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Effect of Agility Drills along with Reaction Time Exercises on Agility and Reaction Speed among Collegiate Badminton Players

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Abstract

Background: Badminton is a game of small margin where every milli second counts. In badminton as the shuttle moves in an incredible speed the player will have a very minimal amount of time to react and execute the shot. Reaction time and Agility are the two main important components that have to be trained along with other regular exercises.
Objective: To find the effectiveness of Agility drills along with Reaction time exercises on Agility and Reaction speed among collegiate badminton players.
Methods: A Quasi experimental study was conducted on 18 badminton players; they were divided into 2 groups with 9 in each group based on purposive sampling technique. Group A underwent Agility drills along with Reaction time exercises and Group B underwent conventional exercises. South east Missouri agility test was used to measure the Agility and Reaction time ruler drop test was used to measure reaction time.
Results: An Independent t-test was used to compare the results between two groups. Significant difference was found on both outcome measures, the South east Missouri agility test values of group A was 11.3 seconds and in group B was 12.06 seconds. Where as in Reaction time ruler drop test values on Group A was 0.17 seconds and in Group B was 0.20 seconds. The results suggest that Group A which undergone Agility drills along with Reaction time exercises shown significant improvement than Group B that underwent conventional exercises in all parameters following intervention.
Conclusion: The study concludes that the Agility drills along with Reaction time exercises is more effective in improving Agility and Reaction speed than Conventional exercises in collegiate badminton players, as it improves the hand eye coordination as well as the time required to reach the shuttle becomes faster through the increased processing rate by the sense of stimuli by the central nervous system and its response in form of motor response.

Keywords

Badminton, Reaction time, Exercise, Motor skills, Athletic performance

Introduction

Badminton is one of the fastest games in the world and is the exciting sport to play. In recent years badminton has undergone developments in terms of rules as well as the pattern of play of athletes. This evolution has caused the players to perform various game play pattern especially in terms of speed and agility along with other factors (Saber and Kashef, 2008). Players have to react quickly

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and additionally be able to decide in short period of time. In short, reaction time is one of the vital components for badminton players. Every sports activity is associated with visual reaction time. Thus, the components of reaction time may play an important role in improving the performance of badminton athletes (Dane and Pratt 2009).

Reaction time is defined as the time between a given stimulus and the onset of movement (Bankosz *et al.,* 2020). Reaction time involves a process of receiving stimuli by receptor, the transmission of information through the nerves to the brain and from the brain to the muscle to perform the movement (Seth *et al*., 2018). Reaction time is one of the reliable indicators of the processing rate by the sense of stimuli by the central nervous system and its response in the form of motor response. This can determine the person's level of alertness because a person's speed to respond to a stimulus is dependent on his or her reaction time (Solanki *et al*., 2012).

Agility is a skill related component of physical fitness that relates to the ability to rapidly change the position of the entire body in space with speed and accuracy. At speed there are two things that underlie the speed itself, namely the speed of movement and speed of reaction (Jian & Beng, 2000). Foot work is a step movement that regulates the body to place the position in such a way that makes it easier to hit the shuttlecock according to its position. Lack of footwork in badminton games can be an infective of player's movement, so it will be difficult for the player to get a good performance or often not able to finish the game well (Subarjah and Herman, 2009).

The aim of the study was to find the effect of agility drills along with reaction time exercises on agility and reaction speed among collegiate badminton players. As said earlier reaction time is important for pretty much in every aspect of badminton which is accompanied with agility. The need for the study is find out the effect of agility drills along with reaction time exercises on agility and reaction speed among collegiate badminton players.

Methodology

A quasi-experimental study was conducted among 18 collegiate badminton players at ST badminton academy, Coimbatore, India. A clear explanation was given to all the players and an informed consent was obtained prior to the study. Both male and female whose age ranging between 19 to 25 years playing badminton for more than a year with regular training were included in this study. Players with history of soft tissue injuries and recent fractures, suffered with any pain during the regime, if the players were irregular in training regime, any history of cardiovascular, musculoskeletal or neurological problems were excluded from this study. The players were divided into two groups with 9 players in each. Players in Group A underwent Agility drills along with Reaction time exercise which includes, 1) Ball drop reaction drill – 20 balls (Fig 1), 2) surprise catch – 20 balls (Fig 2), 3) Lateral shuffle reaction drill – 2 minutes (2 sets) (Fig 3), 4) Shadow badminton drill – 20 sets (Fig 4) and also, they underwent the conventional exercise before training. Players in Group B underwent conventional exercise which includes, 1) 10 rounds of jogging around the court, 2) General stretches for both upper and lower limb (dynamic 10 times), 3) Stairs up and down fast stepping, 4) Multi directional lunges (10 times each), 5) Wall squat (10 times -2 sets), 6) Ladder drills (front and sides -2 sets each) (Fig 5). The players in both the groups underwent training for 6 days in a week for 4 weeks (Ramalingam *et al*., 2023). The pre and post-test measure on reaction time was measured using South east Missouri agility test (SEMO) for Agility and the Reaction speed was measured using Reaction time ruler drop test (Fig 6). SPSS version 22.0 was used to analyse and interpret the data. Independent t-test was used to compare the mean difference between the pre and post-test of two groups.



