



IMPACTS OF SHADOW TRAINING ON REACTION TIME AND AGILITY AMONG HANDBALL PLAYERS

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ABSTRACT

The objective of this research was to investigate the effects of shadow training on reaction time and agility in handball players. The study involved thirty handball players from Ramakrishna Mission Vidyalaya Maruthi College of Physical Education, Periyanaickenpalayam, Coimbatore, Tamil Nadu, who were selected at the college level. The age range of the participants was 21 to 25 years. The players were divided into two groups, each consisting of fifteen participants. The groups were not intentionally matched. The Experimental Group (Group I) underwent eight weeks of shadow training (ST), while the Control Group (Group II) did not engage in any training program other than their regular activities. The participants' agility was assessed using the 4x10mts shuttle run test, and their reaction time was evaluated using the Penney Cup Test. The collected data was analyzed using a 't' ratio to determine any significant improvements at a confidence level of 0.05. The results revealed a significant improvement in agility and reaction time as a result of shadow training. It is important to note that the limitations of the study include factors such as diet, climate, lifestyle, as well as the participants' previous training. Nevertheless, the findings of this study align with previous research conducted by different experts in the field of sports sciences. In conclusion, shadow training had a significant positive impact on the agility and reaction time of college-level handball players.

KEYWORDS: Handball Players, Agility and Reaction Time.

INTRODUCTION

Handball is a dynamic and fast-paced sport that requires athletes to possess quick reaction times and exceptional agility. The ability to react swiftly and move with agility is crucial for successful performance in handball, as it directly influences a player's ability to anticipate and respond to the rapid changes that occur during a match. Therefore, finding effective training methods to enhance reaction time and agility is of great interest to coaches, athletes, and researchers.

One such training method that has gained attention in recent years is shadow training. Shadow training involves mimicking the movements and actions of an opponent or imaginary opponent, without any physical contact. It is commonly used in various sports to improve technique, speed, coordination, and mental focus. Shadow training allows athletes to refine their skills, develop muscle memory, and enhance their overall performance. Understanding the impacts of shadow training specifically on reaction time and agility among handball players is crucial for optimizing training programs and improving player performance. By investigating the effects of shadow training, coaches and trainers can develop targeted training regimens that address the specific demands of handball and help athletes reach their full potential.

Research in the field of sports sciences has shown that reaction time and agility can be improved through various training methods, including plyometrics, speed drills, and specific sport-related exercises. However, the specific effects of shadow training on handball players' reaction time and agility remain relatively unexplored. Therefore, this study aims to bridge this research gap by examining the impacts of shadow training on reaction time and agility among handball players. By assessing the changes in these two critical performance factors, this research will contribute to the body of knowledge surrounding effective training methods for handball players and provide valuable insights for coaches, trainers, and athletes.

To accomplish this goal, a group of college-level handball players will be selected, and they will undergo a shadow training program over a period of eight weeks. Their reaction time and agility will be assessed before and after the training program using standardized tests. Statistical analysis will then be conducted to determine if significant improvements in reaction time and agility can be attributed to the shadow training intervention. The findings of this study will not only enhance our understanding of the impacts of shadow training on handball players but also have practical implications for the development of training protocols aimed at improving reaction time and agility. Ultimately, the knowledge gained from this research has the potential to optimize training strategies, enhance player performance, and contribute to the overall advancement of handball as a sport.



METHODS

Experimental Approach to the Problem

To test the proposed hypothesis, a total of thirty college-level handball players were carefully selected for this study. The participants' ages fell within the range of 21 to 25 years. They were then divided into two groups, each containing fifteen individuals. It's important to note that no specific efforts were made to ensure equal distribution of attributes between the groups.

Group I, known as the experimental group, comprised fifteen participants who underwent an intensive eight-week shadow training program. On the other hand, Group II, serving as the control group, consisted of fifteen individuals who did not partake in any training program other than their regular handball activities.

By implementing this design, we aimed to observe the potential impact of shadow training on the selected variables. The control group allowed us to assess any changes solely attributable to the shadow training intervention in the experimental group. This approach provides a basis for comparison and enables us to draw more accurate conclusions regarding the effects of shadow training on handball players' performance.

Design

The parameters that were evaluated in this study included agility, assessed using the 4x10m shuttle run, and reaction time, measured using the Penney Cup Test. These measurements were conducted at the baseline before the intervention began and again after the eight-week period of shadow training (ST). The purpose of these evaluations was to analyze the effects of the training program on the participants' agility and reaction time. By comparing the measurements at baseline with the post-training results, we aimed to determine the impact of the shadow training intervention on these performance indicators.

