

# **An Experimental Study on Aerobics Athletes' Balance Ability Based on Modern Educational Technology**

**Chen Xinrui**

Zhejiang University of Science & Technology, Hangzhou, China

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**Abstract:** Aerobics is an Aperiodic Skill Sport Based on Flexibility and Coordination, with Strength and Strength as the Core and Endurance as the Guarantee. on the Basis of Reading Literature and Aerobics Teaching and Training Practice, This Paper Attempts to Reform the Traditional Aerobics Athletes' Balance Ability Training Method by Using Computer Multimedia Technology under the Guidance of Modern Educational Technology Theory. through Experimental Comparison, This Paper Analyzes and Discusses That Modern Educational Technology Can Improve the Balance Ability of Aerobics Athletes and is Conducive to the Implementation of Quality Education. the Results Show That Modern Educational Technology Has a Great Influence and Promotion on the Balance Ability of Aerobics Athletes. Aerobics Professional Athletes in Colleges and Universities Surveyed Have a Good Understanding of Modern Educational Technology, and the Use of Software Technology and Teaching Equipment Needs to Be Improved and Improved. after Core Strength Training, Athletes Can Effectively Control Their Body Posture in Both Twist and Air Jump Movements, Maintain the Stability of Their Trunks, Achieve Higher Completion Rates of Twist and Rotation Movements, and Improve Their Athletic Performance.

## **1. Introduction**

The Predecessor of Modern Educational Technology is Educational Technology, Which Embodies the Development of Educational Technology in Different Times. It Has Been More Than 20 Years Since Competitive Aerobics Was Introduced into China. during This Period, Coaches and Scholars in Our Country Are Constantly Exploring-Practicing-Re-Exploring-Re-Practicing to Implement Their Own Training Theories, Some of Which Are Mainly Based on Exercises and Some Are Mainly Based on Quality [1]. in All Kinds of Sports Activities, People Use the Stability of the Core Area to Maintain Their Body Balance. on This Basis, They Simultaneously Transmit the Strength of the Core Area to the Upper and Lower Limbs. This Ability of the Body is Called Core Stability [2]. Using Multimedia Computer Technology, Internet-Based Network Communication Technology and Micro-Teaching to Construct a New Teaching Mode of Innovative Education, and Strive to Break through the Shackles of Traditional Education, Reflecting the Idea That High-Tech Teaching Equipment is a Learning Tool for Aerobics Athletes and the Teaching Idea That Aerobics Athletes Are Cognitive Subjects [3]. Therefore, Good Teaching Methods and Favorable Material Conditions Have Promoted the Smooth Development of Teaching Activities. in the Field of Calisthenics Teaching in Colleges and Universities, the Application of Modern Educational Technology to Assist Calisthenics Teaching is a Powerful Manifestation of the "Optimization Theory of Teaching Education" in Teaching Methods and Teaching Conditions.

## **2. Research Objects and Methods**

### **2.1 Research Object**

The Subjects of the Experiment Were 46 Aerobics Athletes Who Chose Aerobics in Normal Universities. on Platforms Such as Hownet, the Author Collected 33 Documents on the Relationship between Core Strength and Competitive Aerobics in the Past Ten Years, and Focused on Reading, Sorting and Classifying These 33 Documents. in Addition, the Author Also Consulted

5 Books on Aerobics and 5 Books on Core Strength and Balance Ability. These Calisthenics Athletes Have Taken One Semester of Calisthenics in the Last Semester, Have Mastered the Basic Movements of Calisthenics, and Have a Certain Level of Athletic Ability. This Semester, They Mainly Study the Balance Ability of Calisthenics.

## 2.2 Research Method

Experimental method: Aerobics athletes were randomly divided into experimental group and control group. After grouping, there was no significant difference in quality and theoretical knowledge. In the experimental site, other factors (except the application of modern educational technology) are strictly controlled under the same conditions. The intra-group comparison and inter-group comparison of male and female groups before, during and after training are carried out, so as to explore whether the core strength training mode of the healthy abdomen wheel type has significant improvement on the balance ability, and whether this training mode has inter-group difference on the improvement of the balance ability of different male and female athletes.

