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The application of sports mechanics principles in physical education

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Abstract: *As a special form of physical exercise, physical education has a positive effect on people's physical and mental health development. However, due to the influence of venue and equipment, students' participation is not high and the effect is not satisfactory. Therefore, it is necessary to strengthen physical education and improve teachers' professionalism in order to provide a good training environment for students. Based on this, this paper will analyze the mechanics of strength and endurance movements used by athletes in the process of competition with the basic principles of kinesiology and related theoretical knowledge, and finally propose specific implementation strategies on how to use the laws of mechanics to enhance the skills of athletes, so as to ensure that athletes can give full play to their subjective initiative and maximize their personal value in the competition activities. In order to further improve the overall strength of the athletes, and finally achieve excellent results to obtain the desired results. It is hoped that the research results can provide some reference value for the general physical education teachers, and promote our athletes to have stronger competitive ability and adaptability in the fierce competitive environment, and continuously optimize their own physical training mode.*

Keywords: *Sports mechanics; physical education; application of principles*

1. Introduction

At present, most colleges and universities in China are set up for physical education courses based on theoretical knowledge. This leads to many teachers only focus on theoretical knowledge when conducting lectures, and do not combine practice with theory. This not only fails to improve the efficiency and quality of classroom teaching, but also is not conducive to cultivating students' good learning habits and innovation ability. Moreover, the traditional teaching mode is too single, boring and tedious, which makes many students resist. In response to these problems, we should actively introduce modern teaching methods to enrich the classroom teaching content, so that students can master the relevant knowledge through various forms of teaching methods, and also use multimedia technology to play some interesting videos or animations, so as to mobilize students' interest in learning, and then enhance their participation. In addition, because of the lack of physical awareness and willpower of exercise among college students in China, it is necessary to strengthen the physical quality of college students to effectively improve this situation, starting from many aspects, such as strengthening physical fitness, scientific fitness, reasonable diet, etc., so as to achieve a better exercise effect. In addition, it is also necessary to pay attention to the mental health of college students. For college students, they are the future and hope of our country, so in order to promote the overall physical and mental development of college students, the school should not only provide them with professional training and guidance, but also focus on ideological and political education to help college students establish a correct world view, outlook on life and values, etc.; at the same time, it should actively carry out colorful and healthy campus activities, so that college students can At the same time, they should also actively carry out colorful and healthy campus activities, so that college students can have a healthy body and understand their physical condition through various ways, find out the problems in time and take effective measures to solve them, so that their physical quality can be improved continuously and finally realize the goal of harmonious living between human beings and nature. In addition, teachers in colleges and universities should give full play to their guiding role when teaching physical education, and combine theoretical knowledge with practice, so as to stimulate students' interests and hobbies, and then improve the quality of classroom teaching. In addition, teachers can also appropriately introduce some modern technical means in the process of teaching, such as multimedia technology, which can bring visual impact to students and effectively mobilize students' learning initiative. The last thing is to strengthen the communication between teachers and students.

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The first is to explain the key points in detail; the second is to provide students with corresponding practice problems and exercises to help them better understand what they have learned; the second is to organize group discussions, debates and other activities to deepen students' impressions of the relevant content; and the last is to encourage students to actively participate in teaching and learn from other students, so as to promote their overall quality[1]. Finally, students should be encouraged to actively participate in teaching and learn from other students, so as to promote students' overall development. For example, when teaching theoretical knowledge about basketball, teachers can let students find information and analyze data by themselves, and then share these data with their classmates, so that students can gain a sense of achievement and increase their self-confidence. Teachers should also pay attention to cultivating students' thinking skills of finding problems - thinking about problems - asking questions and the habit of independent thinking, through which not only can they exercise their logical thinking skills, but also help improve students' practical hands-on skills. In addition, in the classroom, teachers should be good at using a variety of methods to motivate each student to participate in the learning process. For example, students who are not as basic or willing to participate in group activities can be tutored individually, and then they can be brought along to discuss together, which can effectively improve students' independent learning ability and stimulate their interest in learning. In addition, for those students who have already mastered certain theoretical knowledge and skills, some interesting teaching contents can be carried out appropriately to attract students, so as to deepen students' impression of the knowledge they have learned and thus achieve twice the effect with half the effort. In conclusion, only continuous innovation can promote the overall development of China's university education level and provide more high-quality talents for the society[2].

