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The Effect of Acceleration Sprint and Zig-zag Drill Combination to Increase Students' Speed and Agility

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Abstract: The purpose of this research is to analyze the following factors: (1) how far the effect of exercise acceleration sprint on the speed and agility (2) how much influence the zig-zag drill combination to the speed and agility (3) and is there any difference between the effects of exercise acceleration sprint and practice zig-zag drill combination of the speed and agility. This research is quantitative with quasi-experimental approach. The design of this study is matching only design. This study was conducted on 33 male students who take part in extracurricular and divided into 3 groups with 11 students in each group. Group 1 was given training of acceleration sprint, group 2 was given zig-zag training combination drills of conventional and exercises for group 3, for 8 weeks. The data collection was using sprint 30 meter to test the speed and agility t-test to test agility. Data were analyzed using t-test and analysis of variance. The conclusion of the research is (1) there is a significant effect of exercise acceleration sprint for the speed and agility, (2) there is a significant influence combination zig-zag drills, on speed and agility (3) and exercise acceleration sprint have more effect on the speed and agility.

1. Introduction

Sport is a physical activity that is carried out to maintain a healthy and strengthening the muscles of the body. This activity can be done as an activity that entertain, fun or can also be conducted in order to improve performance. One of the desired expectations of a sportsman is to be someone who is well known in public or to achieve maximum performance in sports. Maximum achievement, according to the desired expectations will be achieved through guidance and training directed and carried out effectively and efficiently. According Sukadiyanto & Muluk, (2011), "Exercise is a process of changing to be the better, which is to improve the quality of physical, functional ability of the body equipment, and the quality of child psychological training". One element to achieve in sport is a physical condition [1]. According to Hidayat (2014), the physical condition is a very important element in nearly all branches of sports, therefore doing exercise for physical conditions is necessary for serious concern and systematic so that physical fitness and functional ability will be better [2]. Training methods to improve the speed and agility, drills acceleration sprint and exercises zig-zag drill combination. According Deuster et al (2013), sprint acceleration is a speed development drills, by running fast and gradually increased from jogging, striding, and the sprint is done repeatedly [3]. Meanwhile, according to Mylsidayu & Kurniawan (2015), said that the combination zig-zag drill one method of exercise to improve body agility in changing direction [4]. The researcher's reason to choose the two forms of exercise because the exercise was based on dominating the formation and increased velocity (speed) and agility (agility).



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Based on the background above, this study aims to examine and analyze (1) how far influence the workout acceleration sprint on the speed and agility (2) how much the effect of exercises zig-zag combination drills on speed and agility (3) and is there any difference between the effects of exercise acceleration sprint and zig-zag drill combination to speed and agility. This type of research is quantitative research with a quasi-experimental approach (quasi experiment). The study design used is matching only design. The sample in this research is the high school students who participated in extracurricular as many as 33 pupils. The results obtained after 8 weeks researching with training sessions three times a week showed that the experimental group were given exercises acceleration sprint and practice zig-zag drill combination indicated a significant increase. (a) the experimental group I for speed -0.16% and -0.22%, for agility (b) experimental group II of speed -0.12%, and -0.15% for agility, (c) a control group of speed -0.05% and -0.08% for agility. The conclusion of the study are (1) there is a significant effect of exercise acceleration sprint and exercise combination zig-zag drill on the speed and agility, (2) the exercise acceleration sprint have more effect on the speed and agility, (3) the exercise acceleration sprint impacted on the pace and agility.

2. Method

The research is a quantitative study with a quasi-experimental approach. The study design used is matching only design and data analysis using t-test and ANOVA. Data collection used sprint 30 meters measuring the speed and agility whereas t-test is used to measure agility during the pretest and posttest. Furthermore, the data were analyzed using SPSS 20.0 series.

3. Results

The result shows to determine the effect of drills acceleration sprint and exercise zig-zag drill combination on the step test using t-test and ANOVA. The results of processing the data are in the table 1.

Table 1. Test Results of Mean Differences in Paired Samples Free
Test Paired Samples

		Mean	T	Sig. (2-tailed)
K1	Posttest Speed- Pretest Speed	-0.21909	-6.727	0.000
K2	Posttest Speed-Pretest Speed	-0.12364	-7798	0.000
K3	Posttest Speed- Pretest Speed	-0.05182	-4969	0,001

Table2. Test Results of Mean difference in Paired Samples agility
Test Paired Samples

		Mean	T	Sig. (2-tailed)
K1	PosttestAgility- Pretest Agility	-0.22818	-10.116	0.000
K2	PosttestAgility- Pretest Agility	-0.15182	-10 201	0,000
K3	posttest Agility- Pretest Agility	-0.08091	-5.709	0.000

The table 2 shows that the level of significance of each variable obtained sig <0.05. It is a significant difference or distinction between pretest and posttest data of each dependent variable (speed and agility), both in the experimental group I, group II and group experiments III. So it can be concluded that there is a significant effect of giving workout, acceleration sprint exercise zig-zag drill combination and in the control group.

