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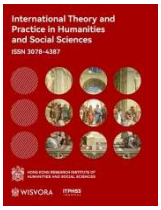

Research on the Pre-competition Physical Training Strategy of College Female Volleyball Players

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Abstract

Physical fitness is the foundation of all sports, good physical fitness not only enhances physical fitness and health, but also is very important for mastering volleyball skills and winning the game. Physical training is the core issue of training theory and practice method, and excellent physical quality will improve athletes' performance. Therefore, the purpose of this paper is to discuss the theoretical basis of volleyball specialized physical training and its application in actual training. First of all, taking 14 female volleyball team members of Soochow University (national first-class athletes) as experimental subjects, we divided them into an experimental group and a control group by random number method for 12-week physical training. The physical quality of the athletes before and after the experiment was measured by the physical quality test index adopted by the national female volleyball training camp. The results show that 1) both conventional physical training and improved comprehensive physical training can enhance the physical quality of female volleyball players, but the improved comprehensive physical training is better; 2) Compared with routine physical training, the 12-week comprehensive physical training method has more advantages in improving the lower extremity strength quality and lower extremity movement speed of female volleyball athletes.Consequently,the improved comprehensive physical training based on conventional physical training and combining theory and practice can further optimize the training mode, which has a very positive effect on improving the special physical quality of female volleyball athletes.

1. Introduction

Volleyball is a comprehensive collective sport that requires athletes' strength, speed, endurance, and sensitivity. In recent years, with the development of volleyball and the improvement of competitive level, the athlete's physical training is becoming more and more important. In 2020, the General Office of the General Administration of Sport of the People's Republic of China issued the "On Further Strengthening the Basic Physical Training and Deficient Complement," which clearly pointed out that physical training should be taken as an important subject for the basic training of the sports bureaus of various provinces and regions and the sports departments of the PLA. Strengthening physical training can not only create favorable conditions for athletes' skills and tactics but also reduce the risk of injury in the course of sports.[1] Therefore, this research adopts the conventional physical training scheme and comprehensive physical training scheme to carry out the experimental research on the female volleyball team players of Soochow

University, compares the changes in the physical quality test indexes of the athletes before and after the experiment, and analyzes the influence of the two physical training schemes on the physical quality of the athletes, so as to provide a practical reference for the female volleyball athletes of college students before the competition.[2]

2. Research object and method

2.1 Research object

Between July 1, 2024 and September 30, 2024, Fourteen female volleyball team athletes from Soochow University were taken as experimental subjects; 14 athletes were all students of Soochow University, and they were also national volleyball players.

2.2 Research methods

2.2.1 Experimental site

Volleyball court of Soochow University, playground, gym, etc.

2.2.2 Experimental equipment

Volleyball, Smith rack, platform, horizontal bar, cushion, mark, stopwatch, tape measure, bar, bar slice, dumbbell, squat rack, height touching the device, etc.

2.2.3 Training programme

Twelve weeks of training in the experimental group takes four weeks as the first-stage cycle. See Table 1 - Table 5 for the comprehensive physical training scheme in the experimental group. The training mode of the remaining weeks' training scheme remains unchanged. The load and load intensity increase or decrease with the athletes' physical condition by 20%-50%. Training weights in the experimental group included both completing all interval weights and single-weight exercises.

Table 1 Comprehensive Physical Training Scheme Of Experimental Group(Week 1)

	Training programme	Technical essentials and requirements	Training weight	Number of groups
Monday Lower extremity	Weight-bearing squat High platform leg Footwork	Stick thigh to calf The athlete lies flat with his feet on the platform, knees 90°, and exercises using a hip lift and triceps. The athlete leaned the barbell forward, and a man stood against it in front.	40kg-60kg 10kg 60kg-80kg	Group 12*1 Group 30*8 Group 30*8
Upper limb	Lying push Flexural arm Dumbbell Leaning bird	Dumbbell: After both hands hold the dumbbell for side leveling, the hands shall be lifted in three directions according to the front, upper, and side leveling, and the wrist must	40kg-90kg 20kg-50kg 10kg-20kg 10kg-20kg	Group 10*6 Group 10*6 Group

