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by Mugiyo Hartono

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Massed and Distributed Practice: What is the Best Method to Improve Young Dribbling Skills of Football Players?

Mugiyo Hartono^{1*}, Andry Akhiruyanto¹, Dewangga Yudhistira¹, Sulistiyono²

¹Faculty of Sport Sciences, Universitas Negeri Semarang, Indonesia

²Faculty of Sport Science and Health, Universitas Negeri Yogyakarta, Indonesia

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Abstract Dribbling techniques must be mastered perfectly because every movement is needed. Developing dribbling techniques is done using massed and distributed practice methods. However, there are inconsistencies between these two training methods. The purpose of the study is to examine the effect of (1) massed and distributed methods on dribbling skills, (2) soccer players who have high and low coordination on dribbling skills, (3) the interaction of both methods and high and low coordination on dribbling skills. This research used 2x2 factorial experimental method. Participants are male soccer players aged 13-15 years; data collection techniques: document analysis in the form of relevant articles and tests; instrument: soccer wall volley test and dribbling instrument. Two-way Anova test was used to analyse the data with the help of SPSS 23. The results of the study (1) there is no difference in the effect between massed and distributed practice on dribbling skills $0.769 > 0.05$; (2) there is a difference in influence between players who have low and high coordination on dribbling skills $0.000 < 0.05$; (3) there is no interaction between massed and distributed methods and low and high coordination on dribbling skills $0.494 > 0.05$. In conclusion, although the posttest results of the massed group are better, both training methods are equally good for improving dribbling skills. Soccer players who have low coordination need special training in coordination, and flexibility along with basic technique training. In addition,

it provides information that there is no interaction between the two methods and high and low coordination in dribbling skills, but further proof is needed to be a supporting fact.

Keywords Massed and Distributed, Eye-Foot Coordination, Young Football Players

1. Introduction

Football is a team sport played by two teams of 11 players each, who compete against one another to score a goal [1]. Several facets of football must be studied [2]. The most essential aspect of football, however, is how individual players and teams have adequate basic technical skills [3]. Football's fundamental techniques include passing, receiving, heading, shooting, and dribbling. Dribbling the ball is one of the most significant techniques in football [3], [4].

We must recognise that all moves in football need the ability to dribble properly [3]. When approaching the opponent's goal, the player must run while dribbling the ball; similarly, when securing the ball from the opponent's pursuit, the player must run while dribbling to keep the ball away from his area [3]. As a result, all essential football techniques, including the skill to dribble, must be properly

practised [4].

Furthermore, football players must learn the fundamental techniques of the game at an early age [5]. The basic techniques must be adequately integrated from phase one to the next, according to long-term athlete development theory [6]. According to other studies, the application of coaching athletes at a young age should not only concentrate on how to win matches but also on developing good technical skills and abilities along with other aspects so that achievements will be obtained by the specified phase, namely champions at the senior stage [7].

The theory is more than just intellectual knowledge; it must be put into practice. Thus, scientific endeavours must be adequately planned and implemented in practice. This has a direct relationship to a trainer's capacity to employ and create effective variations of approaches for skill improvement [8]. According to earlier research, selecting a particular training approach requires taking the application of the training content into account [9].

The massed practice and distributed practice methods are two training approaches that can be applied. The mass practice method is a technique training method that is performed in a row with no or little rest [10]. Meanwhile, the distributed practice training method is a technique training method that includes a rest period before repeating the technique [10]. Both of these strategies are thought to be capable of improving football technical skills such as shooting, dribbling, heading, passing, and receiving [11], [12].

Therefore, these two training methods can be one of the alternatives to develop techniques in soccer [13]. However, we need to understand that the ability of basic dribbling techniques can be influenced by several factors, one of which is ankle coordination [14], [15], so that the application of both massed practice and distributed practice training methods also needs to understand the ankle coordination aspects of each individual soccer player in order to provide optimal results.

Numerous studies have been done on the application of mass practice and distributed practice in the use of basic football technical skills. Examples include the disparities between the effects of massed and distributed training on dribbling skill improvement [11], the effects of training methods and coordination on football skills [16], the analysis of dribbling skills using massed and distributed practise methods on football players [12], the interaction between training methods and ankle coordination of football players [17], and the effect of training methods and coordination on dribbling skills in student football players [18].

