

A Study of the Role of Physical Functioning and Physical Conditioning on the Influence of Competitive Sports Programmes

Yuxin Yang^{1,a,*}

¹Zhengzhou University School of Physical Education University, Changxing Road, Zhengzhou, China

a. 1813010101@stu.hrbust.edu.cn

**corresponding author*

Abstract: With the continuous progress of science and technology, the field of competitive sports has also witnessed revolutionary changes. Modern technology is playing an increasingly important role in improving athletes' performance, optimising training methods and preventing sports injuries. The aim of this study is to delve into the role of body functions and form states in competitive sports and how they affect athletes' competitive performance. By analysing the physical characteristics and training needs of athletes in different sports, it reveals the state effects of body function and form state on competitive sports. The study further proposes the enhancement of athletes' physical functioning and shape shape through scientific training methods. The application of these strategies will help athletes achieve optimal performance in training and competition, reduce the risk of injury, and improve athletic performance. With the continuous development and application of science and technology, we have reason to believe that competitive sports will become more scientific, efficient and humane.

Keywords: Competitive sport, physical function, sports performance.

1. Introduction

Competitive sports have been gradually shaped and grown over the course of human development, and the driving factors behind their formation and growth are varied [1]. Within the context of competitive sport, the physical functioning and morphological condition of the athlete are seen as core elements affecting their performance. Excellent athletes must have good physical fitness and strong mental fitness to ensure that they achieve excellent results. With the continuous progress of modern sports science, research on athletes' physical condition and training methods has become more and more in-depth, which not only affects individual athletes' achievements but also has an impact on the improvement of the overall level of sports competitiveness. Therefore, how to improve athletes' physical health and athletic ability through effective methods has become one of the current focuses of scholars at home and abroad. The aim of this study will be to gain insight into how physical function and morphological state will affect competitive sports programmes, with a view to providing solid theoretical support and practical advice for athlete training, competition strategy development, and further research in sports science.

Athletic sports products are the crystallisation of ideas that satisfy people's social needs for competitive viewing, leisure and entertainment, embodied experience, sports socialisation, sports grouping and personal value realisation, etc [2]. It is not only a core part of human society and culture, but also the degree of its development is often regarded as an important indicator to measure the progress of a country or a region in the field of sports. Therefore, many developed countries in the world attach great importance to competitive sports training and take the cultivation of outstanding athletes as a basic national policy, with a view to contributing to the improvement of the sports skills of the people in their own countries and even in their own regions. With the gradual globalisation and commercialisation of competitive sports, more and more people have begun to pay attention to the performance of athletes in competition. Therefore, athletes must have good physical and mental qualities in order to achieve excellent results. In this context, the criticality of the athlete's physical function and morphological state is seen as the core of competitive strength.

There are many different kinds of methods of sports research. The first one to be introduced is the methodology of sports training, which encompasses a number of aspects such as the practice of movements and their combinations, the loads of the sport and their modes of variation, the arrangement of the training process and its modes of variation, the way in which information is disseminated, and the external environment and its modes of variation. Due to the various combinations of these factors and their variations, we can develop training strategies with different functions, such as systematic controlled training and specific manipulative training. The next section deals with the research methodology of sports nutrition: this research methodology covers an in-depth study of the basic concepts and classification of sports nutritional foods, the biochemical monitoring of sports nutrition, as well as the practice of sports nutrition and the corresponding countermeasures. Sports nutrition is an applied science that integrates several disciplines, and it plays a very positive role in improving physical performance and ensuring health in competitive sports. The final discussion is on the research methodology of sports biomechanics: this research methodology covers both theoretical and experimental research, where the experimental research methodology is further subdivided into laboratory measurements and exercise measurements. The variety of research instruments also covers physical, biological, and systematic research methods. Specific methods of research cover high-speed photography, video recording, force measurement, electromyography, muscle force testing systems, simultaneous experiments, theoretical analyses, and techniques such as CT scanning and MRI.

2. Literature Review

2.1. The Impact of Physical Function and Conditioning on Exercise

Research has shown that maintaining good physical condition not only improves athlete efficiency but also reduces the likelihood of injury. The use of classical physiological and biochemical indicators to monitor the state of an athlete's physical functioning has become an integral part of training in endurance sports [3]. For example, through strength training, an athlete's muscular explosiveness and endurance will be strengthened; speed training can speed up the neuromuscular response; and increased flexibility training can help to expand the range of motion of the joints and reduce muscle tension. In addition, maintaining an appropriate body shape is crucial for athletes to gain an advantage in competition. For example, a slenderer body of a swimmer can effectively reduce resistance in the water.

The use of science and technology in sports training and competition has had an impact on athletes' fitness and body shape. Advances in sports science have allowed training methods to become more personalised and scientific, for example, the use of data analysis to optimise training protocols, the

use of advanced equipment to enhance performance, and the application of biomechanical analysis to refine technical movements.