		be rotated in the next direction.		20*6 Group 15*6
Lumbar abdomen	Forward from both ends Back to both ends Supine bike Three or nine prone points	3: 9 prone: The athletes lay down on the mattress, and the upper body swung in the direction of three o'clock and nine o'clock. Another athlete presses the ankle.		Group 30*6 Group 30*6 Group 30*6 Group 30*6
Lower limbs on Wednesday	Squatting Load change braking Footwork training	1-2 per weight, 80% squat weight: Max. 120 kg, 80% squat is 100 kg. Angle 90-100° The athlete carries the barbell piece to carry out the single-leg front, rear, left, and right direction change braking exercise. One foot tiptoe requires slow down and quick up.	60 kg punching 10kg-20kg 15kg-20kg	Group 8*6 Group 20*6 Group 30*6
Upper limb	Back pull Head lift Backrest arm Push-ups	Use a Pull-down Machine for training. Double-armed barbells whip forward from behind. Support the platform to make the upper and lower arms, legs straight, and buttocks empty. Ask to jump when bracing with both hands and feet.	60kg-100kg 20kg-30kg	Group 10*6 Group 10*6 Group 10*6 Group 10*6
Lumbar abdomen	High platform swing arm Gaotai boating Supine swing leg Weight-bearing supine sit-up	A group of two people pressed on the legs; the body lifted flat, two hands holding the bar first up and down and then swinging the bar left and right. The method is the same as above, with a two-hand barbell forward and backward to do the rowing motion. Lie flat with your legs straight up and down. After holding the barbell piece on the head, do not touch the ground and knee.	5kg 15kg-20kg 10kg	Group 20*6 Group 15*6 Group 30*6 Group 30*6
Lower limbs on Friday	Weight-bearing half squat Crossover Single-legged squat	The angle is required to be 120 degrees, and it shall be started slowly and quickly. Squat your heels off the ground. The back bar bells to cross jump, mostly with the calf and ankle joint force; the jump process requires fast, heel off the ground.	Maximum amount of squat +20% Maximum amount of squat —	Group 12*6 Group 20*6 Group

	Raise your legs for a minute.	For single-leg non-load squats, the required angle is 90°. During the exercise, lower your center of gravity and make your body slightly flexed.	40% Single leg exercise	10*6 Four groups
Upper limb	Scratch	Hold the barbell directly from the ground to the highest; during the snatching process, the waist should be straight, and there should be no pause.	30kg-40kg	Group 8*6
	Barbell blade side pendulum	Starting from below the right knee of the body, the two-hand barbell piece swings backward and upwards to below the left knee of the body.	10kg-20kg 20kg-30kg 15kg-20kg 40kg-50kg	Group 10*6 Group 15*6 Group 10*6
	Supine lift arm Horizontal pull	Double-hand barbell parallel to the chest for quick push and pull. After lying flat, the pusher frame holds the barbell, and the arm stretches straight from the top of the head to the front of the chest.		Group 10*6
Lumbar abdomen	Plate support jump Load and lift the waist Prone abdomen Dorsal reverse bow	The legs are bent, the waist and back are stretched straight, the body is 90°, the arms are wide, the barbell is pulled up to the chest, and the body remains stable when it is lowered. At the same time, the two legs of the plate support the opening and closing jump. The body is 90° legs, waist, and arms stretched straight, two hands barbell, use waist strength hip joint up and down movement. It was flattened after contralateral limb knee and elbow collisions. The contralateral limbs, legs, and arms are raised upward at the same time, and the body is in the shape of a back bridge at the same time.	50kg-60kg Alternate Alternate	Group 30*6 Group 20*6 Group 30*6 Group 30*6
Saturday Endurance	Special braking direction change plus ball Track and Field Endurance Running	Conduct the first and second direction changes according to the actual line. After departure, rollover or forward flapping action shall be carried out after reaching the first direction change point, and quickly get up for secondary direction change and secondary direction change fitting ball. Within 20 minutes. Group the athletes according to their weight and arrange the completion time reasonably.	50-60 Code 4000 m	Five groups Ten turns

