Discussion on the Present Situation and Measures of Physical Training of Volleyball Team in Higher Vocational Colleges

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Abstract—In order to understand the current situation and measures of physical training of volleyball team in higher vocational colleges, this paper takes the current situation of physical training of volleyball team in Higher Vocational Colleges as the object, starting with the physical training of volleyball team in Higher Vocational Colleges as the starting point, using the methods of literature review, questionnaire survey, expert interview and mathematical statistics, briefly discusses the concept of physical training of volleyball team in Higher Vocational Colleges at this stage, and analyzes the current stage of vocational colleges. This paper analyzes the performance of insufficient physical training of college volleyball team, and introduces the new concept of physical training to analyze the optimization measures of physical training of volleyball team in higher vocational colleges. It is concluded that the basic situation of volleyball players in higher vocational colleges is not different, which has no great impact on physical training, but the physical training lacks certain scientificity, and the training mode is relatively single, and the training plan is not targeted. Through scientific physical training, we can improve the competitive ability of volleyball players in higher vocational colleges. Therefore, physical fitness is an important component of the competitive ability of volleyball players in higher vocational colleges, and good physical quality is the key for volleyball players in Higher Vocational Colleges to have high-level technology and obtain good sports results.

1. INTRODUCTION
In recent years, the policy threshold for professional athletes to enter vocational colleges has gradually relaxed, which has led to a significant improvement in the physical fitness and competitive level of volleyball players in vocational colleges in a short period of time. The competition in national vocational college volleyball competitions is becoming increasingly fierce, and higher requirements have been put forward for the physical training level of vocational college volleyball teams. In this situation, how to develop a scientific physical training plan, optimize traditional physical training methods, and strengthen targeted high-level physical training has become a problem that university volleyball teams need to consider properly.

2. OVERVIEW OF PHYSICAL FITNESS TRAINING FOR VOLLEYBALL TEAMS IN VOCATIONAL COLLEGES

From "Sports Training", it can be concluded that physical fitness is an important component of the physical fitness of volleyball players in vocational colleges, covering factors such as sensitivity, endurance, speed, flexibility, and strength. Essentially, physical fitness mainly refers to the ability of volleyball players in vocational colleges to acquire morphological structures through innate inheritance and acquired training, as well as their ability to regulate body function and store material energy in combination with the external environment. In a narrow sense, the physical fitness of volleyball players in vocational colleges mainly refers to their physical fitness level, while in a broad sense, the physical fitness of volleyball players in vocational colleges covers three aspects: physical fitness, form structure, and function[1]. The physical fitness training of volleyball players in vocational colleges is mainly aimed at volleyball athletes, which can improve their physical fitness level, function, and form structure.

3. INVESTIGATION ON THE CURRENT SITUATION OF PHYSICAL FITNESS TRAINING FOR VOLLEYBALL TEAMS IN VOCATIONAL COLLEGES

3.1. Survey objects and methods
This survey focuses on the current situation of physical fitness training for volleyball teams in vocational colleges. The survey was conducted using literature review, questionnaire survey, expert interview, and mathematical statistics methods.
3.1.1. Literature method

Based on the physical fitness training of volleyball teams in vocational colleges, I have consulted papers and books on sports education, sports training, sports history, and sports management. And relying on internet platforms, we have consulted literature summary materials such as China Education Network, China National Knowledge Infrastructure, and Volleyball Management Center, laying the foundation for the overall research framework and theoretical viewpoints.

3.1.2. Questionnaire survey method

An objective and impartial survey was conducted on the physical fitness training of volleyball players and coaches in vocational colleges through a self-designed representative questionnaire. A total of 100 survey questionnaires were distributed in this survey, and 100 were collected. There were 95 valid questionnaires, with an effective rate of 95%.

3.1.3. Expert Interview Method

Although physical fitness training has been accumulated to a certain extent in the academic community, simple literature reading and questionnaire surveys cannot fully understand the current situation of volleyball team training in vocational colleges[2]. Therefore, through face-to-face communication with frontline sports team coaches and other experts, or by attending expert professional academic lectures and research activities, we have obtained more authentic and comprehensive feedback information.

