

Comparative Study of Training Effects on Physical Performance of Female Players across Different Playing Surfaces

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Abstract

It has been found that the training affected by the variety and quality of surfaces which also effects the physical fitness level of the trainee. In general, natural surfaces tended to be more consistent in their playing quality; required less force to overcome the surface. The purpose of the study was to compare the effects of training on different playing surfaces on physical variables of female players and also to find out which surface brings maximum changes in selected physical variables.

Keywords: Female Athletes; Training Effects; Physical Performance; Playing Surfaces; Sports Training; Athletic Performance; Exercise Physiology; Fitness Parameters; Performance Comparison; Female Players

1. Introduction

Changes and challenges are the twin laws of nature and they affect every aspect of human life. Changes are taking place all around, and because of these changes, new challenges present themselves. Man is constantly trying to meet these challenges and excel his previous performance every time.

It is because of the growing change in competitive philosophy of sports that a close liaison has developed among sports scientists, team physicians, athletic trainers, coaches and athletes to investigate modern scientific techniques in terms of selection of athletes best suited to the activity and to device new tactics and training methods. The author has also attempted to identify the fitness factors that help in achieving a level of skill and fitness, which a player can attain, thought proper training and evaluation in various games. The player's performance depends on their effectiveness of training programmes, quality of surface, constructional characteristics, and weather conditions. The playing characteristics are thought to be also determined by player movement, and player-surface interaction. Several tests have been designed to quantify these characteristics and some have been adopted as a measurement standard. The surface interaction of players effects the performance and movement. Player-surface interaction is evaluated from measuring the peak deceleration of a sphere dropped on/to the surface, and by measuring the ground reaction force during a simulated running action using a constant man model

2. OBJECTIVE AND METHODOLOGY

The main objective of the study was to compare the effect on different playing surfaces on physical variables of female players taking part in the school competition of Hisar between the age group of 14 to 16 years. The study was restricted to 8 weeks of training on grassy, non grassy, wooden and sand surface and the study was delimited to the following physical variables

- (i) Strength (Explosive Strength)
- (ii) Speed
- (iii) Agility
- (iv) Endurance (Cardio Vascular Endurance)

To facilitate this study on one hundred female players were selected as the subject from the school of Hisar. The age level of subject ranged from fourteen to sixteen year. The entire subjects were residing at different places. The subjects were divided in to five groups of 20 each. Group 'A' practiced on Grassy surface group 'B' on Non- Grassy, Group 'C' on wooden, Group 'D' on sand, and group 'E' acted as control group. The physical variables selected for this study were speed, explosive strength, Cardio-vascular endurance and agility. A ten week's training programme was employed on four surfaces. After the complication of ten weeks training programmer, data was collected of all five groups on physical. No treatment was given to the control group.

The criterion measures adopted for this study were for explosive strength was measured by using standing broad jump, for speed to 50 mts. dash, for endurance 12 mts. run of walk, for agility 4x10 meter shuttle run. Analysis of covariance was employed to compare the effect of training of grassy, non-grassy, wooden and sand training on of physical variables of female players. Further, to compare paired mean difference where 'F' ratio is significant, the post hoc test (LSD Test) was used. The level of significant was kept at level 0.5 level.

3. RESULTS AND DISCUSSION

Various descriptive measure like range, minimum, maximum scores, Standard Deviation for the selected physical variables were calculated and presented in tables

Table 1: Descriptive analysis of Physical Variables

Variables	Surface	Range	Min.	Max.	Mean	SD
Strength	Grassy Pre	0.30	1.05	1.35	1.19	0.08
	Grassy Post	0.38	1.1	1.39	1.24	0.08
	Non-Grassy Pre	0.38	1.07	1.45	1.21	0.1
	Non-Grassy Post		1.08	1.47	1.24	0.1
	Wooden Pre	0.40	1.05	1.45	1.21	0.1
	Wooden Post		1.09	1.47	1.24	0.1
	Sand Pre	0.39	1.06	1.45	1.20	0.1
	Sand Post	0.39	1.12	1.51	1.26	0.1
	Control Pre	0.30	1.15	1.45	1.25	0.12
	Control Post	0.39	1.07	1.46	1.26	0.12
Speed	Grassy Pre	2.38	8.64	11.02	9.65	0.82
	Grassy Post	2.9	8	10.9	9.36	0.91
	Non-Grassy Pre	2.5	8.71	11.21	9.92	0.85
	Non-Grassy Post	2.75	8.55	11.3	9.74	0.90

