



The Influence of Creatine Monohydrate on Strength and Endurance After Doing Physical Exercise With Maximum Intensity

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History Article

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Abstract

The purpose of this study was: (1) to analyze the effect of creatine monohydrate to give strength after doing physical exercise with maximum intensity, towards endurance after doing physical exercise with maximum intensity, (2) to analyze the effect of non creatine monohydrate to give strength after doing physical exercise with maximum intensity, towards endurance after doing physical exercise with maximum intensity, (3) to analyze the results of the difference by administering creatine and non creatine on strength and endurance after exercise with maximum intensity. This type of research used in this research was quantitative with quasi experimental research methods. The design of this study was using pretest and posttest control group design, and data analysis was using a paired sample t-test. The process of data collection was done with the test leg muscle strength using a strength test with back and leg dynamometer, sit ups test with 1 minute sit ups, push ups test with push ups and 30 seconds with a VO₂max test cosmed quart CPET during the pretest and posttest. Furthermore, the data were analyzed using SPSS 22.0 series. The results showed: (1) There was the influence of creatine administration against the strength after doing exercise with maximum intensity; (2) There was the influence of creatine administration against the group endurance after doing exercise with maximum intensity; (3) There was the influence of non creatine against the force after exercise maximum intensity; (4) There was the influence of non creatine against the group after endurance exercise maximum intensity; (5) The significant difference with the provision of non creatine and creatine from creatine group difference delta at higher against the increased strength and endurance after exercise maximum intensity. Based on the above analysis, it can be concluded that the increased strength and durability for each of the groups after being given a workout..

How to Cite

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INTRODUCTION

Exercise is a necessity for humans because humans are moving beings. Sport can also be used to gain an achievement. Sports achievement is the result achieved by a person or group of people because they have ability or skill of a sports number after going through the process of programmed, directed, and continuous training (Zimmerman, Starischa, and Grosser, 2011).

Achievements can be seen from the development of a sport that is progressing rapidly. This is marked by the creation of some new record or achievement in the sport continues to increase. An increase of new record increase or achievement in sports is also supported by the state of the athlete's physical condition. The physical condition of athletes is one of the main things to support achievement in sports competition. This physical condition is used in training long before the competition is done.

Exercise or training is a process that is planned in various stages and implemented continuously. In principle, exercise is to improve the physical quality and process of developing skills possessed by an athlete, which has a goal to achieve a change towards the better so that athletes can perform well in any sports activities including during the competition. According to Sukadiyanto and Muluk (2011: 6), exercise is the application of a plan to improve the sport ability which contains material, theory, practice, method, and implementation rules in accordance with the goals and objectives to achieve.

Exercises by an athlete in support of this achievement, include strength and endurance training. Strength training is an exercise that is devoted to increasing the ability to use maximum power to resist or lift heavy loads in a short time (Kent, 1994). Endurance training is exercise performed with relatively long duration and light intensity (Fox, 1993). Speed is important thing in both trainings. In a running race for example, determining the running steps to be repeated, checking the foot turn, and adding speed must be taken into account. Taking that into account, there will be a maximum speed that can be done during the race. Correct exercise includes drill forms and techniques, strength training in the gym, and of course in practice should be under the supervision of the coach.

Besides exercise, nutrition is also an important factor in achieving sports achievement. Provision of nutrients is used to give maximum effect in exercise. Creatine Monohydrate is one of the most popular supplements and is used by

athletes who want to form dry muscle mass, maximize performance, and increase the strength. Creatin is the most widely used supplement and it is recommended as an ergogenic aid that works to improve the health and performance during exercise (Kraemer, 1999). Creatine Monohydrate (Crm or CM) is the most widely used supplement for oral consumption. When taken orally, creatine monohydrate can increase performance and fat free mass. In the other words, it can increase muscle strength and mass. According to survey data, more than 40% of athletes of the National Collegiate Athletic Association (NCAA) reported that they had used creatine.

