PROGRESSIVE PHYSICAL TRAINING OF SWIMMING FOR COLLEGE STUDENTS

TREINAMENTO FÍSICO PROGRESSIVO DE NATAÇÃO PARA ESTUDANTES UNIVERSITÁRIOS

ENTRENAMIENTO FÍSICO PROGRESIVO DE NATACIÓN PARA UNIVERSITARIOS

Original Article
Artigo Original
Artículo Original

Guo Huang[1]
(Physical Education Professional)

1. Zhejiang Wanli University, Zhejiang, Ningbo, China.

Correspondence:
Guo Huang
Zhejiang, Ningbo, China. 315100.
2002900057@zwu.edu.cn

ABSTRACT

Introduction: It is necessary to adjust the physical training of swimmers according to their physical conditions, being the progressive stages method the most indicated nowadays. However, this is not the most observed technique in teaching swimming to college students. Objective: Study a protocol for applying progressive physical training in teaching swimming to college students. Methods: In one semester of teaching swimming sports, two volunteer students (n=40) classes were selected for the experiment. Equally divided into experimental and control group, the experimental group trained according to the phased physical training, while the control trained according to the usual semester physical training program. Before and after the experiment, the relevant indices were measured. Results: Compared with constant general physical training, progressive physical training can provide better guidance of necessary training according to the actual situation of students, and the efficiency of optimization on body composition is more evident during the semester. Conclusion: Selecting progressive physical training and adjusting training items and intensity according to students' actual situation can amplify the effect of swimming instruction on college students, its promotion is suggested. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Physical Education and Training; Students; Universities; Swimming.

RESUMO

Introdução: É necessário ajustar o treinamento físico dos nadadores de acordo com as suas condições físicas, sendo o método de etapas progressivas o mais indicado atualmente. No entanto, não é essa a técnica a mais observada no ensino de natação para estudantes universitários. Objetivo: Estudar um protocolo para a aplicação do treinamento físico progressivo no ensino de natação para estudantes universitários. Métodos: Em um semestre de ensino de natação esportiva, selecionou-se duas classes de estudantes voluntários (n=40) para o experimento. Igualmente divididos em grupo experimental e controle, o grupo experimental treinou de acordo com o treinamento físico por fases, enquanto o controle treinou de acordo com o programa habitual de treinamento físico semestral. Antes e depois do experimento, os índices relevantes foram mensurados. Resultados: Em comparação com o treinamento físico geral constante, o treinamento físico progressivo pode fornecer melhor orientação de treinamento necessário de acordo com a situação real dos estudantes, sendo a eficiência da otimização sobre a composição corporal mais evidente durante o semestre. Conclusão: A seleção do treinamento físico progressivo e o ajuste dos itens e intensidade do treinamento de acordo com a situação real dos estudantes pode amplificar o efeito do ensino de natação sobre os estudantes universitários, sugere-se a sua promoção. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Educação Física e Treinamento; Estudantes; Universidades; Natação.*

RESUMEN

Introducción: Es necesario ajustar el entrenamiento físico de los nadadores en función de sus condiciones físicas, siendo el método de etapas progresivas el más indicado en la actualidad. Sin embargo, ésta no es la técnica más observada en la enseñanza de la natación a estudiantes universitarios. Objetivo: Estudiar un protocolo de aplicación del entrenamiento físico progresivo en la enseñanza de la natación a estudiantes universitarios. Métodos: En un semestre de enseñanza de natación deportiva, se seleccionaron para el experimento dos clases de alumnos voluntarios (n=40). Divididos a partes iguales en grupo experimental y grupo de control, el grupo experimental entrenó según el entrenamiento físico por fases, mientras que el de control entrenó según el programa habitual de entrenamiento físico semestral. Antes y después del experimento, se midieron los índices pertinentes. Resultados: En comparación con el entrenamiento físico general constante, el entrenamiento físico progresivo puede proporcionar una mejor orientación del entrenamiento necesario según la situación real de los estudiantes, y la eficacia de la optimización sobre la composición corporal es más evidente durante el semestre. Conclusión: La selección del entrenamiento físico progresivo y el ajuste de los elementos de entrenamiento y la intensidad según la situación real de los estudiantes pueden amplificar el efecto de la enseñanza de la natación en los estudiantes universitarios, se sugiere su promoción. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Educación y Entrenamiento Físico; Estudiantes; Universidades; Natación.*

DOI: http://dx.doi.org/10.1590/1517-8692202329012022_0691 Article received on 11/23/2022 accepted on 12/07/2022