2.2. Classification of Different Body States and Body Functions

In the field of sports competition, the performance of athletes is influenced by two key factors: physical function and physical condition. Physical functioning describes the physiological activity of an individual during exercise and encompasses aspects such as strength, speed, endurance, flexibility, coordination and balance. Optimising these functions enhances an athlete's technical execution, tactical response and overall athletic ability. Strength is fundamental to the effectiveness of an athlete's execution of a movement; speed and endurance have a direct impact on performance during prolonged or high-intensity exercise; flexibility and coordination contribute to the smooth execution of a movement and reduce the likelihood of injury; and balance helps an athlete to maintain stability during the execution of complex manoeuvres. An athlete's physical condition encompasses a wide range of body components, such as body shape, weight, body fat percentage, muscle mass, and bone structure. These elements play a key role in different sports competitions. For example, in swimming or running events that require endurance, lower body fat and excellent muscle form can effectively reduce resistance in water or air; while in weightlifting events that require strength, the amount of muscle and the strength of the skeleton directly affect the performance of strength; and in gymnastic events that require skills, more importance is placed on softness and body coordination.

3. Differences in Physical Conditioning Requirements for Different Competitive Sports

3.1. Track and Field Event

Athletics is an important part of sports competition, and it includes a wide variety of different events, from sprints to marathons, from high jumps to throws. One of the most basic of these track and field events is the triple jump, a jumping event. For each of these events, specific standards are set for the physical condition and function of the athlete. One of the characteristics common to all track and field events is speed.

Sprinters need to have excellent explosive power and acceleration, and they are usually on the short and stocky side, with well-muscled bodies to accommodate the demands of instantaneous, high-speed movement. Therefore, in competitions, sprint teams generally use fast running to achieve excellent results, which is also one of the training principles commonly followed by track and field athletes around the world. Middle and long-distance runners are mainly concerned with endurance and cardiorespiratory function, and they usually have a lean and long body shape, with a high proportion of slow muscles in their muscle fibres and are able to adapt to the maintenance of a long period of rhythm. Long distance competitors focus on strength qualities and aerobic endurance levels. Athletes in marathons and long-distance running require extremely high levels of endurance and fat metabolism, and they are usually lighter in weight and lower in body fat, which reduces physical exertion. As a result, athletes in short-distance events must have sufficiently great strength, flexibility, and the ability to react quickly and accurately in order to excel. In the obstacle course, athletes not only need to excel in speed and endurance, but also must have excellent rhythm and coordination. Race runners need to master more skills to cope with various challenges, the core of which is fast running and stable support. Relay events focus on teamwork and precise handover techniques. High jumpers need to have good explosive power and agility. Hurdlers need a combination of speed, strength and agility to cross obstacles more efficiently. Sprinters can improve their athletic performance by running fast. Walkers need to have exceptional lower body strength and stability to ensure that they are able to maintain the required technical manoeuvres. Sprinters demonstrate greater endurance and agility in fast running. Athletes involved in throwing events are highly dependent on

strong upper body strength, core stability, and their throwing skills. Athletes in track and field need specialised qualities to perform different types of sports, including flexibility, agility and muscular endurance. Athletes in the long jump and triple jump demonstrate excellent explosive power and co-ordination, while high jumpers require a high degree of co-ordination and aerial body control.

3.2. Ball Game

Ball sports, as another important category of sports competition, covers a number of sports such as football, basketball, volleyball, tennis, etc. These sports have different requirements for athletes' physical condition and function. Ball sports require high aerobic capacity of athletes, as well as strong instantaneous explosive power of acceleration, deceleration, change of direction, etc., and also need to make multiple sprints in a short distance to adapt to the intermittent and high-intensity sports characteristics of ball sports [4].

Football requires athletes to have excellent endurance, speed, and agility. Football players usually run continuously for more than 90 minutes on the field, so it requires high cardiorespiratory endurance and lower limb strength. In addition, footballers need to have good balance and co-ordination to be able to control the ball at high speeds and to pass and shoot accurately.

Basketball players need to use a combination of strength, speed, endurance and agility. They have to do a lot of jumping, quick change of direction and instantaneous acceleration, so the lower extremity explosive power and upper extremity strength are put forward very high requirements. Basketball players' height, arm span and other physical characteristics are also important, especially for grabbing rebounds and blocking shots.

Volleyball players do require excellent agility, harmony, and height. Jumping is particularly frequent in volleyball, so athletes generally have outstanding lower-body strength and core stability. Volleyball players also need to have quick reflexes and strong teamwork.

For tennis players, they need to have outstanding endurance, agility and harmony. Tennis games move fast, hit the ball with great power and long time, and have comprehensive requirements for players' physical quality. Tennis players are generally well-proportioned, have excellent speed and power, and are able to quickly change direction on the court with agility.