Creatine monohydrate is consumed before and after doing the heavy exercise. For example, in the badminton game, this sport tends to have high intensity. Badminton has now changed from typical predominantly forward endurance games to be a typical speed and power game. The match schedule of a badminton club also tends to be crowded. This is due to the schedule of badminton sport following a predetermined game schedule. With this busy schedule, badminton athletes need supplements in order to reduce the occurrence of injury during exercise.

As sports numbers are growing and changing, it demands a relatively fast recovery phase. For example on single and multi sport event, as a result of relatively short competition and the distance between adjacent matches causes the recovery phase to be done quickly. So when doing a quick recovery phase is required to be done correctly.

In sport, regular physical exercise becomes a fundamental foundation to achieve maximum results. However, in sports that require maximum muscle strength and long muscle endurance, maximum physical exercise only is not enough. An additional energy supplement is needed to maintain the fitness. This supplement is intended to keep the body stamina maintained, reduce physical fatigue, and can provide additional energy. The absence of research conducted to determine the influence in taking supplements after doing this maximum exercise that became the basis of the need of a study showing how the influence of creatine monohydrate on strength and endurance after doing physical exercise with maximum intensity..

METHOD

This research was using quantitative type with Experimental Laboratory method (quasi experiment). The study design was using pretest

posttest control group design (Zainudin, 2000)

The population in this research was Physical Education students 2013 of Universitas Negeri Surabaya, which is actively enrolled as a student with a total of 25 students. The sample in this research was active student of Educational Education Department of Universitas Negeri Surabaya 2013 as many as 25 people. Sampling technique in this research was using simple random sampling. Determination of samples grouping was done by ordinal pairing or adjusted with rank of pretest result.

The place of study was conducted at SSFC Building. The time of the research was done in July 2016 for 7 days. The research instruments in this research were strength and endurance test using stopwatch tool, back leg dynamometer and COSMED Treadmill

In accordance with the hypothesis and the type of research used in this study, the statistical analysis used was normality data and homogeneity test, and it was continued with paired t-test with a significance level of 5%. The above process then be implemented using the Statistical Products and Service Solution (SPSS) 22.0 program.

RESULT AND DISCUSSION

This research was conducted on students of Physical Education Department 2013 of FIK UNESA which amounted to 25 people and divided into 2 groups, each group consisted of 12 people.

Results description of this study discussed the average and standard deviation obtained from test performed on each group. The results of the test was calculated and recorded based on the group and type of exercises performed and was analyzed for treatment results from the 2 groups of creatine monohydrate supplement groups and maximal intensity exercise with the group given the exercise with maximum intensity without creatin.

Group I Data Description (Creatine Supplement and Exercise with Maximal Intensity)

Based on the result of measurement in group I, there was an increase of mean value between pretest and posttest on dependent variable (strength and endurance. The mean values to increase strength of posttest for push ups (32 times), back and leg dynamometers (240 kg) appeared to be higher than the pretest (25 times) for push ups and (157 kg) for back and leg dynamometer. So it was clear that the difference from the average showed an improvement after 7 days of training.

Similarly, in endurance variable data showing that there was a significant improvement in durability after 7 days of treatment. It could be seen that the average of the posttest for sit ups (51 times) and vo2max (56.1 cc/ kg/ bb) was higher than the pretest results (42 times) for sit ups and 43.7 cc/ kg/ bb) for vo2max. Based on the results above, it was concluded that in the treatment of 7 days in group I, it could increase leg muscle strength, arm muscle strength, abdominal muscle and cardio respiratory vascular endurance.

Group II Data Description (Exercise with Maximal Intensity)

In experiment group II, there was an increase of mean value between pretest and posttest on dependent variable (strength and endurance) where the average posttest value was greater. The mean values for the increase of strength of posttest for push up (30 times) and back and leg dynamometer (25 kg), and this looked higher than the pretest (26 times) for the push up and (207kg) for the back and leg dynamometer. So the difference from the mean value indicated improvement after 7 days of training and with frequency of ongoing exercise.