INTRODUCTION

With the continuous improvement of physical education courses in colleges and universities, the types of physical education courses are gradually developing in an all-round way. Among many sports related courses in colleges and universities, swimming has gradually become one of the favorite sports for college students. Swimming is beneficial to the physical and mental health of college students and improves their physical functions.[1] In addition, it can also achieve the purpose of shaping the body. However, swimming is difficult and dangerous. Therefore, swimming events require high physical quality, physical function and coordination of students.[2] Therefore, in order to carry out swimming courses in colleges and universities, it is necessary to do a good job in investigating the physical conditions of college students.[3] For the purpose of improving students' physical quality, college students should have enough physical conditions as the basis to participate in the project. In addition, the course is required to be conducted in a safe sports environment. Avoid the occurrence of students' sports safety problems. The traditional swimming teaching mode only imparts students the basic knowledge of the swimming project, and students only master the basic movements and basic concepts of the project.[4] This kind of teaching mode can not make college students have a deeper understanding of the project. And the technical level cannot be improved. Finally, the project development is not mature enough among college students. Therefore, the stage training teaching should be adopted for college students' swimming teaching. In addition, we should make a comprehensive training plan based on the strength, flexibility, coordination and endurance of college students.[5] Real time follow-up of students' existing technical level is helpful to explore the potential of students' projects. It is conducive to students' learning experience in the course, and the project performance can be effectively improved. From a macro perspective, staged physical training is to develop different physical training plans according to the different periods of the course content that students learn and master.[6] At a deeper level, it means that teaching should adopt follow-up teaching, pay close attention to students' existing technical ability in real time, improve students' technical level through current training, and help students develop towards a higher level. Although there have been some previous studies on the phased and physical training of college students, there are still some problems in the practical teaching process.[7] Therefore, this paper applies the phased physical training in the swimming teaching of college students to explore its training effects.

METHOD

In this paper, two male swimming elective parallel classes were selected as the research objects from the sophomore swimming elective course in a university. The study and all the participants were reviewed and approved by Ethics Committee of Zhejiang Wanli University (NO. 2018ZJWL-SP004). After excluding some students with too high or too low swimming scores, the students in the middle of the class were selected, 20 in each class, as the experimental group and the control group. In a semester of swimming sports teaching, the experimental group adjusts the intensity and action of physical training according to the actual situation of students in the way of phased physical training, so that the physical training matches the needs of students at the current stage, and the relevant physical training is completed. The control group trained according to the same set of physical training program within a semester, and the movement and intensity remained unchanged. Before and after the beginning of the experiment, the relevant data indicators were measured, and the data results were compared and analyzed, so as to explore the role of physical training in different situations on the effect of students' swimming teaching.

Due to the limited space of the university natatorium, the physical training should be carried out on land. The training methods of the two groups of research objects are as follows:

The control group: used the strength belt as an auxiliary prop to complete the physical training of the upper limbs, completed the physical training of the core area in the form of abdominal bridge clapping and prone elbow support, and completed the physical training of the lower limbs in the form of single leg jumping and horizontal walking with the strength belt. The whole physical training lasts for 30 minutes, including 5 minutes of warm-up training, 20 minutes of physical training and 5 minutes of relaxation training. After physical training, after full stretching and relaxation, enter the swimming pool to carry out relevant swimming teaching.

Experimental group: Three stage physical training forms were set up for stage training. The main physical training methods in the first stage were shoulder blade strength training, mini shoulder spin, weight bearing supine throwing, strength belt training, weight bearing single leg squat and single leg half squat jump. The main physical training methods in the second stage are Swiss ball push ups, Swiss ball top crotch exercises, elbow pushing Swiss ball forward, elbow pushing Swiss ball elbow turning movement, swallow balance single hand lifting and single leg squatting. The main physical training methods in the third stage are barbell press, alternating kettlebell swing, weight bearing up chest, kettlebell swing, swallow balance (weight bearing), dumbbell split leg squat and kettlebell sumo squat. During the whole period of physical training, teachers regularly set certain physical goals for students. When students reach this goal, they can carry out the next stage of physical training.

RESULTS

Effect of physical training on changes of body composition of college students

For ordinary college students, physical education is more about strengthening their bodies and improving their physical quality. Therefore, changes in body composition can be used as an observation indicator of swimming teaching results. In this section, Table 1 and Table 2 respectively analyzed the impact of staged physical training on the change of body composition of college students in the experimental group, and the impact of ordinary physical training on the change of body composition of college students in the control group. Starting from weight, skeletal muscle, body fat, PBF (body fat ratio), WHR (waist hip ratio) and other aspects, they discussed the impact of staged physical training on the swimming teaching effect of college students.

