International Journal of Intelligent Information and Management Science
ISSN: 2307-0692, Volume 8, Issue 2, April, 2019

Analysis on the Grasp of Rhythm and Force Process in Football Sport

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Abstract: Football, as a sport that students like to learn in the physical education major of Colleges and Universities, has unique sports features and many aspects of educational function, and it plays a positive role in promoting students' moral accomplishment, cultural quality, intelligence progress and willpower quality. Due to the characteristics of Football movement and technical structure, it is required that the learners have a good comprehensive physical and mental quality and ability to learn and master the skills of Football, such as quick response ability and thinking judgment ability, sports quality and ability, interpersonal communication and cooperation ability, emotion regulation and control ability and so on. Therefore, training the multifaceted intelligence and ability of Football learners is very important for the learning of Football technical skills. This paper takes Football teaching as the research object to analyze the grasp of rhythm and force process in Football, and modeling the classic movement by 3D-max, and storing it in database, so that it can be easily reproduced, which is of great significance.

Keywords: Football; The grasp of rhythm; Force process; 3D-max; Database

1. Introduction

In recent years, football has been introduced into China from South Korea. Football as a favorite sport of young people, it can promote the healthy development of body and mind, strengthen body, prevent disease, cultivate the body and nourishing heart, grind the heart and mind, and so on. These features make more and more people like this sport, and it is adored and loved by contemporary college students in particular. With the increasing popularity of this sport, football courses have been successfully carried out in many colleges and universities. The regular universities in China also pay more attention to the sport of football, and football has attracted more and more college students with its own characteristics. The students' love for football and the rising status of football in the physical education curriculum have made the Football project developed better. The proportion of teachers in Football should be more reasonable in all colleges and universities throughout the country, for professional football teachers, they can adopt requirements of reduce academic qualifications. In this way, teachers in colleges and universities can be more specialized, and the number of teachers should be allocated according to the number of students studying football in each school [1-3]. At present, football teachers in various colleges and universities should organize regular learning and study. Only by continuous learning can they improve their level of professional skills, and only with advanced teaching methods can they meet the real learning needs of college students nowadays[4].

2. Related Research on the Grasp of the Rhythm in Football Teaching

2.1. The necessity of the grasp of the rhythm

In football training, many coaches and athletes often focus on the play of technique and tactics, the expression of mental will, physical strength and endurance and other quality. But in a high-level competition, the skills, reactions and psychological qualities of both players are very similar. Both athletes are in the direct physical confrontation of the fist to the foot, who can better control the rhythm of the game is the key to victory. In the game, if you can control the rhythm of the game very well, it will show that attack and defense act on each other, the rhythm is obvious, which reflects the characteristics of flexibility, standardization, transformation of virtual reality and speed fluently. Often the change in a rhythm makes the opponent be taken by surprise. And the attack with rhythmic does not make people tired in actual combat and can help to produce muscle bursts[5-7].

2.2. The grasp of rhythm in football teaching

In football training, the best idea is to force the other side to indulge our speed, that is, to force the other side to cope with the change of speed. In this way, it will be able to gain the advantage in speed, to achieve a preemptive initiative, at the same time; it can get the advantage in the spirit. When doing every attack in the actual battle of football, the hands are not vague and hesitant, and the movements cannot be confused. When doing every cohe-

rent action or interval action, the action should be fast when it is fast, slow when it is slow, and pay attention to the sense of rhythm.

The rhythm of strength in football is the intensity of strength. In the usual football training, we will immediately think of increasing the speed of the muscles, the explosive force and the staying power of the heart and improving the flexibility of the legs. Of course, these are important. They are hardware. No matter how powerful the muscle is, if you can't beat the target with rhythmic in a real battle, it is impossible to make full use of the explosive force of the leg muscles .If you only pay attention to strengthening muscle strength, it can even prevent effective beating and flexible movement. So, rhythm is produced in the process of ingeniously controlling the explosive force, flexibility, agility, persistence of muscle and maintaining the balance.

In football teaching and training, if the speed is adjusted appropriately with the opponent, it can be called rhythm transformation. The correct judgment of the rhythm enables the trainer to have a calm control over every foot of the punch. And this kind of good control ability can make the trainer choose the correct action of attack and defense more leisurely[8-10].

3. Analysis on the Force Process in Football Teaching

Just as Chinese martial arts have a " Nanquan and Northern kick" statement, football is based on the leg technique, the flexibility of the leg technique is crucial to the exertion of Football. Analyzing the force of football with mechanics knowledge is helpful for students to understand and analyze football action, and also has inspiration for researchers and helps the innovation of action. Students have known that force is the cause of changing the state of the body's movement in physical learning, each technical action of football is accomplished under the combined action of the internal force of the human body and the external force of the opponent and the environment. Therefore, in the daily training, the teacher should consciously let the students understand the analysis of the force of football.

