

Research on Methods of Improving Teaching Efficiency of Physical Training Based on Sports Biomechanics

Weiyan Ying^{1*}, Wenlang Huang²

¹*Department of Physical Education, Zhejiang University of Finance & Economics Dongfang College, Haining, Zhejiang 314408, China*

²*Physical and Military Training Education Department, Zhejiang Ocean University, Zhoushan, Zhejiang 316022, China*

ywy1100@163.com, hwl191217@163.com

**Corresponding Author*

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Abstract: Today, with the continuous development of science and technology, sports biomechanics has also made some progress. The application of various new materials and technologies has made the test of sports biomechanics more accurate and fast, especially the application of computer technology has accelerated the development of sports biomechanics automation. Sports biomechanics plays its own unique role in physical education, and it is an important part of physical education. Studying sports biomechanics is helpful to speed up the reform process of physical education. This paper introduces the methods of improving the efficiency of physical training teaching. Applying sports biomechanics to physical education and training in Colleges and universities is conducive to students to understand and grasp the essential rules of movement and improve the learning and training effect. Therefore, we should carry out the teaching reform of sports biomechanics course, and apply it to the physical education and training of colleges and universities better, so as to improve the sports technology level of college students.

1. Introduction

As a new discipline, sports biomechanics has not developed for a long time, but in short, it is a discipline based on the principles of biology, physics, etc., which uses advanced scientific measurement technology to study the change law of human body function in sports [1]. As a new discipline, sports biomechanics has not developed for a long time, but in short, it is a discipline based on the principles of biology, physics, etc., which uses advanced scientific measurement technology to study the change law of human body function in sports [2]. Sports biomechanics is a discipline that studies the laws of human beings engaged in sports technical mechanics. It applies mechanics, mathematics, anatomy, physiology and sports technology theories to study the characteristics and laws of various sports techniques. It is a basic theoretical science that the majority of physical education teachers, coaches and athletes must master [3]. In recent decades, the

international sports biomechanics has developed rapidly, and the application of new materials and computers has enabled the rapid development of biomechanical testing methods in the direction of automation, accuracy and speed [4]. In the research of human body structure, test methods and means, the speed and accuracy of test data processing, the depth and breadth of research have been greatly improved [5]. At present, the research of sports biomechanics has made rapid progress, and has been gradually applied to large-scale international competition training, but it is less applied to college physical education and training. Therefore, we need to carry out the teaching reform of sports biomechanics course, and better apply it to college physical education and training, so as to improve the sports technology level of college students [6].

2. The Significance of Applying Sports Biomechanics

2.1 Sports Biomechanics

In the physical environment, whether the human body is in a static state or in intense sports, it is obtained under the action of force. That is to say, no matter what kind of movement, it follows the principle of sports biomechanics [6]. The cultivation of young students in China requires them not only to have scientific cultural knowledge and good moral character, but also to have a healthy body and sports spirit. In the pilot phase of reforms in China's education, there is still a large gap in physical education compared with some developed countries in Europe and America. In particular, there is a lack of sports equipment in rural physical education, resulting in uneven overall quality of physical education in China. Physical education teachers don't pay enough attention to physical education courses, their technical expertise is poor, and some teachers even have a vague knowledge of sports biomechanics. Therefore, the understanding of sports biomechanics and technical learning should be implemented at this stage [7]. The function and efficiency of any movement of human body should follow the principle of kinesiology. If we can use the basic principles of biomechanics and summarize them into several basic biomechanical problems, it will help to guide students to accurately understand and grasp the essential laws of sports movements, so as to effectively improve the learning effect [8].

2.2 Importance of Sports Biomechanics

The movement of the human body must conform to the laws of mechanics, but the mechanical formula cannot be applied in the same way. The human body has the properties of things but is different from objects. The human body is an organism with life and movement, and there are individual differences in physiology and psychology between people, so it must be analyzed and studied according to the biological characteristics of the human body. These are the problems to be studied and solved in sports biomechanics [9]. The traditional physical education and training model can be said to be pure physical activity. Teachers and students only express sports through a lot of "body language". As a result, you only know how to do sports and don't know why you want to do it. It can be understood from Newton's law that whether a person turns from static to motion or from motion to static, it will be affected by the effects of moving body tissues, etc., which requires analysis of sports through the value and direction of Newton's force. Therefore, students need knowledge of sports biomechanics as a guide in physical exercise, which requires teachers to use sports biomechanics in physical education to create conditions for guiding students [10]. Figure 1 is a model diagram of sports biomechanics research.

