Effectiveness Of Training Cost Method Of Using Serial And Parallel To Increase Power And Leg Muscle Strength, Muscles Back, Stomach Muscle

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Abstract: This study aims to determine the effect of weight training using serial and parallel methods in improving the power and strength of leg muscles, back muscles, abdominal muscles. Subjects in the study were students of Teachers' Training FPOK Mataram academic year 2014/2015 which were both undergoing training load with two training methods. This study uses a quantitative approach using experimental method with factorial design. The research instrument to measure the strength of the back muscles and leg muscle strength using a dynamometer leg,meter *the leg muscles using a powerjump Duration of Fright* (DF) series TKK 5114, and to measure abdominal muscle kekutan using crunches. The results showed that there was a significant effect of weight training using serial and parallel methods in improving the power and strength of leg muscles, back muscles, abdominal muscles.

Keyword: Training Cost, Leg Muscle Strength, Muscles Back

A. Introductions

The development of the sport and the demands to improve the quality of athletes is part of the sport is very important for sportsmen. Sporting achievements can not be achieved *instantaneously,* required exercise programmed, organized and measurable involving various disciplines of science and technology. To achieve this all would not be separated from the role of a coach who mempuni, have an understanding and experience in training. Problems coaching methodology is continuously developed in order to help achieve maximum performance. One method of training that is *popular* to improve muscle strength is *weight training* (weight training)*."Weighttraining* is an exercise conducted on prisoners to improve the quality of muscles that are being trained on someone training to improve fitness" (Beachle and Groves, 1997, p. 67). In sports activities, muscle strength is an important element for moving the organs for every sportsman and fundamental things that determine the performance capability of the exercise (Randall, 2004, p. 173). Without the large muscle strength, maximum performance is not achieved, the greater the muscle force exerted better improvement of physical elements (Baechle & Earle, 2002, p. 42). Usually an athlete has a major advantage dangan much larger than the average person. This group usually has a physical type called *mesomorphy.*They have a great body and in general they are called athletic.

Appropriate training to support the sustainable development of maximum strength exercises is the resistance *(resistanceexercise).* To be effective results prisoners exercise must be done with proper technique and in earnest when an athlete must expend maximum effort to hold the load. Similarly, the burden should be gradually increased so that the development of muscle weight can be assured that the increase in muscle strength and the ability to appear invisible. Therefore the training of prisoners should always be aexercises *progressive* and do not stop at one weight or a certain weight. To be able to do the technique correctly in all sports physical aspect is certainly a very important role where there are components of strength endurance, agility, speed, balance and others. All sports at the same perinsipnya, which require major physical strength and speed as the foundation to obtain an optimal motion. This is in accordance with the opinion Bompa (2009) that the sporting achievements influenced by several factors namely physical, technical, tactical and mental. According Kusnanik (2016) that every athlete should have good conditions in order to provide the best performance while playing.

B. Methods

This study uses a quantitative approach using experimental method with factorial design. The research instrument to measure the strength of the back muscles and leg muscle strength using a dynamometer leg,meter *the leg muscles using a powerjump Duration of Fright* (DF) series TKK 5114, and to measure abdominal muscle kekutan using crunches.

C. Results

Before analyzing the results of *pretest* and *posttest* to answer questions from the formulation of the problem, it will first discuss the data descriptive of thescores *pretest* and *posttest* on each variable. For more details, described as follows.

1. PRL

Descriptive Analysis Results PRL Group

Variable	Skor	N	Minimum	Maximum	Mean	Std. Deviation
Power Limbs	Pretest	16	444,31	588,90	506,38	44,68
	Postest	16	488,85	666,40	552,36	46,82
Limbs Strength	Pretest	16	97,50	125,50	113,28	7,56
	Postest	16	105,60	132,50	120,64	8,12
Squad Strength	Pretest	16	87,50	125,50	104,50	11,31
	Postest	16	95,40	143,30	114,59	11,90
Abdominal Strength	Pretest	16	27,00	32,00	29,50	1,59
	Postest	16	29,00	35,00	31,25	2,05

Portrait descriptive analysis of theresults. *pretest* and *posttest* The results were derived from the descriptive analysis above includes the number of samples (N), the minimum score, maximum score, the mean score *(mean)* and standard deviation *(Std. Deviation)*. From the data known increase PRL biggest score in the group found in leg muscle strength is equal to 9.66%. While the increase was lowest for the strength of the abdominal muscles is 5.93%.