3.1. Action analysis

This study analyzes two classic movements in football: Break and Round house kick.

Break: In order to show its mighty power, Football often kicks off the board or uses fist, palm to smash tiles in the performance, which is used in Football break technology. Break technique refers toa test or evaluation action that using various parts of the body, such aspalms, elbows, knees and so on, to break the fixed object (brick, tile, board and so on). As shown in Figure 1, it is a classic break action.

Figure 1. Break action

According to Newton's second law:

$$F = ma \quad (1)$$

It can be seen that the physical mass of an athlete is constant, so the greater the force, the greater the acceleration of the movement. To produce a better effect of force in the moment of hitting, the athletes need to break out a lot of power in a moment, so the usual strength training is very important. The force in break technology should make full use of the counteraction of the external environment such as the ground to the human body and transform the force of the athlete to push the ground into motive power, so as to achieve the hit of the target. When an athlete makes a break technical action to hit a target, there is a close relationship between the hitting effect and the momentum theorem.

According to the momentum theorem expression:

$$Ft = mv \quad (2)$$

It can be seen that when the athlete's momentum mvis constant, the shorter the time the body part is contact with a batting object, the greater the momentum is. The effect of force depends on the size of the force, the role of point and direction, so the greater the force, the more obvious effect. Similarly, increasing the speed of the body can increase the momentum of the athletes, and also have an obvious effect on the increase of the break effect. Increasing speed can be achieved by moving the body's center of gravity or increasing the moving distance. Moving the body's center of gravity can use its own weight to achieve the two-force, thereby increasing the body's acceleration to achieve an increase in speed. The purpose of increasing the moving distance is to extend the speed of acceleration.

According to:

$$v_t = v_0 + at \quad (3)$$

It can be seen that the speed of the body can be effectively increased. It is necessary to make full use of the counterforce of the ground to the human body when making a break technical action. Taking the middle axle of the body as the axis, the two parts of the body move to the opposite direction to produce rotation, and then use the moment of inertia of the body to increase the effect of the

hit. In this process, in addition to the use of external forces, the physical coordination force is also important. Therefore, it is necessary to strengthen the training of the physical coordination in the process of training. When touching the target, the reduction of the hit area can effectively increase the effect of the break, which is based on the pressure formula:

$$p = \frac{F}{S} \quad (4)$$

When the force is constant, the smaller the force area is, the more obvious the effect of the force is. In order to protect the athletes from injury, when they make a break technical action, the action must be coherent, the time is short, and the target must be penetrated, which is because that if the target is not penetrated, it will cause a greater counterforce to the body's hit part, which leads to the athlete's body injury. Therefore, it is necessary to increase the body's moment of inertia by using the counterforce of the ground to the human body and utilizing the action of the rotation of the waist to increase the power of hitting and achieve the breakdown of the target.

Round house kick

Round house kick is a kind of leg technique which is forced from the side when the body has support, and as shown in Figure 2. When making a round house kick, the hip, knee and ankle joints should be fully used, and successively forcing according to the order of hip, knee and ankle. In this way, the muscle force produced by the leg muscle contraction can be transferred to the foot in turn, so that the force is superimposed and the best hitting effect is produced. Round house kick process involves leverage torque and rotational momentum.

According toleverage torque:

$$M = FL \quad (5)$$

The greater the force and its arm of force, the greater the torque produced, the better the effect of the body's rotation. In order to increase the effect of side kicking, it is necessary to increase the speed of its movement and increasing the torque of the side kicking is an effective way. From the characteristics of the muscles of the lower extremities, it is known that the muscle that rotating the leg and legs make up a leveraged model, and the muscles provide motive power, and the length of the leg provides an arm of force. The length of the leg is constant, so increasing the force of the muscles is the main way to increase the leverage torque of the leg. Therefore, when doing side kicking, we should strictly follow the order of muscle force according to the characteristics of biomechanics, so as to produce greater dynamic torque. We know that when the torque is fixed, if to raise the acceleration of side kicking, we must reduce the momentum of body rotation, which is reason we often see that when an athlete makes a side kicking, his body is almost immobile. In addition, when making a side kicking, the thigh drives the calf, and the thigh accelerates, the leg will also fold. When the thigh stops motion, the leg will expand quickly and accelerate the leg to kick the target.

