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Effect of training phased distance training method the archer's shooting ability

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Abstract

This study aims to evaluate the effect of gradual distance drill method training on the shooting ability of archery athletes at Dega Archery School. The research methods used were pre-experimental research methods with the design of a group pre-test and post-test design. The study sample consisted of 10 athletes selected based on a uniform ability level. Instrumental research using an archery accuracy test. Data analysis using paired t-test with SPSS version 23. The results showed a significant improvement in accuracy and consistency of shooting in the athletes who underwent the gradual distance drill method, indicating the method's effectiveness in improving shooting ability. This finding highlights the potential of the Gradual Distance Drill Method as a training strategy that can be used to enhance the performance of archery athletes. Conclusion The graded distance drill method can be used as a training strategy to improve the performance of archery athletes. Suggestions, further research could use larger sample sizes and tighter controls to provide an understanding of the effectiveness of the method in a broader context.

Keywords: *driil method; gradual distance; shooting; archery athlete*

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INTRODUCTION

Training is an integral part of developing an athlete's skills in a sport. In archery, shooting technique is a key factor in achieving consistency and accuracy (Mulya, 2020). As the sport of archery develops, new training methods are constantly being introduced to improve the athlete's skills (Tarigan et al., 2022). Archery is a sport that requires the mastery of various physical and technical aspects such as strength, coordination, endurance, flexibility, draw length and balance in order to develop an effective archery technique (Beyaz et al., 2023; Heo et al., 2023). S et al., (2023), all these factors must be supported by consistent training as well as excellent physical condition and durability. Precision in archery is the main key where consistency and stability of stable movements are required to achieve high accuracy in shooting (Gu et al., 2022; Heo et al., 2023). Research confirms (Wattimena, 2020) that archery is a target sport that uses a scoring system where each arrow that hits the target has a value. With a maximum of 10 points and a minimum of 5, accuracy in shooting becomes the key to scoring optimal points.

A variety of training methods have been used in the sport of archery, ranging from basic technique exercises to competition simulation exercises (Yachsie et al., 2021). The gradual distance training method is one of the techniques used to develop the ability to aim arrows

(Hudaya, 2024; Suwo et al., 2021). Several previous studies have shown the potential to improve the accuracy and consistency of shots (Shinohara et al., 2023; Yudho et al., 2022). Therefore, it is important to evaluate the effectiveness of this method in the context of archery practice. Further analysis of the relevant literature can provide a deeper insight into the principles underlying the use of the phased distance drill method and its effect on the development of shooting technique.

Theories supporting the use of the gradual distance drill method include the principle of repetitive learning and the concept of focused attention. A study by (Masitoh et al., 2021) showed that practice of the gradual distance drill significantly improved the shooting ability of basketball players in a game situation. Several previous studies have demonstrated the potential of the gradual distance drill method to improve shooting accuracy and consistency. Practice using the gradual distance drill method could improve shot accuracy in novice archers (Wang et al., 2022). Similarly, research by (Yudho et al., 2022) found that gradual increases in shooting distance can help improve shot consistency and accuracy in recurve archers.

In addition, research by (Priambudi & Mashud, 2023)shows that the use of the gradual distance drill method with young athletes can help improve their ability to achieve better accuracy in shooting. These studies have consistently shown that the graded distance drill method has significant potential to improve accuracy and shot consistency across a wide range of archer types and skill levels. In addition, a recent study by (Hazinah & Hazinah, 2017) found that the use of the graduated distance drill method in volley ball training resulted in significant improvements in players' passing and smash accuracy. These findings suggest that the Gradual Distance Drill method has the potential to improve the shooting performance of archery athletes.

Previous studies have investigated the potential of the gradual distance drill method to improve accuracy and consistency of shots in a variety of sports, including archery, but no studies have specifically evaluated the effectiveness of this method in the context of archery practice at Dega Archery School, which was not present in previous studies. The purpose of this study was to empirically evaluate the effect of training with the Gradual Distance Drill Method on the shooting ability of archery athletes at Dega Archery School. It is hoped that by understanding the effects of this training, it will provide better guidance in the development of training programmes to improve the performance of archery athletes, as well as increasing understanding of the importance of structured and focused training in achieving training goals.