Figure 1. Ball drop reaction drill



Figure 2. Surprise catch



Figure 3. Lateral shuffle reaction drill

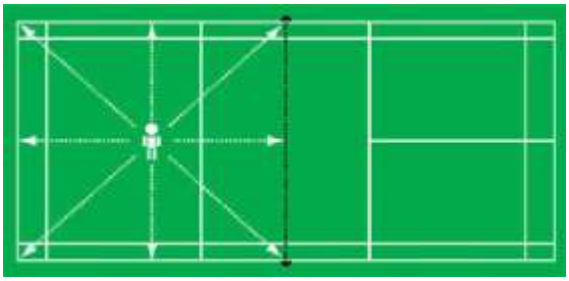


Figure 4. badminton shadow drill

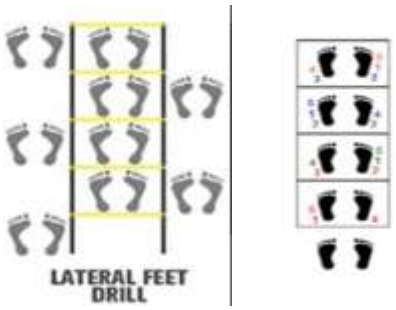


Figure 5. Ladder drills

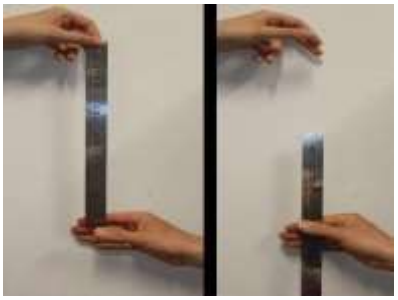


Figure 6. Reaction time ruler drop test

Results and Discussion

The Pre-training results of SEMO agility test for Group A recorded a mean of 11.8 seconds and Group B recorded a mean of 12.3 seconds whereas Pre-training results of Reaction time ruler drop test for Group A recorded a mean of 0.19 seconds and Group B recorded a mean of 0.20 seconds. On the other hand, the Post training results of SEMO agility test for Group A recorded a mean of 11.3 seconds where Group B recorded a mean of 12.06 seconds whereas post-training results of Reaction time ruler drop test for Group A recorded a mean of 0.17 seconds where Group B recorded 0.20 seconds. Thus for 16 degrees of freedom at 5% level of significance, the post-test values of Group A in both the outcome measure shows significant improvement on Agility and Reaction speed than Group B.

Table 1. Results of independent t test on SEMO agility test

	Mean		Calculated t value	Table t value	p value
	Group A	Group B			
Pre test	11.8s	12.3s	1.6797	2.306	>0.05
Post test	11.3s	12.06s	2.9388	2.306	<0.05

*s - seconds

Table 2. Results of independent t-test on Reaction time ruler drop test

	Mean		Calculated t value	Table t value	p value & Level of significance
	Group A	Group B			
Pre test	0.19s	0.20s	1.3543	2.306	>0.05
Post test	0.17s	0.20s	2.9388	2.306	<0.05

*s-seconds

As discussed earlier, Reaction time is one of the important methods to study a person's response speed to a stimulus, which involves cerebral processing and coordinated peripheral response (Dube, Mungal and Kulkarni, 2015). The coordinated feature here is the Agility and Reaction speed, which is important for responding fast during the game. Particularly the high-speed shuttle leaves a very little time for the player to react, thus badminton players should be quick and accurate to decide the shots during the game which is less than a second (Yüksel & Tunç, 2018). This shows the importance of the Reaction time and Agility training on badminton players. Similar findings were found in research on Agility specific exercise program on badminton players which showed reduction in time taken to complete the Agility t test (Doshi et al., 2021). The Reaction time exercise which more likely uses visual feedback using the tennis ball in this study for training also improves the reaction speed as it is closely intact with the game as the visual stimulus during the game is the shuttlecock to which the player has to react. Similar findings were found in the research on visual training on reaction time among badminton players which showed reduction in the time taken to react on the whole-body reaction time as well as in the Finger reaction time (Prak *et al.*, 2022). However, the previous studies were based on either Agility or Reaction time/speed, and not both the components have been compared or programmed together in training for badminton players. On this aspect this study has programmed the Agility drills along with the Reaction time exercise in badminton players and found that there is a significant improvement in both Agility as well as Reaction speed when trained together.

Even though both the techniques worked significantly, Agility drill along with Reaction time exercises has shown significant improvement in both Agility and Reaction speed among collegiate badminton players. The limitation of the study is that the study was conducted on smaller sample size and the age group was limited. Only collegiate players were included. Hence this study recommends to include various level of players, larger sample size, other sports players where agility and reaction speed plays a major role, other outcome measures like whole body reaction time which can also be included in future studies.

Conclusion

In conclusion, Agility drills along with Reaction time exercises is more effective in improving the Agility and Reaction speed than the conventional exercises. Thus, Agility drills along Reaction time exercise have to be trained for a better improvement in the overall game play among collegiate badminton players.

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