Table 2 Comprehensive Physical Training Scheme Of Experimental Group(Week 2)

	Training programme	Technical essentials and requirements	Training weight	Number of groups
Monday Lower extremity	Weight squat	Angle 90-100° is required to be grouped according to the size of force, each weight from low to high and from high to low.	60kg-100kg 70kg-110kg	Group 5*10
	Prone flexing leg	Belt-assisted training.	80kg-120kg	Group 30*6
	Load-bearing footwork	Practice using a Heel Lifting Machine.		
	A minute walk	Fast, ground with forefoot, no less than 150 times.	60kg-80kg	Group 30*6 Six groups
Upper limb	Lying push Head lift	Three groups of wide lying and three groups of narrow lying.	50kg-100kg	Group 10*6
	Flexural arm Back pull	Push-ups: It is required that the distance between the two hands in the first three groups is the same as the shoulder width, and the opening and closing of the two hands in the second 3 groups are the largest.	20kg-35kg 30kg-40kg	Group 10*6
	Push-ups	Stretch your hands straight and open and close to the maximum.	60kg-90kg 5kg-10kg	Group 10*6 Group 10*6 Group 15*6
Lumbar abdomen	Weight-bearing dorsal plateau muscle	One presses his leg, and the other is empty above the hip.	10kg	Group 30*6
	Weight-bearing platform 3, 9 points	The athlete is lying on the platform, and the air above the hips swings towards three and nine o'clock. The left and right sides of the body, the abdomen, when hand and foot contact.	10kg Alternate 20kg	Group 30*6 Group 30*6
	From both lateral ends Lateral muscle	The body is in an upright position, the single-hand dumbbell is close to the outside of the thigh for relaxation, the contralateral swing is performed through the lateral muscle, and the lateral muscle force is felt at the same time, without disc belt force.		Group 30*6
	Supine pinch ball swing	Lie flat with legs swinging around with Swiss balls.		

Wednesday	Weight-bearing lunge	The back bar is used for the forward lunge, and the front leg is required to be 90°	20kg-40kg 20kg-40kg	Group 12*6
Lower extremity	Weight-bearing sideslip step	The sliding steps on the left and right sides of the back bar are required to be close to the leg.	10kg-20kg 10kg-20kg	Group 12*6
	Load single jump	With a pair of hand-held barbell pieces on the chest, the single leg spans a big step forward to keep the body balanced through single-leg support. Single-leg left and right jumping support	10gk-15kg	Group 10*6
	Load-bearing unilateral step			Group 10*6
	Load-bearing footwork			Group 30*6
Upper limb	Barbell		10kg-20kg	Group
	Supine boom	Lie down on the pusher with both hands straight forward.	10kg-20kg	20*6
	Jerk		30kg-50kg	Group
	Lift	Please put it on the clavicle after grasping it, and lift it to the highest point.	20kg-40kg	10*6
	Pull up	Standing position, both hands close to each other, pull up to the jaw. Three groups of positive grip and three groups of negative grip can be used with elastic belts.		Group 8*6 Group 10*6 Group 10*6
Lumbar abdomen	High platform swing arm		10kg 15kg	Group 20*6
	Gaotai boating	In any way. Requirements: The total number of times reaches 500.		Group 20*6
	Abdominal muscle-free exercise	In any way. Requirements: The total number of times reaches 650. Crosswise crawling of the athlete with both hands and feet or on the same side		Group 10*2
	Dorsal muscle-free exercise			
	Crab crawling			
Friday Lower extremity	American squat method	After the back barbell, lower the waist first, and then bend the leg until the hip is locked and the knee does not exceed the toe.	60kg-100kg	Group 6*5
	Footwork		60kg-80kg	Group 30*4
	High platform leg	Using Heel Lifting Machine devices One-foot continuous exercise		Group 30*4
Upper limb	Dumbbell flexure	Two hands first alternate up 14, then up six at the same time	20kg 60kg-90kg	Group 10*4
	Back pull	Use a Pull-down Machine for training.	10kg-20kg	Group
	Wrist	Semi-squatting position, with movement in a positive grip position. Wrist varus	10kg	10*4
	Barbell blade side pendulum	After alternating left and right, step forward and lift your hands.		Group 20*4 Group 18*4