However, the study conducted by Kuncoro et al research had multiple shortcomings, including the absence of a gap in the introduction [21] which made the research objectives unclear, the age of the participants was not explained, the inclusion and exclusion criteria were not explained, the presentation of results and discussion was still biased, and conclusions could not be generalised well [11]. In the study

of Muhajirin et al, it was found that the issues were only based on observational studies, which claimed that players frequently lose the ball when dribbling, it is challenging to outrun opponents, and eye and foot coordination is still lacking [12]. The connection between the two massed and distributed approaches and dribbling skills is not shown in Pradana's study [16]. Additionally, mass and distributed training programmes are not described [11], [12], [16]–[18]. Then, research from Kuncoro [11]] asserts that the massed method is superior, while research from Muhajirin [12] contends that the distributed method is superior for enhancing dribbling skills, while research from Ahmad [18] contends that the massed method is superior for improving dribbling skills. Then research from Aghdasi et al compared massed and distributed methods of motor development with the result that massed methods are better than distributed methods to improve motor development [4,9]. Furthermore, Kamal's research in table tennis found that the distributed method is better than the massed method for smash skills [10].

According to the document's analysis, there are still gaps in the presentation of problems, the application and presentation of training programmes, the presentation of results and discussion, and there are still discrepancies from earlier studies. By completing an in-depth analysis of these aspects associated with assessing massed and distributed methods of training in terms of ankle coordination in young football players, the authors' research helps to close a gap in earlier studies. As a result, it is expected that this research will make a positive contribution to the understanding and application of training methods to young football players.

2. Materials and Methods

This research is a 2x2 factorial experiment that has two independent variables that are given training, one controlled attribute variable and one dependent variable. The dependent variable is dribbling skills, the controlled independent variable is high and low ankle coordination, and the variables given manipulation are the massed method and the distributed method. The study was divided into 24 meetings with an exercise frequency of 3 times a week. Participants are 13 to 15-year-old footballers. Football players who agreed to participate in the exercises for 24 sessions, were in good health, were prepared to take the exercises seriously and with discipline, were found to have adequate eye-foot coordination, had played football for at least a year, and met other exclusion criteria were all included in this study. As many as 40 participants were attained as a result of these criteria being established. An ankle coordination test was then conducted to determine which players would receive the massed method and which players would receive the distributed method. The results showed that the 10 players with high ankle coordination would receive

the massed method, while the 10 players with low ankle coordination would receive the distributed method. The instruments for testing eye-foot coordination were the football wall volleyball test [20] and the ball-dribbling instrument [21]. The two-way ANOVA test was used to analyse the data, and the level of significance level was chosen at 0.05 using the SPSS version 23 application. A 2x2 factorial design is shown below to help with comprehension of this research:

Table 1. The 2x2 factorial experimental design

Massed and distributed training methods (A)	Attribute variable		Eye and foot coordination (B)	
	Manipulative Variables		High (B1)	Low (B2)
		Massed method (A1)	A1B1	A1B2
	Distributed method (A2)	A2B1	A2B2	

2.1. Testing Procedure

The massed training method was utilised by participants in groups A1B1 and A1B2, whereas the distributed method was used by participants in groups A2B1 and A2B2. The full method of this exercise was carried out 24 times and three times every week. Before football players performed the core training material, coaches and assistants offered them instructions to ensure the exercises executed smoothly. They were then instructed to warm up by jogging for 3-5 minutes to raise their body temperature, stretching static and dynamically, and performing core exercises utilising the massed and distributed approaches. This stage ends with trainers and assistants providing cooling-down instructions, including static stretching and PNF. To be more specific, the training programme is shown in Table 2 below:

