

The Value of Motor Vision in Middle School Students' Motor Cognition Development and Its Application in Teaching Practice

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Keywords: Motion vision; Middle school student sports; Cognitive development; Teaching practice

Abstract: Vision plays a dominant role in human perception, assuming the function of receiving most sensory information. After visual perception, this information is transmitted to the nerve center through the afferent nerve for analysis, and then affects the various reactions of the human body. In the prevention and control of myopia in adolescents, the application of visual training is very extensive, and it also has a significant effect on the treatment of ametropia. Compared with traditional visual training, sports visual training pays more attention to the improvement of visual function related to motor ability. This training not only enhances eye movement function and lens regulation, thereby improving vision and relieving visual fatigue, but also improves motor performance by optimizing visual function.

1. Introduction

Motor vision has important value in the development of motor cognition of middle school students, and the teaching practice is the key to realize this value. Through scientific and reasonable teaching practice application, it can effectively improve students' motor vision ability and promote their motor cognitive development. Therefore, PE teachers should pay attention to the cultivation of students' visual ability and integrate it into daily teaching. At the same time, further research should also focus on how to improve students' motor vision ability more effectively, and how to combine it with other teaching methods to achieve more comprehensive student development.

2. The implications of motion vision

Visual training originated in France, after years of development, has become an important branch of the field of ophthalmology. With the unremitting efforts of several generations of ophthalmologists, the methods of visual training have been enriched and matured, and a systematic training system has been gradually formed. With the popularity and application of visual training, more and more patients have benefited from this training method, which has improved vision problems and improved quality

of life ^[1].

Motion vision is a kind of visual perception ability, which involves many aspects of visual function. These include static vision, dynamic vision, depth perception, eye-hand coordination, and so on. After observing the changes of the environment and things in the process of movement, people have the ability to make timely feedback and adjustment to their actions. This ability is crucial to an athlete's performance in competition, as it helps them better cope with complex and changing situations on the field. Motion vision can be evaluated and trained in a variety of ways. For example, an athlete's motor vision ability can be assessed by observing and evaluating their visual response speed, eye movement, and focus regulation. At the same time, these abilities can also be improved through specific training methods, such as simulation training using virtual reality technology and eye-hand coordination training. Compared with visual training, the research on motion vision started relatively late. Although motor vision plays an important role in motor performance and skill improvement, it has not received enough attention for a long time. The United States is one of the first countries to study motion vision. With the deepening of research, motion vision has gradually been widely concerned and applied. Japan has developed rapidly in this field and established the Sports Vision Center in Tokyo in 1987 to provide sports vision training services for athletes and ordinary people ^[2].

The research and application of visual training in our country started late, and it was not until the 1990s that we began to conduct in-depth research on visual training. Compared with developed countries, there are still some gaps in visual training and sports vision in China. In order to better promote the development of visual training and sports vision, China has strengthened the research and application in related fields, and constantly improved the public's understanding and attention to visual training and sports vision ^[3]. At the same time, China actively introduces foreign advanced training methods and equipment, strengthen international exchanges and cooperation, therefore, China's visual training and sports vision-related research level is developing rapidly.

3. The role and value of motor vision in middle school students' motor cognition

Motor vision is the ability of the brain to receive and respond to the information collected by the eyes. Different from other vision, it mainly collects information on the field through the visual organs as the basis for the brain to perform actions ^[4]. This kind of visual function related to motion is called motor vision, which is directly related to the visual function of motion. In summary, sports vision is a branch of the field of vision, simply put, is related to sports vision, is a kind of field situation and information acquisition ability. This ability is crucial to an athlete's performance in competition, as it helps them better cope with complex and changing situations on the field ^[5].

3.1. The role of motor vision in middle school students' motor cognition

Visual motor ability is the basis of motor vision. For middle school students, motor vision is not only the ability to observe moving objects, but also involves a series of complex cognitive processes. Visual motor ability is the basis of motor vision. Students need to focus quickly and accurately on a moving object or person in order to act or react accordingly. Eye-hand/foot coordination is related to students' ability to translate visual information into effective actions ^[6]. For example, in basketball, good eye-hand coordination is key for students to shoot accurately (Figure 1). Dynamic visual acuity covers visual motor ability, visual perception ability and eye-hand/foot coordination ability, which work together to help students make accurate judgments and reactions during movement. In addition, visual perception is also an important part of motion vision. This includes visual memory, visualisation and graphic background perception. Visual memory enables students to remember complex motion scenes in a short period of time, while visualisation allows students to "preview" their movements. Graphic background perception, that is, identifying the most important information