According to the research needs, an expert questionnaire is formulated, i.e. experts are first-line coaches engaged in competitive aerobics and international judges, etc., thus helping the author to obtain effective special skill test indexes on the relationship between core strength training and balance ability and relevant training implementation basis. In order to ensure the validity of the questionnaire, the author made a qualitative evaluation on the structure, content and whole of the questionnaire for 20 first-line coaches engaged in competitive aerobics. the scoring criteria were divided into five grades, namely: “very consistent, very consistent, basically consistent, not very consistent, not consistent”. The evaluation results are shown in Table 1 below.

Table 1 List of Statistical Results of Questionnaire Validity Test

|                     | Very consistent | Basic symbol | Not quite in line | Non conformity |
|---------------------|-----------------|--------------|-------------------|----------------|
| Structural validity | 14              | 4            | 2                 | 0              |
| Content validity    | 17              | 2            | 1                 | 0              |
| Overall validity    | 16              | 1            | 1                 | 0              |

According to the practical statistical method and SPSS operation, the data collected were processed by SPSS. The data of each group were expressed by mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ), and the significant difference was compared by t test.

## 3. Results and Analysis

### 3.1 Can Greatly Improve the Calisthenics Balance Ability of Calisthenics Athletes

After the experimental teaching in the experimental group and the control group, the teaching effect of the ability of organizing exercises was tested respectively. The results showed that there were obvious differences between the two groups of aerobics athletes (Table 2). In order to realize the optimization of teaching and education process, we must first fully understand the characteristics and conditions of aerobics athletes and aerobics athletes, which is the premise and foundation of realizing the optimization of teaching and education process. This fully shows that, on the one hand, the core strength training of the healthy abdomen wheel type has greatly improved the explosive force of the core of male and female athletes, but it is not that the longer the training time is, the more explosive force of the core can be improved indefinitely.

Table 2 Comparison of Results between Experimental Group and Control Group

| Projects          | Experimental group | Control group | P value |
|-------------------|--------------------|---------------|---------|
| Fitness           | 85.4               | 73.7          | <0.01   |
| Scientific nature | 85.8               | 71.5          | <0.01   |
| Artistry          | 80.5               | 74.2          | <0.01   |
| Novelty           | 83.5               | 70.3          | <0.01   |

In competitive calisthenics, every movement is not independent and requires the joint efforts of many muscles. Traditional waist and abdomen strength training methods can only practice the strength of a certain muscle or muscle group, and cannot fully practice the whole core area. Core

strength training can practice waist and abdominal muscle groups in a wider range. The more novel the action is created, and the computer-aided operation system and Internet-based network resources provide us with huge action vocabulary resources. Therefore, on the whole, this phenomenon is not conducive to the all-round and rapid development of aerobics. Therefore, the unfavorable situation should be reversed by carrying out teaching training and adding the teaching of this content in aerobics theory and practice classes, so as to consolidate the theoretical and practical basis of software application for teachers and students.

### 3.2 It is Conducive to the Cultivation of Aerobics Athletes' Innovative Thinking and Innovative Ability

The formation of calisthenics' balance ability is complicated. It is restricted by many factors and is also the result of the interaction and comprehensive reflection of various abilities. Standing and squatting exercises with eyes open and closed can enhance the balance and stability of athletes' bodies, as shown in Table 3. Standing exercises with eyes open and closed can enhance athletes' proprioception. Squatting exercises with eyes open and closed are to strengthen the strength of the core muscle group while enhancing the coordination and control ability of the athletes themselves.

