



Effect Of High Intensity Interval Training In Hard And Sand Surface On Anaerobic Power Among Male Soccer Players

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Abstract

This study was to find out the effect of high intensity interval training in hard and sand surface on anaerobic power among male soccer players. Forty-five male soccer players from Annamalai University in Chidambaram, Tamil Nadu, India, were chosen as the study's subjects in order to fulfill its objectives. The individuals' ages ranged from eighteen to twenty-three. Three groups of fifteen people each were formed from the chosen themes. Group I (n = 15) engaged in HIIT on a sand surface, Group II (n = 15) engaged in HIIT on a hard surface, and Group III (n = 15) served as a control group that engaged in no training other than playing soccer on a regular basis. Training took place three days a week for twelve weeks, with fifteen subjects in each group. The RAST test was used to measure anaerobic power prior to and following the training period. The current study used Analysis of Covariance (ANCOVA) as a statistical method. When the adjusted post-test means' "F" ratio was found to be significant at the 0.05 level of significance, the Scheffé S test was employed as a post-hoc test. When compared to the control group, both the hard and sand surface groups' high-intensity interval training had an impact on anaerobic power. According to the study's findings, male soccer players' anaerobic power was improved by high-intensity interval training in the hard surface group as opposed to the sand surface group.

Keywords:, High Intensity Interval Training in hard and sand Surface, Soccer and anaerobic power

Introduction

There are mental and physical challenges in the game of soccer. Football players have to execute deft moves in a generalized setting with constrained time, space, physical and mental exhaustion, and other players. Each player must run several miles during the game, mostly at sprint-like speeds, and respond quickly to a variety of two rapidly shifting situations. Finally, one needs to be well-versed in team, group, and individual techniques. One's ability to overcome each of these obstacles determines how well they play on the football field. (Beim, 1977).

An exercise technique called interval training uses preset intervals to control training intensity. Time, distance, and heart rate are a few methods of measuring intervals. Exercise at a high effort for a certain distance or duration, followed by a brief rest period before returning to the high intensity, is known as interval training.

Due to variations in shock absorption and stability, football training, performance, and injury risk are greatly impacted by sand and hard surfaces. Sand offers a more physically taxing workout and is frequently utilized for rehabilitation, whilst hard surfaces allow for maximum speed.

Monitoring our training intensity is essential, especially in the early stages of the routine. This necessitates practice taking the pulse, which is typically in the radial or carotid artery regions, because it is challenging to palpate the pulse when it is active. Once you've stopped completely, start counting the pulse from zero for ten seconds. If the heart rate is below the desired range during training, raise the intensity level; if it is above the intended range, lower it. An intensity higher than 50–60% of functional capacity (VO₂) is required for cardiovascular exercise; for safety and comfort, this can be raised to 75%–80%. A heart rate training range of 70% to 80% of one's maximal heart rate is usually the outcome of this.

Anaerobic power is crucial in football for explosive, short-burst movements like sprinting, jumping, tackling, and rapid changes of direction, which are vital for attacking, defending, and winning duels, providing the explosive energy needed in brief, high-intensity actions that significantly impact match outcomes. While aerobic fitness provides overall endurance, anaerobic power fuels the game's most decisive moments, enabling quick accelerations and powerful plays with minimal recovery time between efforts, making it essential for success.

Statement of the problem

The purpose of the present study was to find out effect of high intensity interval training in hard and sand surface on anaerobic power among male soccer players.

Methodology

Forty-five male soccer players from Annamalai University in Chidambaram, Tamil Nadu, India, were chosen as the study's subjects in order to fulfill its objectives. The individuals' ages ranged from eighteen to twenty-three. Three groups of fifteen people each were formed from the chosen themes. Group I (n = 15) engaged in HIIT on a sand surface, Group II (n = 15) engaged in HIIT on a hard surface, and Group III (n = 15) served as a control group that engaged in no training other than playing soccer on a regular basis. Training took place three days a week for twelve weeks, with fifteen subjects in each group. The RAST test was used to measure anaerobic power prior to and following the training period.

Analysis of data**Anaerobic power**

The mean values of anaerobic power of high intensity interval training in hard and sand surface group and control group at different stages of tests have been analyzed and submitted in table – I.