in motion, is essential for quick decision making. It should be noted that motion vision is not the same as static vision [7]. Static vision is primarily concerned with clarity, while motion vision involves dynamic observation and rapid reaction times. In motion, even if static vision is good, without proper motion vision training, students may still not be able to accurately capture moving objects or make appropriate movements. At the same time, through the experiment, it is found that the influence of motion vision in different sports is different [8]. For example, baseball, tennis and other projects that require quick reaction and accurate judgment have higher requirements for motion vision. Therefore, it is very necessary to conduct sports vision training according to the characteristics of different projects (Table 1).



Figure 1: Basketball visual training

Table 1: Requirements of visual ability in different sports

Sports event	Visual ability requirement
Skiing	Far vision, dynamic vision, depth perception
Curling	Static vision, spatial perception, target recognition
Basketball	Dynamic vision, hand-eye coordination, spatial perception
Soccer	Dynamic vision, hand-eye coordination, spatial perception
Race car	Dynamic vision, object recognition, spatial perception
Baseball	Far vision, dynamic vision, target recognition
Tennis	Dynamic vision, hand-eye coordination, spatial perception

3.2. The value of sports vision in middle school students' sports cognition

(1) Information acquisition ability

The primary feature of motion vision is its ability to acquire information during movement. On the sports field, middle school students need to quickly and accurately capture the position, speed, movement trajectory and other information of various moving objects in order to make corresponding responses. This kind of information acquisition ability is very important to improve the motion perception and cognitive ability of middle school students. Training and improving middle school students' ability to acquire sports visual information can help them better understand and cope with complex sports scenes, thus improving their performance in different sports events [9].

(2) Dynamic vision ability

Motion vision emphasizes the ability to observe and react to dynamic objects. On the sports field,

objects and the environment are constantly changing, and middle school students need to be able to adapt to this dynamic change and make judgments and reactions quickly and accurately. This dynamic vision ability is helpful to improve the speed of motor decision making and reaction of middle school students. Dynamic vision ability not only helps to improve the reaction speed of middle school students in sports, but also helps them better adapt to changes in competitions and improve their competitive level ^[10].

(3) Spatial cognitive ability

Motor vision is closely related to spatial cognition. Through motion vision, middle school students can better perceive and judge the spatial position and distance of objects, and then make correct actions. This kind of spatial cognition ability is helpful to improve middle school students' sense of position and space in sports. In basketball, football and other sports that need good spatial cognition ability, the spatial cognition ability of motion vision is particularly important. Training and improving the spatial cognitive ability of middle school students can help them better understand and master the skills and strategies of sports ^[11].

(4) Attention and concentration

Motion vision requires a high degree of focused attention and concentration in a rapidly changing motion scene. It is helpful to improve the concentration, anti-interference ability and emotional stability of middle school students, which is of great significance to improve their sports performance and competitive level. Through the training of sports vision, it can help middle school students to better control their attention and emotions, so as to improve their performance and competitiveness in the game.

(5) Predictive ability

Through motion vision, middle school students can anticipate the movements and intentions of opponents or teammates in advance, so as to react in advance. This kind of predictive ability can help middle school students better adapt to the changes in competition and improve their sports performance and competitive level. The ability of anticipation is very important for the sports performance of middle school students, especially in sports that require quick reaction and high skill, such as badminton and table tennis. Training and improving middle school students' predictive ability can help them better cope with complex situations in competitions and improve their competitive level ^[12].

To sum up, movement vision has important value in middle school students' movement cognition. Through training and improving the sports vision ability of middle school students, it can promote the improvement of their motion perception, reaction speed, concentration, anticipation ability, etc., and then improve their overall sports performance and competitive level. Therefore, in the middle school physical education, we should pay attention to the training and cultivation of sports vision, in order to improve the sports cognition ability of middle school students. At the same time, targeted training methods should be adopted according to the needs of different sports to improve the sports performance of middle school students.

4. Application of motion vision in sports training of middle school students

The more visual the eyes are, the more information the brain receives, which helps improve athletic performance. Studies have shown that vision accounts for 83% of the external information collected by the human body, and effective visual training can improve visual acuity and physical activity ability, thereby improving sports performance. Chinese researchers have also conducted research on sports vision and found that vision plays a key role in sports training for middle school students and regulates the efficiency of sports training for middle school students ^[13].