3.1.4. Mathematical Statistics

Using Excel documents, encode the questionnaire results to obtain digital questionnaire survey results. And data cleaning was carried out through average value measurement, eliminating unreliable data, and forming a specific research result on the physical fitness training status of volleyball teams.

3.2. Survey Results

3.2.1. Basic Information of Volleyball Players

A survey was conducted on the basic information of volleyball players in vocational colleges, such as weight, height, and age. The results are shown in Table 1:

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Heyuan Vocational and Technical College</th>
<th>Shenzhen Vocational and Technical College</th>
<th>Guangdong Transportation Vocational and Technical College</th>
<th>Guangdong Light Industry Vocational and Technical College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height/cm</td>
<td>179.8</td>
<td>181.2</td>
<td>180.8</td>
<td>180.9</td>
</tr>
<tr>
<td>Body weight/kg</td>
<td>76.0</td>
<td>77.0</td>
<td>76.4</td>
<td>76.7</td>
</tr>
<tr>
<td>Age/years old</td>
<td>20.7</td>
<td>20.5</td>
<td>20.4</td>
<td>20.7</td>
</tr>
</tbody>
</table>

According to Table 1, the average height of volleyball players in vocational colleges ranges from 179.8 to 181.2cm, with a weight of 76.0 to 77.0kg, and an age range of 20.4 to 20.7 years old. The basic difference is not significant and has no significant impact on physical training.

3.2.2. Sports venues and facilities

The frequency distribution of equipment used in physical fitness training for volleyball teams in current vocational colleges is shown in Table 2:

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Frequency/person</th>
</tr>
</thead>
<tbody>
<tr>
<td>dumbbell</td>
<td>15</td>
</tr>
<tr>
<td>barbell</td>
<td>28</td>
</tr>
<tr>
<td>skippingrope</td>
<td>12</td>
</tr>
<tr>
<td>Local muscle exercises</td>
<td>20</td>
</tr>
<tr>
<td>Combination instrument</td>
<td>11</td>
</tr>
<tr>
<td>Elastic rubber band</td>
<td>14</td>
</tr>
</tbody>
</table>

From Table 2, it can be seen that the number of volleyball players who use barbells to complete physical training is the highest, at 28, followed by local muscle exercises at 20, and combination equipment exercises at 11. From this, it can be seen that volleyball players in vocational colleges have a low utilization rate of skipping rope, combination equipment, elastic rubber bands, and dumbbells, and lack a certain scientific level of physical fitness training.

3.2.3. Physical fitness training methods

By analyzing the frequency distribution of commonly used methods for daily physical fitness training of volleyball players in vocational colleges, the results are shown in Table 3:

<table>
<thead>
<tr>
<th>Training method</th>
<th>repetition training</th>
<th>continual training</th>
<th>interval training</th>
<th>Transformation training method</th>
<th>other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training frequency/%</td>
<td>33.0</td>
<td>36.0</td>
<td>8.5</td>
<td>7.0</td>
<td>15.5</td>
</tr>
</tbody>
</table>
As shown in Table 3, the continuous training method (with almost no rest time between the two groups) and the repeated training method (with sufficient rest time between the two groups) have the highest frequency of application in the daily physical fitness training of volleyball players in vocational colleges, with 36.0% and 33.0%, respectively. However, the variable training method (with certain changes in training content, form, and load between the two groups) and the interval training method (with strict rest time between the two groups) have the lowest frequency of application, with 7.0%, respectively. 8.5% indicates that there is no consensus on physical fitness training methods among volleyball players in vocational colleges, and the training mode is relatively single, with no targeted training plans.