METHOD

This study adopts a pre-experimental research method with a group pretest-posttest design to evaluate the effectiveness of the gradual distance drill method in improving the shooting ability of archery athletes (Darwin et al., 2021). Participants consisted of 10 archery athletes selected from Dega Archery School, taking into account a uniform level of ability. Measurements were made by archery accuracy tests before and after training with the method. The experimental procedures included selection of the athletes, baseline measurement of accuracy before training, performance of the training using the phased distance drill method, and re-measurement of accuracy after training. Exercise is done as many as 12 sessions with 3 sessions each week is called the maximum load because of the intensity of 100%.

Treatment in this case the first distance to be performed is a distance of 10 metres. In the next session the distance was increased to 20 metres and then 30 metres. If the study has been carried out at a distance of 30 metres, then the distance of the shot is returned to a distance of 10 metres and so on, in order to repeat the technique and consistency of athletes in archery. The next step after 12 sessions of gradual distance training is a final test called the post-test. The post-test is done in the same way as the pre-test of archery, using 3 arrows with 6 rambahan to obtain the final result of the scoring process, which is then calculated with this research tool. Data analysis was done using paired t-test with SPSS version 23 to assess the significance of improved shooting ability.

RESULTS

The data obtained from the results of this study are pre-test and post-test data at a distance of 30 metres. After being given treatment to athletes with drill training, namely archery at a distance of 10 metres at the first meeting, then meeting the two archery athletes at a distance of 20 metres, meeting the three archery athletes at a distance of 30 metres, then at the fourth meeting applied fixed distance training, so that archery athletes at a distance of 30 metres. Up to the 12th meeting of the applied training pattern is as above, so that the results of the study are obtained drill distance increments:

Table 1. Data Pre-Test and Post-Test Drills Phased Distance Drill Method

Sample	Pree-test	Post-test	Difference
Sample 1	93	158	65
Sample 2	115	163	48
Sample 3	104	154	50
Sample 4	98	153	55
Sample 5	95	137	42
Sample 6	98	138	40
Sample 7	90	147	57

Sample	Pree-test	Post-test	Difference
Sample 8	96	139	43
Sample 9	94	144	50
Sample 10	91	143	52
Minimum	90	137	40
Maximum	115	163	65
Mean	97.4	1.476	50.2
Std. Dev	7.366	8.996	7.598

Table 1 shows the pre-test and post-test data for the Phased Distance Drill method, which includes the results for ten samples. These data give an idea of the effectiveness of the treatment on the archer's ability. The lowest score recorded in the pre-test was 90 and the lowest in the post-test was 137, a difference of 40. Meanwhile, the highest pre-test score was 115 and the highest post-test score was 163, with a difference of 65. The average pre-test score was 97.4, which increased to 147.6 in the post-test, indicating a significant improvement in training results. The mean difference between post-test and pre-test was 50.2, indicating a consistent improvement in athlete performance after treatment. The standard deviation analysis also showed the degree of variation in the improvement in athlete performance, with a standard deviation of 7.366 on the pre-test, 8.996 on the post-test and a difference of 7.598. From this table it can be concluded that the treatment with the gradual distance drill method has a significant positive effect on the shooting ability of archery athletes, which is reflected in the consistent improvement of training results.

Table 2. Result Paired Samples Test Pretest dan Posttest

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
			Lower	Upper			
-5.020	7.598	2.402	-55.635	-44.764	-20.892	9	0.000

Table 2 shows the results of the paired samples test between pre-test and post-test. The mean difference between pretest and post-test is -50.2, with a standard deviation of 7.59825. The mean standard error is 2.40278. The 95% confidence interval for the difference ranges from -55.63546 to -44.76454. The recorded value of t is -20.892 with 9 degrees of freedom. The results of the statistical tests showed significance (Sig.) at a significance level of 0.000 ($p < 0.001$), indicating that there is a significant difference between the pretest and the post-test. It can therefore be concluded that the treatment given to the athletes has a significant effect on the results of their training.

