Volleyball Smash Skills

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Abstract: This study aims to determine the effect of weight training method with active and passive recovery and eye-hand-leg coordination towards spike skill. The experimental method used the 2x2x2 factorial design. The research samples were 80 students of PJKR UNISMA Bekasi. The data were analyzed by ANAVA and Tuckey tests. The result are; 1) Weight training super set system (WTSSS) is better than weight training set system (WTSS), 2) There is interaction between weight training, coordination and recovery, 3) WTSSS is better than WTSS on high coordination with active recovery, 4) WTSSS is better than WTSS on low coordination with active recovery, 5) WTSSS is better than WTSS on high coordination with passive recovery, 6) WTSSS is better than WTSS on low coordination with passive recovery, 7) There is difference of results between active recovery and passive recovery, 8) There is difference of results between active recovery and passive recovery on WTSSS with high coordination group, 9) There is difference of results between active recovery and passive recovery on WTSS with high coordination group, 10) There is difference of results between active recovery and passive recovery on WTSSS with low coordination group, 11) There is difference of results between active recovery and passive recovery on WTSS with low coordination group.

1 INTRODUCTION

Volleyball is one of the popular sports and loved by the people of Indonesia. It should have reached better achievement again, so there is a need for a more optimal coaching. *Persatuan Bola voli Seluruh Indonesia* (PBVSI) as the parent of volleyball organization in the country must learn from the current position, then immediately performs a large and very complex coaching. The demands from public for achievements from volleyball is higher and adds to the burden in the coaching efforts.

Such a disappointment that the current achievement of the men's and women's volleyball team is left behind by Thai team. In fact, our women's team is far behind Thailand's. As we can see at the 27th Sea Games, which just passed in 2013 in Myanmar, Indonesia couldn't defeat Thailand in the final, so the men's team could only win silver medal, and the women's team could only win a bronze medal. This means that this result did not improve from the 26th Sea Games in Jakarta-Palembang in 2011. Although it was held at home, Indonesian volleyball performance is not so different with the achievement of UNISMA Bekasi students, in which in 2011, the volleyball team of UNISMA

Bekasi students achieved the 1st Winner of National Inter-Universities competition. Some of their players joined PON JABAR and JATENG teams, and represented Indonesia in Malaysia for SUKMALINDO in 2012. However, along the way, such achievement decreased through the year of 2015 where there were very few achievements on national level. This issue must be addressed so that the achievement that has been carried by the volleyball team can be achieved again, just like the glory in the year of 2011.

Based on the observation of the author when watching the volleyball team of UNISMA Bekasi students in Bandung directly, during the match between students among KOPERTIS Region IV West Java, the team only achieved the 2nd position. During said competition, the smash hits were easily blocked and not as strong and sharp as previous players. Although the new team players were supported by some old players, it looks like the new players have weaker smash. Therefore, the author is interested to conduct research on smash particularly, because in the volleyball game, scores are mostly gained from the smash.

A correct mastery of basic volleyball techniques is a target of coaching. According to Dieter Beutelstahl, there are six basic techniques that must

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be mastered by the volleyball players, including; (1) Service; (2) Dig; (3) Volley; (4) Smash/Spike; (5) Block; (6) Defense. (Dieter Beutelstahl, 2008).

From six techniques mentioned above, based on observations in every volleyball game, smash technique is a technique that is often used to generate scores. In every volleyball game, more than 50% of the achieved scores are the results of smash technique. When analyzed, almost all teams currently applies the "Power game" type in volleyball game. This type is the type of attack with the hope in a short time the ball fall on the opponent's field (Yudiana, 2013). We can see the service alone can be used to attack. Not a few players do jump service, in which this technique is like doing smash. This type of "power game" is strongly supported by the muscle's explosive power component, especially when performing very hard, fast, and precise smash techniques on the intended target.

There are several weight training systems, among others; System Set, Super Set System, Split Routines, Multi Poundage Method, Burn out and Pyramid System.

As for other weight training forms that are used to train muscle's explosive power for volleyball athletes which are very supportive to smash ability, are: wrist curl to train the wrist muscle towards flexion, two arm curl to train biceps muscle, pull over to train the chest muscles, sit up to train the abdominal muscles. For the development of muscles to be "balanced," the antagonist muscles should be trained like protogonic muscles. Such forms of exercise are reverse wrist curls, to train the wrist muscles towards the extension, triceps stretch to train the triceps muscles, the shoulder muscle training press, and back up to train the back muscles. Of all the exercises mentioned above, weight training system set and super set system were used. (Hamilton, 2011)

Repetitive exercises given to the group in form of super-set system load training and weight-bearing system sets will increase the body fatigue rate due to the accumulation of metabolic remnants such as lactic acid in the body and reduced muscle energy reserves. Therefore, there must be a way to accelerate the discharge of lactic acid, i.e. by resting in each set of weight training, both active and passive rest. (Brooks, 1996)

Coordination is the ability to perform movement or work precisely and efficiently. Coordination states harmonious relation of various factors that occur in a movement. (Widiastuti, 2015)

The smash skills performed by a volleyball player must have a harmony of footwork while jumping, upper and lower arm muscles, and hands towards the intended target, in which the coordination refers to the eye, hand and foot coordination. (Ma'mum, A. & Subroto, T., 2001)

Based on the description above, it is necessary to do a more in-depth study using weight training, rest and coordination of the results of volleyball smash skills.

2 METHODS

For the analysis purposes, blocks of diagrams are required. Each block contains the same subject and is homogeneous. Therefore, the design in this study is the factorial experiment design in block design, since the experimental units within the blocks are relatively homogeneous and many experimental units within a block are equal to many of the studied treatments. (Sudjana, 2005). The method used in this research is experimental method with 2x2x2 factorial design.