Table 2. Massed and distributed practice training programs for football players

Massed Practice Training Program			
Week	Meeting	Material	Exercise Dosage
1-2	1-6	Core training: dribbling the ball using the massed practice method	Exercise duration: 9 minutes Set: 2 - adjustable Interval: 10-20 seconds-adjustable Recovery: 2-3 minutes
3-4	7-12	Core training: dribbling the ball using the massed practice method	Exercise duration: 5-6 minutes Set: 2-3, adjustable Interval: no rest Recovery: 2-3 minutes
5-6	13-18	Core training: dribbling the ball using the massed practice method	Exercise duration: 7-8 minutes Set: 2, adjustable Interval: : no rest Recovery: 2-3 minutes
7-8	19-24	Core training: dribbling the ball using the massed practice method	Exercise duration: 9 minutes Set: 2, adjustable Interval: no rest Recovery: 2-3 minutes
Distributed Practice Training Program			
1-2	1-6	Core training: dribbling the ball using distributed practice	Exercise duration: 3-4 minutes Set: 2-3 adjustable Interval: 10-20 seconds, adjustable Recovery: 2-3 minutes
3-4	7-12	Core training: dribbling the ball using distributed practice	Exercise duration: 5-6 minutes Set: 2-3 adjustable Interval: 10-20 minutes, adjustable Recovery: 2-3 minutes
5-6	13-18	Core training: dribbling the ball using distributed practice	Exercise duration: 7-8 minutes Set: 2, adjustable Interval: 10-20 minutes, adjustable Recovery: 2-3 minutes
7-8	19-24	Core training: dribbling the ball using distributed practice	Exercise duration: 9 minutes Set: 2, adjustable Interval: 10-20 minutes, adjustable Recovery: 2-3 minutes

3. Results

The following results of the descriptive data, normality test, homogeneity test, and hypothesis testing are presented in this section:

Table 3. Results of the posttest on dribbling skills using the massed and distributed methods

Training Method	High and low hand-eye coordination	Mean	Std.Dev	N
Massed Practice	High (A1B1)	57.50	9.501	10
	Low (A1B2)	33.50	6.687	10
	Total	45.50	14.681	20
Distributed Practice	High (A2B1)	56.50	7.091	10
	Low (A2B2)	36.00	8.433	10
	Total	46.25	12.965	20

Based on the results, it is clear that the skill to dribble the ball in group A1B1 is 57.50, whereas it is 33.50 in group A1B2. This result implies that the A1B1 group has improved more than the A1B2 group. Furthermore, the skill to dribble the ball in group A2B1 has a mean value of 56.50, and group A2B2 received a mean value of 36.00, indicating that group A2B1 improved more than group A2B2. As seen in the diagram, the result is as follows:

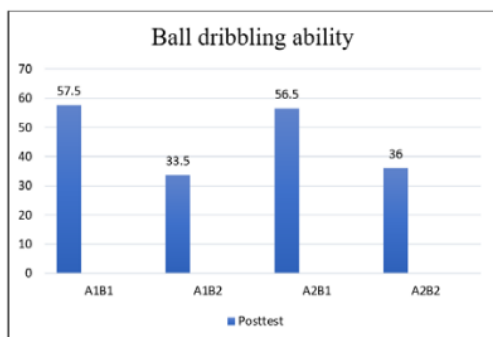


Figure 1. The results of dribbling the ball

Table 4. Summary of the normality test results

Standardized Residual for the results of the dribble skills	Shapiro-Wilk		
	Statistic	df	Sig.
	0.960	40	0.173

The normality test findings from the prerequisites test yield a significance value of $0.173 > 0.05$. As a result, it is concluded that the variance of dribble skills is normally distributed, and so the assumptions of the two-way ANOVA test are met.

Table 5. Summary of homogeneity test results

F	Df1	Df2	Sig.
0.348	3	36	0.791

The normality test findings from the prerequisites test yield a significance value of $0.791 > 0.05$. As a result, it is concluded that the variance of dribble skills is normally distributed, and so the assumptions of the two-way ANOVA test are met.

Table 6. Hypothesis testing results of "There is a difference in the effect of the massed and distributed practice methods on dribbling skills"

Source	Type III Sum Of Square	Df	Mean Square	F	Sig
Exercise Models	5.625	1	5.625	0.088	0.769

Based on the table above, the significance value obtained is $0.769 > 0.05$. These results lead to the conclusion that "there is no difference in the effect of the massed practice method and the distributed practice method on dribbling skills". Thus, the hypothesis is rejected.