	Wooden Pre	2.49	8.71	11.2	9.91	0.84
	Wooden Post	2.9	8.2	11.1	9.72	0.86
	Sand Pre	2.38	8.64	11.02	9.73	0.78
	Sand Post	2.92	8.01	10.93	9.28	0.91
	Control Pre	4.44	8.06	12.5	9.84	1.06
	Control Post	4.34	8.05	12.4	9.85	1.07
Agility	Grassy Pre	2.42	11.24	13.66	12.19	0.67
	Grassy Post	2.46	10.8	13.26	11.83	0.75
	Non-Grassy Pre	3.44	10.47	13.91	11.51	0.80
	Non-Grassy Post	3.81	10	13.81	11.25	0.84
	Wooden Pre	3.44	10.47	13.91	11.51	0.8
	Wooden Post	3.44	10.32	13.76	11.36	0.8
	Sand Pre	2.23	10.17	12.4	11.51	0.6
	Sand Post		9.9	12	10.97	0.64
	Control Pre	3.39	10.23	13.62	12.24	0.01
	Control Post	3.5	9.95	13.45	12.05	1.08
Endurance	Grassy Pre	435	1765	2210	2005.2	147.07
	Grassy Post	560	1830	2390	2061.6	143.82
	Non-Grassy Pre	648	1620	2268	1954.2	182.36
	Non-Grassy Post	616	1644	2360	1977.35	179.96
	Wooden Pre	1070	1300	2370	1691.7	121.80
	Wooden Post	1070	1315	2385	1714.85	318.26
	Sand Pre	1585	1720	2305	1936.95	170.74
	Sand Post	588	1810	2398	20.14	177.97
	Control Pre	850	1300	2150	1640.5	329.13
	Control Post	848	1315	2163	1655.35	326.6

Table 2: Analysis Of Covariance of the Means Of Five Groups (Grassy, Non Grassy, Wooden, Sand And Control Group) On Physical Variable ‘Strength’

SV	DF	SS	MSS	F
Among Means	4	0.0845	0.021125	18.53*
Within Groups	94	0.1075	0.00114	

According to the analysis of data presented in the above table 6, that the calculated 'F' ratio 18.53 was greater than the tabulated 'F' value 2.46 at 0.5 level of significance. So it is concluded that there was a significant difference among all the surfaces in the physical variable of 'Strength'

The graphical representation of comparison of mean values of pre test and post test on Strength of five groups is presented in figure 1. To find out the paired mean difference where 'F' ratio was significant, the post hoc test (LSD test) was used and the data pertaining to this is presented below.

