oliver GD, Adams-Blair HR. Improving core strength to prevent injury. J Phys Educ Recreat Dance. 2010;81(7):15-9.