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Effect of Plyometric training on agility and reaction time of Kabaddi players

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Abstract
This study analyses how kabaddi players' agility and reaction time are impacted by a six-week plyometric training program. It is well recognised that plyometric activities improve agility, explosive strength, and neuromuscular coordination. 30 male kabaddi players, ages 18 to 25, were randomly assigned to experimental and control groups in this study's experimental design. Standardised agility and reaction time tests were used for both pre- and post-testing. The experimental group's agility and reaction time were significantly enhanced according to the statistics, confirming the value of plyometric training in enhancing kabaddi performance.

Keywords: Plyometric training, agility, reaction time, Kabaddi, athletic performance

Introduction

Kabaddi is a high-intensity contact sport that demands quick reflexes, rapid directional changes, and explosive strength. Agility and reaction time are two critical components that determine the performance of a kabaddi player, especially in raiding and defence actions. Plyometric training has been extensively used in sports to improve athletic performance, particularly in activities requiring rapid and powerful movements. However, its specific impact on kabaddi players has not been widely studied.

The modern game of kabaddi combines anaerobic and aerobic fitness, explosive power, and mental alertness. Players often perform short bursts of high-intensity activity, alternating with defensive and recovery phases, making it essential for athletes to develop physical traits such as agility and rapid reaction ability (Ghosh, 2010) [3]. Plyometric training, which emphasizes the stretch-shortening cycle of muscles, is effective in enhancing explosive power and neuromuscular coordination (Markovic & Mikulic, 2010) [4].

Previous studies have shown that plyometric training can significantly improve vertical jump performance, sprint time, and agility in athletes from various sports, including basketball, football, and volleyball (Miller *et al*., 2006 [5]; Ramirez-Campillo *et al*., 2013) [6]. Despite the extensive research in other sports, its application in kabaddi—a sport that requires a blend of power, speed, and reaction—remains under-explored.

Therefore, this study aims to examine the effectiveness of a structured plyometric training program on two critical performance indicators: agility and reaction time in kabaddi players. Understanding this relationship could provide valuable insights for coaches and fitness trainers in designing sport-specific conditioning programs.

Methodology

Selection of Subjects

From college teams, thirty male kabaddi players, ages 18 to 25, were chosen. Two groups were randomly selected from among the participants. Group for Experiments (n=15) Group of Control (n=15)

Procedure: For six weeks (three sessions per week), the experimental group participated in an organised plyometric training program that included activities like tuck leaps, lateral hops, lateral hops, squat jumps, and bounding. Without receiving any extra plyometric training, the control group carried on with their usual kabaddi training.

Testing Instruments

Agility: Measured using the Illinois Agility Test.

Reaction Time: Measured using a digital reaction timer.

Statistical Analysis: The data collected was tabulated and subjected to statistical analysis. Descriptive analysis was done by computing means, standard deviations and paired 't' test were applied to analyse the data.

Result: After the six-week plyometric exercise intervention, the experimental group showed significant improvements in both agility and reaction time, according to the statistical analysis. The experimental group showed improved agility in the Illinois Agility Test by lowering their mean time from 18.2 seconds (pre-test) to 17.0 seconds (post-test). On the other hand, there was little change in the control group (from 18.1 seconds to 18.0 seconds).

In the same way, the experimental group's reaction time significantly improved. The control group's mean reaction time significantly increased (from 0.51 seconds to 0.49 seconds), whereas the mean reaction time decreased from 0.52 seconds (pre-test) to 0.37 seconds (post-test). The experimental group's paired t-test findings were statistically significant ($p < 0.05$), indicating that the improvements were not the result of chance.

Discussion

The findings of this study indicate that plyometric training helps kabaddi players become more agility and reaction time. These findings are in accordance with those of Miller *et al*. (2006) [5], who reported that collegiate athletes who underwent a similar plyometric training program showed significant improvements in agility. Increased

neuromuscular efficiency and quicker motor unit recruitment made possible by plyometric exercises are responsible for the improvement in reaction time (Markovic & Mikulic, 2010) [4].

In kabaddi, agility is an important attribute that directly affects an athlete's ability to dodge opponents and change direction quickly. The training intervention's practical significance is shown by the observed 1.2-second improvement in the Illinois Agility Test. Furthermore, quicker reaction times increase an athlete's ability to react quickly to opponent moves and are essential for both defensive and raiding replies.

These results support the inclusion of sport-specific plyometric exercises in kabaddi training regimens. Trainers and coaches should consider integrating plyometric components tailored to the movement demands of kabaddi to maximize performance outcomes. However, the study is limited by a relatively small sample size and short intervention period. Future research should explore long-term effects and include diverse age groups and female participants to generalize the findings.

Table 1

Variable	Group	Pre-Test Mean ± SD	Post-Test Mean ± SD	t-value	p-value
Agility (s)	Experimental	18.20 ± 0.45	17.00 ± 0.42	7.82	0.000 **
	Control	18.10 ± 0.48	18.00 ± 0.46	1.10	0.285
Reaction Time (s)	Experimental	0.52 ± 0.04	0.37 ± 0.05	9.21	0.000 **
	Control	0.51 ± 0.03	0.49 ± 0.03	1.34	0.197

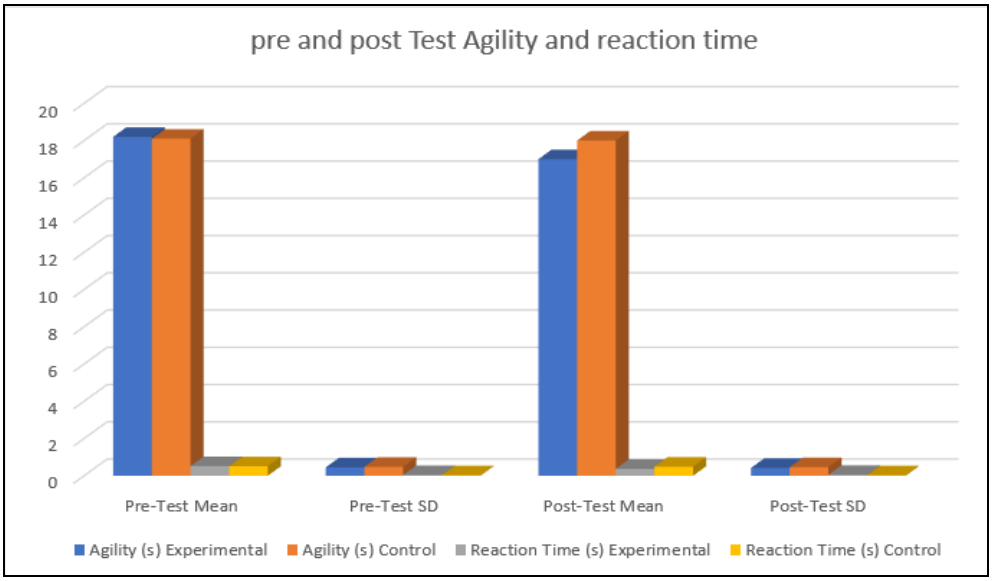

Fig 1

Conclusion

Plyometric training has a positive impact on agility and reaction time in kabaddi players. Coaches and trainers should consider integrating plyometric exercises into their training routines to enhance on-field performance.

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