2. SRL

Descriptive Analysis Results PRL Group

Variable	Skor	N	Minimum	Maximum	Mean	Std. Deviation
Power Limbs	Pretest	16	418,75	597,80	483,41	53,14
	Postest	16	417,41	799,15	570,28	99,55
Limbs Strength	Pretest	16	95,50	125,50	113,50	7,97
	Postest	16	105,60	138,20	121,58	9,55
Squad Strength	Pretest	16	97,50	126,00	110,84	8,72
	Postest	16	110,00	145,30	123,07	11,07
Abdominal Strength	Pretest	16	27,00	31,00	28,75	1,44
	Postest	16	30,00	39,00	32,31	2,39

Portrait descriptive analysis of theresults. *pretest* and *posttest* The results were derived from the descriptive analysis above includes the number of samples (N), the minimum score, maximum score, the mean score *(mean)* and standard deviation *(Std.Deviation)*. From the data known increase PRL biggest score in the group found in *power* the leg musclethat is equal to 17.97%. While there is the lowest increase in leg muscle strength is equal to 7:12%.

3. Controls

Table 4.3
Descriptive AnalysisControl Group

Variable		N	Minimum	Maximum	Mean	Std. Deviation
Power Limbs	Pretest	16	438,81	560,00	495,94	31,74
	Postest	16	423,44	627,20	545,82	52,74
Limbs Strength	Pretest	16	95,50	120,50	106,16	8,24
	Postest	16	101,30	122,20	110,62	6,27
Squad Strength	Pretest	16	87,50	135,50	108,09	15,12
	Postest	16	87,50	140,30	109,84	15,61
Abdominal Strength	Pretest	16	27,00	33,00	29,63	1,54
	Postest	16	27,00	35,00	30,25	2,18

Portrait descriptive analysis of theresults. *pretest* and *posttest* The results were derived from the descriptive analysis above includes the number of samples (N), the minimum score, maximum score, the mean score *(mean)* and standard deviation *(Std.Deviation)*.From the data, the largest known to increase scores in the control group contained in *power* limb musclethat is equal to 10.06%. While the lowest for the

increase in abdominal muscle strength is equal to 1.62%.

Based on the research that has been doneof data obtained on the training methodsthree groups with analysis, *multivariate the following results*

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Pwr Leg	6.7717[a]	2	3,39	1,02	0,37
	Strength Leg	936.500[b]	2	468,25	20,16	0,00
	Squad Strength	115.792[c]	2	57,90	1,76	0,18
	Abdominal Strength	70.292[d]	2	35,15	10,09	0,00
Intercept	Pwr Leg	3.4047	1	3,40	1,02	0,32
	Strength Leg	2745.187	1	2745,19	118,18	0,00
	Squad Strength	1925.333	1	1925,33	58,51	0,00
	Abdominal Strength	188.021	1	188,02	54,00	0,00
kelompok	Pwr Leg	6.7717	2	3,39	1,02	0,37
	Strength Leg	936.500	2	468,25	20,16	0,00
	Squad Strength	115.792	2	57,90	1,76	0,18
	Abdominal Strength	70.292	2	35,15	10,09	0,00
Error	Pwr Leg	1.4999	45	3,33		
	Strength Leg	1045.312	45	23,23		
	Squad Strength	1480.875	45	32,91		
	Abdominal Strength	156.688	45	3,48		
Total	Pwr Leg	1.6019	48			
	Strength Leg	4727.000	48			
	Squad Strength	3522.000	48			
	Abdominal Strength	415.000	48			
Corrected Total	Pwr Leg	1.5679	47			
	Strength Leg	1981.812	47			
	Squad Strength	1596.667	47			
	Abdominal Strength	226.979	47			

a. R Squared = .043 (Adjusted R Squared = .001)
b. R Squared = .473 (Adjusted R Squared = .449)
c. R Squared = .073 (Adjusted R Squared = .031)
d. R Squared = .310 (Adjusted R Squared = .279)

Based on the demonstrated effects of training methods SRL and PRL between subjects *(tests of between-subjects effects)* significant value is the dependent variable (*power* leg muscle, leg muscle strength, muscle strength back and abdominal muscle strength), SRL and PRL = 0.000 less than the value of ά. It can be concluded that there is a significant difference in the effects of training methods SRL and PRL to an increase in *the independent* variable. To view more details about the improvement *power,* of leg muscle leg muscle strength, muscle strength back and abdominal muscle strength in each group with SRL and PRL method.

D. Discussion

1. Effect of SRL and PRL method against Muscles Legs

leg muscle is a muscle that has an important role for athletes to take a leap of activities relating to the *power* leg. Many sports that focuses on the ability of the leg muscles do the work. Some of the sport in question here include football, long jump, high jump and some other athletic sports. To get the maximum results in an increase in leg muscle strength needed several methods can be used.

Previous've done some research that examines the appropriate method for increasing leg muscle strength. One is a study by Karabulut et al (2010). Karabulut examine the effects of low-intensity endurance exercise on the smooth blood vessels in the elderly. Karabulut dividing the sample into three groups, namely the high-intensity resistance training (80% of 1-RM), low-intensity endurance exercise group (20% of 1-RM) and a control group without treatment. Based on this research it was concluded that low-intensity exercise (20% of 1-RM) has better results than training in high intnsitas (80% 1-RM), particularly in elderly men.

