Article

Research on countermeasures for safety prevention of muscle injury in sports under the background of big data and smart medicine

Chunfang Wang

Department of Physical Education, Zhejiang Yuexiu University, Shaoxing 312000, China; 20042026@zyufl.edu.cn

Abstract: With the deepening of quality-oriented education and the implementation of new curriculum standards, the forms and contents of school sports activities are increasingly diversified. In this regard, special attention must be paid to sports safety. Sports is a sport to improve physical and mental health, but it is easy to cause physical injury in sports. Big data can effectively monitor the normalization of movement in the process of exercise, so as to take timely safety precautions and reduce the probability of muscle injury. Therefore, by analyzing the causes and influencing factors of muscle injury in sports, this paper puts forward some safety precautions to avoid muscle injury accidents during sports. Through the neural network algorithm, it can be seen that with the increase of time, the function width and prevention index of security are constantly rising, and the average value of function width is about 0.83. The seventh day is 0.15 higher than the first day, the average value of prevention index is 1.31, and the seventh day is 0.19 higher than the first day. The effect of the optimized safety prevention strategy is better than that of the traditional safety prevention strategy, and the probability of muscle injury of athletes is also greatly reduced by 11% compared with the traditional one; However, the rehabilitation effect has improved a lot, 9% higher than the traditional one.

Keywords: muscle injury; safety precautions; countermeasure research; physical education teaching

1. Introduction

Sports injury not only affects the physical and mental health of athletes, but also affects the learning effect of athletes. In sports, due to the influence of equipment, sports, physical condition, training arrangement, venue, time and other factors, athletes may have accidents (especially sports injuries). Sports injury has a certain impact on people's life and learning. Improper treatment may lead to permanent disability. Therefore, it is necessary to make correct use of big data and smart medicine to monitor and deal with athletes' irregular movements in a timely manner, and correct them in a timely manner to reduce the probability of muscle injury. It has become an important task for physical education workers to correctly deal with the problems of physical education and safety education, and to reduce the occupational accidents caused by physical education and training.

Muscle injury is a common sports injury in sports, and its influencing factors are numerous. Sanchez et al. tested the hypothesis that electrical impedance electromyography can detect the injury caused by maximal force prolongation of contraction, and considered that malnourished muscles are particularly vulnerable to injury induced by centrifugal contraction [1]. Prakash et al. put forward a new grading system based on the integrity of connective tissue, and evaluated the correlation between grading scores and the time to resume competition [2]. Zhao discussed the treatment of muscle injury by mesoporous multifunctional nanomaterials based on

exercise rehabilitation training, and studied the biological characteristics of targeted control of mesoporous multifunctional nanomaterials for targeted drugs [3]. Matsuda found that the limited range of motion of the hip joint during flexion leads to the forced fracture of the half pelvis, even the ballistic backward tilt, which may not only cause pathological transfer stress to the pubic symphysis, but also cause pathological stress to the sacroiliac joint, lumbar spine and proximal hamstring [4]. Scillia et al. proposed a surgical technique, including rectus abdominis repair and adductor longus lengthening, to treat core muscle injury which is ineffective for conservative treatment [5]. Padaki et al. believed that for femoral acetabular impact and core muscle injury, thorough medical history and physical examination are essential to guide the treatment [6]. Hall proposed an ultrasound scanning protocol, which provides real-time guidance for muscle healing and can help identify athletes who are likely to be injured again. These athletes look clinically suitable for back in the game [7]. All the above studies have described the impact of muscle injury, but there are few studies on countermeasures. The above research methods have their own advantages and disadvantages, with high accuracy of electrical impedance detection, strong operability of grading system, strong innovation in the application of nano-materials, and comprehensive research on bone stress conduction. Results the causes of muscle injury are basically the same, but the countermeasures are less studied and need further discussion. Although the above research reveals a variety of causes and detection methods of muscle injury, there are some shortcomings: first, there is little research on actual preventive measures and lack of systematic preventive measures; second, most of the studies focus on specific factors, and the overall comprehensiveness is not strong; Third, the application of big data and intelligent medicine is not fully discussed, and advanced technologies are not fully utilized to optimize prevention and treatment strategies.