Lumbar abdomen	From both sides of the front	All athletes practice according to the password.		Group 30*6
	From both ends of the dorsal muscle	A 10 m 20 m plus 360 turn is required. Group the athletes according to their weight and arrange the completion time reasonably.		Group 30*6
	Track and Field 30 meters sprint			Eight groups
Saturday Speed	10 m sprint run	Start the brake fast.		Six groups
	50 m sprint run	The first three groups are straight roads, and the second three groups are curved roads.	3*3 Straight and curved	Six groups
	100 sprint run	If the straight road is within 12 s and the curve road is within 13 s, the timeout is not counted. The time can be relaxed according to the weight. Wear equipment is required.		Two groups
	400 meters sprint		1min30s	

Table 3 Comprehensive Physical Training Scheme Of Experimental Group(Week 3)

	Training programme	**Technical essentials and requirements**	**Training weight**	**Number of groups**
Monday Lower extremity	Weight-bearing lunge	This training follows the principle of cyclic training. One person rotates all training methods in turn.	30kg-50kg	Ten counts
	Weight-bearing sideslip step		30kg-50kg	Ten counts
	Weight-bearing high-leg crossover jump		30kg-50kg	Ten counts
			30kg-50kg	20 counts
Upper limb	Parallel fast push	Complete all training as a group, each 10-minute interval, a total of 6 groups of cycles.	20kg-30kg	Ten counts
	Head lift		30kg-50kg	Ten counts
	Wrist Barbell lift		30kg-50kg	Ten counts
			30kg-50kg	Ten counts
Lumbar abdomen	Dumbbell lateral muscle	The upper limbs, lower limbs, waist, and abdomen carry out the circulation sequence. The project order remains the same.	10kg-20kg	30 counts
				20 counts
	Supine legs			30 counts
	Supine bike			30 counts
	From the opposite side of the top support Supine freestyle			30 counts

Wednesday Main attack/response	Weight-bearing half squat	This time, special strength training is carried out to practice the strength training required for different positions according to the situation of other positions. Upper and lower limbs, waist, and abdomen training.	80kg 10kg-20kg	Group 10*4
	Load-bearing single-leg directional support		20kg 25kg	Group 10*6 Group
	Weight-bearing sliding step and cross-step change direction		20kg 10kg	10*6 Group 10*4 Group
	Wrist Supine lift arm	Ask not to get up completely; feel the strength of the upper abdomen. Stretching of hands and legs is required.		10*4 Group 15*4
	Throw a solid ball with both hands			Group 30*6
	Sit-ups			Group
	Prostrate both ends			30*6 Group
	Lying on both sides			30*6
Lieutenant/Freedom Man	American squat	Upper and lower limbs, waist, and abdomen training.	60kg-80kg 20kg	Group 6*8 Group
	Load-bearing movement		40kg	40*4
	Load-bearing arch		40kg-120kg 40kg-60kg	Group 30*4 Group
	Lying push		30kg-50kg	10*4
	Flexural arm Lift		10kg-20kg	Group 10*4
	Swinging large film			Group 10*4
	Plateau lumbar abdomen			Group 20*6 Group 30*6
Second pass	Squat	Upper and lower limbs, waist, and abdomen training.	80kg-120kg	Group 4*2
	Supine landing		20kg	Group 30*6
	Load-bearing footwork		60kg-110kg	Group 30*6
	Lying push			Group 5*1
	Back pull		80kg	Group
	Jerk	Sit up supine for 15times after 30 m, 10times after 20 m, 10m5 times, insist for 30 m	50kg-80kg	10*4
	From both lateral ends			Group 10*4

