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The Effect of Wrist Flexibility Exercise Using a Bottle on the Ability of Smash Badminton at the Extracurricular of SMK Negeri 2 Palembang

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Abstract: The purpose of this study was to determine whether there was an effect of wrist flexibility training using a bottle on the ability to smash in badminton games for extracurricular students at SMK Negeri 2 Palembang. The research method used is the one group pretest-posttest experimental method. The data source for this study were 20 students who took part in badminton extracurricular activities at SMK Negeri 2 Palembang. The data analysis technique uses the t-test formula. The results showed that wrist flexibility exercises using a bottle had an influence on the ability to hit badminton smash on extracurricular students at SMK Negeri 2 Palembang with results showing t-count = 2.638 > t-table = 2.093. So that the exercise of flexing the wrist using a bottle has a significant effect on the ability to smash in a badminton game.

Keywords: Flexibility Exercises, Smash Punching Skills, Using Bottles, Wrists

A. Introduction

Achievement sports are activities carried out with the aim of obtaining optimal performance. As stated in the Republic of Indonesia's Sports Law Number 3 of 2005 concerning the National Sports System. Sports achievement is an effort to increase the ability and potential of athletes in order to increase the dignity of the nation through a process of coaching and development in a planned, tiered and sustainable manner with the support of sports science and technology.

Badminton or badminton is one of the achievement sports included in the National Sports Grand Design Program (DBON). Badminton or badminton is a racquet sport played by two people (for singles) or two pairs (for doubles) who take opposite positions on a field that is divided in half by a net (net) (Aksan, 2012). Similar to tennis, badminton aims to hit the ball over the net so that it falls on the designated opponent's field of play and prevents opposing players from doing the same thing (Kurniawan, 2011).

The basic techniques of badminton skills that must be mastered by a badminton player include: stance, racket holding technique, ball hitting technique, and foot work technique (Purnama, 2010). In the game of badminton players also have to master

several kinds of hitting techniques, namely: (1) lob (bounce), (2) drive (flat shot), (3) dropshot (short punch with a push or a subtle touch and how come it doesn't fall over the line). doubles), (4) service (first blow after getting a point), (5) netting (how come the game is in the net area), (6) smash (a blow above the head that is directed downward or dives towards the opponent's area and over the net with full power). One of the abilities that players must have to win the game by getting points is smash.

According to Usman (2010) smash is hitting a ball or shuttlecock that is very hard and sharp or a full smash, because it is accompanied by all the available energy, and more importantly by jumping. The goal is to suppress the opponent until the ball is dead. So, the essence of the badminton smash is the key to turning off the shuttlecock on the opponent's side, this hard and directed shot is a finishing shot that cannot be returned. To get a good smash, there are several factors that influence it, such as leg power, arm power, and hand flexibility, in this case what is meant is the wrist (Widiastuti, 2015).

Flexibility of the hand or flexibility of the wrist is the joint's ability to carry out movement within the range of motion of the joint to the fullest without causing joint or muscle tension. There are two types of flexibility, namely dynamic (active) flexibility and static (passive) flexibility. Dynamic flexibility is the ability to move joints and muscles continuously in full range of motion quickly, and without resistance, for example kicking a ball without resistance or load on the hamstring muscles and hip joint, while static flexibility is the ability of joints to perform movements in large space, for example move split (Ismaryati, 2011).

The flexibility of the hands can certainly be trained to be good to support a player's smash ability. According to Syafruddin (2012), training is a process of processing or applying training material such as movement skills in the form of repeated implementation and through varied demands. Meanwhile, according to (Sukadiyanto, 2011). training is the application of a plan to improve the ability to exercise which contains material theory, practice, methods and implementation rules in accordance with the goals and objectives to be achieved. There are 4 aspects of training that athletes need to pay attention to and train carefully, namely (1) physical training, (2) technical training, (3) tactical training, (4) mental training (Harsono, 2015).

Based on observations, information, and observations in the field that in badminton lessons the students are quite good. However, when hitting a smash, there are still many who cannot cross into the opponent's area. This is very detrimental because all players rely heavily on strong and sharp smashes which are synonymous with attacking and more dominant punches to get points. From the problems above, the writer is interested in carrying out research on the ability to hit smashes in badminton games. Because smashing is important to get points but in reality, the field is not

perfect in smashing and most of them only rely on arm power so the results are not good.

To overcome this problem, the researchers provide a solution so that extracurricular students at SMK Negeri 2 Palembang are able to do smash shots, it is necessary to practice forming the flexibility of the hands or wrists using bottles, with the aim that these students can do smash shots properly and correctly at the beginning. before the experiment or treatment was carried out, the students had not been able to hit the smash properly, so by doing the research and with this experiment, it was hoped that the students could increase their achievements in badminton games. Therefore, researchers are interested in examining whether there is "the effect of wrist flexibility training using a bottle on the ability to smash in badminton games for extracurricular students at SMK Negeri 2 Palembang".

B. Methods

This method used is the one group pretest-posttest design experimental research method. Experimental research methods can be interpreted as research methods used to find the effect of certain treatments on others under controlled conditions (Sugiyono, 2015). While the population is the entire research subject. If someone wants to examine all the elements in the research area, then the research is population research (Arikunto, 2013). Based on the opinion above, the population of this study were 20 extracurricular students of SMK Negeri 2 Palembang.

In this study, the method of sampling used a total sampling technique, because there were only 20 people in the population. Thus, the researchers took samples from the entire population of extracurricular students at SMK Negeri 2 Palembang as many as 20 people. Data collection techniques use badminton smash test instruments (Poole, 2013).