After a semester of staged physical training, the body composition of college students in the experimental group has changed to a certain extent. As shown in Table 1, weight, skeletal muscle, body fat, PBF (body fat ratio), WHR (waist hip ratio) have all decreased, indicating that the body fat ratio of college students has decreased throughout the training process, and their body shape is more symmetrical, indicating

Table 1. The influence of staged physical training on the changes of body composition of college students in the experimental group.

Test indicator	Before(n=20)	After(n=20)	P
Weight (kg)	78.171±5.548	73.314±4.859	0.0000
Skeletal muscle (kg)	32.359±2.064	31.913±2.033	0.6013
Body fat (kg)	19.382±3.626	15.811±3.156	0.0000
PBF(%)	24.808±3.195	21.136±3.107	0.0000
WHR(%)	0.927±0.040	0.873±0.040	0.0000

that staged physical training can promote the improvement of college students' physical quality.

After a semester of general physical training, the body composition of students in the control group has also been optimized. As can be seen from Table 2, all indicators of students in the control group have decreased, but the effect is not obvious compared with the experimental group.

The influence of physical training on the change of college students' physical fitness

In this section, the impact of physical training on the change of physical fitness of college students is studied. Table 3 shows the impact of staged physical training on the relevant physical fitness of college students in the experimental group, and Table 4 shows the impact of general physical training on the relevant physical fitness of college students in the control group.

After a semester of training, we can see from Table 3 that the physical fitness of college students in the experimental group has been better optimized, which has laid a good physical foundation for swimming.

Table 4 shows the physical changes of the control group after a semester of general physical training. It can be seen that although the physical fitness level of students in the control group has also been improved to a certain extent, there are still some shortcomings compared with the experimental group data in Table 3, which need further improvement.

The influence of physical training on college students' swimming performance

In this section, students' swimming performance is selected as the key indicator to judge the effect of swimming teaching. Table 5 shows the impact of staged physical training on the swimming performance of students in the experimental group, and Table 6 shows the impact of general physical training on the swimming performance of students in the control group. Through the investigation before the experiment, we can see that there are two main types of swimming teaching in this university, one is freestyle, the other is breaststroke, and the students in the middle of the results selected in this paper mainly master the two kinds of swimming. Therefore, in the selection of indicators, the 100-meter freestyle results and 100-meter breaststroke results are selected as reference objects

It can be seen from Table 5 that the scores of college students in 100m freestyle before the experiment were (119.463 ± 12.083) s, which were shortened to (93.756 ± 11.572) s after the experiment, (137.619 ± 9.765) s before the experiment, and (118.096 ± 8.009) s after the experiment. It can be seen that the staged physical training can significantly improve the swimming performance of the experimental group students in the middle of the score, and $P<0.01$, indicating that there is a very significant difference.

It can be seen from Table 6 that the scores of college students in 100m freestyle before the experiment were (121.488 ± 11.760) s, which were shortened to (105.740 ± 11.460) s after the experiment, (136.600 ± 9.160) s in 100m breaststroke before the experiment, and (125.080 ± 9.2969) s after the experiment. This shows that ordinary physical training can also effectively improve the swimming performance of college students in the middle of their performance, and $P<0.01$, indicating that there is a very significant difference.

Table 2. The influence of general physical training on the change of body composition of college students in the control group.

Test indicator	Before(n=20)	After(n=20)	P
Weight (kg)	78.453±5.337	77.470±5.383	0.0000
Skeletal muscle (kg)	31.854±2.071	31.653±1.891	0.1390
Body fat (kg)	20.051±3.324	19.563±3.216	0.0000
PBF(%)	25.559±2.946	24.768±2.868	0.0000
WHR(%)	0.927±0.047	0.913±0.496	0.0000

Table 3. The influence of staged physical training on the changes of physical fitness of college students in the experimental group.

Test indicator	Before(n=20)	After(n=20)	P
Push -up (one)	14.797±5.128	21.752±6.298	0.0172
1.5 miles (min)	14.322±1.385	12.864±1.230	0.0568

Table 4. The influence of general physical training on the change of physical fitness of college students in the control group.