4.1. The necessity of developing sports visual physical education course

Sports vision course plays a vital role in physical education teaching. Firstly, through sports vision training, students can better perceive and understand the visual information in motion, thus improving their sports performance. This ability is very important in all kinds of sports, whether it is ball games that require quick reflexes, or sports such as gymnastics or swimming that require precise movements, sports vision training can help students improve attention, concentration and reaction speed. In a fierce game, students need to quickly capture the opponent's movements, the position of the ball and other information, and make accurate judgments and reactions. Through targeted motion vision training, students are able to better control their vision and capture key information faster, thus gaining an edge in the game. Sports vision training also helps to improve students' self-confidence and ability to withstand pressure. Stress and tension are inevitable in sports competitions, and good sports vision skills can help students stay calm and confident. With the improvement of motor vision ability, students will trust their eyes and body reactions more, thus playing a better level in the competition [14].

4.2. Combine with sports

With the advancement of PE curriculum reform, more and more schools begin to pay attention to the development of special sports. The combination of sports vision training and special sports can better adapt to the needs of PE teaching reform, enrich the content of PE courses, and improve students' learning interest and participation. Different sports have different requirements for visual ability. Combining sports visual training with special sports can improve students' visual ability more pertinence, so as to better adapt to the needs of special sports. This can not only improve the training effect, but also save training time and avoid ineffective training. Sports vision is only a part of sports ability. Combining sports vision training with special sports can better cultivate students' comprehensive sports ability, including physical coordination ability, reaction speed, strength and endurance. This helps to improve the overall sports level of students and lays a solid foundation for future sports development. At the same time, the combination of motor vision training and special sports can promote the integration of vision and movement, help students better perceive and guide their movements, and improve sports performance.

It is very necessary to combine the sports vision course with special sports, which can improve the training effect, promote the integration of vision and sports, adapt to the needs of the reform of sports teaching and cultivate the comprehensive sports ability. In physical education teaching, teachers should arrange the content and methods of sports vision training reasonably according to the characteristics and needs of different special sports, so as to give full play to its role.

4.3. Motion visual tutorial should follow the principles

Sports vision training is an important branch of sports training, in order to ensure the scientific and efficient training, we must follow certain principles. In the process of training, reasonable arrangements should be made around the three components of brain, visual receptors and visual information.

(1) Teach students according to their aptitude

Each student is unique and varies in their visual ability, comprehension ability, learning speed, etc. Therefore, the tutorial should be personalized according to the specific situation of each student to ensure the effectiveness and pertinency of the training. For students with weak visual ability, they can start from the foundation and gradually improve. For students with strong visual ability, the difficulty can be increased and further improved.

(2) Step by step

The improvement of motion vision is a gradual process and should not be rushed. The course should be from simple to complex, from easy to difficult, and gradually improve students' visual ability. This can not only ensure that students' ability is gradually improved, but also avoid poor training results or injuries caused by excessive difficulty.

(3) Moderate amount

Visual training is not a quick fix, it takes time and patience. Therefore, the tutorial should reasonably arrange the training time and training amount to ensure that students get the best results in the appropriate amount of training. Excessive training may lead to fatigue and counter-effects, while insufficient training will not achieve the desired effect.

(4) Safety first

The course should be based on scientific theory and research to ensure that the training method is scientific and effective. At the same time, the course should also follow the law of students' physical and mental development, and avoid over-training and unnecessary injury. In the course of implementation, attention should always be paid to the safety of students and to avoid injuries caused by improper training. Teachers should give special guidance and supervision to the training content that may have potential safety risks. At the same time, it is also necessary to ensure the safety of the training environment and facilities, and ensure that students are trained in a safe environment.

The sports visual course designed in accordance with the above principles can better meet the needs of students, improve their visual ability, and promote the improvement of sports performance. At the same time, such a course is more scientific and effective, and can better achieve the goal of physical education.

5. Conclusion

Sports vision is closely related to middle school students' physical education, and sports vision function training has important application value in middle school students' physical education. Through scientific and reasonable sports vision training, it can not only improve the sports skills of middle school students, but also promote the development of their cognitive ability, so as to enhance their comprehensive competitiveness in the field of sports. Therefore, in the middle school physical education, we should pay attention to the practice and effect evaluation of sports vision training, so as to provide more targeted training methods and means for middle school students.

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