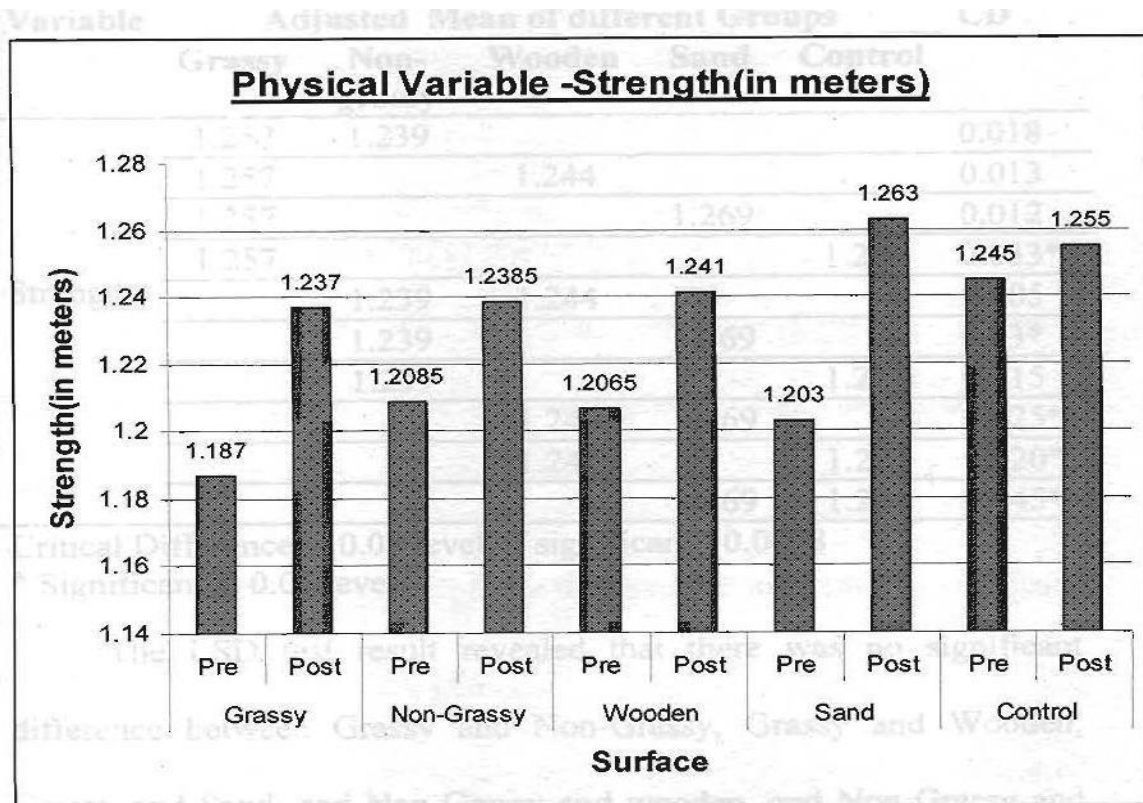


Fig. 1. Comparison of means of Pre test and Post test Data on 'Strength' of 5 Groups on Different Surfaces

The LSD test result revealed that there was no significant difference between Grassy and Non-Grassy, Grassy and Wooden, Grassy and Sand, and Non-Grassy and wooden, and Non-Grassy and Control. But there was significant difference between Grassy and Control, Non-Grassy and Sand, Wooden and Sand, Wooden and Control, and Sand and Control group in case of Strength.

Table.3 Analysis of Covariance of the Means of Five Groups (Grassy, Non Grassy, Wooden, Sand And Control Group) On Physical Variable 'Speed'

SV	DF	SS	MSS	F
Among Means	4	1.95	0.49	4.08*
Within Groups	94	11.6	0.12	

*Significant at 0.5 level. 'F' (4, 94) = 2.46

According to the analysis of data presented in the above table 8, that the calculated 'F' ratio 4.08 was greater than the tabulated 'F' value 2.46 at 0.5 level of significance. So it is concluded that there was a significant difference among all the surfaces in the physical variable of 'Speed'. The graphical representation of comparison of mean values of pre test and post test on Speed of five groups is presented in figure 2. To find out the paired mean difference where 'F' ratio was significant, the post hoc test (LSD test) was used and the data pertaining to this is presented below:

