

# The Effect of Physical Training on Rowing Sport Achievement

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## ABSTRACT

The aims of the study explored the different effects of plyometric training and coordination on rowing sport achievement. This research was involved 40 rowing beginner athletes at Kendari from July up to September 2019. The research method was a quasi-experimental method that tested two methods for two treatment groups. The instrument used is the rowing sport achievement test, and data were analyzed by descriptive quantitative, ANAVA, and Tukey analysis at the  $\alpha = 0,05$  level of significance. This result shows that plyometric training provides higher average values of sports achievement than coordination. Furthermore, the two forms of training have different effects on sport achievement.

**Keywords:** *Physical training, plyometric, coordination, achievement, rowing*

## 1. INTRODUCTION

Indonesia, with its natural potentials such as rivers and lakes, supports the development of rowing sports. This type of water sports is done in teams in one boat. Rowing sports contests are growing the all over Indonesia, causing a growing interest in this sport. Beginner athlete with an average age of 14-26 years is a likely age to achieve the highest achievements. Guiding and developing rowing sport is a part of efforts to improve the quality and adequate level of health and fitness. Nevertheless, the performance of junior athletes was meager. The reason for this issue related to the decline in coach numbers. This fact requires coaches to explore effective training methods to increase athlete achievement.

These skills of an athlete can be developed by cognitive, associative, and autonomous. Thirdly is a health condition related to system organs such as the nervous system, digestive system, cardiovascular system, and others. Finally, the athlete's personality factor is related to their intellectual, moral, and other psychic abilities. These four factors contribute by sustainable to the athlete's achievement [1], [2].

Besides that, the management athlete is critical to achieving high performance. There are seven conditions about the management: (1) seed selection factors in the insight of scientific methods, (2) systematic of coaching,

(3) high quality of trainer education, (4) the guidance on health and social condition of athletes, (5) the optimal application of science and programs implementation of training, (6) the depth of research, (7) the coordination of all these efforts [3], [4].

The coaching system is needed continuously and supported with adequate science and technology. Based on experience, creating an achievement requires an efficient approach through methods that according to the conditions and situations of athletes who are trained. The physical elements that are very dominant in influencing the ability of a rower are the strength, explosive power of the hand muscles, leg muscles, speed of endurance, coordination, and flexibility [5]. The involvement of various physical components that exclusively contribute to the achievements of the rowers is insignificant; it needs to get attention and proper handling and appropriately programmed [6].

This research reviews the application of two methods of rowing practice, plyometric training and coordination training. Plyometric training is a method for developing explosive strength, which is the most critical component of some athletes' achievements. In practice that plyometrics are relatively very easy to learn and teach, for that it must be of lightweight or with a form of repetition or duration of training. The method intended to describe the occurrence of higher tension exhibited by a

group of muscles. The training program is performed by showing a phase of rapid stretching followed by commensurate rapid contractions.

Plyometrics is a form of training that can increase anaerobic speed, and explosive power in short distance rowers with types of exercise include sit up, push up, skipping, hopping, leapfrog, bounding jump, strides, bounding jump, and depal jump. Plyometrics comes from the words "plyo and metric," which means more and measurable [7]. Other references mentioned that plyometrics is a form of training that has been recommended for sports branches whose success depends on muscle strength. Alford said that plyometrics is a training designed to develop elastic strength. [8].

Through plyometrics, muscles are trained to produce a more forceful contraction. The faster a muscle is stretched, the more significant related concentric contractions, which at their peak produce a powerful movement Radcliffe and Farentinos state that plyometrics is a form/method of training for coaches and athletes towards improving techniques of good speed and strength so that the combination of both of them will be the power of speed, where the strength of this speed is very instrumental in an athlete's skill and is something that is very decisive [9].

The second experiment is coordination. This training develops the ability of athlete with varying degrees, efficiently, full accuracy, and stimulate the workings of muscle. Coordination is the ability to make a pattern of movement that requires skill. Coordination is also an integral part of motor skills; in fact, the notion of coordination has been considered as an equivalent of motor ability and skills [10]. Coordination is the ability to stimulate simultaneous muscle operation [11].

The coordination referred to a form of cooperation and arrangement nerves and muscles into an integrated and coordinated movement. Coordination abilities include activities that consist of two or more skills and patterns of movement. This sub-category is mainly about the ability to coordinate between eyes and hands or the ability to coordinate between eyes and legs. Coordination of the eyes and hands refers to the athlete's ability to choose an object and its surroundings and coordinate the object received by manipulating the motion of his hand. Eye and hand coordination requirements for accuracy in controlling movement. Eye and leg coordination refer to the athlete's ability to distinguish an object from the background and coordinate the object received with the required movements of a sport.