Table 3 Contents and Sequence of Standing and Squatting Exercises with Eyes Open and Closed

| Practice method                      | Requirement   | Number of seconds |
|--------------------------------------|---|-------------------|
| Stand on one leg with your eyes open | One leg is used as a supporting leg, the other leg is raised and made with eyes open                            | 50                |
| Stand on one leg with eyes closed    | One leg is used as a supporting leg, the other leg is lifted and made with eyes closed                          | 60                |
| Open your eyes and squat on one leg  | One leg is used as a supporting leg, the other leg is lifted, and the supporting leg does squats with eyes open | 30 times /min     |

Only by mastering this rule can the potential of athletes be exploited to the fullest. The total increase of men's pitch control at both ends and left and right waist control is lower than that of women, and the left and right waist ability has obviously developed from imbalance to regional balance [4]. There must be creative thinking, and the cultivation of creative thinking depends on the cultivation of divergent thinking, intuitive thinking and image thinking. Active interviews with coaches and aerobics experts revealed that most coaches focus on the strength and quality of the “front abdominal muscles”, which easily leads to unbalanced development of the “front-back” abdominal muscles, thus restricting the athletes' body posture and the exertion of various difficulties, exercises, excesses and convergence movements in the competition [5]. Assuming that there is no significant difference between the physical quality of the athletes in the experimental group and the control group, after statistical analysis, the probabilities of supine biceps, push-ups, prone biceps and leg high kick in the experimental group and the control group are  $P > 0.05$ , the difference is not significant, thus confirming the original hypothesis. Therefore, the above physical qualities of the experimental group and the control group belong to the same level before the experiment.

### 3.3 It is Beneficial for Aerobics Athletes to Change from “Learning” to “Learning”

Under the guidance of constructivism theory, the application of modern educational technology to the cultivation of calisthenics' balance ability can transform calisthenics athletes from passive learning to active participation, which well reflects calisthenics athletes-centered learning and promotes the individualized development of education [6]. From Table 4, it can be seen from the overall analysis that after the core strength training in the form of healthy abdominal wheels, the training time for improving the balance ability of women and men is about 12 weeks, and after 12 weeks, it will enter a stable state, suggesting that coaches should grasp the best time for training sensitivity of this index.

Table 4 List of Analysis on the Number of Men and Women Who Completed Vertical Rotation of 540 and Vertical Split without Support (Unit: Months /Min)

| Indicators   | Group              | Initial state | At the end of the first phase | At the end of the second stage | At the end of the third stage |
|--|--------------------|---------------|-------------------------------|--------------------------------|-------------------------------|
|  |                    | 0 weeks       | 6 weeks                       | 12 weeks                       | 18 weeks                      |
| Left single foot vertical turn 540 joint without support vertical split  | Experimental group | 0             | 3                             | 3                              | 2                             |
|  | Control group      | 0             | 4                             | 3                              | 0                             |
| Right single foot vertical turn 540 joint without support vertical split | Experimental group | 0             | 2                             | 2                              | 0                             |
|  | Control group      | 0             | 2                             | 4                              | 1                             |

Assuming that the subjects in the experimental group have significant differences in physical fitness before and after a small cycle of training, after statistical analysis, the probability of the subjects in the experimental group before and after the experiment in supine two-head up, push-ups, prone two-head up and legs high kick on the leg  $P < 0.05$ , the difference is not significant, denying the original hypothesis. However, it should not be ignored that after entering the consolidation phase, the men's side has slowly improved, while the women's side has decreased, but the decrease is very small, which can be considered as reaching the saturation state of women athletes. In the teaching of calisthenics' balance ability, we have always been guided by the constructivism theory, emphasizing that calisthenics coaches are the main body, calisthenics athletes are the main body, heuristic teaching is actively implemented, and attention is paid to the cultivation of calisthenics athletes' independent thinking ability and innovative consciousness [7].