2. Results and analysis

2.1 Classification of sports

According to different categories can be divided into the following types. First, competitive sports (including athletics and ball games, etc.); second, recreational sports (such as swimming, diving, etc.); third, fitness sports (such as yoga, aerobics); fourth, other types of sports (such as martial arts, tai chi, etc.). The first three are the most basic and most common. The latter are mainly soccer, basketball, table tennis, badminton, etc. From the above data: for competitive sports, they involve a large variety of items, and each item has its own unique characteristics, so students must have an in-depth understanding of each item to better master these items in order to effectively improve their learning efficiency and thus promote the improvement of students' comprehensive ability; at the same time, it is also important to note that this type of items requires students to It is also worth advocating that this type of program requires students to have good physical fitness and strong mental ability to fully demonstrate their value; however, due to the special nature of the program, it is difficult for many students to stick to it. For example, some ball games are not easy to be accepted and loved by most people, although they are very difficult and challenging, and their spectacle is not high, so their social recognition is not particularly high. Sports like running and swimming, on the other hand, have certain advantages over other types of sports, which can not only exercise and relax, but also enhance physical fitness, and thus are welcomed and favored by the general public. Therefore, for different categories of sports should be based on the actual situation to choose the right way to exercise, and to ensure that each sport is meaningful, not just the pursuit of quantity and ignore the quality. In addition, there are many ways to learn more about sports, such as knowledge and skills, so as to improve their professional skills and lay a solid foundation for future study and work. In addition, because athletes are under a lot of pressure when they participate in competitions, they must maintain a good mental state in order to complete the tasks, and also pay attention to reasonable control of their emotions and breathing rate, etc. Thus, in order to give full play to these factors, it is necessary to strengthen the scientific and effective sports training, so as to maximize the effect of sports training. For example, the body can be properly stretched or relaxed; second is to focus on a certain degree of stimulation of muscle groups, so that it becomes stronger and more powerful, and thus promote the body parts to improve the function. Finally, it is necessary to continue to strengthen exercise, so as to have a healthy body, help strengthen the body and reduce the incidence of injuries and diseases[3]. However, different types of sports activities have different characteristics. The most common ones are athletic sports, such as basketball and soccer. Moreover, with the improvement of social and economic level, more and more people are choosing to participate in some sports with strong competitiveness. For example, table tennis, badminton, tennis, etc. are among the popular sports.

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2.2 Adaptability of sports mechanics in sports

For physical education teachers, in order to make students better master theoretical knowledge and skills, they must develop strategies according to the characteristics of different stages and the actual situation of students. For example, in junior high school, teachers need to focus on how to improve students' physical quality because of the large amount of curriculum content, while in senior high school, students already have a certain knowledge base, so teachers can mobilize them through some fun activities so that students can actively participate in them. For example, when learning "basketball dribbling technique", in order to stimulate students' interest and also to exercise, teachers can organize a basketball competition for students and ask each group to send a representative, and then compete as a group, which not only can activate the atmosphere, but also can effectively cultivate students' sense of cooperation, thus improving the efficiency of classroom teaching. This will not only liven up the atmosphere, but also effectively cultivate students' sense of cooperation, thus enhancing the efficiency of classroom teaching. In addition, teachers should also pay attention to real-life teaching activities to enhance students' practical skills and innovative thinking, and to promote students' overall development. For example, in the lesson "Synthesis and Decomposition of Forces", students are introduced to two concepts - Newton's first law and the relationship between action and reaction forces, followed by an analysis of the forces on several typical objects. Since students have certain hands-on skills and understanding, they will be more comfortable in the actual operation, and thus achieve good results. In this way, students not only fully grasp the theoretical knowledge, but also help to stimulate their interest in learning. On the other hand, teachers should guide students to apply what they have learned to practice, so that they can find problems and solve them in practice. In addition, the specific teaching process should also focus on strengthening the interaction between teachers and students to promote the active participation of students, so as to further improve the overall quality of students, achieve efficient learning effect, and ultimately promote the healthy development of China's sports industry.