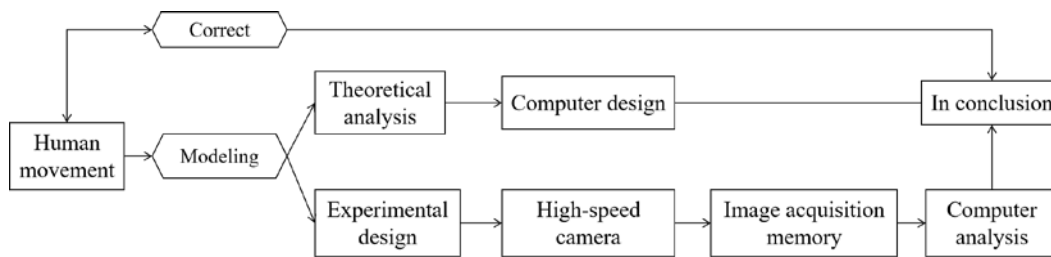


Fig.1 Research Model of Sports Biomechanics

Applying sports biomechanics to physical education and sports training will promote the transformation of physical education and sports training from “training type” to “knowledge type”, thus improving students' sports achievements, effectively protecting students' safety during sports and promoting the improvement of sports competition level.

3. Application of Sports Biomechanics in Physical Education

3.1 Sports Biomechanics Teaching

In the past long-term sports training, coaches used visual means and traditional training methods based on experience, which are very valuable and indispensable for teaching sports skills and improving sports performance. However, the traditional training methods have great limitations and can not adapt to the development of sports technology and the improvement of technical level. Using the principles of sports biomechanics to teach physical education courses, students not only move their bodies throughout the class, but also use their hands and brains to actively think, which improves the enthusiasm of sports and the atmosphere of “inquiry” in the classroom. After class, students will take problems and have great interest in their running situation, read books extensively and try to analyze their own movements. Through this way of teaching, students will have a comprehensive and in-depth understanding of their theoretical level, understanding of technical movements, mastering and improving technical movements, as well as what methods to improve technical movements and why to improve them. Figure 2 is a three-dimensional image of the joint based on biomechanical analysis.

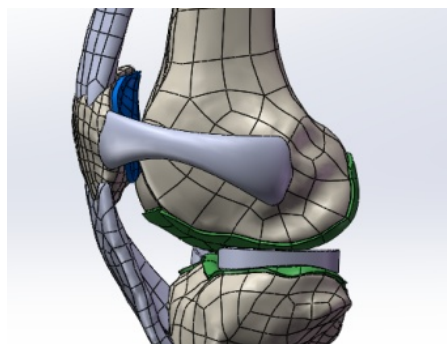


Fig.2 Three Dimensional Image of Joint Based on Biomechanical Analysis

The basic theoretical knowledge of biomechanics and intuitive understanding in practice are adopted in sports experimental teaching materials. Combining basic theoretical knowledge with concrete practice is beneficial for students to effectively and flexibly use biomechanics to solve practical problems in sports training in future work, and at the same time, it will enhance students' interest in learning this subject. Through long-term systematic teaching guidance, the scientific nature of physical education will penetrate into students' minds. Sports biomechanics runs through

every movement of students in sports, which is closely related to the stress of physical exercise.

