

2014

# BioTechnology

*An Indian Journal*

FULL PAPER

BTAIJ, 10(15), 2014 [8595-8600]

## Athletic load research on common ball technique practice manner in volleyball special training course in universities

Yan Mao

Zhengzhou Tourism College, Zhengzhou, 450009, (CHINA)

### ABSTRACT

Volleyball is a kind of popular sports event, which can enhance people's body function and cultivate good psychological quality and teamwork quality. So is is popular with teenagers. Volleyball course has been developing widely, but whether the volleyball education course physiological load arrangement is suitable or not concerns about the college students' health. The excise physiological load is too small to reach the goal of good exercise and reach its effect, which can produce bad stress reaction and bring bad influence to college students. Volleyball course has been one of the main PE education in undergraduate education, which play an irreplaceable role in other kinds of sports activities. Therefore, there is some necessities and importance about the research on the common volleyball practicing skills. This paper will discuss volleyball common ball excising skills load. This paper applies literature study, investigation and laboratory means and it mainly regards 2013 PE students who majors in volleyball in HeiBei normal university as experiment subjects and analyzes the exercising load of volleyball skills. In this experiment, Actigraph equipment records the energy consumption data. There are four points that we can get through statistics and analysis.

### KEYWORDS

Volleyball special training course; Higher school PE education; Skills with the ball; Sports load.



PE education not only makes students master sports techniques and skills but also suits students' exercise load. Students should undertake certain psychological load. But this kind of psychological load has an obvious effect on mastering this sports skills and techniques. Therefore, good arrangement of excise load seems to be very important when students exercise. However, the research on sports exercising skills education is rare no matter in domestic and abroad. Therefore, various exercising methods and means load in different teaching programs is not clear. This results in the phenomena that teachers cares about the rationale of exercising skills load. It can be seen that the discussion on the exercising load of course exercising means is necessary and urgency.

This research tries to measure and analyze volleyball skills practicing load in PE major education and to make sure the same classification and different classification of practicing skills load arrangement and to seek the same skills and same practicing forms. And the research offers reference to teaching design and offer reference to the popularization of volleyball activities.

## RESEARCH MATERIALS AND SKILLS

### Research targets

HeBei normal university 2013 volleyball- major- students are the main research objects and this research applies random sampling method to extract 24 boys ans girls (they all pass volleyball test). In order to ensure the scientific nature and rationality, the height and weight of 24 students within the normal range (BMI index male 20~25, female 19~24). This research examines the volleyball basic skills level of interviewees and ensure its accuracy. The interviewees do not have strong physical activities and they are forbidden to eat spicy food with spiciness and fishiness smell. The basic condition of the interviewees are as the following TABLE 1:

**TABLE 1 : The basic condition of interviewees**

Sex	Height(cm)	Weight(kg)	BMI(kg/m <sup>2</sup> )	Age (y)
Male (n=14)	181±5.0	72.1±6.5	22±1.7	21±1.0
Female (n=10)	167.6±3.7	56.9±5.0	20.3±1.8	20.4±1.0

### Research method

The experimental place is in volleyball center hall in HeBei normal university sports, the experimental objects are given the tests at the beginning and the end of the term. The research will be done in a sunny day considering the influence of temperature.

Firstly, in terms of the data collection, the height and weight of interviewees are used meant for university students. Actigraph GT3X(which is short for GT3X) and velocity are used to take samples of PE students. And this research sets the interval time as 30s and the serve and spike time is 2s.

Secondly, in terms of practicing skills arrangements, common ball practicing skills are as follows by referring lots of university volleyball materials and visiting some teachers and the combination of university students qualities. Ball skills are as the following TABLE 2.