The rehabilitation strategy of muscle injury is an important means to quickly repair the injured part of muscle. Quartey et al. believed that physical therapists play a key role in the rehabilitation of sports injuries in sports medical teams. Therefore, it is necessary to consider the expectations of injured athletes when making rehabilitation plans [8]. Shrier et al. re-examined the proposal of sports injuries, and explained that if the injury risk changes with time and is independent of the injuries that have occurred before, the proposal would also be flawed [9]. Edouard and Ford found that the number of myosin heads that can bind to actin would decrease, but many myosins would remain in the attached position [10]. Luchetti et al. proposed a sports injury rehabilitation monitoring system based on wireless sensor networks. By analyzing the overall framework of sports injury rehabilitation monitoring system, the system design is divided into structural hardware design and monitoring software design [11]. Pollock et al. checked the diagnosis and results of hamstring injuries of elite track and field athletes after all hamstring injuries were examined and treated by the track and field medical team and the track and field hamstring rehabilitation method was implemented [12]. Micheo believed that sports injury rehabilitation requires a comprehensive clinical evaluation of not only symptom areas, but also the power chain of sports activities, and a complete program [13]. Cao et al. established the visual dynamic tracking model of human exercise rehabilitation, and then adopted fuzzy proportional integral differential superheterodyne control method to design the

bone training control of human exercise rehabilitation [14]. All the above studies have described the role of muscle injury rehabilitation training, but there are many deficiencies in safety precautions.

The existing preparatory activities and stretching activities are repetitive and boring for athletes, which often lead to perfunctory situations. The final result of training is not ideal and is more vulnerable to injury. Therefore, coaches and athletes should use big data to timely monitor the normalization of athletes' training exercises, improve the awareness of active measures to prevent sports injuries, so that athletes and instructors can better understand the characteristics of sports injuries in future training and competition, improve the self-protection and prevention ability of sports injuries, and master the treatment methods and relevance of sports injuries.

2. Factor of muscle injury

1) Common sports injury parts and types

At present, sports injuries in physical education mainly focus on the following four aspects, as shown in **Figure 1**. The first is the muscle band and skin surface. Typical muscle, ligament and skin abrasions include posterior thigh muscle group, lumbar muscle group, triceps surae muscle group and adductor thigh muscle group. Skin abrasion, namely skin trauma, is mainly caused by the breakage and collision of skin surface. The second is the typical injury of ankle joint, joint (interphalangeal) and elbow joint [15]. Dislocation mainly occurs in gymnastics. Due to the unreasonable strength of sportsman, they lose their center of gravity when falling, resulting in dislocation. The third is the bone part. Fractures are mainly caused by violence. In basketball and football games, when sportsman fall, their knees directly touch the ground, or they support them with their hands, resulting in broken elbows and lumbar vertebrae. The fourth is shock and nosebleed. Shock occurs during exercise, usually due to excessive exercise or hot weather and insufficient blood supply to the brain. Nosebleeds are usually caused by collisions. When sportsmen are engaged in high-intensity competition training, such as basketball and football, other sportsmen may bleed unintentionally due to their intense activities.
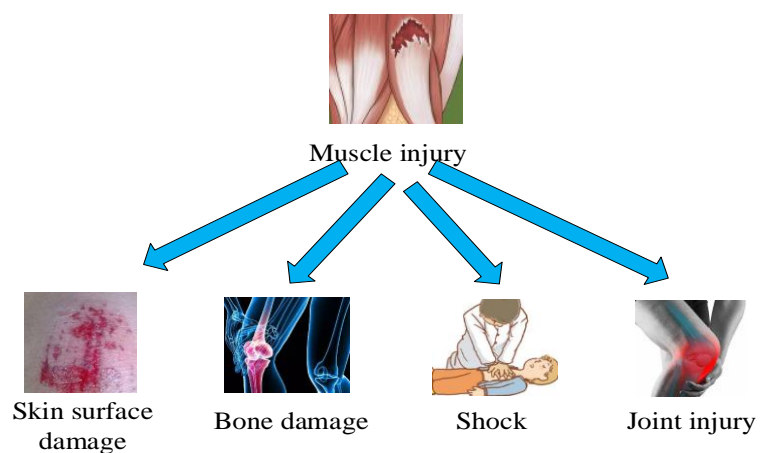

Figure 1. Common sports injury parts and types.