2.3 Inadaptability of sports mechanics in sports

(1) The mastery of some movements is not proficient enough. Due to their own age and psychological quality and other factors, some students may experience a decline in physical function. This requires teachers to make scientific and reasonable training plans for students according to the actual situation and strict requirements for themselves, so that they can actively participate in the classroom teaching activities to improve the learning efficiency of students. At the same time, attention should be paid to guiding students to treat failure correctly, so as to better complete the relevant tasks. For example, in the process of basketball teaching activities, if students cannot control their shooting percentage well, they will not be able to achieve good results[4]. Therefore, teachers should strengthen the training of students' shooting skills and tactical skills, so that each student can improve their skills through continuous practice, and then obtain excellent performance; on the other hand, they should also pay attention to the exercise of students' teamwork and communication skills, so as to effectively promote the overall development of students. For example, when students participate in the school basketball tournament, due to the limitations of the venue and time, so many students can only use one-on-one confrontation, which will lead to some students appear nervous, and even psychological imbalance phenomenon occurs, which seriously affects the overall state of competition. In order to solve this problem, teachers should encourage students to work together in small groups and cooperate with each other, so as to finally achieve complementary strengths and weaknesses, enhance students' sense of collective honor and responsibility, and ensure that students can fully devote themselves to the competition. In addition, when carrying out teaching work also need to pay attention to, not just the pursuit of speed and ignore the normality of the action. Only by ensuring that the movements are standardized can we better bring out the strengths of each student and thus achieve the best training effect. Therefore, in the actual teaching process, teachers must fully take into account the individual differences of students, according to the specific circumstances of different students to take appropriate measures to guide, so that they can actively participate in classroom teaching activities, so as to improve students' interest in learning. At the same time, for some students with good physical quality should be given appropriate attention and care, so that they have enough time for self-exercise; for some students who are weak or in poor physical condition should be timely found and help them to develop a reasonable rehabilitation training plan, so as to maximize the level of comprehensive quality of students and avoid injuries and other accidents. For example, in the pull-up exercise, if the students do not do a good job of warming up, it will easily lead to muscle strains and joint injuries, and even fractures in serious cases. Therefore, it is important to check whether the students' physical condition is normal before starting the program, and if there is any abnormality, they should stop the exercise immediately or seek medical treatment immediately.

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2.4 Characteristics of muscle mechanics

Muscle is composed of myocytes and smooth muscle cells. Muscle contraction is achieved mainly by the rapid diffusion of protein molecules within the muscle fiber. When muscle tissue is subjected to external forces, it causes changes in its internal structure, which leads to faster contraction and an increase in the maximum force of the muscle. The faster the muscle contraction speed, the more energy per unit of time consumed; conversely, the slower the muscle contraction speed, the less energy per unit of time consumed. Therefore, when training, you should pay attention to control the rhythm of each action to avoid the phenomenon of excessive fatigue. In addition, we should also pay attention to the rate of muscle contraction and the strength of the exercise, so as to effectively improve the level of physical fitness of students and lay a good foundation for their future participation in various competitions. During the exercise process, the muscles need to transmit signals to the central nervous system of the brain through the nervous system, thus prompting the body to produce an excitatory response. When people are affected by external factors, such as strenuous exercise or emotional excitement, muscle spasms will occur, in this case, the body will automatically adjust their own muscle tension, in order to better play the function and effect of the muscle itself. At the same time, because of the elastic nature of the muscles, they will be more obvious when subjected to external stimuli. Therefore, in order to make students master the correct way of muscle force, they should strengthen the training of their strength parts, and according to the actual situation of reasonable adjustment, and then achieve twice the effect with half the effort; in addition, you can also use some equipment to assist practice, such as elastic bands, sandbags, etc. are more commonly used to the equipment, they can enhance muscle flexibility, so that the muscles get fully relaxed. In addition, teachers can also guide students to aerobic exercise, which can not only promote the improvement of physical function and muscle coordination development, but also effectively improve muscle stiffness, so as to provide good conditions for the next to carry out other movements. Finally, stretching and massage can be used to relieve muscle soreness, which can lead to muscle recovery, further improve muscle flexibility and stability, and ultimately achieve efficient fitness.