In terms of the data processing, the data of actigraph is transmitted by actilife5.10.0. The experimental data should be sampled and the initial data should be transmitted into Imin. The independent sample t is being analyzed by data filtering and sorting. (The statistics is seen in the following formula)

$$T = \frac{(\bar{X} - \bar{Y}) - \delta}{S_w \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}},$$

s. t.

$$S_w^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2},$$

$$S_w = \sqrt{S_w^2}$$

(1)

**TABLE 2 : Volleyball practicing skills**

	<b>Practicing means</b>	<b>Practicing skills</b>
Serving skills with two holding hands in front	Set up with two hands	Two persons a group with a distance of 3-4cm and the teacher serve the volleyball within 1cm range and the highest point of the parabola is 2cm from the land and the action of set up and serving lasts for 1 min and the number is recorded. Another person is as the above
	Set up by oneself in opposite of walls	A person holds a ball and throw it to the wall with 1-2 meters away and the duration time is 1min. The ball is within 0.5min above the head and the set up number is recorded
	Set up with moving steps	A person holds a ball and move with a low gravity and the height of set up is above the hand 1 m, the number of set up is recorded
	Set up portfolio	Two students set up to the wall at the same time and move the self set up and record the number
Passing skills with two hands in front	Set up by two persons	Two persons a group with a distance of 3-4cm and the highest point of the the parabola is 2cm from the land. The duration time is 1min and the number is recorded
	Passing the ball by two persons	Two persons a group with a distance of 3-4cm and the teacher serve the volleyball within 1cm range and the highest point of the parabola is 2cm from the land and the action of set up and serving lasts for 1 min and the number is recorded. Another person is as the above
	Self passing ball in front of the wall	A person holds a ball and throw it to the wall with 3 meters away and the duration time is 1min. The ball is within 0.5min above the head and the passing ball number is recorded
	Passing the ball with moving balls	A person holds a ball and move with a low gravity and the height of set up is above the hand 1 m, the number of passing ball is recorded
	Combination practice	Two students pass the ball in front of the wall at the same time and move the self set up and record the number
	Passing the ball by two persons who are face to face	Two persons a group with a distance of 3-4cm and the highest point of the the parabola is 2cm from the land. The duration time is 1min and the number of passing the ball is recorded by teacher
	Pass the ball and set up by two persons	A person holds a ball and stand in front of the wall with 1-2 meters and set up once and pass the ball once and the duration time is i minute the number of passing the ball is recorded (set up and the passing belong to a group)
	Pass the ball and set up by two persons with moving steps	A person holds a ball and set up once and pass the ball once and the duration time is 1 minute. The two different action in an exchange way. the number of passing the ball is recorded (set up and the passing belong to a group)
	Serve the ball in front of the wall	A person holds a ball and stand in front of the wall and defender with a distance of 4-5cm and students practice serving the ball. The landing point of of the ball should be 2-3cm distance and the duration time is 1minute and the number should be recorded.
	Serve volleyball skills with two hands in front	Serve the ball continually with a distance of 6 meters
Serve the ball continually with a distance of 9 meters		Two persons a group with a distance of 9 meters and practice serving. A person serves 5 times and the landing point of the ball should be 1-2meters each other and the duration time is recorded
Serve the ball in different areas		A person serve in a group and the other person pass the ball for the server and the server stands in a fixed position and serve the ball to 3 rows areas in front and 3 rows area in back
Serve the ball in different lines		A person serve in a group and the other person pass the ball for the server and the server stands in a fixed position and serve the ball in straight line and oblique line. The landing point of the ball is 2 meters from the positive line. The students should serve 6 times continually. And the number of serving is recorded.
Spike the ball skills with hands in front	Spike the ball skills in front of the wall	A person with a ball and spike the rebound ball continually from the wall 3-4 meters
	Spike the ball by two persons	Two persons a group with a distance of 1-2m and the teacher stands in the side of the students and throw the ball to the accurate position and the students should spike the ball five times continually and the landing point of the ball should be 4-5 meters away from the middle line and the duration time should be recorded
	Self- throwing and	A person with a ball and stand in front of the wall or the defender with 6 meters