	Dorsal muscle 3: 9 Sit-up static force		0-10kg	Group 30*6 Group 30*6 Six groups
Lower limbs on Friday	Static force of lower extremity Single-legged squat Blocked leg kick Half-height platform quick lift leg	Bending leg 60°, 90°, 120 degrees, three angles in turn static force, each angle insists 30 m Belt assist exercise. The height of the platform is 30 cm, and the two legs alternate fast pedals.		Group 3 min*6 Group 10*6 Group 15*6 Group 10*6
Upper limb	Push-ups Pull up Explosive confrontation	Hands and feet off the ground at the same time Two people in a group, face to face, ten fingers tight, up, down, left, right uninterrupted, push each other against each other.		Group 10*6 Group 10*6 Group 2 min*4
Lumbar abdomen	Flat plate support The static force of the back bridge Side bridge	The dorsal bridge uses the top hip motion to land on the back. Raise one leg while practicing.	3min-5min 3min-5min 3min-5min	Six groups Six groups Six groups
Saturday Speed	Special speed	Carry out special speed training according to different positions. The duration of interval time bit training in each group was 2.5-4 times. For example, 100 code 11 s, 11*2.5=27.5 is about 30 s.	5, 10, 15, 20, 40	Four groups

Table 4 Comprehensive Physical Training Scheme Of Experimental Group(Week 4)

	Training programme	Technical essentials and requirements	Training weight	Number of groups
Monday Lower extremity	American squat method Tertiary frog jump Load pedal	Jumping at a distance of 10 meters requires continuity of action. The athlete's back barbell jumps alternately on a 30 cm high platform with feet, which	60kg-80kg 20kg-30kg	Group 6*8 Ten groups Group 10× 6 Six groups

	jump 20 m sprint	requires emptying when reaching the highest point.		
Upper limb	Lying push	Ascending, the number is reduced by the weight reduction. One weight decreases by two increments.	60kg-110kg	Group 10*2
	Flat quick push		30kg-50kg	Group 10×5
	Standing brace	Ask to jump when standing and support when lying down.		
	Swinging large film		10kg-20kg	Group 30×5
				Group 12×5
Lumbar abdomen	Kneecap supported on the side	Athletes unified lumbar and abdominal muscle training.		Group 20×6
	Top bracing hand opening and closing			Group 30×6
	Supine top hip			Group 20×6
	Supine legs			Group 30×6
Wednesday Lower extremity	Rope ladder training	There are two rope ladders, two groups at the same time, and ten kinds of foot change.	40kg-60kg	Two groups
	Drop squat			Group 10*6
	High platform leg	Grab the barbell to do high-turning first, and at the same time squat.		Group 30*6
	Tertiary frog jump			Ten groups
Upper limb	Push	Requires speed and consistency.	30kg-50kg	Group 10*6
	Supine lift arm	Keep the arm straight at all times.	20kg-40kg	
	Dumbbell Lift		10kg-20kg	Group 10*6
			30kg-40kg	Group 20*6
				Group 10*6
Lumbar abdomen	High platform swing arm	Work together in pairs, pay attention to safety	10kg-15kg	Group 20*5
			15kg-20kg	
	Gaotai boating		10kg-20kg	Group 10*5
	Plateau abdominal muscle		10kg-20kg	Group 20*5
	Plateau dorsal muscle			Group 20*5

Friday Lower extremity	pause squat	When the whole squat is up, the knee joint is 90°, and then the squat is finished.	60kg-110kg	Group 10*5
	Half squat and footwork	Training with a Back Pedal Machine requires a quick squat.	90kg-160kg	Group 10*5
Upper limb	Back pull	Training with Pull-down Machine	50kg-100kg	Group 10*5
	Clamp chest	Training with Butterfly Machine		
	Royal 21 salute gun	Using Priest Bench for Flex Arm Training	50kg-100kg	Group 10*5
			15kg-30kg	Group 21*5
Lumbar abdomen	Lower oblique roll	Practice with a Supine bench, and put weight on the abdomen with a barbell.	10kg-20kg	Group 30*5
	Goats stand up	Practice with Roman Bench, two-handed barbell	10kg-20kg	Group 30*5
Saturday Endurance	Staircase training	Carry out double-foot single-ladder jumping, single-foot single-ladder jumping, double-foot two, three-ladder jumping. Then run the stairs	Order 40 30min	Group 1*4 Ten groups

The routine physical training in the control group was five-differentiation training. Practice five parts per week, three movements per part, five groups per movement, 8-12 times per group, and rest seconds to 60 s between groups. Each training time is 60 min-90 min. See Table 5 for details.