From the above, it can be seen that in physical education activities, in order to make students more active participation, the first need to muscle exercise as one of the main content, and then gradually start related activities. In the specific implementation of the actual situation, it is necessary to choose the appropriate way, such as the use of different exercise methods or combinations of forms, so as to improve the efficiency of exercise. Secondly, the psychological quality of students should be cultivated, and they should be guided to correctly understand the important role of muscle training for themselves, so that students can also maintain a good attitude in the learning process, with full enthusiasm into the training. In addition, teachers should develop a scientific and reasonable training plan according to the individual differences of each person, and strictly follow the requirements to ensure the training effect. At the same time, the supervision and management of students should be strengthened to promote the improvement of their overall quality through continuous strengthening of training, so as to help students to develop good habits. The last thing is to ensure that students can master the knowledge they have learned and learn to use this theoretical knowledge to solve problems. For example, when doing some difficult exercises, students may feel strained or difficult to complete and other problems, then you can use the auxiliary tools - elastic band to achieve this purpose. This method not only enhances physical fitness, but also helps to develop students' willpower and self-confidence, so that they can participate more actively in training activities, effectively exercising their skills, laying a solid foundation for future development and improving their overall strength. In addition, it should be noted that when stretching exercises should pay attention to speed to avoid strains; at the same time, not too hard to avoid ligament rupture or joint dislocation and other situations. In addition, during the stretching process, you should always stay relaxed and not overly tense. If discomfort occurs during stretching, stop stretching immediately, then adjust and deal with it until it returns to normal before continuing to stretch. In addition, in order to get good results, you must ensure that the muscles are in a relatively relaxed state in order to achieve the best stretching effect. Because muscle stretching will produce a certain resistance, which in turn affects the stretching and elasticity of the muscle itself, so in practice, the appropriate stretching method should be chosen according to the characteristics of different parts.

2.5 Characteristics of sports process

(1) Body posture changes. Teachers can group students according to their actual situation, let each group cooperate with each other to complete the corresponding exercises, and make it the focus of classroom teaching, which can effectively enhance the students' enthusiasm and initiative to participate in sports activities. For example, in the basketball dribbling training, in order to better exercise students' reaction ability, students can first demonstrate simple movements, and then be corrected by other students;

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or through some games to carry out classroom teaching, such as quiz, so that students can give full play to their imagination and creativity to think about the problem, and then improve their thinking ability, and at the same time to cultivate At the same time, they should cultivate a good spirit of cooperation, so as to promote the overall development of their comprehensive quality. (2) Movement speed. After making a movement, in order to ensure the fluency and consistency of the movement must require athletes to have a certain degree of speed, and this is also one of the key factors to measure whether a sports player has a high level, only with the ability to react quickly to ensure that they can win in the game. (3) Strength. When playing basketball, athletes not only need to rely on their own strength to complete the shot, but also need to use their bouncing power to throw the ball into the basket, so that a large part of the good or bad sports technology depends on the flexibility of the arm. (4) Endurance. In our daily lives we often find that some people have difficulty completing the load required for strenuous exercise even after long hours of training. But if through scientific and effective methods to exercise the body, and persistently to practice hard, then everyone can reach their own limit level, so that they can make their muscles become stronger, so that their physical quality has been significantly improved[5]. (5) Perseverance. "Perseverance" has always been considered one of the most basic qualities and qualities of athletes. And this quality is also an important ability necessary for all sports, only with a good quality of will to ensure that athletes can always maintain a positive and optimistic attitude, to be able to lay a solid foundation for the subsequent game. Therefore, to improve sports performance is necessary to cultivate a team of athletes with good will quality and strong will, and thus continue to promote the development of China's youth sports career. (6) Sensitivity. The so-called sensitivity mainly refers to the sensitivity of athletes to changes in the external environment. Since there are big differences between different athletes, there are certain differences in their reaction speed and movement rate, but these differences are not enough to affect the final sports effect, so coaches should reasonably arrange the training plan according to the actual situation, and also need to pay attention to the following points. The first point is to develop different training methods for different types of athletes; the second point is to strengthen the physical fitness of the players and strengthen the training, so as to effectively enhance the physical reserves of the players; the third point is to help the athletes establish the correct values through a scientific and reasonable way, and make them form a healthy attitude towards life, so that they can better adapt to the future The third is to help athletes establish correct values and develop a healthy attitude towards life through scientific and reasonable methods so that they can better adapt to their future jobs.