	self-spike	and throw it himself and run to spike it five times continually and the time should be recorded.
	Spike the ball continually 6 meters away	Two persons a group with 6 meters distance and practice the spike and the time is recorded
	Spike the ball in different line	Pass the ball and spike the ball and then spike it when come back and spike four balls : two straight-line balls and two oblique-line balls. The landing point of the ball should be 4-5 meters away from the middle line. Another person should do it in the same way.
Block skills	Jump from the standing position and block	Students should stand in front of the net when hearing the teacher's whistling and jump from the standing position and block the ball. Their two palms of hands should be above the net. A person do it five times and the time should be recorded.
	Move one step and block	The teacher stand at a high platform with the ball holding in hand 0.5meters, students move 1 left and right and jump to practice blocking. Each person should do five times and records the time.
	One throw and one block	Teacher and students stand besides a net and the teacher throw the ball to the NO. 2 and NO.4 position. The error should be within 0.5m. The student should jump around the NO. 3 and defend the ball back and each person should do four times and the time should be recorded.
	Netting marking	Two persons a group and stand besides a net. One person jump to the left and right to block. The other person watch him and move quickly to clap hands without touching each other's hands. Each group should do this five times and record the time

The same practicing form brings different load to students with different sexes. The practice that two people throw and move brings more load to girls than boys. Practice that faces to the wall brings less load to girls than boys. The same technique brings more load to girls than boys (blocking is an except). However, no matter boys or girls, the load changes as the exercising form changes.

The same skills exercise brings different exercise intensities, the exercise intensity of the skill practice that done by boys is more than girls, the skill exercise of girls belong to strenuous exercise. The same exercise form brings students with different exercise the same intensity. The exercising intensity of boys and girls is between intermediate-strength and maximum intensity.

### THE EXPERIMENTAL RESULTS AND ANALYSIS

#### The comparison among different practices

Set up, passing, spike and blocking are the basic techniques of volleyball, which is also called ball skills. The exercise load of girls is lower than that of boys. The comparison between boys and girls is shown as TABLE 3.

TABLE 3 : The comparison between boys and girls

Index	Load of boys	Load of girls
Total energy	3.142±0.184	6.026±0.085

A list of different kinds of practices is shown as TABLE 4.

TABLE 4 : A list of different kinds of practices

Index	Load of boys	Load of girls
Set up	0.082±0.815	0.128±0.039
Pass	0.083±0.010	0.041±0.042
Serve	0.072±0.011	0.268±0.031
Spike	0.164±0.022	0.467±0.028
Block	0.286±0.056	0.251±0.036

In the set up, pass, serve and spike activities, girls have bigger load than boys( $p < 0.05$ ) and in the blocking exercise, there is no difference between boys and girls( $p > 0.05$ ) when boys and girls do the exercise under the same condition, boys will spend less energy than girls. Many factors will affect energy consumption which includes the ability to control the ball

and the body condition. Therefore, it shows us that boys have advantages in the ability of ball controlling, strength, speed and flexibility. It also can be seen that boys have no difference in energy consumption in set up, passing and serve and blocking. As for girls, there is no difference in passing and serving but there is difference among blocking, spiking and serving. And there are many factors behind the difference.

**The comparison among different athletic strength**

in physiology, exercising intensity is defined as consumption amount in a unit of time by people and in this paper, the unit of consumption is MET, which is also called Metabolic equivalents. Hereby, 1 MET refers to the consumption amount of a person who takes part in 1-minute activity and he will consume oxygen 3.5ml each minute. The activity with low intensity refers to  $1.5 < MET < 3$  and the activity with middle intensity refers to  $3 < MET < 6$  and the activity with big intensity refers to  $6 < MET < 9$  and MET29 refers to strenuous exercise. The following chart shows people the relationship between consumption amount and met. The classification of exercising intensity and the intensity of different exercising means classification are shown as TABLE 5 and TABLE 6.

