



The Effect of Wave Squat and Double Leg Hop Progression With a Leg Press and Calf Sitting on Leg Muscle Strength and Power

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History Article

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Abstract

The purposes of this research were to analyze (1) the effect of wave squat to increase leg muscle strength; (2) the effect of double leg hop progression towards an increase in leg muscle strength; (3) the effect of leg press exercise to increase leg muscle strength; (4) the effects of exercise sitting calf to the power of leg muscles; (5) different effects of leg press and sitting calf to increase leg strength; (6) different effects of wave squat and double-leg hop progression to the increase of the leg power. The type of research was quantitative with quasi-experimental methods. The research design was matching only design and data analysis was using Anova. The data retrieval process performed by leg power jump test DF and leg muscle power, back and leg dynamometer were used during the pretest and posttest. Furthermore, the outcome data was analyzed using SPSS 16.0 series. The results showed that there was a significant difference between the wave squat compared to double leg hop workout progression in leg muscle strength; with the Sig. 0,000 less than 0.05 ($p < 0.05$). whereas for leg power there was a significant difference between the leg press exercise when compared with calf sitting exercises to improve leg power proved; with the Sig. 0,000 less than 0.05 ($p < 0.05$) From the t-test result, there was an increase in leg muscle strength and power in each group after being given training.

How to Cite

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INTRODUCTION

Chu (2013) defined plyometric as a technique exercise used by athletes in sports that requiring the strength and power. Dangerous products baechle & amp; grove (2003: 27) the weight exercise is a training exercise using load to improve the quality of muscle in order to increase fitness. Regular weight exercise cause a change in body composition. The obstacles from Universitas Tadulako (UNTAD) football team was the lack of physical exercise applied by coach who uses and comparing plyometric exercise and weight training to increase the strength and power. These exercises were carried out conventionally. Therefore, wave squat and doubles leg hops progression exercise with leg press and sitting calf never be applied before. So that the researchers interested to apply the wave squat exercise program and double leg hop progression with a leg press and calf sitting to increase leg muscle strength and power in UNTAD football students team of academic year 2015.

METHOD

This type of this research was quantitative experimental method with quasi-experimental approaching and the research design was a matching-only design .

The population in this study were all UNTAD football team of academic year 2015, numbered of 42 people.

The division of samples per group using ordinal pairing, the sample in this study was group

as follows: group A= 14 people were treated with wave squat and double leg hop progression exercise, group B= 14 people were treated with leg press and sitting calf exercise. Group C= 14 as a control group using Z Score techniques.

Back and leg dynamometer to test the leg muscle strength. Jump DF to test leg muscles power. Data analysis used descriptive statistical techniques and analyzed with SPSS (Statistical Program For Social Science) 17.0 program.

RESULT AND DISCUSSION

To determine the effect of exercise and the double leg wall squat hop progression with a leg press and sitting calf, then the t-test in SPSS called a paired t-test was carried out.

The difference the increase in leg muscle strength and power between the study groups could be seen from Mean difference. From the Mean difference, the wave group and double-leg squat hop progression were more optimally deliver the increase of leg muscle strength compared with the sitting leg press and calf group and control group. Table 1 test results of leg muscle strength and leg muscle power LSD Post Hoc Test.

The Table 1 showed that there were significant differences among the three groups based on the mean difference. The experimental group II provided the optimal improvement of leg muscle strength compared with the experimental group I or the control group. But the leg muscle power showed that the experimental group I was more optimal than other groups, as shown in the table 2.

Table 1. Test Results Post-Hoc LSD Limb Muscle Strength

Group		Mean difference	Significance (p)
Experiment I	Experiment II	-1,6243	0,000
	Control	2,5929	0,000
Experiment II	Experiment I	1,6243	0,000
	Control	4,2171	0,000
Control	Experiment I	-2,5929	0,000
	Experiment II	-4,2171	0,000

Table 2. Test Results Post-Hoc with LSD Power Limbs

Group		Mean difference	Significance (p)
Experiment I	Experiment II	16,1586	0,083
	Control	29,5536	0,002
Experiment II	Experiment I	-16,1586	0,083
	Control	13,3950	0,002
Control	Experiment I	-29,5536	0,002
	Experiment II	-13,3950	0,149

Exercise Experiment Group I (Wave Squat and Double leg hops progression)

Double Wave Squat and leg hop progression exercises increase the leg muscle strength due to leg continues to contract continuously while doing the exercise. Thus the leg muscles are required to work continuously because in doing this exercise should be continuous. With the continuous contraction and the increasing of load weight every two weeks, leg muscle strength and leg muscle power will increase. Besides the training program Wave Squat and Double leg hops progression in this study was using the body weight itself so it reached the maximum movement, it was linear with the nature of the power. According to Setiawan, 2005 (in Setyawan, 2010: 16), the muscle ability in performing contractions to generate voltage against a load resistance. The Wave Squat and Double leg hops progression exercise gave significant influence to leg muscle strength and leg muscle power.

Exercise Experiment Group II (Leg Press and Sitting Calf)

Leg Press and Sitting Calf exercise had a significant effect on leg muscle strength and power due to leg muscle was continuously contracting while doing the exercise. Thus the leg muscles were required to work continuously because in doing this exercise should be continuous. With the continuous contraction and the increasing the load every two weeks so it made the leg muscle strength and leg muscle power increased. Beside that, the Leg Press and Calf Sitting exercise was using a lightweight instrument so the ability in the movement could be done with maximum that is in the line with the principle of power. According to Chu (2001: 95), exercise increases the power to do repetitions with light weights movement. Therefore, there was significant influence from Leg Press and Calf Sitting exercise on leg muscle strength and leg muscle power.

Comparison of Wall Squat and Double leg hops and progression with Leg press Sitting calf Exercise

There were differences in the effect of leg muscle strength and muscle power leg where the Wave Squat and Double leg hops progression exercise was better than the Leg Press and Sitting calf exercise. This happened because in Wave Squat and Double leg hops progression exercise, the contraction of the muscles in the legs in-

creased twice compared with the muscle contraction on Leg press and Sitting calf exercise. The basic theory of "force is the product of speed and power" (Bucher, 2009: 260). Based on the theory, the amount of force proportional with the power, it means that if the force increases, the power also increases.

CONCLUSION

There was a significant effect of wave squats exercise on leg muscle strength and power of UNTAD football team, there was a significant effect of double leg hop progression exercise to leg muscle strength and power of UNTAD football team, there was a significant effect of leg press exercise to leg muscle strength and power of UNTAD football team, there was a significant effect of sitting calf exercise to leg muscle strength and power of UNTAD football team, there was a significant difference between the wave squat and double-leg hop progression exercise with leg press and calf sitting on leg muscle strength of UNTAD football team, there was a significant difference between the wave double leg squat and hop progression exercise with a leg press and calf sitting exercise on the leg muscle power of UNTAD football team.

Provision and application of the four forms of exercise, namely wave squat, double leg hops progression, leg press and sitting calf can increase in leg muscle strength and power, therefore double leg hop progression and leg press can be used as a reference for coaches, trainers in provision of training in order to improve the physical condition, especially in the legs. The coaches and trainers in implementing of training should first understand the character of the training program that will be provided, so that the athletes will get the appropriate exercises to reach the desirable target.

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