## 4. Conclusions and Suggestions

### 4.1 Conclusion

Under the guidance of constructivism theory, the application of modern educational technology can stimulate aerobics athletes' creative thinking and innovative ability, thus enabling aerobics athletes to create high-quality aerobics routines [8]. There is a profound relationship between educational technology and aerobics teaching in colleges and universities. Modern educational technology plays a greater role in promoting aerobics teaching in colleges and universities. Teachers and students in aerobics teaching in colleges and universities surveyed have a better understanding of modern educational technology. On the static balance index, after training with the core strength of the healthy abdominal wheel, the balance ability of the swallow balance and the leg moving on one foot side are significantly improved ( $p < 0.05$ ), and the training improvement time for both men and women is about 12 weeks, and after 12 weeks it will enter a stable state, suggesting that coaches should grasp the best time for training sensitivity of this index. Core strength training can effectively improve the physical quality of competitive aerobics athletes. When athletes do exercises and connect, especially difficult movements, their strong trunk strength saves physical strength and reduces the consumption of physical strength, thus enabling athletes to coordinate their limbs more quickly and accurately.

Under the guidance of modern learning theory and incorporating modern educational technology into physical education, a new teaching mode can be constructed and quality education can be implemented truly, which is beneficial to the cultivation of aerobics athletes' abilities [9]. On the dynamic balance index, after training with the core strength of healthy abdominal wheel, the balance ability of split leg with single foot standing 720 and standing 540 without supporting standing is significantly improved ( $p < 0.05$ ). the training improvement time for both women and men is about 12 weeks, and after 12 weeks, it will enter a stable state, suggesting that coaches should grasp the best time for training sensitivity of this index. Core strength training can improve the physical quality of competitive aerobics athletes faster, more comprehensively and greatly than

traditional waist and abdomen strength training. Compared with traditional waist and abdomen strength training, core strength training can effectively improve the ability of competitive aerobics athletes.

At least two small cycles of core strength training are required to have a significant impact on the physical quality of competitive aerobics athletes. In terms of dynamic and static balance indexes, after training with the core strength of a healthy abdominal wheel type, the training improvement time for men and women is 12 weeks and 18 weeks respectively, and then they enter a stable state in terms of the single-legged lateral leg rotation 360 degrees and Ilyushin's unsupported vertical split balance ability. Computer multimedia technology and network technology provide a large number of information materials, which provide strong support for aerobics athletes to explore independently and further improve their balance ability [10]. At the same time, the computer can accurately analyze the number of movements of each joint in the routine, which provides a strong guarantee for the fitness and scientificity of the routine. Modern educational technology has certain influence and promotion on calisthenics teaching in colleges and universities. There are still many problems that need to be solved urgently in calisthenics teaching in colleges and universities under modern educational technology.

## **4.2 Proposal**

First of all, aerobics coaches should do a good job in changing their roles, i.e. from imparting knowledge to guiding and organizing teaching activities. Secondly, we should change the status of aerobics athletes, that is, aerobics athletes should change from passive recipients of knowledge to active discovery and inquiry of knowledge. Whether it is a single exercise without instruments or an exercise with various unstable instruments, the methods of exercise have the characteristics of diversity. We must adhere to the principle of mutual promotion and constant change of various methods, and teach students according to their abilities according to local conditions. Only in this way can we more comprehensively practice the muscle groups in the core area and make the core area more stable. To improve the awareness and ability of college teachers and students to use and promote modern educational technology in aerobics teaching. We will step up efforts to promote the use of modern educational technology in aerobics teaching. During training design, athletes should be monitored in a targeted way, and statistical tables of all index data before and after training should be made so as to find problems in training.

We should clearly understand the transformation of the role of the media, and suggest that modern educational technology should play an important role in promoting and influencing calisthenics teaching in colleges and universities. When arranging physical fitness training, we should combine equipment such as Swiss ball and small ball to create as many unstable situations as possible to carry out systematic core balance training. In order to give full play to the maximum effect of core strength training in competitive calisthenics, it requires coaches of competitive calisthenics to think, practice, reflect and innovate constantly, and pay attention to various problems arising from the training practice, so as to better digest, solve and innovate the problems.

According to the data results of this study, it is not difficult to find that the core strength training of the abdominal wheel type has a significant effect on the corresponding development of the core muscle groups of aerobics athletes, and the training arrangement in this paper is undoubtedly a training mode worthy of promotion. Based on this, coaches can refer to this mode for training.

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