Table 3. Frequency Distribution of Experimental Class Values

Interval	Fi	Xi	FiXi	Xi^2	$FiXi^2$
82 – 91	8	86,5	692	7.482,25	478.864
92 – 101	13	96,5	1.254,5	9.312,25	1.573.770,25
102 – 111	8	106,5	852	11.342,25	725.904
112 – 121	17	116,5	1.980,5	13.572,25	3.922.380,25
122 – 131	21	126,5	2.656,5	16.002,25	7.056.992,25
132 – 141	30	136,5	4095	18.632,25	16. 769.025
142 – 151	25	146,5	3.662,5	21.462,25	13.413.906,25
152 – 161	14	156,5	2.191	24.492,25	4.800.481
162 – 171	4	166,5	666	27.722,25	443.556
Total	140	1.138,5	18.050	150.020,25	49.184.879

Table 3 shows the frequency distribution of experimental class values in each interval, which gives an idea of the distribution of values in the data set. Each interval has a different number of frequencies, reflecting the distribution of data in a particular range. The sum of all values in the table provides an important statistical summary of the overall distribution. Based on the frequency distribution data obtained, the results of the highest frequency class in the 132-141 interval represent up to 30 treatments for each athlete, while the lowest frequency class value with an interval of 162-171 represents up to 4 treatments.

DISCUSSION

The incremental distance exercise method is a variation of the fixed target distance exercise (Hudaya, 2024; Latue et al., 2020). The execution of the exercise emphasises more on the variation of several target distances in the exercise. The stage is given with 3 distances, namely 10 metres, 20 metres and 30 metres with a frequency of exercise in a week as much as 4 times treatment and a total of 14 sessions including pre-test at the beginning and post-test results of research to determine the minimum score and final results of athletes. After the treatment of the drill method on athletes, it is found that there are influences that arise, one of which is the increase in the results of athletes training (Aliriad et al., 2024; Hendker & Eils, 2021). The increase in score also led to an increase in the athlete's confidence in archery to produce a consistent technique (Alfindo & Sasmarianto, 2023).

Based on the results of the research conducted at Dega Archery School, an increase in athlete training scores was obtained during the pre-test and post-test. Pre-test values taken found the average athlete score is below 100, there are only 2 athletes whose score is above 100 with the total mean obtained from all athletes is 97.4. Whilst the post-test results after the athletes were given treatment obtained an average mean of 147.6 with a range of athlete score results from 137-163. With an average difference from the total athletes obtained up to 50.2 even from one of the athletes found a difference in score increase to 65 points. The analysis of

the hypothesis calculation with AVANA produces F_{count} = 16.272 F_{tabel} = 0.022, Fhitung Ftabel then Ho rejected, which means that there is a difference in the results of the athlete's score during the pre-test and post-test. It can be concluded that the treatment given to the athlete has an influence on the results of the athlete's training.

The results showed that the gradual distance training method is very effective in improving the shooting skills of archery athletes. By providing variety in training and setting a target distance that is not fixed, athletes can experience a significant improvement in training results as well as increased confidence in themselves. In addition, this study confirms that consistency in archery technique and increased self-confidence are important factors in improving athlete performance. The gradual distance training method helps to develop consistency in technique and can increase confidence to optimise training results (Arisman & Okilanda, 2020; Muslimin et al., 2022). However, research has also highlighted the importance of addressing inhibiting factors, both external and internal, to improve athlete performance. Changes in weather and wind direction can affect an athlete's training results, so strategies for dealing with these factors should be incorporated into the training programme (Satria, Ramadhan, et al., 2023; Satria, Septiano, et al., 2023; Suwo et al., 2021).

The importance of environmental adaptation gives an idea of how athletes and coaches can develop adaptation strategies in the sport of archery, especially outdoors (Pratama et al., 2023; Sari et al., 2022; Yachsie & Suhasto, 2021). Athletes and coaches need to consider how to deal with environmental challenges that may arise during training and competition, such as changes in weather and wind direction that may affect training results. The important role of the coach in developing training methods was then highlighted. The coach must have an understanding of the different training methods and be able to adapt the training programme to the individual needs and characteristics of the athlete. The coach plays a key role in ensuring that the training programme is effective and relevant to the athlete's condition.

CONCLUSION

Based on the analysis of the data, it can be concluded that the use of a gradual distance training method has a significant impact on improving the performance of archery athletes. The pre-test and post-test results showed a consistent improvement in the athlete's performance after using this training method. In addition, the results of statistical tests showed that the difference between the pre-test and post-test was statistically significant, confirming the effectiveness of the gradual distance drill method treatment. The suggestion for future research is to include a larger sample and to more closely control external variables that may affect the

results, such as weather factors. In addition, further research is needed to explore in more detail the mechanisms or factors that affect the effectiveness of the graduated distance drilling method. Thus, future research may provide a more comprehensive understanding of the effectiveness and implications of the use of graduated distance training methods in the development of archery athletes' skills.

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