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The Effect of Battle Rope Training on the Long Throw Ability of Football Athlete

Ghildan Magrisha Siddik[1], Muhamad Tafaqur[2]✉, Yudi Nurcahya[3]

Indonesian University of Education, Bandung, West Java, Indonesia[123]

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Abstract

This study aims to determine the effect of battle ropes training on the long throw-in ability of football athletes. The study used an experimental method with a one-group pretest-posttest design involving 12 male football athletes from Jasukars FC. The training program was carried out for 16 meetings over four weeks with variations of Power Slams, Double Waves, Jumping Slams, Plank Battle Ropes, and Squat to Waves exercises. Data were collected using the Throw-in Distance Measurement instrument and analyzed through the Shapiro-Wilk normality test and the Paired Sample t-test. The results showed a significant increase in long throw-in ability after being given battle ropes training. This increase was caused by the development of upper body strength, explosive power, and core muscle stability produced through dynamic and isometric contractions during the exercise. These findings reinforce that battle ropes training is able to provide specific motor transfer to throw-in mechanics, thereby increasing throwing efficiency and distance. Thus, battle ropes training is recommended as an effective alternative in developing functional strength and throw-in ability for football athletes.

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✉ Correspondence address :
E-mail: muhamad.tafaqur@upi.edu

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INTRODUCTION

Sport is a physical activity that plays an important role in improving human abilities, motor skills and physical fitness (Wake, 2016). Regular sports activities can have a positive impact on a person's physical and psychological development (Khairuddin, 2017). In addition, sport also functions as a means to develop physical, spiritual, and social potential, so that it becomes an integral part of human life needs (Destriana, 2018). In this context, football is one of the most popular and sought-after sports across all levels of society, including children, teenagers, and adults.

Football is not just a competitive sport; it also holds significant social, economic, and cultural significance. International tournaments such as the FIFA World Cup and the UEFA Champions League are clear evidence of how football can significantly contribute to the global economy, particularly in the tourism, media, and sports industries (BBC Sport, 2022). According to(FIFA, 2020), more than 250 million active players spread across more than 200 countries, making football the sport with the largest participation in the world.

Historically, the modern game of football developed in England in the 19th century, precisely in 1863, when The Football Association (FA) formed official rules that differentiated football from rugby (FIFA, 2020; Goldblatt, 2006). In Indonesia, football has become an integral part of social life. Enthusiasm for both the national league and international matches demonstrates the sport's strong fan base. The government and the national football federation are also continuously striving to improve the quality of player development, professionalism, and sports facilities and infrastructure.

In modern football, mastery of basic techniques is crucial to a team's success. Basic techniques that players must master include passing, shooting, dribbling, heading, and throw-in (Afrianova, 2012). One technique that is often considered simple but plays a crucial role in creating opportunities is the throw-in. A throw-in serves to restart play after the ball has gone out of bounds and can be an effective offensive strategy if executed with power and accuracy (Andi, 2012; Sukirno, 2014). In practice, the long throw-in technique can even produce goal-scoring opportunities, as demonstrated by Indonesian national team player Pratama Arhan in an international match against Timor Leste.

Successful long throw-ins are heavily influenced by the strength and explosive power of the arm, shoulder, and core muscles (core stability). The combination of muscle strength and proper throwing technique will determine the distance and direction of the throw (de Baranda et al., 2020; Lees & Nolan, 1998). Therefore, physical exercises that can increase upper body muscle strength are important in supporting a football player's throw-in ability.

One effective form of exercise for increasing upper body muscle strength is battle ropes. This exercise involves dynamic, isometric movements using heavy ropes to simultaneously activate the shoulder, arm, chest, and core muscles (Bergeron, 2015). Several studies have shown that battle ropes training can improve shoulder muscle strength, core muscle endurance, and upper body stability (Martinez & Perez, 2021; Ratamess et al., 2015). This ability has direct relevance to improving long throw-in performance in football.

Professional teams such as Liverpool and Brentford in the Premier League have implemented a long throw-in strategy as part of their attacking pattern, relying on long-range throwing specialists to create goal-scoring opportunities (Lund & van der Kamp, 2021). This demonstrates that the throw-in is not simply a transitional movement, but can be a tactical weapon that determines the outcome of a match. Therefore, the right training approach is required to develop this skill.

