

# The Influence of Single Double Tuck Jump and Side to Side Barrier Single Double Tuck Jump on Power and Strength

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**Abstract-** Plyometric is an exercise that involves eccentric muscle contraction. Plyometric is divided into some forms, however this study uses 4 plyometric forms, namely: single tuck jump, double tuck jump, side to side barrier single tuck jump and side to side barrier double tuck jump. This study aims to analyze the influence of single double tuck jump exercise and side to side barrier single double tuck jump exercise towards power and strength. The subjects of this study are the sports extracurricular students of State Junior High School 1 Candi with the number of 36 schoolboys, it is quantitative research type with the quasi-experimental method, the research design uses "matching only design" and analyzed using "ANOVA". The power data retrieval process uses jump MD and strength are using "leg dynamometer" during pretest and posttest. Furthermore, the data were analyzed using SPSS Version 21. The results of this study indicate the influence of single double tuck jump exercises and side to side barrier exercises single double tuck jump towards increase power and strength. It can be concluded that single double tuck jump exercises and side to side barrier single double tuck jump exercises are very efficient.

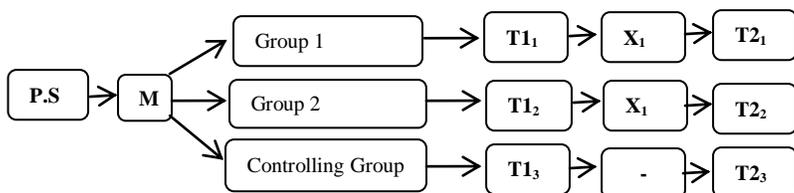
**Keywords:** *plyometric, power and strength, single tuck jump, double tuck jump, side to side barrier single tuck jump, side to side barrier double tuck jump.*

## I. INTRODUCTION

Trainer, instructional design and knowledge take important role concern with athlete's achievement. As matter of fact, achievement needs a long process, sport extracurricular can be a place to exercises to student physic, technique, skill and tricks. The physic condition is an important thing to keep as well as to improve performance. It is also being the prominent thing to achieve achievement. Volleyball, Basket, and Football really need power and strength to maximize athletes' performance. Thus, sports teachers should develop students' power and strength by implementing plyometric. This study used plyometric because it has various exercises so that students will not feel bored. According to Muzammil et al (2016), the effect of different modes of plyometric training increase explosive power. However, this study only examines on four types of exercises, including single tuck jump, double tuck jump, side to side barrier single tuck jump and side to side barrier double tuck jump taken place at state Junior high school (SMPN 1 Candi).

## II. METHODOLOGY

This study applied a quantitative method with quasi-experiment and matching the only program. This program is matching a subject based on the variable (Maksum, 2012 : p.100).



## Note:

P-S = *population and sample*

M = *matching*

T1<sub>1</sub> = *group 1 of power and strength pretest*

T1<sub>2</sub> = *group 2 of power and strength pretest*

T1<sub>3</sub> = *group 3 of power and strength pretest*

X<sub>1</sub> = *single tuck jump and double tuck jump exercise*

X<sub>2</sub> = *side to side barrier single tuck jump and side to side barrier double tuck jump*

T2<sub>1</sub> = *group 1 of power and strength posttest*

T2<sub>2</sub> = *group 2 of power and strength posttest*

T2<sub>3</sub> = *group 3 of power and strength posttest*

- = *conventionally exercise*

The population of this study is 120 students of sport extracurricular in SMPN 1 Candi with 30% of the students which taken as the sample. Yudhistira (2013) explained that if the subject of a study is less than 100 people, so all of them must be included a sample but if it is more than 100 people so the sample may be taken from only 10%-25% or more. Therefore, there are 36 schoolboys taken as a sample with age around 12-14 years old. The sample is divided into groups. Each group should get power and strength pretest because the different result of power and strength will be equal by t score arranged from the smaller (ordinal pairing technique). This technique is one of the ways to group sample with the ranking system. The aim of ordinal pairing is to equal each sample skill. Hence, Each group is provided an exercise course three times per week.



Figure 1: single tuck jump



Figure 2: double tuck jump



Figure 3: Side to side barrier single tuck jump



Figure 4: Side to side barrier double tuck jump

The controlling group is free from any exercise but they still do conventional exercises. This method based on Bompa theory (2015) that the exercise course has been done for three times per week during 18 meetings. In addition, Zbigniw, et al. (2014) set forth that six weeks exercise program will encourage power increase. However, this study only uses 40%-60% of the whole week since the sample is still students of Junior High School. The frequency of the exercise is explained through description, percentage and average. Then, the data were analyzed with SPSS 21 program. This is used to measure the data normality test. Kolmogrov-Smirnov analysis is applied if the data is normally distributed then continued by paired sample test and homogeneity test through ANOVA to know which exercise method is more effective.

### III. FINDINGS

#### A. Group 1 (single tuck jump and double tuck jump)

The test result for power and strength before and after the exercise on 12 students is displayed below.