2) Effects of muscle injury

Chronic muscle injury affects sportsman' daily life and sports. Muscle injuries

during training lead to a longer recovery process, but many physical activities cannot be carried out immediately after recovery, which would continue to affect sportsman for a period of time. As shown in **Figure 2**, there are three main reasons for long-term exposure to muscle damage. The first is psychological influence. The pain caused by muscle injury is immediately reflected in the nerve center. In the same exercise, sportsman instinctively reflect the sports conditions and avoid having a certain impact on the performance of correct actions in daily exercises and competitions. In view of this situation, sportsman have to face difficulties, try this action step by step, and clear the shadow in the brain again and again [16]. The second is functional effect. After muscle injury, sportsman would experience long-term recovery. Normal activity can be restored within 1–2 weeks, but it takes 1–2 months to restore the original exercise level. If the injury is serious, the previous training level would not be restored. After muscle injury, most sportsman are affected and difficult to carry out normal sports, learning and games. The greater the muscle damage, the longer the recovery time. The third is physical effects. Long term training or ultra long-distance training in sports training would lead to the decline of learners' physical functions and fatigue. Physical fatigue is characterized by reduced sensitivity and reaction speed, inattention, reduced muscle tension and low leg elasticity. Once symptoms occur, the frequency of muscle damage would increase dramatically with continued exercise.
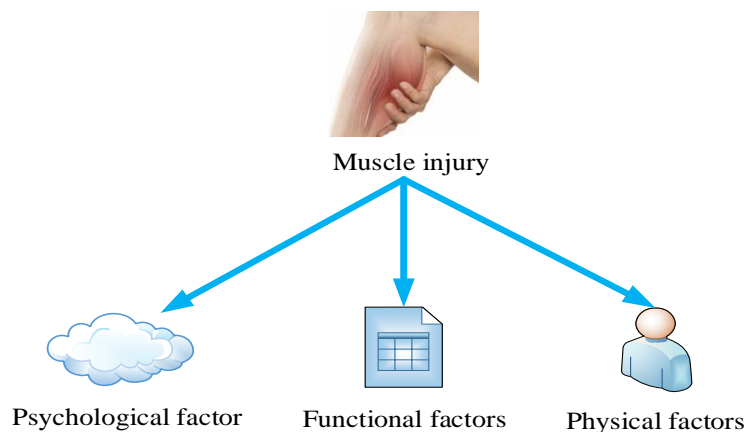

Figure 2. Effect of muscle injury.

3) Causes of muscle injury

In sports, the causes of muscle injury mainly include the following three factors, as shown in **Figure 3**.
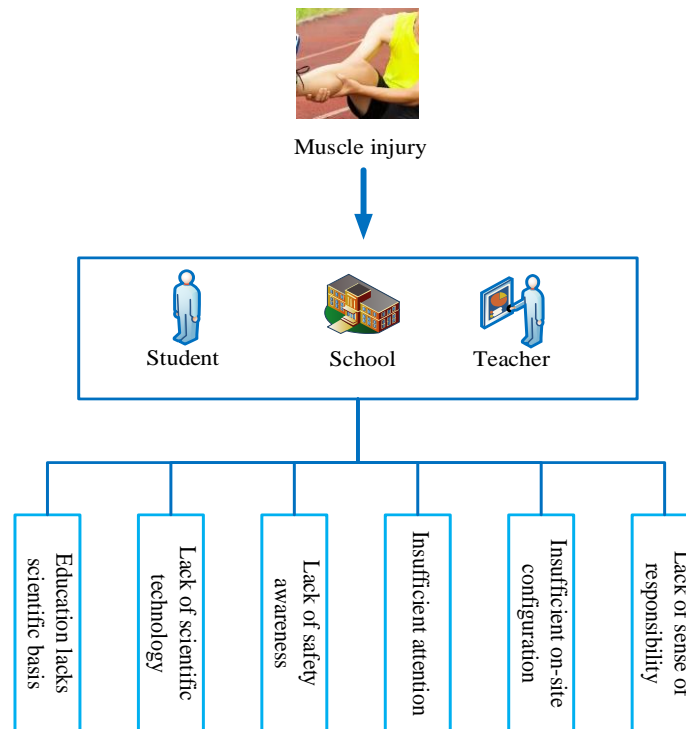
Figure 3. Causes of muscle injury.

(1) Student factors

First, education lacks a scientific basis. Insufficient preparation or training is the main reason for muscle injury, so people should be prepared for professional activities during sports or physical activities. Therefore, people should be prepared for professional activities during sports or physical activities, because scientific preparation activities can improve the strength of the central nervous system, strengthen the activities of respiratory organs and cardiovascular systems, enhance the elasticity and strength of muscles, expand the range of joint activities, and enable people to exercise better. However, some sportsmen still have misunderstanding on cognition and cut corners in preparation activities. Finally, muscles become stiff during exercise, leading to muscle damage [17]. Secondly, mastering technological action lacks scientific knowledge. In sports, sportsman learn or repeat actions, especially new actions. Some sportsmen lack awareness or learn new behaviors and indulge in past experiences. Therefore, there is usually no motion control in motion. The structure, function and mechanical principle of human body are interfered in the process of movement, resulting in muscle damage. The third is the lack of security awareness and self-control. sportsman' weak safety awareness, sports safety awareness, sportsman' weak self-protection ability and low level of protection knowledge and skills are important factors that cause sports injuries. Fourth, in sports, sportsman with physical defects would cover up the disease and do not notify the school teachers, which would lead to muscle damage of sportsman due to lack of ability.

