

The Effect of Plyometric and Ladder Drill Training on the Agility of Female Cricket Athletes in Terms of Leg Power



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ABSTRACT: Cricket is a sport played by hitting the ball with a bat and running to exchange positions to get points, which is played on an oval-shaped field. Cricket requires good physical conditions such as speed. Plyometric and ladder drill training methods are training methods that can increase speed. This study aimed to examine the effect of plyometric and ladder drill training on the speed of cricket athletes in terms of leg power. This research uses a 2x2 factorial experimental method. The population of this study was 45 cricket athletes from the province of East Nusa Tenggara (NTT). The research sample consisted of 24 cricket athletes who were taken using a purposive sampling technique and then carried out ordinal pairing to divide the groups. The data collection technique uses pretest and posttest, the test instrument used to measure speed is a 30 m sprint and the agility instrument is the T-Test. The data analysis technique uses two-way ANOVA with a significance level of 0.05. The research results show that (1) there is a significant difference in influence between plyometric training and ladder drill training on the speed of female cricket athletes. The plyometric training group experienced an increase in speed of 4.67, better than ladder drill training, namely 4.86, with a posttest average difference of 0.19. (2) there is a significant difference in influence between cricket athletes who have high and low leg power on speed. Cricket athletes who have high leg power experience an increase in speed of 4.64, which is better than cricket athletes who have low leg power, namely 4.89 with a posttest average difference of 4.25. (3) There is no interaction between plyometric and ladder drill training and leg power on speed

KEYWORDS: Plyometrics, ladder drill, agility, cricket athletes

I. INTRODUCTION

Sport is a physical activity that is simple but has a big role in realizing human health [1]. Apart from health, sports can also make someone achieve. There are three scopes of sports, namely educational sports, community sports, and achievement sports. Achievement sports are a form of sport that is carried out systematically through stages to obtain achievements. Cricket is one of the sports achievements in the province of East Nusa Tenggara (NTT). This sport is played on an oval-shaped field by 2 teams, one team is the hitter and the other team is the guard. The team in charge of batting tries to hit the ball to score as many runs as possible by hitting the ball between the fielders and making a run or hitting the ball over the field boundary, while the team in charge of bowling and guard tries to limit the hitting team from scoring points or runs [2].

In the game of cricket, those responsible for batting, bowling, or fielding must be in good physical condition. Physical condition is an important factor in improving an athlete's performance. By having good physical condition, an athlete can optimize his abilities when playing in a match or competition. One of the important elements for achieving the desired sporting achievements, apart from mastery of technique, tactics, and mentality, is physicality [3]. Physical conditions like this are still an obstacle for NTT female cricket athletes, including agility. In cricket the ability to change direction quickly, run between the stumps, catch and chase the ball requires agility [4].

Agility is the ability to move and change direction and body position quickly, effectively, and while remaining under control [5]. Agility refers to the ability to move quickly and easily, both physically and mentally (Mandal et al., 2017). In the game of cricket, agility is very much needed for batters, bowlers, and fielders because by having good agility an athlete or cricket player can run quickly and remain under control to change positions when batting, make run-ups, and follow-up movements when bowling, and when fielding. Quickly and remain under control chasing and holding the ball hit by the batter.

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To improve the physical condition of NTT female cricket athletes, appropriate training methods are needed. Based on the results of previous research, plyometric and ladder drill training methods influence increasing agility. . [6] Effects of ladder and plyometric training on agility among cricket players concluded that the plyometric and ladder drill training groups influenced increasing agility. Plyometrics is a training method to increase speed, agility, and strength (Mardhika, 2016). Ladder drill training is a form of agility training. A ladder is a ladder-shaped training equipment that is very useful and useful in improving body control and agility as well as increasing foot speed [7]. Based on the problems above, this research aims to determine "The effect of plyometric and ladder drill training on the agility of female cricket athletes in terms of leg power.

II. METHODS

The method used in this research is a 2x2 factorial design experiment. The experimental method is a method used to prove a certain statement or hypothesis. The research design was A1B1, the high leg power group was given plyometric training; A2B1, the high leg power group was given ladder drill training; A1B2, the low leg power group was given plyometric training; A2B2, the low leg power group was given ladder drill training. The training program was carried out for 4 weeks outside The pretest and posttest took place at Gor Flobamora NTT with a training frequency of 4 times per week. The population in this study was 45 people. The sample is part of the number and characteristics of the population (Sugiyono, 2017: 81). The sampling in this study used purposive sampling according to predetermined criteria, thus obtaining 24 samples of NTT female cricket athletes. The 24 samples were divided into two groups using ordinal pairing, namely the plyometric and ladder drill groups with 12 members each. The plyometric training group did plyometric exercises and the ladder drill training group did ladder drill exercises.