4. OPTIMIZATION MEASURES FOR PHYSICAL FITNESS TRAINING OF VOLLEYBALL TEAMS IN VOCATIONAL COLLEGES

4.1. Reasonable selection of functional training equipment

Functional training mainly originates from the fields of rehabilitation and fitness, and is a targeted action mode that develops various body functions. It can comprehensively improve the muscle coordination ability and dynamic balance level of various parts of the body of volleyball players in vocational colleges, thereby promoting the integrated development of the functional movement chain of volleyball players in vocational colleges, activating the muscle speed of various body parts involved in volleyball sports, and improving specialized skills[3]. Functional training requires the scientific use of various training equipment, such as the use of a 55.0cm-65.0cm Swiss ball for "double foot back touch ball straight arm push ups” to train upper limb strength and waist abdominal strength, the use of yoga pads for "supine leg lift and head up” strength exercises, and the use of elastic bands with good elasticity for "single hand quick pull elastic bands" and "negative elastic band vertical jumps" to train upper limb strength and balance.

4.2. Develop a reasonable physical fitness training plan

4.2.1. Development of anaerobic training plan

Anaerobic training can effectively enhance the explosive power, speed, strength and other specialized sports qualities of college volleyball players, and effectively improve their comprehensive competitive ability. When formulating anaerobic training plans for volleyball players in vocational colleges, commonly used methods include ultra isometric training, resistance training, speed training, etc., which can be appropriately designed based on the principles of overload, sustained growth, and specificity[4]. For super isometric training based on muscle stretching and contraction, it can be combined with resistance training for volleyball players in vocational colleges, such as upper limb resistance training+lower limb super isometric training. It should be noted that during lower limb super isometric speed training, vocational college volleyball players should ensure that their 1RM deep squat weight reaches 65% of their own weight, with a frequency of five times. Upper limb super isometric speed training requires vocational college volleyball players to use 60.0% of their own weight and perform six consecutive push ups.

For resistance training, it is possible to combine the specific situation of volleyball players in vocational colleges and the characteristics of volleyball sports, and choose structural movements such as squats, push ups, and hard pulls that target one or more large muscle groups and multiple joints. At the same time, taking into account the age and physical endurance of volleyball players, adjust the training frequency. For younger female volleyball players, they can schedule two or three resistance training sessions within a week, one high-intensity multi joint core training session, six or less developmental ability training sessions (3-5 groups per session), and an interval of approximately 60 seconds for moderate intensity muscle growth training. And according to the method of alternating upper and lower limb training, complete explosive strength training, core strength training, and auxiliary training step by step[5].

In speed training, in order to ensure the best mental state and physical reserve of volleyball players in vocational colleges during the training period, the training volume can be controlled as the starting point. The "listening to signal running” and "watching gesture running” can be arranged into two groups of two times per group, with each group consisting of two groups of 30 seconds. Additionally, 3-4 groups of short distance sprint running methods such as 30m sprint running are introduced to promote volleyball players in vocational colleges to achieve maximum intensity during the training period.

4.2.2. Development of aerobic training plan

Aerobic training mainly refers to continuous running and bouncing, frequent offensive and defensive transitions, and is an effective means of cultivating good endurance qualities of volleyball players in vocational colleges. Coaches can choose cycling (supine simulation, 60s, 120s/group * 3 groups), running (interval running, 15min/group * 1 group), continuous vertical jump (60s, 60s/group * 3 groups) and other events, using KARCONEN calculation method and maximum heart rate calculation method to control training intensity, training time, training load, and training frequency. The entire aerobic fitness training is implemented twice a week, and each training is conducted within half an hour or one hour after volleyball technical and tactical training.
4.3. Scientific development of training cycles

Based on the laws of strength quality followed by speed quality, agility and coordination quality, and finally endurance quality and strengthening training, and relying on theoretical foundations such as sports physiology, sports anatomy, and sports training, a scientific training method system for volleyball players in vocational colleges can be formulated from the aspects of warm-up training, speed and strength quality training, sensitivity and coordination quality training, and endurance quality training.