(2) School factors

The school did not pay enough attention to physical education, and did not put the guiding ideology of "safety first and health first" at the forefront of school work. Weak awareness of sports safety education is one of the main reasons for school sports

safety accidents. In addition, improper configuration of on-site equipment, unreasonable configuration of school sports facilities, and irregular inspection of on-site equipment have brought potential safety hazards to sports or extracurricular activities. The activity site is not centralized and the activity content is too large, which weakens the teachers' supervision ability and is not conducive to the timely handling of accidents [18].

(3) Teacher factor

Physical education workers who lack a sense of responsibility do not attach importance to imparting sports health knowledge to sportsman and neglect safety education in physical education. This is one of the main reasons for school sports safety accidents. The sportsmen do not understand the specific requirements and preventive measures of the activities in detail. In addition, sportsmen do not have timely training and interrupt courses, which would lead to frequent accidents.

3. Countermeasure analysis of safety prevention of muscle injury in sports under big data and smart medicine

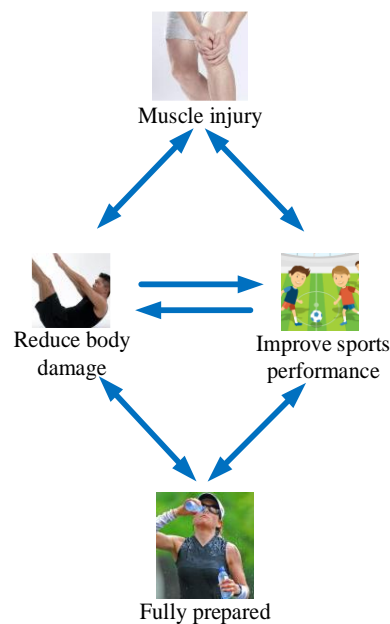1) The importance of preventing muscle damage

Figure 4. Importance of preventing muscle injury.

Preventing muscle injury can not only reduce the damage to the body, but also improve sports performance, as shown in **Figure 4**. Injuries affect the life of athletes. Many athletes are injured when they are young. They receive the following training and competitions due to incomplete treatment or recovery. Joint and muscle injuries and sprains are common. Occupational diseases related to chronic injuries occur, especially physical injuries in sports competitions. Especially after retirement, it has brought great harm to adult players [19]. In addition, in the process of sports training, in addition to various sports injuries, there may also be some specific medical diseases. Sports should aim at protecting the national health. If the training is not guaranteed, there would be no high-level competition and excellent performance. The lack of first-class competition experience also directly affects the learning performance of athletes.

Many athletes also retire prematurely due to serious injuries and sports diseases. Therefore, athletes should fully prepare for sports, effectively improve sports performance and prevent muscle injury, which is an important guarantee for improving performance.

2) Athletes' training movement monitoring system under big data

The training exercises monitoring system based on big data is a large-scale architecture, designed with a three-layer architecture, which is divided into hardware infrastructure layer, function layer and cloud service application layer from bottom to top. For example, the functions of the sports action monitoring system are mainly: training exercises management automation function, sports training exercises plan formulation function, daily management function of athlete action information, training equipment management function, etc. The hardware infrastructure layer is based on cloud hardware, including resource server group, data server group and other server groups. The corresponding resource database is built on the server to ensure the realization of various functions of sports training in the functional layer. The function layer is based on the hardware facility layer. Based on the business division of the sports training exercises monitoring system, it can be divided into four modules: personnel management module, training exercises management module, training equipment management module, and monitoring system management module. The big data application layer, as the interaction channel between the system and users, uses different forms to improve the interaction ability between users and the system.

The training motion monitoring system based on big data needs to realize real-time tracking of the movement of moving targets, which needs to involve the moving target detection algorithm. The moving target detection system includes the input of the image. The video of the area where the moving target is located can be obtained by using the camera to correctly select the target for tracking. Image preprocessing is to filter and smooth the image acquired by the camera, mainly to remove the noise interference in the tone image, try to make the extracted image contour more obvious, image information more accurate, and improve the recognition rate of image targets. Image feature extraction is the most important part of target recognition. Feature selection is the process of obtaining feature information from image information that can reflect the moving target. This process is required to obtain the only recognizable feature of the moving target, which can effectively improve the computational efficiency and reduce the memory space.