3.2 Mode Change of Teaching and Training

In physical education, according to the laws of people's body movement, the force is related to the trajectory of the body. This unique form of exercise conforms to the standard of sports biomechanics, and it also obtains a favorable basis in the education of sports biomechanics. Sports biomechanics can be combined with a variety of sports events such as track or field competitions in the teaching process, so that the content of the teaching curriculum can be optimized and the teaching work of teachers' physical education can be promoted. In addition, sports biomechanics can refine students' body movement technology, promote the coordinated development of students' physical quality, and enhance students' physical strength. This development situation helps to enrich the teaching process to a certain extent, and students gradually enjoy sports through this kind of physical exercise. From a mechanical point of view, when a person is at rest, the resultant force and the resultant force moment are zero. From the statics point of view, the action that people stand at the starting line and prepare to start is the preparation action that the human body changes from a static state to a moving state, which can make the human body quickly change into a moving state.

The use of statics knowledge to study sports training can enable teachers to discover students' balance problems, muscle working status, etc., so as to achieve targeted training for students and strengthen weak links. The picture shows the biomechanical structure of Taijiquan in physical training teaching.

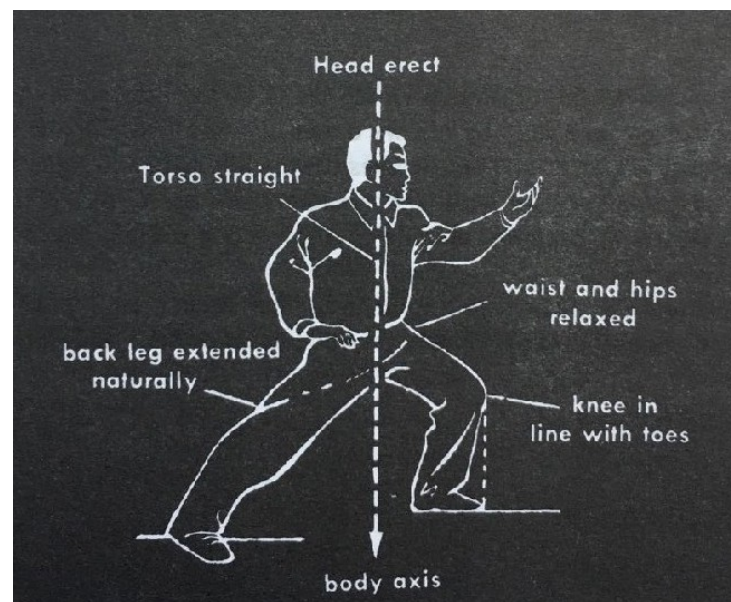


Fig.3 The Biomechanical Structure of Taijiquan

In the curriculum, we should add excellent courses with teaching characteristics, and formulate corresponding teaching plans and teaching programs to make up for the single class situation. A reward and punishment mechanism should be established, giving outstanding annual rewards, and giving criticism or deducting bonuses for poor teaching evaluation. Evaluation methods can be students' evaluation, parents' evaluation, teaching achievement evaluation and so on. It is necessary to innovate teaching methods, attract students' curiosity, improve students' enthusiasm and improve teaching density and quality.

4. Conclusions

In physical education and sports training, it is often necessary to apply the theoretical knowledge of sports biomechanics and its analysis methods, such as explaining the essentials of sports technology with the knowledge of biomechanics, drawing the mechanical analysis diagram and mechanical model teaching aids of sports technology, carrying out the research on the biomechanics analysis and optimization of sports technology, scientific demonstration and optimization of new technology Design and establish the mathematical model of sports technology. No matter what kind of physical exercise, in the process of exercise, everyone should constantly adjust the training plan according to their own state. To sum up, sports biomechanics has become a very important part in physical education, and its role and influence in sports can not be ignored. Through careful analysis of sports events based on the principles of sports biomechanics, we can find scientific ways and means of physical exercise, improve the traditional physical education forms, promote the diversification of teaching process, and make students really fall in love with sports. The main task of sports biomechanics is to study the biomechanical characteristics of human body's shape, structure and function, study all kinds of technical movements of human body, establish technical principles of all kinds of movements, and establish technical models of movements to guide teaching, learning, training and productive labor. Combining the characteristics of the individual's body shape, function and quality, research the best exercise and labor technical action plan suitable for the individual, and gradually improve it through the action technology diagnosis. With the rapid development of science today, only when physical education teachers and coaches master relevant scientific knowledge and use scientific training methods can students master technical movements faster and better, and athletes can better improve their sports skills.

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