This research introduces the use of battle rope training as a specific method to improve the long throw-in ability in football. The novelty lies in combining functional upper-body training with the biomechanical movement pattern of a throw-in, providing a new approach that directly enhances strength, power, and coordination related to football performance.

Based on the description above, this study was conducted to examine the effect of battle ropes training on the long throw-in ability of football athletes. The results are expected to contribute scientifically to the development of upper body strength training methods relevant to the performance requirements of modern football.

METHODS

This study uses an experimental method with a one-group pretest-posttest design (Sugiyono, 2016). This design involved one group being given a battle ropes training treatment to see its effect on the long throw-in ability of football athletes.

The research subjects were 12 male athletes from Jasukars FC who played as fullbacks, win-

gers, and midfielders, selected using purposive sampling techniques (Hardani et al., 2020). The research was conducted on the Jasukars FC field for four weeks with a frequency of four training sessions per week, a total of 16 sessions. This number refers to the opinion of the participants (Sugiardo, 1991) that 16 workouts are enough to produce permanent physical changes.

The instrument used is a long throw-in test using Throw-in Distance Measurement to measure the distance of the ball throw in meters (Alexander & Theodorakis, 2012). This instrument has a validity of 0.78 and a reliability of 0.73 (Arsil, 2010; Widodo, 2014).

The research procedure consisted of baseline measurements, treatment, and final measurements. Battle ropes training was conducted in three phases: strength (4–6 sets of 10–20 seconds, 90 seconds rest), hypertrophy (3–5 sets of 30–45 seconds, 60 seconds rest), and endurance (3–5 sets of 45–60 seconds, 30 seconds rest). Exercise variations included Power Slams, Double Waves, Jumping Slams, Plank Battle Ropes, and Squat to Waves, which focused on strengthening the arm, shoulder, and core muscles (Bompa, 1999; Ratamess et al., 2015; Syafii et al., 2024). Each session begins with a warm-up and ends with a 10-minute cool-down.

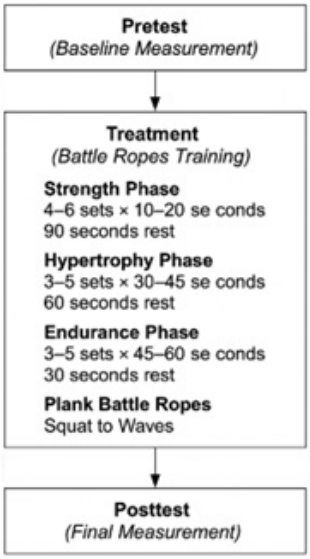

Figure 1. Research Procedure of Battle Ropes Training

Data were obtained from the results of long throw-in tests before and after training. Data analysis was performed using SPSS 25 (Fadluloh et al., 2024). Through the Shapiro-Wilk normality test, homogeneity test, and paired sample t-test. Differences are considered significant if the p-value is <0.05 (Sugiyono, 2016).

RESULTS AND DISCUSSION

Table 1. Descriptive Test

	N	Min	Max	Mean	Standard Deviation
Pretest	12	6.72	15.10	9.4908	2.46301
Post Test	12	18.26	27.54	22.9500	2.88175
Valid N (listwise)	12				

Based on **Table 1**, the results of the descriptive analysis show that the average pretest result for long throw-in ability was 9.49 meters.with a minimum score of 6.72 meters and a maximum of 15.10 meters. After 16 sessions of battle ropes training, the average posttest score increased to 22.95 meters, with a minimum score of 18.26 meters and a maximum score of 27.54 meters. These results indicate a significant increase in long throw-in ability after battle ropes training.

The results of the normality test using the Shapiro-Wilk method show that the pretest data has a significance value of 0.133 and the posttest data is 0.791. Because both significance values are greater than 0.05, it can be concluded that the data is normally distributed and thus meets the requirements for a parametric statistical test, namely the Paired Sample T-Test.