4.3.1. Warm up training

Warm up training plays a crucial role in the training process of volleyball players in vocational colleges, which can awaken the relatively quiet functions of volleyball players, overcome body inertia, and enter a relatively active state. When formulating the warm-up training method system, coaches can start from several aspects such as lower limb muscle group activation, action integration, nerve activation, and stretching training[6]. The activation of the lower limb muscle group involves 10 times/group * 2 groups of Mini belt straight and horizontal walking in 60-120 seconds, 10 times/group * 1 group of Mini belt squats in 60-120 seconds, 5 times/group * 1 group of negative elastic belt acceleration runs in 60-120 seconds, and 10 times/group * 1 group of negative elastic belt vertical jumps in 60-120 seconds; Action integration includes 120-180s of 12m/group * 2 groups of small steps, high leg lifts, acceleration runs, lateral movements, and cross steps; Nerve activation includes 2 rotations per group for 60 seconds, 2 groups for rapid response, and 1 in situ step breaking fast response exercise and soft ladder step training for 30 seconds; The stretching training mainly includes 4 times/group * 1 for 30-60s, including barehanded shoulder fixed stretching and back straight arm palm stretching, 4 times/group * 1 for 30-60s, and 4 times/group * 1 for 30-60s, including lower spine extension and torsion stretching, as well as 4 times/group * 1 for 30-60s, including sitting and holding ankle and hook foot forward bending.

4.3.2. Strength and quality training

Strength training can enhance the cross-sectional area of volleyball players in vocational colleges, involving three aspects: upper limb strength, core strength, and lower limb strength[7]. Among them, upper limb strength training includes 1 minute/group * 4 groups of elastic band arm swings for 30 seconds, 10 times/group * 3 groups of bench press barbells for 60 seconds, 1 minute/group * 3 groups of prone straight arm support for 60 seconds, 10 times/group * 4 groups of chest forward lunge MedicineBall for 30 seconds, and 2 minute/group * 3 groups of elbow bending plate support for 60 seconds; Core strength training mainly includes 60 seconds of 1min/group * 4 groups of elbow flexion side support, 60 seconds of 1min/group * 4 groups of straight arm side support with both feet on a Swiss ball, 10 times/group * 3 groups of supine leg lift and rest, and 20 times/group * 4 groups of single leg alternating squats in 60 seconds; Lower limb strength training mainly includes 20 times/group * 4 groups of supine buttocks lifting/weight bearing steps, and 5 times/group * 5 groups of supine feet stepping on the Swiss ball top hip.

4.3.3. Sensitivity and coordination training

Speed quality training can be scientifically carried out based on the aforementioned anaerobic training plan, while sensitive coordination quality mainly refers to the ability of volleyball players in vocational colleges to accurately and coordinate physical movements under various rapid changes, which is closely related to achieving excellent sports performance. Therefore, appropriate training methods should be adopted[8]. For example, using a 10-20 second 13 grid/group * 2 groups of straight small step fast running forward (soft ladder)/Kariok dance step forward/wide step cushion step hook leg support "S" shaped forward quick cushion step forward and side shift inside and outside the straight box, or a 30 second 60 second mixed running method with 3 groups of "T" shaped, "mouth" shaped, and "U" shaped markers.

Endurance training can be scientifically conducted according to the aforementioned aerobic training plan. The specific training method system can be as follows: activation of lower limb muscle groups (10 times/group * 2 groups of Mini walking with straight and horizontal movements in 60-120 seconds, 10 times/group * 1 group of Mini squatting movements in 60-120 seconds) → stretching training (4 times/group * 1 group for 30-60 seconds) → stretching training (4 times/group * 1 group for spinal extension and torsion stretching, 4 times/group * 1 group for 30-60 seconds) → action integration (12m/group * 2 groups of small steps+high leg lift/acceleration running in 120-180 seconds) → neural activation (2 rotations per group for 60 seconds, 2 groups for quick reaction exercises, and 1 in place step per group for 30 seconds) → Lower limb strength (20 rotations per group for 60 seconds, 4 groups for alternating single leg squats, 1 minute per group for 60 seconds, 4 groups for straight arm side support on a Swiss ball) → Aerobic endurance (120s/group * 3 groups for supine simulation bicycles, 60s/group * 3 groups for continuous vertical jumps) → Leg stretching and relaxation, leg massage.