3) Countermeasures to prevent muscle injury

In view of the muscle injury in sports, the following six countermeasures are proposed, as shown in **Figure 5**.
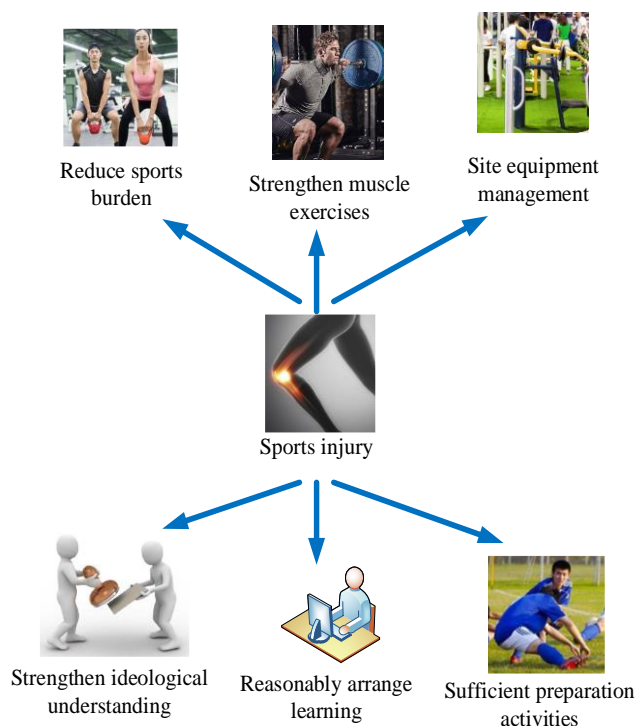
Figure 5. Measures to prevent muscle injury.

(1) Raising awareness and strengthening ideological education

In the field of education, physical education educators should strengthen the objectives of physical education, implement the principle of prevention, and implement safety education in schools in different ways. The occurrence of personal accidents is due to teachers' lack of sense of responsibility and ineffective implementation of measures. Secondly, some sportsman lack the sense of organization, discipline and self-protection. Third, some objective factors lead to accidents. Therefore, schools should fully consider the leading role of teachers and the prominent role of sportsman, strengthen safety education, overcome ideological barriers, and earnestly implement preventive measures.

(2) Reasonably arranging learning

Teachers should carefully study textbooks according to sportsman' age, gender, health status and technical level. In order to master the correct training methods and methods and scientifically increase the range of motion, training must be personalized and gradual. When passing and receiving the ball with both hands, people should pay attention to the movement of passing and receiving, and put the movement in the middle of basic training. The intensity and amount of training vary according to the situation of sportsman. If the sportsman is in good health, they can study harder and should increase training efforts. If sportsmen are not healthy, they can choose low-intensity exercise.

(3) Preparing sufficient activities

In sports training, many muscle injuries are caused by improper training, so serious training is necessary. Exercise can enhance the excitement of the central nervous system, overcome the physical inertia of human activities, and prepare for formal exercise. Preparation activities can increase the opening of muscle capillaries, increase the strength, elasticity and flexibility of muscles, increase the flexibility of ligaments and joints, and increase the mucus in joint cavity to prevent damage to

muscles and ligaments. When preparing, people pay attention to the activities of each joint, and add special training to improve muscle toughness [20].

(4) Preventing local overload

In physical exercise, too much physical exercise, too much exercise time and too much attention to exercise would lead to local body overload and muscle damage. In the training process, the amount and time of exercise should be reasonably allocated to avoid monotonous piecemeal exercise, effectively eliminate fatigue, and prevent local overload from causing muscle damage.

(5) Exercise to strengthen muscle strength of vulnerable parts

The most common injuries in sports are soft tissue injuries such as muscles and ligaments. Therefore, it is very important to strengthen the muscles and ligaments around the weak points to prevent muscle damage. Ankle joint tension is the most common phenomenon in daily sports activities. Strengthening the ligaments around the ankle joint and exercising the muscles can effectively prevent ankle injury. Strengthening the training of deltoid muscle and shoulder joint can prevent shoulder joint injury. People should strengthen the protection and help of sportsman in sports training. Protection and help can not only help sportsman master sports skills faster, but also prevent muscle damage.

(6) Strengthening the management of school grounds and equipment

The school regularly organizes the review of the playground and facilities, especially outdoor sports facilities, such as horizontal bars and barbells, which are easily damaged due to the wind and the sun. The site is a necessary prerequisite for the practice course. When training and organizing competitions, special attention should be paid to leveling the ground and the existence of obstacles to avoid unnecessary damage. Therefore, the teacher should check the equipment on site, especially whether it is damaged and correctly placed.