**TABLE 5 : The classification of exercising intensity**

Exercising intensity	Low intensity	Middle intensity	Big intensity	Strenuous exercise
Energy consumption	1.5-3	3-6	6-9	>9

**TABLE 6 : The intensity of different exercising means classification**

Index	Load of men (MET)	Exercising intensity level	Load of women	Exercising intensity level
Set up	4.69	middle	7.31	big
Passing	4.69	middle	8.06	big
Serving	4.11	middle	15.31	strenuous
spike	9.37	strenuous	26.69	strenuous
blocking	16.34	strenuous	14.34	strenuous

**Factors affecting exercising load**

Firstly, psychological influence comes from space perception, time perception and athletics intuition and it is as the following:

In the volleyball sports, space perception refers to the athletics’s perception of distance, which refers to space or depth perception. Space perception refers to the judgment of direction, distance, speed and whirling character, which affects effect of prognosis. If the prognosis is accurate, then students can move to the right place exactly and adjust their position well and return the ball easily. Instead, the moving steps are more and then the returning of the ball becomes difficult, which leads to the difference in load and intensity.

In the sports activities, the sense of time can be show as sports opportunity and rhythm intuition. The rhythm intuition means the prerequisite that athletics control their own action. In this paper, the rhythm related to the wall, moving and throwing is obvious and each person’s rhythm is different and the cooperation rhythm is different. And all these leads to the difference is exercising load.

In the sports activities, exercising intuition refers to people’s reaction to outside world and body’s self- regulation. Sports occasion has blocking and the distinctions of time. Rhythm perception means the prerequisites that athletes control their own rhythms.

Lastly, the influence comes form the proficiency level and the complexity level of the techniques. Skills is a kind of knowledge experience. Therefore, in the same condition, the more complex the exercise is, the energy it consumes. So the spike activity adds the running and has a large energy consumption because of its high complexity.

**REFERENCES**

[1] Wen yang, He Jiangming; The research on high school common PE psychological load intensity analysis [J], Beijing PE University Journal, **8**, 1072-1073 (2004).  
 [2] Dong Jiwen, Huxinming, Xia Jufeng, Shanghai high school PE psychological load research[J], Shanghai Education, **5**, 51-53 (2010).  
 [3] R.David, Adams, J.Gregory, Fulchiero, F.Diya, Mutasim; Medical Pearl, Intraoral medication application using the “parked” cotton ball technique[J], Journal of the American Academy of Dermatology, **556**, (2006).  
 [4] S.Martijn, Bethlehem, H.Kelvin, Kramp, J.Marc, Van Det, Henk O.Ten Cate Hoedemaker, J.G.M.Nicolaas, Veeger, E.N.Jean Pierre, Pierie; Development of a standardized training course for laparoscopic procedures using delphi methodology[J], Journal of Surgical Education, (2014).

- [5] A.Margot, Skinner, N.Ruth, Kingshott, Sue Filsell, D.Robin Taylor; Efficacy of the 'tennis ball technique' versus nCPAP in the management of position dependent obstructive sleep apnoea syndrome[J], *Respirology*, **135**, (2008).
- [6] Dale Einar, Heggelund Lars, Leegard Truls Michael, Samdal Helvi Holm, Edvardsen Thor, Gjertsen Erik; [Dramatic case report caused by a rare bacteria][J], *Den Norske Laegeforening, Tidsskrift*, **1302**, (2010).
- [7] Tortopidis Dimitrios, Papa Polyxeni, Menexes George, Koidis Petros; Attitudes of dentists regarding the restoration of root canal treated teeth, A survey in greece[J], *International Dental Journal*, **605**, (2010).
- [8] A.Skinner Margot, N.Kingshott Ruth, Filsell Sue, Taylor D.Robin, Efficacy of the 'tennis ball technique' versus nCPAP in the management of position-dependent obstructive sleep apnoea syndrome[J], *Respirology*, **135**, (2008).
- [9] Laing Alan; Critical steps in practice transitions, what you should know[J], *Michigan Dental Association, Journal*, **9010**, (2008).
- [10] J.Kalogredis Vasilios, H.Baum Neil; Taking down your shingle, developing and implementing an exit strategy[J], *Journal of Medical Practice Management*, **226**, (2007).