Theoretically, variables can be defined as attributes of a person, or object, that have "variations" between one person and another or one object and another object (Sugiyono, 2017:81). The variables in this study consist of independent variables, namely plyometric and ladder drill, the dependent variable is agility and the moderator variable is power. Data collection techniques use an initial test or pretest, providing treatment and carrying out a final test or posttest. The instrument for measuring agility uses the T-Test. Data analysis in this study used two-way ANOVA with a significance level of 0.05. This technique begins by carrying out prerequisite tests, namely normality and homogeneity tests. Data is said to be normal when the significance value is greater than 0.05 or $P > 0.05$. When the data is said to be normal and homogeneous, a hypothesis test is carried out. Hypothesis testing in this study used a two-way ANOVA test using IBM SPSS version 26 software.

III. RESULTS

After the training program was implemented for one month and a frequency of 4 times per week regarding the effect of plyometric and ladder drill training on the agility of NTT female cricket athletes, the results of the pre-test and post-test speed were found which can be seen in the following table.

Table 1. Statistical description of pretest and posttest speed of female cricket athletes

Agility					
Group	N	Minimum	Maksimum	mean	Std. Deviation
<i>Pretest A1B1</i>	6	11,68	12,64	12,21	0,36
<i>Posttest A1B1</i>	6	11,47	12,05	11,78	0,24
<i>Pretest A2B1</i>	6	11,75	12,65	12,28	0,35
<i>Posttest A2B1</i>	6	11,32	11,75	11,53	0,14
<i>Pretest A1B2</i>	6	11,59	12,65	12,28	0,38
<i>Posttes A1B2</i>	6	11,50	12,30	11,98	0,28
<i>Pretest A2B2</i>	6	11,98	12,65	12,36	0,31
<i>Posttest A2B2</i>	6	11,50	12,10	11,75	0,23

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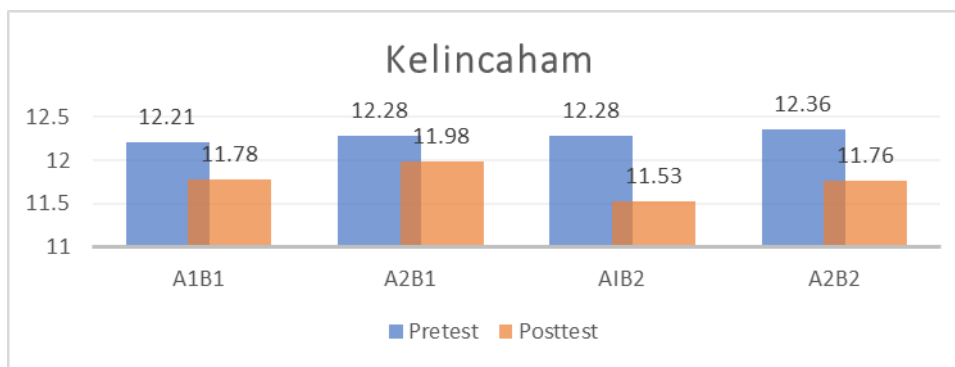


Table 2. Normality test for NTT female cricket athletes' agility

Agility			
Group	P	Significance	Information
Pretest A1B1	0,825		Normal
Posttest A1B1	0,281		Normal
Pretest A2B1	0,508		Normal
Posttest A2B1	0,880	0,05	Normal
Pretest A1B2	0,245		Normal
Posttes A1B2	0,572		Normal
Pretest A2B2	0,092		Normal
Posttest A2B2	0,705		Normal

Table 4. Homogeneity Test

Group	Levene Statistic	df1	dft2	Sig
Agility	0,800	7	40	0,592

Based on a statistical analysis of the homogeneity test, a significance value > 0.05 was obtained, thus the data group had homogeneous variance.

Table 5. ANOVA test results of differences in the influence of plyometric and ladder drill training on the agility of cricket athletes

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Training method	0,343	1	0,343	6,570	0,019

Based on the Anova test results in Table 5 above, it can be seen that the significant P value is 0.019 and the F value is 6.570. Because the significant P value is $0.019 < 0.05$, there is a significant difference in the influence between plyometric training and ladder drills on the agility of cricket athletes. Based on the results of the analysis, it was found that the ladder drill training group experienced an increase in agility of 11.64, which was better than plyometric training, namely 18.88, with a posttest average difference of 0.24.

Table 6. ANOVA test results of differences in the influence of cricket athletes who have high and low leg power on agility

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Training method	0,258	1	0,258	4,945	0,038

Based on the Anava test results in Table 6 above, it can be seen that the significant P value is 0.038 and the F value is 4.945. Because the significant P value is $0.038 < 0.05$, there is a significant difference in influence between cricket athletes who have high and low leg power on agility. According to the results of the analysis, it was found that cricket athletes who had high leg power

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experienced an increase in agility of 11.66, which was better than cricket athletes who had low leg power, namely 11.87, with a posttest average difference of 0.21.

Table 7. ANOVA results of the interaction between plyometric and ladder drill training and leg power on the agility of cricket athletes

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Training Method	0,001	1	0,001	0,010	0,923

Based on the Anova test results in Table 7 above, it can be seen that the significant P value is 0.923, and the F value is 0.010. Because the significant P value is $0.923 > 0.05$, there is no interaction between plyometric and ladder drill training and leg power on the agility of cricket athletes.

IV. DISCUSSION

There is a difference in the effect of plyometric and ladder drill training on the agility of cricket athletes.