4. Evaluation of the application of neural network in the safety prevention of muscle injury

In order to understand the safety prevention effect of muscle injury, this paper classifies and evaluates the injury warning level of sportsman through neural network. First, the hidden layer of the neural network is selected as the activation function of the damage element, and then the activation function is:

$$A_j(a) = e^{\frac{-\|a - b_j\|^2}{2\alpha_j^2}} \tag{1}$$

Among them, *A* is the syllable point output of the injury, *a* is the input vector, and then the network output of the muscle injury is calculated as:

$$z_j = \sum_{j=1}^{k} \alpha_{ij} A(a), i = 1, 2, \cdots, m \tag{2}$$

Among them, *z* is the output node value of muscle injury, and α is the weight value from hidden layer to output layer. Then, by defining the error function of muscle injury, the results can be obtained as follows:

$$\chi = \frac{1}{2} \sum_{n=1}^{N} e_n^2 \tag{3}$$

Among them, *e* is the error value of muscle injury, and *e* satisfies the following equation.

$$e_n = p_n - q(a_n) = p_n - \sum_{j=1}^{3} \alpha_{1j} A_j(a_n) T_v^\mu = \text{diag}(\rho_m, -P_m, -P_m, -P_m), \tag{4}$$

The error value after processing can be obtained by combining Equations (1) and (4) as follows:

$$e_n = p_n - \sum_{j=1}^{3} \alpha_{1j} e^{\frac{-\|a-b_j\|^2}{2\alpha_j^2}} \tag{5}$$

Among them, *p* is the value required by the damage type sample, and then the weight of the damage output unit can be obtained as follows:

$$\frac{\partial \chi(y)}{\partial \alpha_{1j}(y)} = -\sum_{n=1}^{m} e_n(y) A_j(a_q) = -\sum_{n=1}^{m} e_n e^{\frac{-\|a-b_j\|^2}{2\alpha_j^2}} \tag{6}$$

$$\alpha_{1j}(y+1) = \alpha_{1j}(y) - \lambda_1 \frac{\partial \chi(y)}{\partial \alpha_{1j}} \tag{7}$$

Among them, *y* is the value range of the damage variable, *y* + 1 is the value range after modification and optimization, and then the hidden element center in the damage process is calculated as:

$$\frac{\partial \chi(y)}{\partial b_j(y)} = -\sum_{n=1}^{m} e_n(y) A_j(a_q) = -\sum_{n=1}^{m} e_n \frac{\alpha_{1j}(y)}{\alpha_j^2} e^{\frac{-\|a-b_j\|^2}{2\alpha_j^2}} \left(a_n - b_j(n)\right) \tag{8}$$

$$b_j(y+1) = b_j(y) - \lambda_2 \frac{\partial \lambda(y)}{\partial b_j} \tag{9}$$

Among them, Equation (9) is the value range of the hidden element of the modified and optimized muscle injury. Then, by combining Equations (6) and (8), it can be obtained that the width of the damage safety protection function is:

$$\frac{\partial \chi(y)}{\partial \alpha_j(y)} = -\sum_{n=1}^{m} e_n(y) \frac{\alpha_{1j}}{\alpha_j^3(y)} \|a_n - b_j(n)\|^2 A_j(a_n) \tag{10}$$

$$\alpha_j(y+1) = \alpha_j(y) - \lambda_3 \frac{\partial \lambda(y)}{\partial \alpha_j(y)} \tag{11}$$

$\lambda_1, \lambda_2, \lambda_3$ is the prevention efficiency of damage safety prevention. Then according to the width of the safety protection function, the protection indicators of the damage function can be obtained as follows:

$$E_{\alpha_{ij}} = \frac{1}{m(m-1)} \sum_{n=1}^{m} e_{mn}(y)[a - b_{mn}]^2 \tag{12}$$

In this study, the control variables include athletes' age, gender, training intensity and training time. These variables may affect the incidence and preventive effect of

muscle injury. In order to ensure the accuracy of the research, when designing the experiment, researchers ensure that all participants have similar training backgrounds and physical qualities. The training intensity and time are carried out in strict accordance with the predetermined plan, and the training conditions among different groups are consistent. In addition, through pre-screening and random distribution, the influence of individual differences on the results is reduced. In data analysis, multiple regression analysis is used to control these variables to ensure that the evaluation results reflect the actual effect of preventive measures.

5. Experimental analysis of safety prevention of muscle injury in sports

In order to understand the safety prevention effect of athletes' muscle injury under sports, this paper analyzes and studies the safety prevention effect of muscle injury through neural network algorithm. First of all, the satisfaction of teachers and sportsman in a school with the safety precautions against muscle injury was investigated. The satisfaction was divided into general satisfaction and dissatisfaction. Data The training and injury records of athletes are collected in real time through the big data platform, and the movements and physiological indicators are monitored by intelligent devices. Then, the neural network algorithm is used to process and analyze these data, classify the injury warning level, evaluate the effect of preventive measures, and optimize the training and rehabilitation program. The specific analysis results are shown in **Table 1**.

Table 1. Satisfaction of teachers and students with safety precautions against muscle injury.