Based on the results of the homogeneity test, a Levene Statistic value of 0.443 was obtained with a significance (Sig.) of 0.512 based on the mean. Because the significance value is greater than 0.05, it can be concluded that the data has homogeneous variance between the pretest and posttest groups. This means that the variance of the two data groups is not significantly different, thus fulfilling one of the assumptions in the use of parametric statistical tests, namely the Paired Sample T-Test.

The results of the Paired Sample T-Test show a calculated t-value of -11.501 with a significance level (Sig. 2-tailed) of 0.000. Since the significance value is less than 0.05, it can be concluded that there is a significant difference between the pretest and posttest results. Thus, battle ropes training has a significant effect on improving long throw-in ability in football athletes.

The study results showed a significant increase in long throw-in ability after 16 sessions of battle ropes training. This improvement indicates that this training program is effective in increasing the strength and explosive power of the up-

per body muscles, including the shoulders, arms, and core, which play a direct role in the football throw-in.

Battle ropes training requires simultaneous dynamic contraction of the shoulder, triceps, deltoid, and core muscles, so that the two-handed movement pattern used resembles the mechanics of a throw-in. Biomechanical research suggests that the primary components of a successful throw are the initial velocity of the ball and the angle of release, which are influenced by shoulder strength and body stability (Yılmaz, 2025). The principle of specificity in training states that exercises that mimic specific movements will provide greater transfer effectiveness in game skills (Lees & Nolan, 1998).

Physiologically, neuromuscular adaptation occurs through increased motor unit recruitment and activation of type II muscle fibers which are responsible for explosive power (Bompa & Haff, 2009). Battle ropes training as a HIIT (high intensity interval training) modality has been shown to increase shoulder strength, upper body muscle endurance, and anaerobic capacity in a short period of time (Chen et al., 2018). The study also found that this exercise increased VO_2max upper body and shoulder isometric strength in 3-6 weeks (Smith & Brown, 2020). Thus, the improvement in throw-in performance in this study can be explained by this physical adaptation.

From a biomechanical and motor control perspective, improved core stability through battle ropes training allows for more efficient energy transfer from the trunk to the upper extremities (Martinez & Perez, 2021) confirmed that core stability significantly influences throwing accuracy and distance. Furthermore, EMG studies have shown that variations of double-arm slams and waves produce significant muscle activation (>40% MVIC) in the shoulder and core muscles, supporting increased functional strength in these muscles.

Recent research on throw-ins suggests that upper body mechanics, particularly the shoulder joint, contribute significantly to ball speed and throw distance (Yılmaz, 2025). Thus, increasing upper body and core muscle strength and control through battle ropes training is highly relevant to improving long throw-in ability in this study.

Practically, these results reinforce previous research showing that battle ropes training is effective for a variety of sports in improving upper body strength, endurance, and technical performance (Chen et al., 2018; Zedan et al., 2022). Study (Zedan et al., 2022) showed that battle ropes training in volleyball athletes improved physical variables and service speed, indicating that this modality does indeed provide transfer to an explosive and directional throwing movement similar to the throw-in in football.

However, this study has several limitations. The sample size was relatively small, which may limit the generalization of the findings to a broader population of football players. In addition, the study did not include a control group, making it difficult to compare the effectiveness of battle ropes training with other training methods. Future research should involve a larger sample, use a control group, and analyze long-term effects to obtain more comprehensive results.

Thus, it can be concluded that the battle ropes training program positively impacts the long throw-in ability of football athletes through a combination of increased upper body muscle strength, explosive power, core stability, and efficient motor coordination. This training program is suitable for use as an alternative functional strength development program for football athletes, particularly to optimize throw-in technique.

CONCLUSION

The research results show that battle ropes training effectively improves long throw-in ability in football athletes. This improvement occurs because battle ropes training develops strength, explosive power, and stability in the upper body and core muscles, which play a direct role in the throw-in movement. The two-handed movement, which mimics the biomechanical pattern of a throw-in, provides effective motor transfer, increasing throwing distance and efficiency.

In addition, the exercise battle ropes It also provides neuromuscular adaptations in the form of increased type II muscle fiber activation and upper body coordination, which impacts the ability to generate optimal thrust when throwing. These results strengthen the theory that specificity training can positively influence technical skills in sports. Therefore, battle ropes training can be recommended as an effective alternative training method to improve long throw-in ability and overall functional performance of football athletes.

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