After all the test and measurement data have been collected, the next step is to perform data processing or data analysis. Data analysis aims to find the truth of the formulated hypothesis. A hypothesis will be accepted or rejected depending on the results of the data. In this study, data analysis techniques were used on the results of the pre-test and post-test results which were guided by the t-score statistical formula. Data processing techniques are carried out by using the normality test step, homogeneity test and hypothesis testing using the t test.

C. Results and Discussion

The research began with the pretest smash punch which aims to determine the ability of students who are the object of research. From the initial test carried out, the highest

score was 20 and the lowest was 10, while in the final test the highest value was 24 and the lowest was 16. From the data that has been collected, a data normality test will be carried out which must be carried out before analyzing the data, namely by using the chi square formula and then testing can be carried out hypothesis by using t-test statistics.

Table 1. Pretest Normality Test with Chi Square

Interval	f_o	f_h	(f_o-f_h)	$(f_o-f_h)^2$	$\frac{(fo-fh^2)}{fh}$
7 – 9	2	0,54	1,46	2,1	3,8
10 – 12	8	2,668	5,3	28,0	10,4
13 – 15	9	6,792	2,208	4,8	0,7
16 – 18	0	6,792	-6,792	46,1	0,67
19 – 21	1	2,68	-1,68	2,8	1,0
∑	20	20	0,496	83,8	22

Based on the above table, it is found that the calculated chi-squared price = 22. This price is then compared with the table's chi-squared price with dk (n-1) = 20-1 and the error level is 5%, so the table's chi-squared value = 30.144. Because the calculated chi-square value is smaller than the table chi-square value (22 < 30.144), the distribution is declared normal.

Table 2. Posttest Normality Test with Chi Square

Interval	f_o	f_h	(f_o-f_h)	$(f_o-f_h)^2$	$\frac{(fo-fh^2)}{fh}$
15 – 16	3	0,54	2,46	6,05	11,20
17 – 18	3	2,668	0,332	0,11	0,04
19 – 20	6	6,792	-0,792	0,62	0,09
21 – 22	4	6,792	-2,782	7,79	1,14
23 – 24	4	6,792	1,32	1,74	0,64
∑	20	20	0,528	16,31	13,11

Based on the table above, it is found that the calculated chi-square value = 13.11. This price is then compared with the price of the chi-squared table with dk (n-1) = 20-1 and an error level of 5%, so the price of the chi-squared table = 30.144. Because the calculated chi-square value is smaller than the table chi-square value (13.11 < 30.144), the distribution is declared normal. After the data is declared normal, then the hypothesis is tested using the t-test.

Table 3. Preliminary Test Data and Final Smash Ability Test Data

No	Student's name	Pre-Test	Post-Test	Enhancement (B)	B^2
1	ES	13	22	9	81
2	M. RM	13	15	2	4
3	YRA	14	20	6	36
4	YKP	14	17	3	9
5	M. DRS	15	19	4	16
6	Mgs. N	15	19	4	16
7	M. R	12	17	5	25
8	M. L	11	24	13	169
9	M. SG	11	22	11	121
10	RF	13	20	7	49
11	AA	20	24	4	16
12	RP	10	23	13	169
13	M. A	11	21	10	100
14	IB	13	16	3	9
15	M. SIA	7	16	9	81
16	RM	7	19	12	144
17	KF	13	20	7	49
18	FIP	12	23	11	121
19	MY	10	21	11	121
20	M. AM	10	18	8	64
Amount		244	396	152	1400

After everything has been obtained, we can enter it into the t-test formula as follows (Sudjana, 2005):

$$t = \frac{B}{SB/\sqrt{n}}$$

$$= \frac{0{,}152}{12{,}88/\sqrt{20}}$$

$$= 2{,}638$$

Next, the value for t-table will be determined using a significant level of 0.05 and dk = (n-1) = 20-1 = 19, so the price for t-table is 2.093. So, it can be concluded that t-count > t-table or 2.638 > 2.093. Then Ho is rejected and Ha is accepted. This means that the hypothesis is that there is an effect of wrist flexibility training using a bottle on the

smash hitting ability in badminton games for extracurricular students at SMK Negeri 2 Palembang.

Based on the results of the research conducted, the authors concluded that there was a significant effect of wrist flexibility training using a bottle on the ability to smash at SMK Negeri 2 Palembang. This research is a type of experimental research with a one group pre-test post-test design. This research was conducted in 16 meetings starting from 22 August to 26 September 2016 at SMK Negeri 2 Palembang with a sample of badminton extracurricular students at SMK Negeri 2 Palembang.

The research was started with the initial test (pre-test) for badminton smash hitting to determine the smash hitting ability of the sample which was the object of research. The results obtained were the highest score of 20 and the lowest 10. Then the researchers began to provide treatment, namely wrist flexibility exercises using a bottle for 3 times a week. At the end of the study, students carried out a final test (post-test) to determine the ability of the students who received the treatment to smash. The results obtained were the highest score of 24 and the lowest score of 16. The results of the final test (post-test) after being analyzed by researchers with statistical tests on the initial test (post-test) can be seen that there is a significant increase.

D. Conclusion

It can be concluded that wrist flexibility exercises using bottles affect the ability to smash in badminton games, because in badminton games not only require strength, agility, muscle endurance, power, speed, and physicality but flexibility, especially from the wrist, is very influential in playing badminton.

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