Table 1: Result test of group 1

No	Name	POWER (Watt)		D	STRENGTH (Kg)		D
		<i>Pretest</i>	<i>Posttest</i>		<i>Pretest</i>	<i>Posttest</i>	
1	<b>DI</b>	191100	211680	20580	50	55	5
2	<b>MFJ</b>	165181	161210	-3971	50	47	-3
3	<b>RB</b>	116017	160418	44401	61	56	-5
4	<b>MAR</b>	104759	148690	43931	47	52.5	5.5
5	<b>YC</b>	108889	119070	10181	46	50	4
6	<b>FAW</b>	119952	114141	-5811	38	43	5
7	<b>MDJ</b>	97694	112896	15202	42	55	13
8	<b>GSP</b>	96600	98784	2184	37	36	-1
9	<b>ESK</b>	100100	211750	111650	34	41	7
10	<b>MKP</b>	86839	90275	3436	34	38	4
11	<b>RAK</b>	96674	113789	17115	30	32	2
12	<b>MHF</b>	76160	86839	10679	28	30.5	2.5
<b>TOTAL</b>		1,359,965	1,629,542	269,577	497	536	39
<b>AVERAGE</b>		113,330	135,795	22,465	41	45	3
<b>DEVIATION</b>		32,948	43,214		10	9	

Based on the table above, there is an increasing result between the pretest and posttest on each variable (power and strength). This is seen from the posttest average which rises up to 113,330 higher than present power with 135,795. Moreover, the comparison score result of strength variable is 45:41. Thus, the treatment of the first group can increase power and strength.

## B. Group 2 (Side to side barrier single tuck jump and side to side barrier double tuck jump)

The result test of group 2 is displayed in bellow table:

Table 2: The test result of group 2

No	Name	POWER (Watt)		D	STRENGTH (Kg)		D
		<i>Pretest</i>	<i>Posttest</i>		<i>Pretest</i>	<i>Posttest</i>	
1	<b>HA</b>	126000	129544	3544	67	68	1
2	<b>REA</b>	119070	161373	42303	65	40	-25
3	<b>FF</b>	183349	198613	15264	37	43	6
4	<b>MF</b>	121956	173727	51771	45	41	-4
5	<b>MGN</b>	124950	117600	-7350	41	73	32
6	<b>YA</b>	151778	165181	13403	29	51	22
7	<b>ADM</b>	108513	107520	-993	37	46	9
8	<b>AMM</b>	106909	113789	6880	35	60	25
9	<b>BGD</b>	114141	119070	4929	29	32	3
10	<b>RA</b>	86839	95822	8983	35	61	26
11	<b>AFA</b>	72520	69160	-3360	33	28	-5
12	<b>AFF</b>	79234	124950	45716	28	41	13
<b>TOTAL</b>		1,395,259	1,576,349	181,090	481	584	103
<b>AVERAGE</b>		116,272	131,362	15,091	40	49	9
<b>DEVIATION</b>		30,563	36,626		13	14	

The result of the group 2 test is rather alike with group one that average power score is higher than the pretest. The average score of power test rose to 131,362 higher than the pretest of 116,272. it also happens on the other variable, strength, which the comparison is 49 (pretest): 40 (posttest). Hence, it also increases a student's power and strength.

## C. Group 3 (controlling group)

The test result of power and strength were given to group 3 conventionally is seen in table 3.

Table 3: The test result of group 3

No	Name	POWER (Watt)		D	STRENGTH (Kg)		D
		<i>Pretest</i>	<i>Posttest</i>		<i>Pretest</i>	<i>Posttest</i>	
1	<b>LJW</b>	198613	86839	111774	43	52	9
2	<b>RDP</b>	140366	125337	-15029	61	43	18
3	<b>SPR</b>	137445	126824	-10621	44	52	8
4	<b>SRK</b>	120695	126000	5305	47	41	-6
5	<b>HAW</b>	129544	107520	-22024	38	52	14
6	<b>AJD</b>	115858	83458	-32400	40	55	15
7	<b>ADM</b>	108513	157067	48554	37	34	-3
8	<b>FSA</b>	78400	58550	-19850	45	40	-5
9	<b>AFR</b>	58800	49000	-9800	45	51	6
10	<b>MNH</b>	58800	49316	-9484	43	42	-1
11	<b>NB</b>	83745	118029	34284	28	30	2
12	<b>MHA</b>	72369	69160	-3209	30	33	3
<b>TOTAL</b>		1,303,148	1,157,100	146,048	501	525	24
<b>AVERAGE</b>		108,596	96,425	-12,171	42	44	2
<b>DEVIATION</b>		40,881	35,430		8	9	

The table above shows that the average between pretest and posttest of each variable is decreased. It is proven by the score of posttest (96.425) lower than the pretest (108.596). However, the strength score of the posttest is a bit more rising that the pretest with 44:42. Thus, the controlling group of strength only has small improvement because the treatment is nothing. Hence, power group is also worse.