Table 7. Hypothesis testing result of "There is a difference in the effect of ball players who have low and high coordination on dribbling skills"

Source	Type III Sum Of Square	Df	Mean Square	F	Sig
Dribbling skills	4950.625	1	4950.625	77.236	0.000

Based on the table above, the significance value obtained is $0.000 < 0.05$. These results lead to the conclusion that "there is a difference in the influence of ball players who have low and high coordination on dribbling skills". Thus, the hypothesis is accepted.

Table 8. Hypothesis testing results of "There is an interaction effect between training methods (Massed and distributed) and ankle coordination (high and low) on dribbling skills"

Source	Type III Sum Of Square	Df	Mean Square	F	Sig
Exercise models * Dribbling skills	30.625	1	30.625	0.478	0.494

Based on the table above, the significance value obtained is $0.494 > 0.05$. These results lead to the conclusion that "there is no interaction between massed and distributed practice methods and low and high ankle coordination on dribbling skills". Thus, the hypothesis is rejected.

13 4. Discussion

The objective of this study was to compare the effects of massed and distributed practice methods on dribbling skills in terms of high and low hand-eye coordination in younger football players. Based on the research findings, the results of the first hypothesis test, namely "there is a difference in the effect of massed and distributed practice methods on skills," were discovered, yielding a significance value of $0.769 > 0.05$. When the significance value is more than 0.05, there is no significant difference. Thus, there is no difference in the effect of the massed practice method against the distributed practice method on dribbling skills. In other words, the first hypothesis is rejected.

The second hypothesis, "there is a difference in the effect of football players who have low and high coordination on dribbling skills", obtained a significance value of $0.000 < 0.05$. A significance value of less than 0.05 indicates a significant difference. The results obtained show that there is a difference in the influence of ball players who have low and high coordination on dribbling skills. Thus, the second hypothesis is accepted.

Test the third hypothesis, "there is an interaction effect between training methods (Massed and distributed) and ankle coordination (high and low) on dribbling skills", obtained a significance value of $0.494 > 0.05$. A significance value of more than 0.05 indicates no significant difference. Therefore, there is no difference in the interaction effect between training methods (Massed and distributed) and ankle coordination (high and low) on dribbling skills.

The dribbling technique is a basic skill that all football players must master [22]. Football players with above-average dribbling skills are highly skilled at playing the ball, such that the purpose of football is to run to the opponent's goal and score goals [23], [24]. According to studies, dribbling is a tactic used to defend the ball while moving into an opponent's territory or free space so that players can successfully kick the ball into the goal [25].

As a result, a staged method based on scientific and technical training challenges is required, such as developing basic techniques, advanced techniques, and game techniques [26]. According to studies, the training method encompasses all techniques or methods used for providing the learning material required during practice [27]. Because there were still gaps in prior studies due to the absence of programme presentation, and there were still discrepancies in previous studies, the authors were motivated to apply the mass practice and distributed practice methods to develop dribbling skills.

Massed practice is a type of practice when the exercise duration exceeds the rest time so that players can become exhausted while using a technique [28]. According to another study, massed practice is an exercise method that is performed constantly without rests and may affect cardiovascular capacity [29] due to the intense stimulation

of the aerobic system. However, regular, repetitive movements will enhance the nerve system's functionality and result in better ball-dribbling patterns [29]. Distributed practice is a training strategy that includes rest periods in between practice sessions [28]. Essentially, this method of training is alternated with rest in between trials to allow players to develop their movement patterns while taking rests [29].

The results of the analysis on the first hypothesis test showed that there was no difference in the effect of the massed practice and distributed practice methods on dribbling skills. It means that both of these methods can help football players improve their dribbling skills. Both methods have strengths and weaknesses. The strength of massed practice is that players can repeat as many motions as possible, allowing them to master their dribbling skills more quickly. This is because this method is used continuously, allowing players to swiftly enhance their movement patterns and improve their feeling of sensitivity to the ball, with a positive impact on aerobic endurance [18]. On the other hand, the weakness of massed practice is that the mastery of the technique of dribbling the ball is not perfect because there are no rest breaks, control and improvement of movements which can cause difficulties and excessive fatigue for players [18].