Based on the results of the hypothesis test, it was found that there was a significant difference in influence between plyometric training and ladder drill training on the agility of cricket athletes. Plyometric training and ladder drills increase the speed of female cricket athletes. Supported by several previous researchers, (Rasyid et al., 2023) the combination of plyometric and ladder drill training has a significant impact on increasing speed, agility, and leg muscle power in badminton. According to the results of the analysis, the ladder drill training method experienced a better increase in agility compared to plyometric training. Prakash et al., (2021) "Effectiveness of Ladder Training Versus Plyometric Training Program on Agility in Kabaddi Players" concluded that ladder drill training is more effective than plyometric training. In this study, it was also found that plyometric training and ladder drill training had a significant influence on the agility of cricket athletes, but ladder drill training achieved a better increase in agility than plyometric training.

There are differences in the influence of cricket athletes who have high and low leg power on agility.

Based on the results of the hypothesis test, it was found that there was a significant difference in influence between cricket athletes who had high and low leg power on speed and agility. Cricket athletes who have high leg power experience a better increase in speed compared to cricket athletes who have low leg power and cricket athletes who have high leg power experience a better increase in agility compared to cricket athletes who have low leg power. (Karyono, 2016) said that the group that had high leg muscle power had higher results in increasing agility compared to the group that had low leg muscle power.

There is an interaction between plyometric and ladder drill training and leg power on the speed and agility of cricket athletes.

Based on the results of the hypothesis test, it was found that there was no interaction between plyometric and ladder drill training and leg power on the agility of cricket athletes. Thus, both high and low leg power in plyometric exercises and ladder drills are equally good to use to increase agility.

V. CONCLUSIONS

The conclusion of this research is

1. There is a significant difference in the influence between plyometric and ladder drill training on the agility of cricket athletes. Both training methods influence increasing agility, but the group training with the ladder drill method experienced a better increase in agility compared to the plyometric method
2. There is a significant difference in the influence between cricket athletes who have high and low leg power on agility. Cricket athletes who have high leg power experience a better increase in agility compared to cricket athletes who have low leg power.
3. There is no interaction between plyometric and ladder drill training and leg power on the agility of cricket athletes. Thus, both high and low leg power in plyometric exercises and ladder drills are equally good to use to increase agility..

REFERENCES

- 1) G. Decheline and Sukendro, "Buku Ajar Anatomi Olahraga," pp. 46–52, 2019.
- 2) A. K. Ramachandran, "Biomechanical and physical determinants of bowling speed in cricket: a novel approach to systematic review and meta-analysis of correlational data," *Sports Biomechanics*. 2021. doi: 10.1080/14763141.2020.1858152.

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- 3) A. Y. Musrifin and A. A. Bausad, "Analisis Unsur Kondisi Fisik Pemain Sepak Bola Mataram Soccer Akademi Ntb," *J. Ilm. Mandala Educ.*, vol. 6, no. 1, pp. 113–119, 2020, doi: 10.58258/jime.v6i1.1116.
- 4) S. Shrivastava, "Efficacy of Specific Physical Fitness Program on Agility of Male Cricketers," *Res. J. Recent Sci.*, vol. 4, pp. 105–107, 2015, [Online]. Available: www.isca.me
- 5) R. S. J. Paul, B. E. Cyrus, L. V P, and P. Jeevan Kumar, "Effects of core stability training on speed of running in male cricket players," *Int. J. Med. Exerc. Sci.*, vol. 04, no. 02, pp. 464–468, 2018, doi: 10.36678/ijmaes.2018.v04i02.002.
- 6) P. Mahesh, "EPRA International Journal of Research and Development (IJRD) EFFECTS OF LADDER AND PLYOMETRIC TRAINING ON AGILITY AMONG CRICKET PLAYERS," *EPRA Int. J. Res. Dev.*, vol. 7, no. 4, pp. 167–170, 2022, [Online]. Available: <https://doi.org/10.36713/epra2016>
- 7) K. T. B.S, "The Effect of 6 Weeks of Plyometric and Resistance Training on Agility, Speed and Explosive Power in Volley ball players," *Int. J. Res. Anal. Rev.*, vol. 6, no. 2, pp. 335–338, 2019, [Online]. Available: www.pelagiaresearchlibrary.com
- 8) Sugiyono, *Metode penelitian kombinasi*. Bandung: Alfabeta, 2017.
- 9) M. Labib Siena Ar Rasyid, O. Wiriawan, G. Siantoro, D. Ardy Kusuma, and A. Rusdiawan, "Combination of plyometric and ladder drill: Its impact on improving speed, agility, and leg muscle power in badminton," *J. Sport. J. Penelit. Pembelajaran*, vol. 9, no. 2, pp. 290–309, 2023, doi: 10.29407/js_unpgri.v9i2.20468.
- 10) K. V. S. Prakash, P. D. Sadvika, and C. A. Chakravarthi, "Effectiveness of Ladder Training Versus Plyometric Training Program on Agility in Kabaddi Players," *Int. J. Heal. Sci. Res.*, vol. 11, no. 11, pp. 320–334, 2021, doi: 10.52403/ijhsr.20211138



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