

A Comparative Study of Shuttle Run Performance of Male Kho-Kho Players on Different Playing Surfaces

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ABSTRACT

Due to varied properties, the agility of male Kho-Kho players on clay and synthetic surfaces may vary and it is essential to know the difference so that coaches can facilitate player's smooth transition from clay to synthetic playing surface. Hence the present study was planned to assess the agility of male Kho-Kho players on clay and synthetic surfaces. To conduct the study, 50 male interuniversity/national level kho-kho players were selected. The age range of the selected subjects was 18-25 years. Purposive sampling was used for the selection of the sample. A 10-meter shuttle run test was used for data collection. It was found that on clay surface the mean shuttle run timings of male interuniversity kho-kho players were recorded as 19.07 seconds while on synthetic surface the mean shuttle run timings of male interuniversity kho-kho players were recorded as 19.39 seconds. The result suggests that male interuniversity kho-kho players performed faster on clay surfaces in the shuttle run test as compared to their performance on synthetic playing surfaces but this can not justified statistically because the calculated 't' = 1.53 did not meet the statistical criteria of significance. Based on the results, it was concluded that the shuttle run performance of male kho-kho players was better on clay surfaces as compared to the synthetic playing surface but it lacks statistical support and therefore further research is needed to validate these results by including a larger sample size.

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INTRODUCTION

Kho-Kho is a traditional Indian sport. The sport requires elements such as speed and agility to excel. In Kho-Kho the chasing team try to tag out as many players from the opposing team while the defending team's players try their best to avoid it. The traditional sport requires quick changes in direction, reflexes and small strategies to tag out or avoid being tagged out.

Kho-Kho as a traditional Indian sport is gaining popularity at the global level. Initially, Kho-Kho was played on surfaces like grass or clay but with time and the popularity of the sport, various experiments were done by using different materials as playing surfaces. These mats provide ample cushioning and act as shock absorbers. These materials are used to reduce surface-related injuries to Kho-Kho players. Today modern mats use materials like rubber or fabrics which provide durability and consistency of playing surface across various geographical areas.

The kho-kho mats are considered to be effective not only in providing better balance but also reduce the risk of injury. With the initiative to promote and popularise kho-kho globally, the game has changed its nature from performing barefoot on mud to shoes on the mat. Naturally mat surface requires more power, speed and strength to perform.

The biggest difference while playing on synthetic surfaces is movement which requires different techniques to excel. Ferris et al. (1999) have reported that surface properties determine dynamics and mechanics as far as movement is concerned. Eventually, surface properties affect sports performance.

Established scientific principles clearly explain the role of surface in terms of friction. So when the surface is rough it is hard to move objects while a smooth surface with less friction is good for speed. The properties related to sports surfaces a complex and it is based on friction and traction. Friction can be defined as the resistance to motion of two moving objects or surfaces that touch. The sports floor has to perform in many ways. It has to absorb shocks in order to minimize the risk of injury. But it can't be too soft, as it becomes tiring for the athletes. The floor's friction is possibly the most important factor which influences sports performance.

Due to varied properties, the agility of male Kho-Kho players on clay and synthetic surfaces may vary and it is essential to know the difference so that coaches can facilitate players' smooth transition from clay to

synthetic playing surface. Hence the present study was planned to assess the agility of male Kho-Kho players on clay and synthetic surfaces.