Coordination is the interplay of harmony between muscle groups during all given motion performances with some indication of skill. Coordination is the ability to use feelings, vision, and hearing simultaneously with body parts in the appearance of proper and running well motion. Muscle coordination is a critical component and

develops individually to enable the ability to work in units of time and space. Besides what has been mentioned above, there are two factors that also need attention to consider in coordination, namely intra-muscular coordination and inter-muscle coordination. Intramuscular coordination, according to physiologists, is based on law. All connective glands in every motion require a maximum contraction, or they do not contract at all. Therefore, it will be necessarily mean, as much as possible, involving units of motion. Synchronous in performance when developing muscle strength training. Another factor is the existence of intra-muscular coordination involving active exploitation of muscles that participate in a specific movement.

The use of sub-maximal strength training has a positive and negative effect on intramuscular coordination. On the positive side is the development of coordination when movements are carried out correctly. The negative side is the development of stereotyped muscles that do not have to be coordinated includes that balance, reaction time, rhythm, spatial orientation, and differentiation [12]. Coordination training itself is a form of training intended to improve the ability of muscles and nervous system. So that there is a coordinated, harmonious movement that makes the motion of the joint muscles more perfect. Coordinated movements are needed if an athlete performs specific and sustained movements both quickly and slowly. A motion must be aligned, rhythmic, and sequential so that it is coordinated. Coordination eyes, hands, and leg is characterized by the integration of visual information with a component of the body.

## **2. METHOD**

This research was conducted in students training education center of rowing Sport Kendari City, Southeast Sulawesi Province, in September 2019. The student's training was the beginner athlete. The method used in this study was quasi-experimental, and involved 40 students was divided into two groups. Physical abilities and student skills are considered homogeneous. The research applied plyometric (PT) in the first group and coordination method (CT) for second group. The measurement of rowing sport performance is done by rowing sport of kayak test according to the executive board of canoe sports competition rules. Regional games all over Indonesia, especially the use of tools in the implementation of tests. The instrument used is the rowing sport achievement test and data were analyzed by descriptive quantitative, ANAVA and Tukey analysis at the  $\alpha = 0,05$  level of significant.

### 3. RESEARCH RESULT

#### 3.1. Descriptive Quantitative

The plyometric method focuses on the repetition of exercises with the target of increasing strength and speed. Coordination exercises while focusing on the ability of athletes to optimize the function of the hands, eyes, and feet regularly. Sports achievements in the two groups are presented in Table 1.

**Table 1.** Sports Achievement of an athlete in two groups

Category	Interval	PT		CT	
		F	%	F	%
Very low	31.00 - 37.70	0	0	3	15
Low	37.80 - 44.50	0	0	1	5
Medium	44.6 - 51.30	2	10	4	20
High	51.4 - 58.10	10	50	8	40
Very High	58.2 - 65.00	8	40	4	20
		20	100	20	100

Most athletes achieve good performance in plyometric training. While in the coordination training, there were 15% of students in the very low category. The sport achievement score of the athlete group with plyometric training as a whole shows a range between 43 to 65 and mean = 58.25 and standard deviation = 4.278. In the coordination group, students reach values between 31 and 64 with a mean value of 50.60 and a standard deviation of 9,687 (Table 2).

**Table 2.** Comparison the descriptive score of the rowing sport

	PT	CT
N	20	20
Mean	58.25	50.60
Standard deviation	4.278	9.687
standard Error	.957	2.166
Minimum	47	31
Maximum	65	65

Descriptive statistical test results show higher mean value in plyometric training compared to other groups. This group also produced an almost uniform achievement in all samples with lower deviation values compared to the other groups.

Based on Table 3, show the mean of the plyometric training amount 58.25 is higher. The homogeneity test of the two groups is shown in Table 3.

**Table 3.** Homogeneity test

Test of Homogeneity of Variances			
RA			
Levene Statistic	df1	df2	Sig.
12.348	1	38	.001

The test of homogeneity of variances has value 0.001, which lower than significant scale 0.05. The result means that both groups have different achievement scores. This result is supported by the ANOVA test with the Tukey method (Table 4).

**Table 4.** Significance test of two groups

ANOVA					
RA					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	585.225	1	585.225	10.438	.003
Within Groups	2130.550	38	56.067		
Total	2715.775	39			

Table 4 indicated that the significance value of 0.003 <0.05 means that the two forms of exercise had different effects on learning achievement. The analysis shows that the plyometric method is more effective than the coordination method.

In general, plyometric training only focuses on increasing muscle performance, which results in speed and strength. This exercise is easy for beginners to understand. But in coordinating exercises, athletes are not only required to move fast and strong but must develop their skills in coordinating their eyes and hands.

Rowing athletes must be able to move ships with one or several paddles, repeating with cyclic movements. In these movements, the pressure of the muscles of the legs, back, knees, and arms must be equal. However, athletes must be able to produce complex movements. Therefore, strength training for beginner athletes is fundamental. While coordinating exercises or displaying rhythmic movements and hands is a follow-up exercise [13].

### 4. CONCLUSION

Based on the analysis, the result of the research found that plyometric training is more effective than coordination training. Achievement of sports skills in beginner rowing athletes is higher in the plyometric method with a smaller standard deviation. The results of the analysis of variance also showed that there were significant differences between the two experimental groups.

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