Table 1: Factorial Design 2 x 2 x 2.

Method Exercise	Weight training Super system set (A1)		Weight Training System Set (A2)	
Coordination	BreakActive (C1)	Passive Break (C2)	BreakActive (C1)	Passive Break (C2)
Coordination High Alarm (B1)	A1 B1C1	A1 B1C2	A2 B1C1	A2 B1C2
Low Coordination (B2)	A1 B2C1	A1 B2C2	A2 B2 C1	A2 B2 C2

Population amounted to 172 people. Samples were 148 people, using purposive sampling technique. To measure the results of volleyball smash skills using the instrument prepared by the researcher, to know the reliability of the smash achievement skills test, there was process of correlating the first test and the second test (test-retest), while the test result of the achievement smash reliability is 0.97 while the test validity skill achievement smash was 0.98. The test results of Eye-Foot-Foot Coordination Reliability is 0.97 while the Validity of the Eye-Foot-Foot Coordination test is 0.99. The validity of this instrument is searched through the "Correlation

With Criterion" technique. This test was consulted with 7 experts in the field.

Analysis of research data using variants analysis, if there is difference, will be continued with Test-Tukey. The normality test concluded that the research sample came from population with normal distribution, while the homogeneity test results concluded that the eight data sets tested came from populations with homogeneous variants.

3 RESULTS AND DISCUSSION

From the first hypothesis, it can be concluded that, overall, there are differences in the results of the Volleyball Smash Skill between Super Set System Load Exercise (A1) and the System Load Set Exercise (A2). Tukey test results are as follows:

Table 2: Results of First Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
A1 with A2	14,034	0,000	0.05	Significant

In the testing for the second hypothesis, there is an interaction effect between weight training, breakthrough coordination (ABC) on the results of Volleyball Smash Skill.

From the data calculation result, it was obtained that the value of Sig (ABC) was equal to $0,009 <$ value of $\alpha = 0,05$. Thus, Ho was rejected. This indicates that there is a very significant ABC interaction effect between the Weight Training (A), Coordination (B) and Rest (C) on the results of the volleyball smash skills.

Table 3: Results or Third Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_1 B_1 C_1$ with $A_2 B_1 C_1$	19,221	0.005	0.05	Significant

It can be concluded that the super set system load training (A1) is better when compared to the system load training set (A2) in the active high-coordination student group break (B1C1) on the volleyball smash skill results.

Table 4: Results of Fourth Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_1 B_2 C_1$ with $A_2 B_2 C_1$	18,525	0.007	0.05	Significant

It can be concluded that the Super Set System Load Set (A1) is better when compared to the System Load Set Exercise (A2) in the active low-coordination student group (B2C1) on the results of the volleyball smash skills.

Table 5: Results of Fifth Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α = 0.05	Information
$A_1 B_1 C_2$ with $A_2 B_1 C_2$	9,903	0.048	0.05	Significant

It can be concluded that the Super Set System Load Exercise (A1) is better when compared to the System Load Set Exercise (A2) of the High Passed Break Coordination Student Group (B1C2) on the results of the Volleyball Smash Skill.

Table 6: Results of Sixth Hypothesis Testing.

Kelompok yang dibandingkan	Selisih harga mutlak Rerata	Nilai Sig	Nilai α	Keterangan
$A_1 B_2 C_2$ dengan $A_2 B_2 C_2$	8,486	0,006	0,05	Signifikan

Can be concluded that the super-set system load exercise (A1) is better when compared to the system load training set (A2) in the low passive passive coordination student group (B2C2) on the volleyball smash skill results.

Table 7: Results of the Seventh Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
C_1 with C_2	24.418	0,000	0.05	Significant

It can be concluded that overall active rest is preferable when compared with passive rest on the results of volleyball smash skills.

Table 8: Results of the Eighth Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_1 B_1 C_1$ with $A_1 B_1 C_2$	28,139	0,000	0.05	Significant

It can be concluded that Active Break (C1) is better when compared to Pass Pass (C2) on High Coordination Student Weighted Coordination Student Group (A1B1) on the results of Volleyball Smash Skill.

Table 9: Results of the Ninth Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_2 B_1 C_1$ with $A_2 B_1 C_2$	18,821	0.006	0.05	Significant

It can be concluded that active rest (C1) is better when compared to passive rest (C2) in the student group of high-coordination system set workload (A2B1) on the results of volleyball smash skills.

Table 10: Results of Tenth Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_1 B_2 C_1$ with $A_1 B_2 C_2$	30,376	0,000	0.05	Significant

It can be concluded that active rest (C1) is better when compared to passive rest (C2) on the Student Group of Low Coordination Set System (A1B2) on the results of volleyball Smash Skill.

Table 11: Results of Eleventh Hypothesis Testing.

Compared groups	Absolute price difference Mean	Sig value	The value of α	Information
$A_2 B_2 C_1$ with $A_2 B_2 C_2$	20,337	0.002	0.05	Significant

It can be concluded that active rest (C1) is better when compared with passive rest (C2) on the Student Group of Weight Training of Low Coordination Set System (A2B2) on the results of volleyball Smash Skill.

4 CONCLUSIONS

From the results of hypothesis testing and discussion of the research results, it can be concluded that for volleyball smash skills, super-load system load training is better than the system load training set, super-load system load training is better than the system load training set at high coordination with active breaks, super load system training set is better than on the system load training set at low coordination with active breaks, super load system training set better than the system load training set at high coordination with passive break, super load system training set better of the system weight training sets at low coordination with passive breaks. There is a difference in the results of volleyball smash skills between active breaks with passive breaks in groups of students training super high load set coordination system, weight training system set of high coordination, super low load system coordination set training, active break with passive breaks in the group of students weight training system set low coordination.

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