Figure 2. The action of round house kick

As shown in Table 1 and Table 2, there are the time data of round house kick by left leg and right leg. From the time data, we can conclude that the average time of the six tested athletes to complete the round house kick technique by left leg is 0.63 second, the fastest is 0.55 second, and the slowest is 0.82 second. The average time of the round house kick technique by right leg is 0.67 second, the fastest is 0.58 second, and the slowest is 0.77 second. The average time of knee lift is 0.55 second, and the average time of last buckle knee hitting is 0.04 second.

Table 1. The time of round house kick by left leg

	Shoulder joint fall	Shoulder joint rise	Shoulder joint Y coordinate intersection	Toe off the ground	Lift the knee until the hit	Contacting target
A	0.18	0.39	0.23	0.26	0.47	0.55
B	0.2	0.48	0.3	0.31	0.59	0.6
C	0.2	0.45	0.28	0.3	0.56	0.58
D	0.3	0.35	0.4	0.47	0.78	0.82
E	0.22	0.48	0.27	0.32	0.54	0.61
F	0.21	0.42	0.29	0.33	0.55	0.63
Average time	0.22	0.42	0.29	0.3	0.6	0.63

Table 2. The time of round house kick by right leg

	Shoulder joint	Shoulder joint	Shoulder joint Y	Toe off the	Lift the knee	Contacting tar-

	fall	rise	coordinate intersection	ground	until the hit	get
A	0.32	0.55	0.39	0.455	0.68	0.73
B	0.21	0.48	0.3	0.32	0.55	0.59
C	0.21	0.44	0.29	0.4	0.57	0.6
D	0.2	0.35	0.3	0.4	0.56	0.58
E	0.35	0.61	0.36	0.44	0.69	0.76
F	0.35	0.57	0.41	0.45	0.7	0.77
Average time	0.27	0.5	0.34	0.41	0.63	0.67

3.2. Action modeling based on 3D-MAX

With the concept of Football into the hearts of people, the application of virtual 3D modeling technology is becoming more and more extensive. At present, there are dozens of 3D modeling software, such as MAYA, 3D-MAX, CAD and so on. MAYA is mainly used in task modeling, the production of animation and film, and the production of game scenes. Through the comparison of several 3D modeling software, this paper uses 3D-MAX software to carry out 3D modeling. The classic action in Football Teaching is introduced into the system through 3D-MAX software to form a three-dimensional image. As shown in Figure 3, it is a three-dimensional human action model established by 3D-max.

Figure 3a. 3D modeling chart of Football

Figure 3b. 3D modeling chart of Football

Figure 3c. 3D modeling chart of Football

Figure 3d. 3D modeling chart of Football

3.3. Data storage based on MYSQL

At present, the commonly used databases have four kinds of databases: Sql server, ORACLE, MYSQL, and MongoDB. Sql server is easy to use and is suitable for distributed organizations, but the security is very low. ORACLE has scalability and parallelism, but the requirements for hardware are higher and the cost is higher. MongoDB is a typical non- relational database, the data is stored in the form ofkey-value, which is suitable for a variety of data formats. MySQL has a small volume, fast speed, low cost in total, and supports multiple operating systems. It is an open source database. The interface provided supports multiple language connection operations. Through the comparison of several databases, this paper chooses to use the MySQL database.

In this paper, the classic movements of middle school students in Football Teaching are stored in the database in the form of pictures. The original data in the database

are updated every other week, all the data are backed up every other week, and the incremental data is backed up and updated every day. It is convenient and accurate to make a decision on the learning situation of football for students at the present stage and is conducive to the scene reproduction of classic action.

3.4. Analysis of strategy

First of all, focus on the grasp of the rhythm of football in teaching. The change of rhythm is taking speed, strength, and action as the basic element. In the regular training, it should focus on the exercise of the ability to strengthen the response ability, the coordination of action and seize the opportunity.

We should strengthen power practice of the core strength and the power chain of the human body, so as to make up the insufficient of the strength and stability of Football athletes. Second, pay attention to the strength exercise of small muscle group that are not needed or ignored, and improve the fine degree of the movement. The proportion of functional training should be increased consciously in the training system with traditional football training.

Strengthening the teaching level of football teaching

4. Conclusion

The time of football entering the education course in China's colleges and universities is short. The research on Football is still in the exploratory stage. Therefore, we should pay attention to the teaching research of Football. This paper focuses on the analysis of the grasp of rhythm and the force process of the action. Through modeling, the scene is reproduced, which is beneficial for students to learn football. Finally, it puts forward some suggestions for the current problems in football teaching. The research of this paper has promoted the research of Football teaching in China.

5. Acknowledgement

The study was Supported by Scientific Research Projects (2017) of Education Department of Shaanxi Province (No. 17JK0885).

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