Test indicator	Before(n=20)	After(n=20)	P
Push -up (one)	15.744±6.979	16.517±6.716	0.6301
1.5 miles (min)	14.088±1.315	13.632±1.291	0.5909

DISCUSSION

The physical fitness training system is divided into several stages, and the training content and training volume in different stages are also different. Make training plan according to the existing technical level. When the technical level reaches a higher level, the training objectives for the next stage shall be formulated. Provide basic link support for the improvement of project technical ability and project performance. The first is physical training at the basic stage, which aims to improve physical function and physical quality, and trains students in speed, strength, flexibility, physique, endurance and other aspects. Aerobic training can be carried out by running and jumping on land or water. At the same time, anaerobic exercise can be carried out by means of equipment, push ups, sit ups, etc. Improve body muscle content and strengthen strength training. Accomplish the training contents at the basic stage with the practice of swimming skills. The next step is physical training at the advanced stage, which focuses more on students' weak links. Combine the weak links of students' individual level and strengthen the practice. The training content in the advanced stage varies from person to person. Different students show different levels of technology. During teaching, students' existing abilities shall be evaluated accordingly. After analysis, formulate targeted training plans. The last is the physical training at the high level. When students complete the training content in the advanced stage and their technical level is raised to a certain level, the training stage will also change. In high-level physical training, the training methods should be more advanced and the training content should be more scientific. At the same time, students should also learn to allocate their physical strength reasonably. In the competition environment, a reasonable allocation of physical strength and tactics will help students achieve better results in the project. In line with the goal of faster and stronger modern competitive sports. After completing all the staged physical training, students' project competitiveness will be significantly improved. Therefore, compared with the traditional training teaching mode, the phased physical training method has more scientific and efficient advantages.

Table 5. The influence of staged physical training on the changes of swimming performance of college students in the experimental group.

Test indicator	Before(n=20)	After(n=20)	P
100m freestyle (s)	119.463±12.083	93.756±11.572	0.0052
100 meters of stroke (S)	137.619±9.765	118.096±8.009	0.0014

Table 6. The influence of general physical training on the swimming performance of college students in the control group.

Test indicator	Before(n=20)	After(n=20)	P
100m freestyle (s)	121.488±11.760	105.740±11.460	0.0083
100 meters of stroke (S)	136.600±9.160	125.080±9.296	0.0030

CONCLUSION

At present, when many colleges and universities are improving their sports teaching achievements, they focus on sports majors or students with sports specialties, and do not pay more attention to elective sports teaching for some non sports majors and students with non-sports specialties. As a result, physical education has become a "leisure class", which has a certain negative impact on the improvement of college students' physical quality. This paper analyzes the effect of staged physical training on college students' swimming teaching, which can not only enhance the progress of college students' swimming, but also improve the importance of colleges and universities on college students' elective sports teaching. The experimental results show that selecting staged physical training and adjusting the training items and training intensity according to the actual situation of students can better improve the teaching effect of college students' swimming teaching, so it is worth promoting.

The author 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. Guo Huang: writing and execution.

REFERENCES

1. Zhao Y. Research on the Intervention of Swimming Training on College Students' Psychological Resilience. Front Educ Res. 2021;1(8):17-21.
2. Yajun L, Aimin, G. Research on Special Physical Ability in Swimming Training in Colleges. Front Sport Res. 2020;2(4):10-2.
3. Karatrantou K, Stavrou V, Hasioti P, Varver D, Krommidas C, Gerodimos V. An enjoyable school-based swimming training programme improves students' aquaticity. Acta Paediatr. 2020;109(1):166-74.
4. Lin P. The Dilemma and Development Strategy of Swimming Teaching in Colleges and Universities. Front Sport Res. 2020;2(6).
5. Yang J, Xu G, Li Y, Zou, Q. College Student Classification in Swimming Teaching and Training. In 2016 International Seminar on Education Innovation and Economic Management (SEIEM 2016). Atlantic Press. 2016:15-19.
6. Stanković S, Marković Ž, Dopsaj M, Ignjatović A, Aleksić D. The effects of a swimming program on the functional abilities of female students. Facta Universitatis. Series: Physical Education and Sport. 2016;14(3):427-34.
7. Saputra SA, Sukur A, Tangkudung J, Dlis F, Widiastuti W. The experiment of physical education teaching style on different categories of student confidence to improve the swimming learning value (Experimental method using design of treatment by factorial 3x2) at Higher School of Teacher Training And Pedagogy Kusumanegara Jakarta. J Educ Health Sport. 2019;9(6):98-120.