Table 5 Regular Physical Training Plan Of Control Group

	Training programme	**Technical essentials and requirements**	**Rest between groups**	**Number of groups**
Monday	Barbell push Dumbbell push Push-ups	Train one part of the body every day—training of pectoralis major, pectoralis minor, subclavius, and serratus anterior. Self-mastering exercise weight.	40s-60s	Five groups
Tuesday	Pull up Barbell rowing Hard pull	Main muscle exercises: Latissimus dorsi, erector spine, rhombus, trapezius. Self-mastering exercise weight.	40s-60s	Five groups
Wednesday	Barbell Push Shoulder Dumbbell flying bird Dumbbell front lift	The main exercise muscle is the shoulder deltoid anterior middle posterior three bundles, trapezius. Self-mastering exercise weight.	40s-60s	Five groups
Thursday	Barbell squat	The main exercise muscles are the triceps	40s-60s	Five

	Frog jump Lunge	brachii, biceps brachii, brachialis, brachioradialis, and flexor carpi brachii. Self-mastering exercise weight.		groups
Friday	Dumbbell bending Lift too much Narrow lying push	Main exercise muscles: Quadriceps femoris, sewing machine, biceps femoris, anterior tibial muscle, triceps calf Self-mastering exercise weight.	40s-60s	Five groups
Saturday	Lumbar abdominal muscle Long and short guns	Main muscle exercises: Rectus abdominis, speed, endurance Ten groups of foundation short-distance sprints and ten circles of long-distance pulling performance	40s-60s	Five groups

2.3 Test index

According to the comprehensive test items of women's volleyball and in combination with the actual situation of athletes, the test indexes are selected as follows:

(1) Vertical jump height (Vertical Jump)

The vertical jump is about the athlete when the body depresses the explosive force, and the strength test is also volleyball attackers' most important test index; its main purpose is to test the athlete's explosive force and the lower extremity leg strength.

Test method: The tested person shall first stand barefoot flat on the testing machine, lift the arm vertically, record the distance between the ground and the fingertip of the tested person, and move the low end of the movable testing device composed of plastic sheets on the testing machine to the position between the members, the tested person shall take off in situ, strive to pull off the plastic sheets together with the fingertip at the highest point of the bounce and measure the bounce height of the members according to the number of plastic sheets, and the distance between each plastic sheet is 0.5 inch. Athletes each test two times, and the interval for all athletes is a round of touch test, which is finished, and they get the best results. [3]

(2) Standing long jump (Broad Jump)

Standing long jumps are used to test leg strength and power, unlike this test, which is used to test horizontal rather than vertical forces and is important for both offensive and defensive players.

Test method: The testee jumps forward in situ and strives to land at the farthest distance from the takeoff point, and the distance from the takeoff toe to the landing point of the heel is the long jump distance. Each athlete takes two standing long jumps, and the interval is the end of a round of standing long jump tests for all athletes. [4]

(3) 30 m linear sprint (30 Yard Dash)

This test tests the athlete's speed, strength, bursting force, and some physical training, expressed in s (seconds) and takes as little time as possible. The test will also record the 10 m and 20 m locations to test the athlete's power further. [5]

Test method: The test subject adopts a three-point support start; after the start of timing, strives to complete the whole process of 30 m with the shortest time and records the time at 10 m, 20 m, and 30 m, respectively. The athlete takes two tests, each at the end of all tests, and takes the best result. [6]

(4) Half "meter" movement

Half-meter movement is an effective means to test the sensitivity and speed quality of

volleyball players. Volleyball players need to make a reasonable judgment according to the change of the ball, so sensitivity and speed quality are indispensable for volleyball players. [7]