REVIEW OF LITERATURE

Girard et al. (2009) assessed the impact of various surfaces on in-shoe loading patterns of tennis players. It was found that the type of surface affects plantar loading in tennis players with Greenset producing less pressure on toes but higher pressure on hallux as compared to clay. **Gains et al. (2010)** compared the speed and agility of soccer players on different playing surfaces. It was found that speed and agility were significantly better on field turf as compared to natural turf. It was also observed that linear momentum is somewhat similar for both surfaces but the change of direction speed is significantly facilitated more in field turf as compared to natural grass. It was concluded that the playing surface affects the speed and agility of soccer players. **Kanaras et al. (2014)** compared the sprinting performance of young soccer players on natural and artificial grass. This study was carried out on 62 young soccer players. A 30m sprint test was administered to each subject. It was found that the sprint performance of young soccer players was significantly better on artificial grass as compared to natural grass. It was concluded that the sprinting performance of young soccer players is affected by the nature of the playing surface. **Brito et al. (2017)** in their study reported that the total distance covered by soccer players on artificial surface was significantly higher as compared to natural turf. **Modric et al. 2023)** in their study reported that artificial playing surfaces are more physically demanding than natural surfaces, especially for midfielders and defensive soccer positions. **Ponce-Bordon et al. (2024)** studied the effect of playing surface on external and mental load in training sessions. The study included Spanish soccer players from the professional league. It was found that the rate of perceived exertion during training on natural turf was significantly higher as compared to the artificial surface.

OBJECTIVE

The present study aims to assess the shuttle run performance of inter-university male kho-kho players on clay and synthetic playing surfaces.

HYPOTHESIS

It was hypothesized that shuttle run timings of interuniversity male kho-kho players would be significantly lower on clay as compared to synthetic playing surfaces.

METHODOLOGY

The following methodological steps were taken to conduct the present study.

Sample

To conduct the study, 50 male interuniversity/national level kho-kho players were selected. The age range of the selected subjects was 18-25 years. Purposive sampling was used for the selection of the sample.

Tools:

10-meter Shuttle Run: 05 cones were placed two meters apart from the starting line. The subject needs to run to the first cone, pick it up and place it behind the starting line. This process is repeated until the fifth cone. Time taken by player is recorded in seconds. Three trials are given and the best timing is recorded.

Procedure:

50 inter-university male kho-kho players were selected. Each player performed 10-meter shuttle run on clay and synthetic surface. The best time on both surfaces was recorded. The data is tabulated in the respective groups and a paired sample 't' test was used for data collection. The results are given in Table 1.

RESULT AND DISCUSSION

Table 1
Paired Comparison of Shuttle Run Timings of Kho-Kho Players
on Different Playing Surfaces

N	Shuttle Run Timing (Second)				Mean Difference	't'
	Kho-Kho Players					
	Clay		Mat			
	Mean	S.D.	Mean	S.D.		
50	19.07	1.18	19.39	1.46	0.31	1.53NS

NS Not Significant

A paired comparison of shuttle run timings for male inter-university players on clay and synthetic playing surfaces was carried out with a sample of 50. On clay surface, the mean shuttle run timings of male interuniversity kho-kho players was recorded as 19.07 seconds and the standard deviation of this data series was 1.18 seconds. On synthetic surface, the mean shuttle run timings of male interuniversity kho-kho players was recorded as 19.39 seconds and the standard deviation of this data series was 1.46 seconds. The mean difference in shuttle run timings on two surfaces is 0.31 and suggests that male interuniversity kho-kho players performed faster on clay surfaces in the shuttle run test as compared to their performance on synthetic playing surface but this can not justified statistically because the calculated $t = 1.53$ did not meet the statistical criteria of significance.

Although the results are not statistically significant, they show that the agility of kho-kho players is slightly compromised when they shift from clay to synthetic surface. A player has a better grip on clay surfaces which enhances traction. This enhanced traction allows kho-kho players to exert more pressure during the push-off phase. It results in quick turns, stops and starts due to better acceleration and deceleration. The ground reaction force is also less on clay surfaces as compared to the synthetic surface thereby providing a natural rhythm to perform lateral and directional changes. A study conducted by Shrivastava and Yadav (2014) also reported that the shuttle run performance of male kabaddi players on clay surfaces was better as compared to mat surfaces. Hence the results are according to theories regarding the impact of playing surfaces on the agility and speed of sportspersons.

CONCLUSION

Based on the results, it was concluded that the agility of male kho-kho players was better on clay surface as compared to synthetic playing surface but it lacks statistical support and therefore further research is needed to validate these results by including a larger sample size.

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