4.4. Pay attention to training details and adjustments

4.4.1. Preparation for Training Details Adjustment

At present, the preparation for physical fitness training of volleyball teams in vocational colleges mainly includes whole-body preparation activities (jogging around the playground for more than five minutes or less, with a control time of less than ten minutes. If the weather temperature is low, the number of laps can be increased or the time can be extended appropriately), and local
preparation activities (head exercises, waist exercises, stretching exercises, leg pressure exercises, joint exercises, chest expansion exercises, buttocks exercises, etc.). Among them, in waist movements, leg pressure movements, joint movements, especially in squatting positions, it is easy to have high or low postures when the left and right knees are bent, and the center of gravity is forward. Only bending the waist without bending the knees can affect the effectiveness of subsequent physical training. To avoid the repetition of the above errors, coaches can require vocational college sports team students to repeatedly carry out non instrumented physical fitness training based on the correct movement points. Divide the students of the sports team into several groups of three or five. First, have each group member watch dynamic pictures or videos, explore the correct movements, and then carry out imitation exercises based on the pictures. At the same time, the coach can provide tour guidance and promptly correct the incorrect actions of the sports team students. Alternatively, require sports team students to conduct non instrumented physical fitness training against the wall. When students have no equipment for physical training, coaches can, based on teaching experience, establish standards in advance that match the students' physical condition, and require students to prepare for equipment free physical training according to the standards. Repeated non instrumented physical training can help sports team students establish a correct awareness of physical training preparation, laying the foundation for the smooth progress of subsequent physical training.

4.4.2 Adjustment of local physical fitness training details

Developing strength and quality is the foundation for college students to master and improve volleyball specialized techniques and tactics, and is related to the reaction, movement, arm swing speed, and approach and takeoff effects of attack and defense in sports competitions. According to the local strength requirements of sports team students, the selected methods also have certain differences. For leg strength training, the "repetition method" can be chosen, requiring students to use knee joint angles that are similar to spiking and jumping, such as 60.0° or below, or knee flexion, such as 90.0° or below, to carry out weight bearing squats (or lying exercises); For the strength training of the lower back muscles, the "intensity method" or the centrifugal centripetal contraction training method can be chosen, requiring students to stand up as fast as possible, or to push out light and medium weights and use a longer time to slowly squat and retract as much as possible. During the above training process, sports team students are prone to errors such as no shoulder lift, inability to clamp their arms, and uneven strength. Based on this, coaches can choose to carry out non instrumented physical fitness training in accordance with the standard, gradually transitioning to a physical fitness training program with equipment support, such as 5 times/group * 1 group of negative elastic belt acceleration runs in 60-

120 seconds, allowing students to repeat bouncing exercises back and forth. After mastering 5 times/group * 1 group of negative elastic band acceleration runs for 60-120 seconds, gradually change the training equipment and increase the difficulty of applying the equipment, enabling them to experience changes in strength during the distance extension process, and then learn how to reasonably control the size of strength.

In addition, coordinated use of upper and lower limb strength is also an important goal of volleyball physical training for sports team students. Some students often encounter problems with only using upper limb strength or upper and lower limb coordination, which poses significant challenges to the smooth progress of physical training plans. Based on this, coaches can increase the intensity of sitting, ankle hugging, and foot hook forward bending exercises, and command the students of the sports team to conduct quick reaction training through commands, prompting them to find a balance point between quick reaction and rotation, improving their coordination of upper and lower limbs, and ensuring the effectiveness of volleyball strength training.

5. CONCLUSIONS

The importance of physical fitness training for volleyball teams in vocational colleges is generally recognized, but there are still a series of problems such as a single commonly used method for daily physical fitness training and a lack of scientific physical fitness training. To avoid the adverse effects of the above issues on the construction of high-level volleyball teams, vocational colleges should carry out targeted physical fitness training for volleyball players based on the principles of high-level and professional development. At the same time, a scientific physical fitness training plan should be formulated, and a functional training oriented physical fitness training plan should be improved to ensure the stable improvement of volleyball players' physical fitness and lay the foundation for the construction of high-level volleyball teams.

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