3.1 Test Results Mean Inter-group difference (Anova)

The test in the study conducted by Anova (F) and the result is to determine whether the difference of results mean different in each group simultaneously. The test results can be seen in the table 3.

Table 3. Results of ANOVA Analysis

Source of Variation	Df	F calculated	F Count	Sig.	Sig.	Specification
Inter-group	2	14.866	17.479	0.000	0.000	Significant
In Group	30					
Total	32					

The table 3 shows that significant value from ANOVA test on the speed and agility is sig <0.05. So it can be concluded that there are significant differences in the results of speed and agility in three different groups. Therefore, with the differences between groups, the data analysis can be continued by using test multiple post Hoc-comparisons using the Least Significant Difference (LSD) in SPSS 20.0 with the aim to determine which independent variables have a significant impact on the increase dependent variable.

Table 4. Test Post Hoc Data Speed

Variable	(I)	(J)	Sig.	95% Interval Lower Bound Upper Bound	Confidence
Speed	Acceleration Sprint	Zig-zag Combination Drill	0.004	0.0326	0.1583
		Control	0.000	0.1044	0.2301
		Sprint	0.004	-0.1583	-0.0326
	Combination Drill Zig-zag	Acceleration Control	0.027	0.0090	0.1347
		Sprint	0.000	-0.2301	-0.1044
	Control	Acceleration Zig-zag Combination Drill	0.027	-0.1347	-0.0090
Agility	Acceleration Sprint	Zig-zag Combination Drill	0.005	0.0255	0.1272
		Control	0.000	0.0964	0.1982

Zig-zag Combination Drill	Sprint Acceleration	0.005	-0.1272	-0.0255
	Control	0.008	0.0200	0.1218
Control	Sprint Acceleration	0.000	0.1982	-0.0964
	Zig-zag Combination Drill	0.008	-0.1218	-0.0200

The table 4 shows that there is difference in mean different a significant between group drills sprints acceleration and zig-zag drill combination, or the control group of both variable speed and agility. Based on these results it can be concluded that the exercise acceleration sprint have more influence on the speed and agility compared with the exercise combination of zig-zag drill and control groups.

4. Discussion

4.1 Exercise Experiment of Group 1 (Acceleration Sprint)

Exercise acceleration sprint is done by building speed, running gradually and slowly increased from running (jogging), length of step (striding) and sprint (sprint), between 50 to 100 meters. Judging from the patterns of movement, workout acceleration sprint is one form of exercises that focuses on improving speed and agility. From the calculation of the mean, it is found that the results is an increased speed and agility after being given the workout. Based on the analysis this exercise will significantly improve the speed and agility in high school male students who take part in extracurricular activities. It is in line with research conducted by Manikanthat that the workout acceleration sprint can increase speed and agility [5]. After testing the significance of the result is significant, it can be said that the administration of workouts acceleration sprint really have positive effect on speed and agility. Kusnanik, (2016) also added that the speed, agility, and acceleration are the component of physical condition which are very important for a sprinter [6]. This is because to be able to sprint quickly athlete must have a component with a good physical condition.

4.2 Experiments Group of Exercise 2 (Combination Drill zig-zag)

Zig-zag drill combination is like a square with a distance of 10 meters on each side. It is done by positioning themselves at the start line and start to run backwards, followed by sprinting intersect then followed with a run backwards and ends with a sprint cross line. The starting point from the patterns of movement that exercises zig-zag drill combination which is one form of exercise that focuses on improving agility in changing direction quickly without losing balance. From the calculation of the mean, it is found that the results have an increase in speed and agility exercises after receiving gifts zig-zag drill combination. Based on the analysis, this exercise will significantly improve the speed and agility in high school male students who take part in extracurricular activities. It is in line with research conducted by Hartati et al, that the exercise combination zig-zag drill can improve agility [7]. After testing the significance, it can be said that the administration of drills combination zig-zag drill truly have positive effect on speed and agility.

4.3 Control Grup

Based on the calculation of the mean group, the results of the exercises shown by the control group had increased the average yield of speed and agility despite the control group allowed to exercise outside of treatment. Exercise under this situation allows a control group to perform other activities that can support the speed and agility, such as: the existence of other activities such as football without no training. In addition to treat specific male student of high school who had exercise can indirectly support the level of biomotoric and skill. The speed and also agility in terms of running and playing ball rise to an increase in proceed from pretest to posttest.

5. Conclusion

The achievement of athletes in various sports can be gained through regular training, upgrading the supporting facilities, and the improvement of qualified and experienced trainers. Trainer are required to create an exercise program which is able to support the potential of athletes and the determination of the training method must also be in accordance with the needs of athletes. It can be proven from this study that there is a great significant effect on the acceleration sprint and combination zig-zag drill training on speed and agility.

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