Furthermore, the distributed practice method's shortcoming is that it makes the coach more specialised in training programmes based on the dominant energy system for a given sport and is carried out at a physiological tension level that optimises the proper performance of technical training. If there is an issue in applying the technique, it can be identified from the beginning so that it may be resolved and the players do not become overly tired. Technical training connected to synchronisation and sensitivity with the ball can be optimised through these efforts. Furthermore, players can receive enough rest to improve their technical performance [18]. However, players can become bored if they take frequent rests. It is possible for players to undertake fewer repetitions of dribbling techniques.

The authors' findings are supported by a relevant study conducted by Fuentes et al on the accuracy of forehand strokes in tennis using massed and distributed practice methods. According to their findings, there was no significant difference between the two methods of training when it came to developing forehand accuracy techniques [30]. The lack of significant differences between the two methods can be influenced by several factors, such as the participants' relatively young age, which requires longer understanding and intervention because the basic components of the technique must be well mastered up to senior age in this phase. Young players' lack of familiarity with both methods is one of the other factors [30]. Another point of view is that at that age, the motor and cognitive abilities of athletes have not been optimally matured. Because of these factors, the use of both

methods was found to have no significant difference, implying that both are equally effective at increasing basic technical abilities, particularly when given a longer intervention [31]. One of the factors in the efficiency of the two methods that did not demonstrate a significant difference was the material delivered and the level of concentration [32]. Setting the training dose in one session and micro can also make the effect of the two methods have no difference [30].

The findings of the second hypothesis test analysis revealed a substantial difference in the influence of football players with low and high coordination on dribbling skills. This means that massed and distributed groups with high coordination outperform groupings with low coordination. Coordination is the synchronisation of one movement to the next, so football players with high coordination have a better chance of obtaining good basic technical skills [20], [33]. Coordination corresponds with speed and flexibility, therefore movements in multi-directional sports require excellent coordination [34]. Furthermore, coordination is required to combine various movements to carry out simple to complicated movements in a harmonious way.

The findings of the authors are supported by relevant studies from Moningka et al. Their study examined the correlation between agility, speed, and coordination with the ability to dribble. The findings revealed a significant correlation between eye and foot coordination and dribbling skills [35]. Ankle coordination in young football players is required because good coordination increases the efficiency of dribbling skills [36]. According to other research, technical skills such as kicking, heading, throwing, and dribbling are influenced by a variety of factors including flexibility, speed, strength, power, balance, concentration, and coordination. As a result, some of these factors serve as the foundation for effectively developing basic football techniques. Physical factors play a significant role in this case [37]. Therefore, young football players are advised to use the massed and distributed practice method, particularly those with poor high and low coordination. This is because, at such a young age, a variety of methods are required to enhance and offer comprehension of them. Coordination efforts begin with a particular flexibility training programme that is always integrated, ABC running exercises, and optimising basic technique exercises [22], [38].

The results of the analysis on the third hypothesis test found no interaction between the two methods and high and low ankle coordination on dribbling skills. Relevant studies from Hartanto et al found no interaction between the two methods of massed and distributed training with ankle coordination on kick ability in football [39]. Reinforced by other research that the massed and distributed methods have no interaction with the presence of high and low coordination groupings [40].

8 5. Conclusions

Based on the findings and discussions, the authors can conclude that (1) there is no significant difference between the massed and distributed practice method in the dribbling ability of young football players; (2) there is a significant difference between the massed and distributed practice methods and high and low ankle coordination on the ability to dribble the ball in young football players which indicates that football players who have high coordination can perform the technique of dribbling well; (3) there is no difference between massed and distributed practice methods and high-low hand-eye coordination on the ability to dribble in young football players. Regarding both methods, these findings are expected to be valuable for practitioners, coaches, and athletes. Even though the posttest findings showed that the massed practise group performed better than the distributed training group, the two methods may still be used to practise dribbling skills. Football players with low eye-foot coordination, on the other hand, require movement enrichment and particular exercises to enhance coordination and flexibility. Basic technical exercises are also suggested for players. This study also adds to academics having the latest information on the discovery of the latest facts that there is no interaction between the two methods and low and high ankle coordination on dribbling abilities. Despite its numerous benefits and contributions, this research has some limitations. Because this study only used one club as a sample and there is no stringent control, further data is needed to establish the absence of interaction between the two methods of training as well as high and low ankle coordination of dribbling skills.

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