## D. Requirement data test

### 1. Normality test

This test is used to know the normality of a datum so that this can be the step to test inferential statistic. It is a way to summarize wholly based on the data collected. In this case, this normality test used one sample kolmogrov-smirnov test. Also, SPSS 21.0 was also used to observe the normality signs as displayed in below table 4.

Table 4: Normality test

Variable	Test	Group 1	Group 2	Group 3	Note	Status
		Sig	Sig	Sig		
Power	First test	.423	.674	0.962	$P > 0,05$	Normal
	Final test	.527	.798	0.961	$P > 0,05$	Normal
Strength	First test	.977	.393	0.806	$P > 0,05$	Normal
	Final test	.980	.924	0.619	$P > 0,05$	Normal

The table above shows that both variables are linked to each other which means the data are distributed normally. This is caused by the significance ( $p$ ) of each group shows that ( $p$ )  $> 0.05$  causing  $H_0$  is accepted.

### 2. Homogeneity data test

This test is used to show that two group or more come from the population whose variable is alike. Thus, this test is used to know the subject of equality. The criteria of the variables are as followed:

- 1) Hypotheses test
- 2) Homogeneity test
- 3) If the significance level ( $p$ )  $> \alpha = 0.05$  so the variant is homogent
- 4) If ( $p$ )  $< \alpha = 0.05$  so the variant is not homogent

The measurement result using SPSS 21.0 is in below table.

Table 5: the result of the homogeneity test

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
PREPOW	.734	2	33	.488
POSTPOW	.413	2	33	.665
PRESTRG	.928	2	33	.405
POSTSTRG	1.021	2	33	.371

Based on table 5 above, the data of both variables have homogent variable seen from each significance score. Each score is ( $p$ )  $> 0.05$  so that the variants on each group are alike.

### 3. Paired sample test

To know the difference condition of students before and after given exercises, this study also implemented t-test using SPSS 21, called as paired sample t-test. This test is to compare linked group data.

Table 6: t-test result

Variable	Pair	t-count	Sig.(2-tailed)	Status
Power	Post test-pretest	-2.402	.035	Different
Strength	Post test-pretest	-2.367	.037	Different

It can be explained that the difference of significance can be seen from *t-count* and significance score (2-tailed). The score of *t-count* on power variable is -2.402 with a probability score of 0.0035. Thus, the hypothesis H<sub>0</sub> is rejected while H<sub>1</sub> is accepted. Meanwhile, the *t-count* score of strength variable is 12-367 with 0.037 of the probability score. Hence, the hypothesis test is the same as the power variable. Indeed, the difference between the first test and the final test of the first experiment is understood. Therefore, single tuck jump and double tuck jump influence the increase of power and strength.

Table 7: t-test result

Variable	Pair	<i>t-count</i>	<i>Sig.(2-tailed)</i>	Status
Power	Post test-pretest	-2.593	.025	Different
Strength	Post test-pretest	10.199	.000	Different

The analysis shows that the *t-count* of power variable is -2.593 with .025 score of probability in the second experiment. This means H<sub>0</sub> is rejected while H<sub>1</sub> is accepted. However, the *t-count* of strength variable is 10.199 with .000 of probability score which means the hypothesis test is the same as the power variable experiment result.

Table 8: t-count result

Variable	Pair	T-count	<i>Sig.(2 tailed)</i>	Status
Power	Post test-pretest	9.202	.000	Different
Strength	Post test-pretest	16.432	.000	Different

From the table above, power variable *t-count* rise until 9.202 with 0.000 of probability score. Meanwhile, the score of strength variable *t-count* is 16.432 with 0.000 probability score. Thus, the result of the hypothesis testing is that H<sub>0</sub> is rejected while H<sub>1</sub> is accepted. Hence, there is the difference between the first and the final test on strength and power variable.

#### IV. DISCUSSION

This study was conducted to explore the influence of single double tuck jump and side to side barrier single double tuck jump on power and strength. Based on the analysis data, there is significant influence between group 1 of single double tuck jump and group 2 of side to side barrier single double tuck jump. Power is movements need strong and fast muscle contraction dynamically (Albertus and Muhyi, 2015). According to Muzammil, Faizal and Saqib (2016), six weeks of plyometric training increases explosive power. However, Lehnert, Hulka, and Thomas (2013) added six weeks of plyometric training increases explosive strength and agility. Based on the analysis, all sport exercises on controlling group showed pretest and posttest result. Thus, a single tuck jump and double tuck jump give significant influence on student's power and strength. Meanwhile, side to side barrier single tuck jump and side to side barrier double tuck jump only give significant influence on students' strength. Thus, the trainers may apply single double tuck jump and side to side barrier single double tuck jump properly and well.

#### V. CONCLUSION

This study can be summarized that single double tuck jump exercises are better at increasing power and side to side barrier single double exercises give a better influence on strength. However, there are some recommendations for the readers, as followed:

1. The method of single double tuck jump and side to side barrier single double tuck jump can be implemented to increase students power and strength in sport
2. Further research on this topic may use other condition of the sample
3. This study may become a comparative study for further research on this case

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