	Satisfied	Commonly	Dissatisfied
Teacher	84	12	4
Student	81	14	5
Total	165	26	9

It can be seen from the table that teachers and students are relatively satisfied with the safety precautions against muscle injuries, of which 82.5% are satisfied, 13% are generally satisfied, and 4.5% are dissatisfied. Satisfied teachers and students feel that this strategy can effectively reduce the probability of muscle injury. By preparing before training, improving the muscle toughness and muscle stretching effect, muscle injury accidents can be effectively avoided. For dissatisfied teachers and students, this kind of countermeasure is a waste of time.

In this study, data were collected through questionnaires and experimental procedures. The questionnaire investigated the satisfaction of school teachers and students with preventive measures for muscle injury, and the experiment recorded the training and injury data of athletes. Data are collected in real time at the training ground, and the time span is one month. The neural network algorithm is used to process the data, quantify the damage warning level and the effect of preventive measures, and descriptive statistics and regression analysis are used to evaluate the changes of satisfaction and safety prevention effect.

In this study, it should be noted that participants' subjective reports may be

influenced by their subjective attitudes, distorted memories or ideological tendencies, which may lead to the deviation of satisfaction survey results. Although the questionnaire and experimental procedure are used, the personal experience and psychological factors of participants may still affect the accuracy of the data. Therefore, future research should consider introducing more objective measurement methods to supplement subjective reports.

1) The degree of injury and the degree of emphasis on thinking under the safety precautions of muscle injury

In order to understand the specific influencing factors of muscle injury, this paper analyzes the degree of muscle injury and the degree of emphasis on thinking in physical education teaching. The specific analysis results are shown in **Figure 6**.
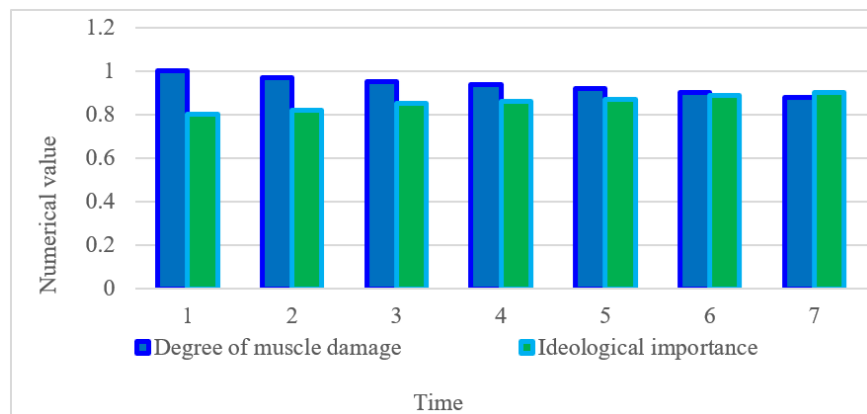

Figure 6. Injury degree of muscle injury and attention.

It can be seen from the figure that, with the increase of training time, the degree of muscle damage of sportsman is gradually decreasing, and the degree of thought attention is gradually increasing. The average degree of muscle injury was about 0.94, and the seventh day was 0.12 lower than the first day; the average value of attention to thought was about 0.86, and the seventh day was 0.10 higher than the first day. This shows that under the safety precautions, sportsman pay more and more attention to the intensity of training and the preparatory activities of muscle stretching, thus avoiding the occurrence of muscle injury in the training process.

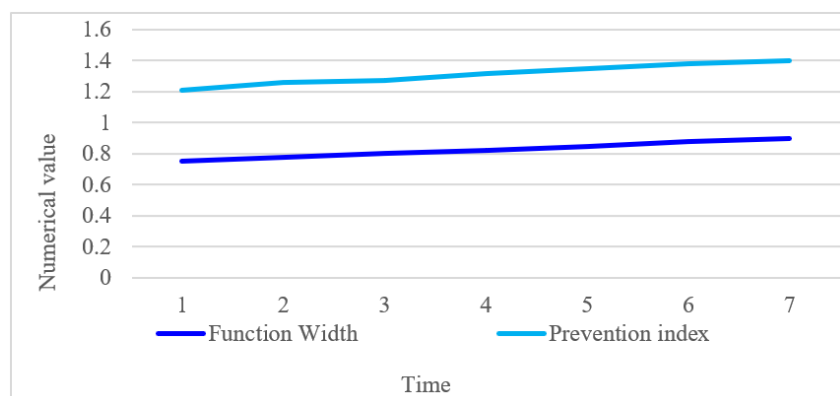2) Experimental analysis of muscle safety prevention based on neural network

Figure 7. Experimental analysis of muscle safety prevention under neural network.

In order to understand the probability of muscle injury in physical education

teaching, this paper analyzes and studies the function width and prevention index of safety prevention of muscle injury through neural network algorithm. The specific analysis results are shown in **Figure 7**.