Test method: The subject faces the ball net, starts from the starting point (midpoint of end line), starts timing, first moves to point 1, after knocking down the marker of point 1, immediately returns to the starting point and knocks down the marker of starting point, then moves to point 2, and so on, until knocking down the marker of point 5 returns to the midpoint of end line (each marker must be knocked down. Otherwise the score is not counted), the timing stops, and the completion time is recorded. Athletes can test 2 times to get the best results. [8]

2.4 Data processing

Fourteen female volleyball players from Soochow University before and after the intervention were compared and analyzed in this experiment. The test data were collected and summarized using SPSS 20.0 and Excel software. All measured data were presented using the (M±SD) method, with a significant difference of $P<0.05$. Repeated measurement variance analysis, inter-group and intra-group comparison, independent sample, and paired sample T-test are used to analyze and compare the measured data before and after the experiment so as to make a good data basis for the next analysis of the research. [10]

3. Research Results and Analysis

3.1 Analysis of difference before and after intervention training of vertical jump height

In the test of athlete's "vertical jump height," the training effect of the two groups of athletes is shown in Table 6. In the aspect of "vertical jump height," the average value of athletes' vertical jump height before intervention in the experimental group is 0.58 m. After intervention training, the average value of athletes' vertical jump height increases to 0.67 m, with an increase of 15%. Through the test of paired samples, there is a significant difference ($P<0.05$) between the athletes' test results before and after the intervention training, indicating that the training effect of athletes in this group is obvious.[11]

The mean value of the high score of longitudinal jumping before intervention in the control group was 0.56 m. After routine training, the mean value of the high score of longitudinal jumping in the control group increased to 0.61 m%. After the paired sample test, the test results of athletes before and after routine training had significant differences ($P<0.05$), which proved that the training effect of athletes in the control group was obvious. However, the increase in athletic performance was slightly lower than that of the test group. [12]

Table 6 Difference Analysis before and after Intervention Training of "Longitudinal Jump High"

Indicators		Experimental group		P value	Control group		P value
		Before intervention	After intervention		Before intervention	After intervention	
Touch high	Mean	0.58	0.67	<0.001	0.56	0.61	<0.001
	Standard deviation	0.11	0.11		0.13	0.13	

Note: Bold indicates significant difference: P<0.05.

3.2 Difference analysis before and after intervention training of standing long jump

In the test of the "standing long jump" of athletes, the training effect of the two groups of athletes is shown in Table 7. In the aspect of the "standing long jump," the average value of the standing long jump before the intervention of athletes in the experimental group is 2.12 m. After the intervention training, the average value of standing long jump increases to 2.25 m with an increase of 5%. After the test of paired samples, there is a significant difference (P<0.05) between the test results of athletes before and after the intervention training, indicating that the training effect of the group of athletes is obvious.

The mean value of the standing long jump before intervention was 2.11 m in the control group. After routine training, the mean value of the standing long jump increased to 2.18 m%. After the paired sample test, there was a significant difference (P<0.05) between before and after routine training. [13]

Table 7 Difference analysis before and after intervention training of "standing long jump"

Indicators		Experimental group		P value	Control group		P value
		Before intervention	After intervention		Before intervention	After intervention	
Long jump	Mean	2.12	2.25	<0.001	2.11	2.18	<0.001
	Standard deviation	0.15	0.13		0.15	0.13	

Note: Bold indicates significant difference: P<0.05.

3.3 Analysis of Difference before and after Intervention Training of 3.3 30 Meter Straight Line Sprinting

In the test of "30 m straight-line sprint," the training effect of the two groups of athletes is shown in Table 8. In the aspect of the "10 m sprint," the average score of the test group of athletes before and after the intervention is 1.80 s. After the intervention training, the average score of the test group of athletes before and after the intervention training, the average score of the test group of athletes increases to 1.60 s, with an increased amplitude of 11.0%. Through the test of paired samples, there is a significant difference (P<0.05) between the test results of athletes before and after the intervention training, which indicates that the athlete performance of the test group increases significantly. [14]The average value of 10 m before intervention was 1.86 s in the control group. After routine training, the average value of 10 m increased to 1.69 s, with an increase of 9%. The test results of athletes before and after routine training showed significant differences (P<0.05).