Similarly, the data of endurance variables also showed an increase in endurance after being treated for 7 days. It can be seen that mean value for the increase of endurance from result of posttest for sit up (47 times) and vo2max (48.7 cc/ kg/ bb) looked higher than pretest equal to 39 times for sit ups and (44.1 cc/ kg/ bb) for vo2max. Based on the results above, it was concluded that in providing a treatment in the experimental group II could increase leg muscle strength, arm muscle strength, endurance abdominal muscle and cardio respiratory vascular endurance.

This research was using quasi-experimental method because it is one of the best research methods to investigate causal relationships (Maksum, 2012: 65). Subjects in this study were male students amounted to 25 people, aged 21-23 years. The selection of male students was intended because men have a more stable hormonal system when compared to female (menstrual cycle). In this study, there was a dropout on the subject because the subjects were unable to carry out high intensity exercise. Number of subjects dropped out by 1 person.

The discussion of this study was discussed in the form of the influence of creatine on strength and endurance with maximal physical exercise intensity. High intensity exercises were designed as treatments for all research subjects assuming would lead to increase the strength and

endurance. The reason researchers providing creatine supplements by doing high intensity physical exercise was to prove whether there was or no influence of creatine by doing high intensity physical exercise in the creatine monohydrate group and non creatine monohydrate.

Creatine Monohydrate Group to Strength
Strength is a force released by muscles which needs energy supply (Izquierdo et al, 2002). In muscle cells, there is a power source that quickly generates power. The energy source is called ATP (Adenosin Triphosphat) and PC (Phosphocreatin). Adenosine Triphosphat is made and stored in the mitochondria of muscle cells. Adenosine Triphosphate produced in muscle cells is then transported to every cell in need. The mechanism of energy formation occurs by splitting ATP into ADP and Pi, as well as a number of energy (Suharjana, 2013). From the energy supply itself, it is divided into several energy systems in the body such as ATP-PC, Anaerobic and Aerob Glycolysis (Cerika, 2010).

While the strength training requires and uses enormous and rapid energy, so the enormous energy will use ATP-PC system which then in the presence of ATP-PC system can use the energy needed in cycle of substance rotation from ATP become ADP (Adenosine DiPospat) ultimately has to revert back to ATP with a fast turnaround cycle so that in the turns a PC will emerge which will help add more energy in the body by changing ADP back to ATP. With the rotation speed of the ATP energy cycle that turns into ADP for the beginning of activity that will then return again to ATP will depend on the availability of energy obtained from the PC in the body. A good PC availability will make the maximum energy the body will use by using a big and fast force. With a fast turnaround cycle and the dependent availability of PC, creatine itself has a function to bring P = PC from ADP which will turn into ATP back to get maximum energy (Viitala et al., 2004).

Creatine Monohydrate Group to Endurance

Endurance is an early biomotor component in the physical condition component. Endurance itself definitely requires aerobic energy systems (Izquierdo et al, 2002). Endurance will use the enormous energy in the body so that in the energy system ATP will turn into Anaerobic Glycolysis and then will change again into the aerobic energy system in the body. Aerobic energy system itself will occur if the energy system in the body that ATP-PC is not able to cover the energy demand by the body. So that there will be a rapid

turnover of energy systems in the body, but if the availability of ATP-PC in the body is sufficient by the body, then the body does not need to use the aerobic energy system to perform activities (Zuhl et al, 2012).

Those processes will make endurance produces huge and maximal energy because if there is too much ATP, it will make endurance to gain more vo2max result. And vo2max depends on energy sytem cycle (Plowman dkk, 2011). Beside that, if there is too much ATP, it will lengthen the anaerob energy that will make the energy system cycle too long and reach the aerobic condition. And aerobic condition will increase endurance in vo2max.

CONCLUSION

Based on the result and discussion above, it was concluded some conclusion as follows: 1. There was significant increase in creatine giving to strength group after doing exercise with maximal intensity; 2. There was significant increase in creatine giving to endurance group after doing exercise with maximal intensity; 3. There was significant increase in non-creatine giving to strength group after doing exercise with maximal intensity; 4. There was significant increase in non-creatine giving to endurance group after doing exercise with maximal intensity; 5. There was significant difference between creatine and non-creatine giving from delta difference in creatine group which was higher to strength and endurance increase after doing exercise with maximal intensity.

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