It can be seen from the figure that with the increase of time, the width of the function of security protection and the prevention indicators are constantly rising, and the average width of the function is about 0.83. The seventh day is 0.15 higher than the first day, the average value of the prevention indicators is 1.31, and the seventh day is 0.19 higher than the first day. The increase in the width of the function and the prevention index shows that the muscle injury of sportsman under the safety prevention measures has been greatly reduced, and various preventive work of superiority and inferiority has also been implemented, thus promoting the safety prevention of muscle injury and improving the health level of sportsman.

3) Analysis of athletes' muscle injury probability and rehabilitation effect under big data muscle injury safety countermeasures

In order to better understand the implementation effect of sportsman' muscle injury countermeasures under safety precautions, this paper conducts a comparative analysis of sportsman' muscle injury probability and rehabilitation effect under traditional safety precautions. The specific analysis results are shown in **Figure 8**.
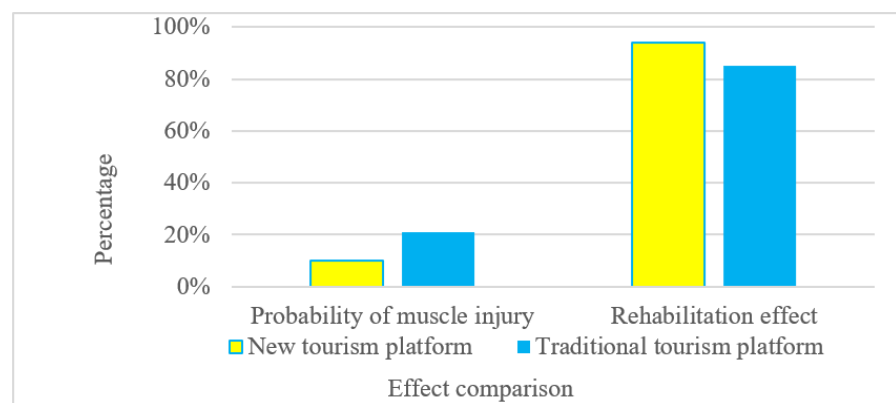

Figure 8. Analysis on the probability of muscle injury and rehabilitation effect of students under the muscle injury safety precautions.

It can be seen from the figure that the effect of the optimized safety precautions is better than that of the traditional safety precautions, and the probability of muscle injury of sportsman is also greatly reduced, which is 11% less than that of the traditional ones; however, the rehabilitation effect has improved a lot. It is 9% higher than the traditional one. In general, the effect of the safety prevention strategy for muscle injury is very good. Different preparation activities and rehabilitation training programs can be proposed for sportsman of different physiques, which can not only reduce the occurrence of muscle injury, but also promote the rehabilitation effect after muscle injury and reduce the time required for rehabilitation. Through the application of big data and intelligent medicine, this paper evaluates and optimizes the prevention of athletes' muscle injury, which makes up for the deficiency of systematic prevention countermeasures in existing research. Compared with the predecessors who mainly focused on the causes of injury and detection methods, this study focused more on the actual effect and optimization of preventive measures, and combined with neural network algorithm to improve the scientificity and efficiency of prevention and

rehabilitation.

The experimental results are shown in **Table 2**.

Table 2. Experimental results of muscle injury prevention.

Time	Degree of muscle damage	Ideological importance	Function width	Prevention index
1	1	0.8	0.75	1.21
2	0.97	0.82	0.78	1.26
3	0.95	0.85	0.8	1.27
4	0.94	0.86	0.82	1.32
5	0.92	0.87	0.85	1.35
6	0.90	0.89	0.88	1.38
7	0.88	0.90	0.90	1.40

6. Conclusions

In the process of sports, physical injury is inevitable, so it is very important to prevent and treat physical injury. Therefore, it is necessary to keep a clear mind, pay attention to the psychology of physical injury, adjust the physical condition, bring it into a good physical condition, create a safe environment, and let sportsman participate in sports activities easily and happily. However, for muscle injuries, calm treatment should be carried out in time to keep them in good condition, so as to prevent and treat muscle injuries, reduce accidents, improve mobility, conduct scientific training, select appropriate locations, and provide technical and medical monitoring. In addition, big data and smart medicine should also be used to monitor athletes' movements and conduct standardized treatment of muscle injuries. In addition, it is also important to clarify that prevention and treatment can minimize muscle damage during training and achieve the desired effect. The limitations of sample selection may include: geographical deviation, uneven distribution of age and gender, etc. This may lead to biased and unrepresentative results. The improvement measures include increasing the sample size to improve the statistical power, and obtaining samples from a wider geographical area and population. Adopt a multi-center and multi-source sample collection strategy to ensure the coverage of different regions and people, so as to enhance the representativeness and generalization ability of the research. At the same time, the samples are screened and matched more carefully to reduce the influence of bias.

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Conflict of interest: The author declares no conflict of interest.

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