3.3. Effects of Exercise on Physiological Structures

The human spine has four physiological curvatures in an 'S' shape. A 'flat back' means that the spine of the subject is not curved properly, that is, the spine is curved a little lower than normal. After a physical examination of 30 cheerleaders, they found that flat backs are a very common problem [5]. Cheerleading requires athletes to have a beautiful, upright figure, so everyone has to hold their heads high and perform various movements. If you hold your head up too much for a long time, you will intentionally pull your shoulder blades backward and lengthen your spine. In order to keep it straight, the rhomboid and trapezius muscles of the back, as well as the muscles deep in the spine, such as the thoracic semispinalis and multifidus muscles, are constantly contracted, and the muscles, fascia and joints will change accordingly, thus resulting in the 'military back', and the formation of a 'flat back'. This results in the formation of a 'flat back' posture.

In the performance of dance cheerleaders, a variety of rotational techniques are widely used, such as the single-footed turn, the suction leg turn, the Kubi turn, the Ara C bar turn and the whip turn, as well as a combination of jumping turn movements, such as the turn to jump and the turn to the deer jump, and so on. One commonality in all of these man oeuvres is that before turning or jumping, athletes need to step one foot backwards and use single leg support. From talking to the coaches and trainees of the Chengdu Sports School and Chongqing University Cheerleading Team, we learnt that when performing this type of turn, the right leg is often stepped back and turned clockwise. This

manner of movement causes the pelvis to turn right, with the left foot supported underneath, resulting in the left pelvis being higher than the right, creating a lateral tilt. There may be differences in the length of the lower limbs due to varying degrees of arch collapse, and this difference indirectly affects the neutral position of the dorsal pelvis, i.e. lateral tilt of the pelvis [6].

The causes of winged shoulders in cheerleaders involve both congenital and psychological factors, and when analysed from the perspective of muscle imbalances, the key lies in four muscles: the serratus anterior, trapezius, rhomboids, and pectoralis minor. The near-fixed contraction of the serratus anterior leads to a pull towards the anterior and inferior parts of the body. In a subfixed contraction of the rhomboids, the upper fibres pull inward and upward, the middle fibres pull horizontally inward, and the lower fibres pull inward and downward; the synergistic action of all three sets of fibres allows for posterior retraction and superior rotation of the scapula. The proximally fixed contraction of the rhomboids promotes scapular elevation, retraction, and inferior rotation. When the middle and lower fibres of the serratus anterior and trapezius muscles and the rhomboids are weak, the scapula has difficulty adhering to the thorax. Near-fixed contraction of the pectoralis minor, on the other hand, causes the scapula to anteriorly extend, descend, and inferiorly rotate. Therefore, once the pectoralis minor contracts, it exerts a pull on the scapula, a condition that usually manifests as an upward cocking of the inferior angle of the scapula [7, 8].

4. Conclusion

In the environment of sports competition, the physical condition and posture of athletes have a decisive impact on their overall performance. Participation in physical exercise can effectively improve mental health and alleviate psychological states such as depression, anxiety, hostility and fear. This paper uses the literature method to explore the mechanisms by which factors such as human function and physical fitness play a role in the sporting process by analysing domestic and international research on sport and health. This research explores in depth how physical function and body posture play a key role in a wide range of sporting activities and reveals how these two factors work together to contribute to athletes' competitive performance. This thesis uses a literature method approach to explore how the link between body function and body posture status exists across different sports. After in-depth research, we found that various body functions, such as strength, speed, endurance, flexibility and coordination, are the core elements of technical implementation and tactical application; and that the physical condition is one of the key elements in winning or losing a game. Physical condition, which covers body size, weight, and body proportions, plays a crucial role in the performance of a particular sport. In addition, researchers have explored the extent to which athletes of different body types respond to these factors and their variability. Several studies have pointed out that the functioning of the body is interrelated with its morphological state. Body form can be enhanced through proper physical exercise, while a good morphological state can likewise promote body function. This thesis takes basketball-specific physical training as an object, and analyses and explores the effects of different types of physical characteristics on athletes' performance and competitive level, with a view to obtaining a higher training effect. The results of this study emphasise the centrality of an all-round training programme and suggest that both functional and morphological conditions of the body should be given equal importance in the development of training strategies.

Moving forward, training strategies and methods in competitive sport are expected to become more scientific and efficient as technology continues to advance and be used extensively. The collection and interpretation of digital training data, for example, has brought coaches more accurate training feedback, giving them the opportunity to develop training programmes that are more in line with their personal preferences. With advances in wearable technology and biosensors, it is now possible to instantly monitor an athlete's health and adjust training intensity and recovery strategies as a result. The use of smart sports equipment and virtual reality technology can further enhance athletes' skill

training and mental preparation. A person's sustained vitality, fullness of spirit, social adaptability, and effective utilization of personal abilities and social functions.

Thanks to the power of technology, the growth of competitive sports will no longer be limited to traditional training, but will be aided by data processing, biomechanical improvements, customised nutritional programmes and psychological counselling. This innovation will not only enhance the overall performance of athletes but will also advance research in sports medicine and sports science to ensure that the health and well-being of athletes is supported in a more in-depth and comprehensive manner.

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