Training Protocol

During the study, each training session lasted for a duration of 60 minutes. These training sessions were conducted three days per week over a span of 8 weeks. The shadow training program consisted of a structured regimen that encompassed various aspects of practice, including warm-up exercises, the main training routine, and a relaxation procedure after each session.

The warm-up phase of the training was crucial in preparing the handball players both physically and mentally for the subsequent activities. It typically involved a series of dynamic stretches, mobility exercises, and cardiovascular movements to increase heart rate, promote blood flow, and improve flexibility. The purpose of the warm-up was to reduce the risk of injury and optimize the players' performance during the training sessions.

Following the warm-up, the main training routine commenced. This phase of the shadow training program focused on replicating the movements, techniques, and actions typically encountered in handball matches. The participants engaged in simulated game scenarios, mimicking the movements of opponents or imaginary opponents. This allowed them to develop their skills, refine their technique, and enhance their overall performance in a controlled environment. The specific exercises and drills varied depending on the targeted aspects of reaction time and agility.

After completing the main training activities, a relaxation procedure was implemented to aid in the recovery and rejuvenation of the players' bodies and minds. This phase involved cool-down exercises, stretching, and breathing techniques to promote relaxation and prevent muscle soreness. By incorporating this relaxation component, the training program aimed to enhance the players' overall well-being and readiness for subsequent sessions.

Throughout the 8-week period, the handball players adhered to this structured training regimen, engaging in shadow practices three days per week. The duration of each training session, the inclusion of warm-up and cool-down procedures, and the focus on replicating game-like situations all contributed to the comprehensive nature of the shadow training program.

By following this consistent and well-designed training schedule, the study sought to determine the specific effects of shadow training on the participants' reaction time and agility. The aim was to assess the efficacy of this training method in improving these crucial performance factors in handball players.

Statistical Analysis

The collected data were analysed with application of 't' test to find out the individual effect from base line to post-test if any. 0.05 level of confidence was fixed to test the level of significance.



RESULTS

Table-I

Relationship of Mean, SD and 't'-Values of the Reaction Time between Pre & Post Test of the Shadow Training and Control Groups of College Level handball Players

Reaction Time	Groups	Test	Mean	S.D	't' Values
	Control Group	Pre Test	5.79	1.17	1.52
		Post Test	5.77	1.20	
	Shadow Training Group	Pre Test	5.03	0.75	8.30*
Post Test		4.71	0.75		

*Significant at 0.05 level of confidence

Table-I reveals that the mean values of per test and post test of control group for reaction time were 5.79 and 5.77 respectively; the obtained t ratio was 1.52 respectively. The tabulated t value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated t ratio was lesser than the table value. It is found to be insignificant change in reaction time of the college level handball players. The obtained mean and standard deviation values of pre test and post test scores of shadow training group were 5.03 and 4.71 respectively; the obtained t ratio was 8.30. The required table value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The obtained t ratio was greater than the table value. It is found to be significant changes in reaction time of the college level handball players. The mean values on shadow training group and control group are graphically represented in figure-1.

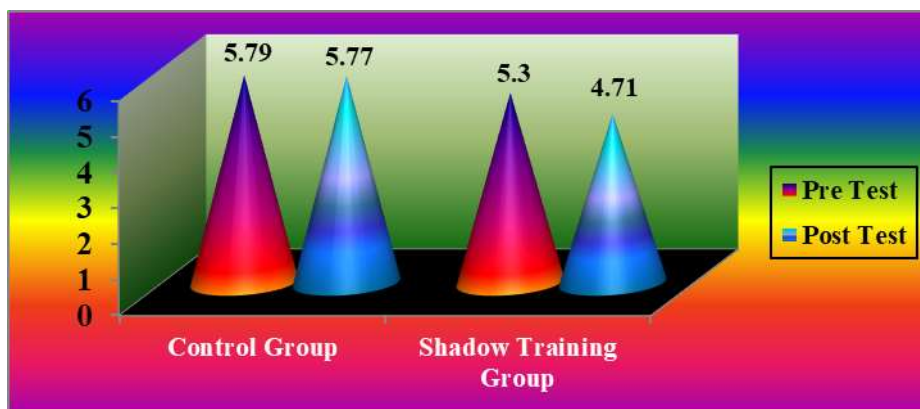


FIGURE-1: Bar Diagram Showing the Pre-Test & Post Test On Reaction Time of Control And Shadow Training Groups

Table-II

Relationship of Mean, SD and 't'-Values of the Agility between Pre & Post Test of the Shadow Training and Control Groups of College Level Handball Players