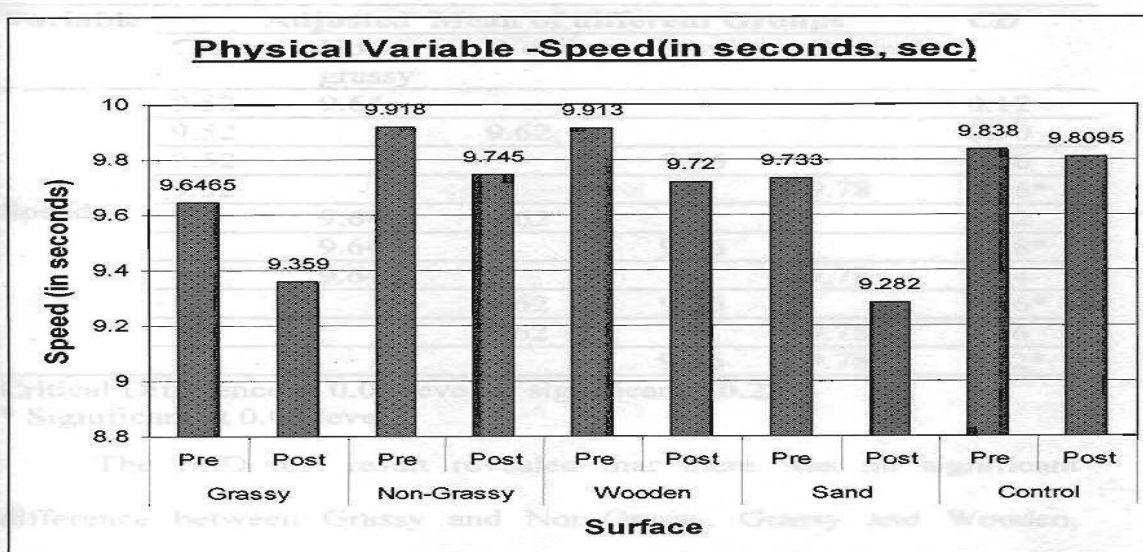


Fig. 2. Comparison of means of Pre test and Post test Data on 'Speed' of 5 Groups on Different Surfaces.

The LSD test result revealed that there was no significant difference between Grassy and Non-Grassy, Grassy and Wooden, Grassy and Sand, Non-Grassy and Wooden, Non-Grassy and Control and Wooden and Control. But there was significant difference between Grassy and Control, Non-Grassy and Sand, Wooden and Sand, and Sand and Control group in case of Speed.

Table 4. Analysis of Covariance of the Means of Five Groups (Grassy, Non Grassy, Wooden, Sand and Control Group) on Physical Variable 'Agility'

SV	DF	SS	MSS	F
Among Means	4	2.11	0.5275	8.27*
Within Groups	94	6.001	0.0638	

*Significant at 0.5 level. 'F' (4, 94) = 2.46

According to the analysis of data presented in the above table 10, that the calculated 'F' ratio 8.27 was greater than the tabulated value 2.46 at 0.5 level of significance. So it is concluded that there was a significant difference among all the surfaces in the physical variable of 'Agility'. The graphical representation of comparison of mean values of pre test and post test on Agility of five groups is presented in figure 3. To find out the paired mean difference where ratio was significant, the post hoc test (LSD test) was used and the data pertaining to this is presented below.

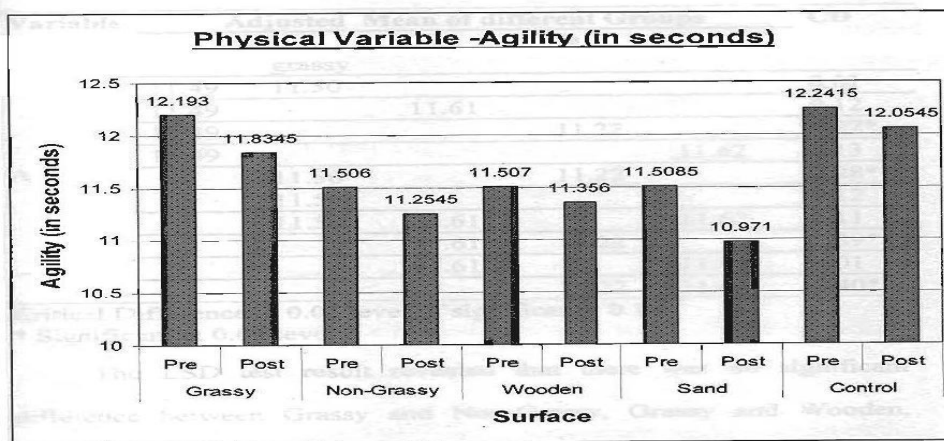


Fig. 3. Comparison of means of Pre test and Post test Data on 'Agility' of 5 Groups on Different Surfaces.