In the index of "20 m sprint," the average score of 20 m in the experimental group was 3.00 s before intervention. After intervention training, the average score of 20 m in the experimental group increased to 2.81 s with an increase of 6%. The test results of athletes before and after intervention training showed significant differences (P<0.05). The average value of 20 m before intervention was 3.07 s in the control group. After routine exercise, the average value of 20 m increased to 2.96 s, with an increase of 4%. After the paired sample test, the test results of athletes

before and after routine training had significant differences (P<0.05), which indicated that the athletes in this group had a substantial increase in sports performance and an obvious improvement in training. However, the increase in sports performance was slightly lower than that in the experimental group. [14]

In the index of "30 m sprint," the average score of the athletes in the experimental group was 4.77 s before intervention. After intervention training, the average score of the athletes in the experimental group increased to 4.54 s, with an increase of 4%. The test results of the athletes before and after intervention training showed a significant difference (P<0.05), indicating that the athletes in the experimental group had a substantial increase in their performance. The average score of the athletes in the control group before intervention was 4.76 s. After routine training, the average score of the athletes in the control group increased to 4.65, with an increase of 2%. The test results of the athletes in the control group before and after routine training showed no significant difference (P>0.05).[15]

Table 8 Difference analysis before and after intervention training of "30 m straight-line sprint"

Indicators		Experimental group		P value	Control group		P value
		Before intervention	After intervention		Before intervention	After intervention	
10 m	Mean	1.80	1.60	<0.001	1.86	1.69	0
	Standard deviation	0.14	0.14		0.13	0.12	
20 m	Mean	3.00	2.81	<0.001	3.07	2.96	0.011
	Standard deviation	0.19	0.19		0.18	0.17	
30 m	Mean	4.77	4.54	<0.001	4.76	4.65	0.064
	Standard deviation	0.34	0.35		0.35	0.26	

Note: Bold indicates significant difference: P<0.05.

3.4 Difference analysis before and after half "meter" character moving intervention training

In the test of semi-" meter "character moving items of athletes, the training effect of athletes in the two groups is shown in Table 9. The average score of athletes in the experimental group before intervention is 18.54 s. After intervention training, the average score of athletes in the experimental group increases to 17.23 s, with an increased amplitude of 9%. After the test of paired samples, there is a significant difference (P<0.05) between the test scores of athletes before and after the intervention training, which indicates that the athletes in this group have a significant increase in their performance. Before the intervention, the average score of athletes in the control group was 18.46 s. After routine training, the average score of athletes in the control group increased to 17.85 s, with an increase of 6%. After the T-test of paired samples, the test results of athletes in the control group showed significant differences (P<0.05). [16]

Table 9 Difference Analysis Before And After Semi-" Meter "Character Moving Intervention Training

Indicators	Experimental group	P	Control group	P

				value			value
		Before intervention	After intervention		Before intervention	After intervention	
Half "meter" movement	Mean	18.54	17.23	<0.001	18.46	17.85	0.061
	Standard deviation	0.13	0.17		0.12	0.11	

Note: Bold indicates significant difference: P<0.05.

4. Research Conclusion

After 12 weeks of training intervention, according to the "vertical jumping height," "standing long jump," "30 m straight-line sprint run," and "half" movement," it is found that both the conventional physical training and the improved comprehensive physical training can enhance the physical quality of female volleyball players. Still, the improved comprehensive physical training has a better promotion effect. Compared with conventional physical training, the 12-week comprehensive physical training method has more advantages in strengthening the lower extremity strength quality and lower extremity movement speed of female volleyball athletes. The sport of volleyball requires athletes' special qualities. The improved comprehensive physical training based on conventional physical training and combining theory and practice can further optimize the training mode, which has a very positive effect on improving the special physical quality of female volleyball athletes.

Combined with the special characteristics and athletes' status, the improved comprehensive physical training and competition can effectively enhance the special effectiveness of physical training. In the actual training in the future, the trainer or athlete can reasonably arrange the training plan according to the actual situation and training demand and adjust the training plan according to the competition demand and training purpose.

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