Agility	Groups	Test	Mean	S.D	't' Values
	Control Group	Pre Test	12.08	1.14	0.11
		Post Test	12.07	1.08	
	Shadow Training Group	Pre Test	9.76	0.71	8.33*
Post Test		9.36	0.67		

*Significant at 0.05 level of confidence

Table-II reveals that the mean values of per test and post test of control group for agility were 12.08 and 12.07 respectively; the obtained t ratio was 0.11 respectively. The tabulated t value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated t ratio was lesser than the table value. It is found to be insignificant change in agility of the college level handball players. The obtained mean and standard deviation values of pre test and post test scores of shadow training group were 9.76 and 9.36 respectively; the obtained t ratio was 8.33. The required table value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The obtained t ratio was greater than the table value. It is found to be significant changes in agility of the



college level handball players. The mean values on shadow training group and control group are graphically represented in figure-2.

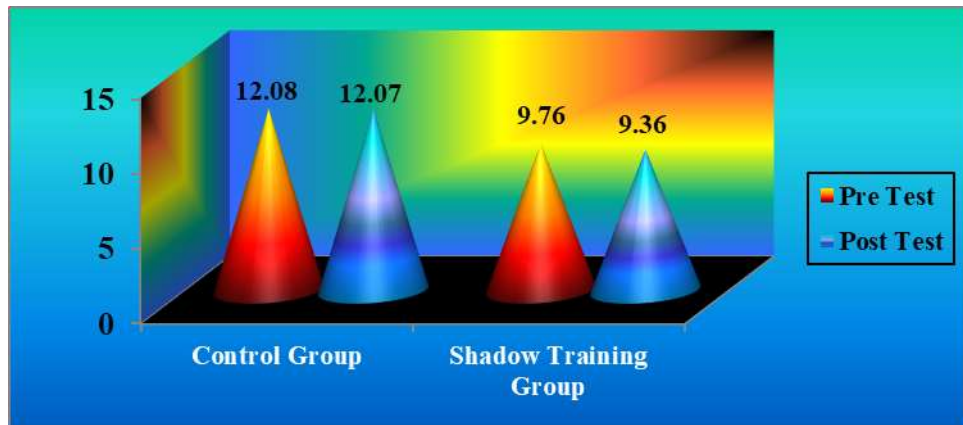


Figure-2: Bar Diagram Showing the Pre-Test & Post Test on Agility of Control and Shadow Training Groups

DISCUSSION ON FINDINGS

Shadow training has emerged as an effective and valuable training method for college-level handball players, particularly in terms of improving reaction time and agility. This study aimed to investigate the impact of shadow training on these performance factors by comparing the shadow training group with a control group. The shadow training program included various exercises specifically designed to enhance reaction time and agility. These exercises consisted of front runs, backward runs, side-to-side movements, and cross runs, all of which aimed to simulate game-like situations and replicate the dynamic actions required in handball. In addition to improving reaction time and agility, the shadow training program also targeted other physical fitness components such as speed and speed endurance.

The results obtained from this study demonstrated significant improvements in the shadow training group. The participants who underwent the shadow training program displayed substantial enhancements in both reaction time and agility. These findings align with previous studies conducted by **Jenith et al., (2021)**, **J. Nirendan et al. (2019)**, **S. Senthil Kumaran (2018)**, and **Mehmet Fatih Yuksel and Latif Aydos (2017)**, which also reported positive effects of similar training methods on reaction time and agility in handball players. In contrast, the control group, which did not engage in any specific training program beyond their regular handball activities, did not show significant improvements in reaction time and agility.

Overall, the findings of this study indicate that shadow training has a significant positive impact on reaction time and agility among college-level handball players. These results contribute to the existing body of literature supporting the effectiveness of shadow training as a valuable tool in enhancing athletic performance.

CONCLUSION

Based on the findings and within the limitation of the study it is noticed that practice of shadow training helped to improve reaction time and agility of college level handball players. It was also seen that there is progressive improvement in the selected criterion variables of shadow training group of handball players after eight weeks of shadow training programme. Further, it also helps to improve reaction and agility.

1. It was concluded that individualized impacts of shadow training group showed a statistically significant positive sign over the course of the treatment period on reaction time and agility of college level handball players.
2. It was concluded that individualized impacts of control group showed a statistically insignificant positive sign over the course of the period on reaction time and agility of college level handball players.
3. The results of comparative effects lead to conclude that shadow training group had better significant improvement on reaction time and agility of college level handball players as compared to their performance with control group.

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