3. Conclusions and suggestions

3.1 Principles of sports mechanics as a theory for studying sports techniques

Through a comprehensive analysis of the muscle strength and joint flexibility of each part of the athlete's body, it is concluded that when an athlete makes a certain action, he or she mainly relies on his or her own muscle groups to produce force for the action to be completed; and because the human body itself has a certain inertia, it will make other muscle groups change when performing a certain action, thus affecting the entire action. The smooth performance of the movement. Therefore, in the actual teaching process, the principles of sports mechanics can be applied and combined with relevant cases to explain to students in order to enhance their interest in learning. At the same time, students should understand that the principles of motion mechanics can not only help them understand what they are learning, but also improve their problem solving ability. In addition, teachers should focus on guiding students to go to the library to check out more knowledge about exercise physiology and biomechanics after class time, which can not only deepen students' impression of what they have learned, but also promote their overall development[6]. On the other hand, as a more systematic theory, it not only includes kinesiology, but also involves sports psychology and sports anatomy, which requires students to have a high comprehensive quality to understand its meaning correctly. Through continuous practice, we found that the principles of sports mechanics are really beneficial to cultivate students' good thinking and scientific methodology, and then effectively exercise students' physical quality. Therefore, in order to improve the teaching effect of this course, reform should be carried out from the following points: first, strengthen the construction of teachers; second, optimize the teaching content system, integrate the principles of sports mechanics into the relevant professional courses, and appropriately increase the laboratory hours, so that students can grasp a richer theoretical knowledge; third, focus on the explanation of key and difficult issues, to help them Third, pay attention to the explanation of key and difficult problems to help them deepen their impression of the knowledge they have learned, and also guide students to think actively and encourage them to think from multiple perspectives; fourth, pay attention to the change of classroom teaching mode. This will not only stimulate students' desire for knowledge, but also help them to improve their independent learning ability and innovation ability; fifth, in terms of

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teaching methods, teachers should choose and adjust teaching methods flexibly according to specific situations. For example, in the actual teaching process, multimedia technology can be used to assist teaching and improve teaching efficiency. In addition, in the actual teaching process, it is necessary to combine different teaching objectives to take effective measures to achieve the desired effect.

3.2 Limitations of application of principles of sports mechanics in sports

Firstly, because the course involves more mathematical knowledge and formula derivation, some abstract and hard-to-understand or difficult-to-remember knowledge points need repeated practice to master. Secondly, although this course is a practical course, many teachers do not realize this point, only focus on the teaching of theoretical knowledge, but ignore the training of students' hands-on ability, making the classroom teaching effect is not good; Finally, due to the limited teaching time, most teachers use the lecture method to teach[6], ignoring the training of students' hands-on ability, resulting in some students in the learning process have Finally, due to the limited time, most teachers use lecture method to teach and ignore the hands-on training of students, which leads to some students' resistance and unwillingness to actively participate in learning activities. Therefore, in order to improve students' learning enthusiasm, we should combine theory and practice, strengthen the exercise of students' hands-on skills and teamwork ability, so that students can better adapt to the needs of future social development and improve their overall quality.

3.3 Construction of principles of sports mechanics based on biomechanics, sports mechanics and mathematics

First, for some theoretical knowledge that is more abstract, teachers can present it visually through videos or pictures. Then, let students explore and complete the corresponding practice problems with what they have learned; finally, the teacher will summarize to help students better understand the relevant concepts. For example, once students have mastered the laws of interaction between the parts of the human body, they can design their favorite gymnastic movements according to these laws, thus increasing their interest and enthusiasm in learning. In addition, teachers should focus on developing students' logical thinking skills and creative abilities. Before teaching a new lesson, students should be guided to review their old knowledge and clarify what will be taught and what problems will be solved in this lesson, so that students can have something to focus on. Moreover, after explaining new knowledge points, students can also be asked to design their own practice problems, which not only helps to exercise students' ability to analyze and think about problems, but also can effectively stimulate students' creative thinking[7]. On the other hand, in the classroom teaching process, teachers should adopt heuristic teaching methods and let students actively participate in teaching activities. Through the observation of students' learning situation, it is found that most students are good at using their brains and hands, so teachers should encourage students to practice more and apply the theoretical knowledge they have learned flexibly in life practice in addition to imparting theoretical knowledge to them when teaching, so that they can achieve twice the effect with half the effort. In addition, teachers should focus on cultivating students' awareness of independent learning, guiding them to actively engage in exploratory learning activities and choosing appropriate training methods according to actual needs, so as to improve their innovative ability and comprehensive quality level, and thus achieve the purpose of improving students' physical quality in all aspects. For example, when doing some difficult movements, the load can be appropriately increased to stimulate the students' nervous system and make them feel excited, which can also promote the development of students' muscle strength and ligament flexibility; moreover, because the muscle contraction speed is faster, it is easier to form muscle memory, which can help enhance students' reaction speed and improve their limb coordination and flexibility. On the other hand, in terms of physical exercise can also involve students in various forms, such as jumping rope and kicking are good ways to exercise students' joint function, which not only can effectively improve students' cardiorespiratory function, but also help them to strengthen the control of muscle groups. In addition, attention should be paid to the principle of gradual progress, not to rush. Only after first mastering the correct way to exercise can they further improve their abilities and eventually achieve their idealized goals.

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