The LSD test result revealed that there was no significant difference between Grassy and Non-Grassy, Grassy and Wooden, Grassy and Control, Non-Grassy and Control, Non-Grassy and wooden, and wooden and Control. But there was significant difference between Grassy and Sand, Non-Grassy and Sand, Wooden and Sand, and Sand and Control group in case of Agility

Table 5: Analysis of Covariance of the Means of Five Groups (Grassy, Non Grassy, Wooden, Sand and Control Group) on Physical Variable 'Endurance'

SV	DF	SS	MSS	F
Among Means	4	52568.4	13142.1	34.106*
Within Groups	94	36221.5	385.335	

* Significant at 0.5 level. 'F' (4, 94) = 2.46

According to the analysis of data presented in the above table 12, that the calculated 'F' ratio 34.106 was greater than the tabulated 'F' value 2.46 at 0.5 level of significance. So it is concluded that there was a significant difference among all the surfaces in the physical variable of 'Endurance'. The graphical representation of comparison of mean values of pre test and post test on 'Endurance' of five groups is presented in figure 4.

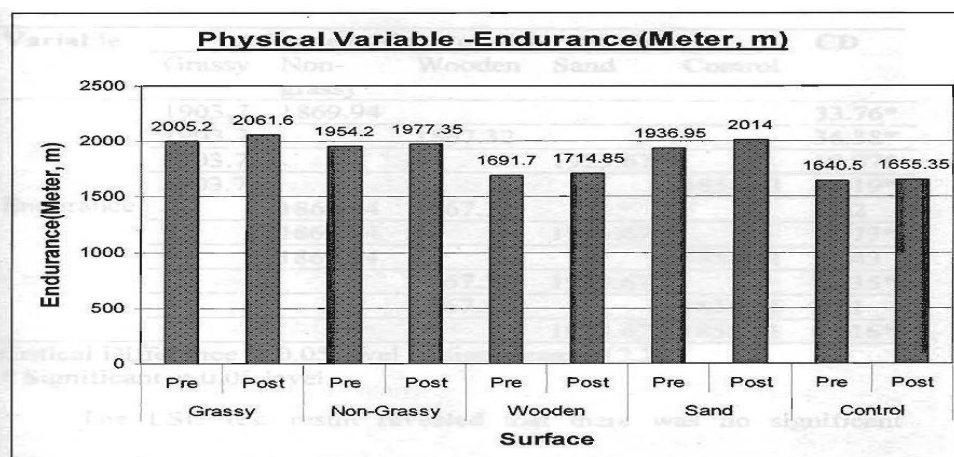


Fig. 4. Comparison of means of Pre test and Post test Data on 'Endurance' of 5 Groups on Different Surfaces.

The LSD test result revealed that there was no significant difference between Non-Grassy and Wooden, Non-Grassy and Control and Wooden and Control. But there was significant difference between Grassy and Non-Grassy, Grassy and Wooden, Grassy and Sand, Grassy and Control, Non-Grassy and Sand, Wooden and Sand, and Sand and Control group in case of Endurance. The purpose of the study was to compare the effect of training on Grassy Surface, Non Grassy Surface, wooden surface and sand surface on physical variables of female players. The analysis exhibits that speed, explosive strength endurance, agility were significant differences among the groups. The calculated 'F' ratio for speed is 4.08, for explosive strength 18.53, for endurance 34.016 and for agility 8.27 which were greater than the tabulated 'F' value of 2.46 at 0.05 levels.

4. CONCLUSION

On the basis of the analysis of data and the limitation of the present study, the following conclusion may be drawn:

1. The training on different playing surface showed better strength performance in sand and Grassy surface in the comparisons to Non-Grassy, wooden and control group. Among these three surfaces the performance of strength in the descending order is wooden, Non-grassy, and control group. The sand surface group performance was the best among the five groups.
2. In the case of endurance, subjects showed better performance in sand and Grassy Surface in comparison to Non-grassy, wooden and control group, among these three surfaces the performance of endurance is better in Non-Grassy comparison to wooden and wooden than control group. The sand surface group performance was the best among the five groups.
3. The training showed better speed, in the two experimental group's sand and Grassy than Non-grassy, wooden and control. Among these three, wooden is more effective than non Grassy and non-grassy and control. There was no significant difference between sand and grassy. But the sand surface group performance was the best among five groups.

In the case of Agility, Subject showed better performance in sand and Grassy in comparison to Non-Grassy, wooden and control, within these three groups Non-Grassy better than wooden and wooden better than control group. The sand surface group performance was the best among the five groups.

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