Mansur (2014) conducted a study that is almost similar. Research conducted by Mansur has a focus on training PCT and SCT. Tests conducted to determine whether the PCT and SCT training can increase power significantly limb muscleor not. After an examination of the sample, the result of research that shows that training manipulation PCT and SCT did not havesignificanteffect *a* on the increase in *power.*While research Riadi (2013) research results that weight training methods APS, MSC and used KON has the effect ofsignificantincrease *a* of the maximum strength. Then research Ioannis et al (2000) showed that the combination of weight training and weight training has a significant influence on the improvement of all the variables tested. Success or failure of a research influenced by many factors one of which is how a researcher minimize mistakes in the field. Errors could be caused by the application of the type of training is not going well despite latihanya program correctly.

Likewise with this research sets and parallel systems used application is supported

by the findings of Campos et al (2002) reported that, the training set per-session system can significantly improve the *power* and muscle strength in trained athletes and untrained. Findings Kemler et al (2004) reported that the training system is set greater effect is to increase the maximum strength. The training system is rekomondasi latest set of ACSM (2012, p. 206), ie, the number of sets per training session for the lower body (leg muscle) is 5-3 set and 6-9 sets per session) for a muscle group with 1-3 type of exercise.

2. Effect of SRL and PRL method against Muscles Squad

Currently there are already a lot of research that talks about training on back muscles. One of these studies by Wijaya (2017) with the title Influence Circuits with Exercises *Core Stabilization* Static and Dynamic against Improved flexibility, balance, Abdominal Muscle Strength, Back, Legs and Arm. Results from this study showed that thecircuit training with *corestabilization* static and dynamic together can increase muscle strength back for eight weeks.

Further research by Permana & Wahyuni (2010) with a focus on freshness back before and after stretching *Mc. Kenzie extension.* This research was given to workers of factory workers in Semarang. Results from this study is that there is a significant difference to kesegara backs before and after *stretching Mc. Kenzie extension.*

In this study based training using methods SRL and PRL showed weight training using methods SRL and PRL have a significant effect on the increase in muscle strength back. PRL method has a greater effect than the method SRL, with the results mean value has increased. Training methods SRL and PRL burden on back muscles strength is the average muscle strength back from the training load SRL and PRL method is the same.

3. Effect of SRL and PRL method against Muscles Peru

One of the exercises that have an influence on the improvement of the abdominal muscles is *sit ups.* By doing *sit ups* will be an increase in muscle strength of one's stomach. We have had many peneitian discuss a wide range of training to improve the strength of the abdominal muscles. Research by Wijaya (2017) who conducted the research with a focus onexercises influence *core stabilization* on the abdominal muscles. Based on these studies obtained a finding thatcircuit workout with *core stabilization* less static increase flexibility, strength of the abdominal muscles. This can be caused by a lack of consistency in maintaining the position of the movement of the sample so that researchers always fix the position regularly. This is very important because the position of the right moves can certainly influence the increase in abdominal muscle strength optimally. In contrast to the *core* dynamic can also improve the flexibility and strength of the abdominal muscles as well. While the strength of the leg muscles getting less than optimal results from bothworkout. *core* static and dynamic \Further research by Meiriawati (2013) which lifted the title *Effect of Training Sit-Up Large Angle $45^{0,}90^{0,}$ and 120^{0} Against the Abdominal Muscle* Strength. This study took a sample of high school students of class X of SMA Dharma Praja Denpasar many as 24 students. Results obtained from this penelitani are training *crunches* greatangle $45^{0,}90^{0}$ and 120^{0} have a significant effect as well as differences in effect on abdominal muscle strength grade X SMA male student Praja Dharma Denpasar 2012/2013 academic year, in which 120 treatment group^{0} has the highest influence in increasing the strength of the abdominal muscles.

the results of this study show that, the training load using methods SRL and PRL have a effectthe *significant* on increase in abdominal muscle strength. PRL method has a greater effect than the method SRL. With the results of the mean value has increased.

E. Conclusion

Based on these results can be concluded that there is a significant effect of weight training using serial and parallel methods in improving the power and strength of leg muscles, back muscles, abdominal muscles.

References

Beachle, T.R., & Earle, R.W. (2002). *Bogor dengan pelatihan beban (terjemahan)* Jakarta: Raja Grafindo Persada.

Beachle, T.R., & Groves, B.R. (2003). *Weight training steps to success terjemahan pelatihan beban langkah-langkah menuju sukses*. Oleh Siregar, R. Jakarta: Raja Grafindo Persada

Bompa, T.O. & Haff, G.G. (2009). *Periodization theory & methodology of training fifth edition.* Champaign: Human Kinetics.

Kusnanik. 2016. Pelatihan Speed, Agility, and Quickness dan Plyometric pada Sprinter Prima Utama Pada Tahun 2013. Jurnal Iptek Olahraga Vol. 18, No.3, September-Desember 2016.