Table – I

**ANALYSIS OF COVARIANCE ON ANAEROBIC POWER OF HIGH INTENSITY
INTERVAL TRAINING IN HARD AND SAND SURFACE TRAINING GROUP AND
CONTROL GROUP**

	Hard Surface Group	Sand Surface Group	Control Group	SO V	SS	df	MS	‘F’
Pre-test mean	108.497	115.3302	114.4791	B	416.002	2	208.001	1.928
S.D	9.78066	10.60057	10.75420	W	4531.60	42	107.895	
Post-test mean	123.764	119.7579	114.0472	B	973.105	2	486.552	4.621*
S.D	7.11043	12.46351	10.48547	W	4421.79	42	105.281	
Adj. Post- Test mean	124.651	118.226	113.692	B	1149.40	2	574.705	5.575*
				W	4226.40	41	103.083	

*** Significant at 0.05 level of confidence.**

(The table value required for significance at 0.05 level of significance with df 2 and 42 and 2 and 41 were 3.22 and 3.23 respectively)

Table-I shows that the pre-test mean scores of anaerobic power of high intensity interval training in hard and sand surface group and control group is 108.4971, 115.3302 and 114.4791 respectively. The obtained ‘F’ value on pre-test scores 1.928 is less than the required ‘F’ value of 3.22 to be significant at 0.05 level. This proves that there is no significant difference among the groups at initial stage and the randomized assignment of the subjects into three groups are successful.

The post test scores analysis proves that there is significant difference among the groups, as obtained ‘F’ value 4.621 is greater than the required ‘F’ value of 3.22. This proves that there is significant difference among the post-test means of the subjects.

Taking into consideration of pre and post-test scores among the groups, adjusted mean scores are calculated and subjected to statistical treatment. The obtained ‘F’ value of 5.575 is greater than the required table ‘F’ value of 3.23. This proves that there is significant difference existed among the adjusted means due to twelve weeks of high intensity interval training in hard and sand surface on anaerobic power.

Since the significant improvements are recorded, the results are subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in table II.

TABLE-II
SCHEFFE'S CONFIDENCE INTERVAL TEST SCORES ON ANAEROBIC POWER

Adjusted post-test means			Mean Difference	Confidence Interval Value
Hard Surface Group	Sand Surface Group	Control Group		
124.651	118.226		6.425*	1.718
124.651		113.692	10.959*	
	118.226	113.692	4.534*	

* *Significant at 0.05 level of confidence.*

As the confidence interval required to be significant at 0.05 level is 1.718 and the obtained values are greater than the required value. It is observed that the significant difference is found to be existed.

The ordered adjusted means on anaerobic power are illustrated through bar diagram for better understanding of the results of this study in figure-I.

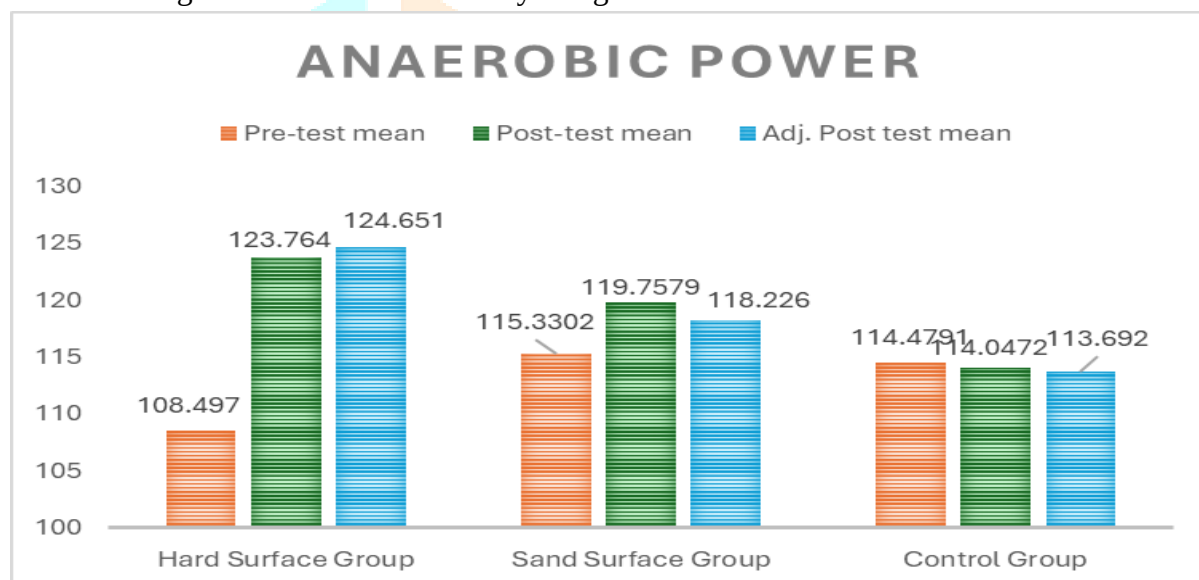


Figure I – Pre, Post and Adjusted post-test mean values on anaerobic power of high intensity interval training in hard and sand surface group and control groups

Results

1. It is concluded that due to the effect of high intensity interval training in hard and sand surface on anaerobic power was significantly improved among male soccer players.
2. It was also concluded that high intensity interval training in hard surface group was better than sand surface training group in increasing anaerobic power among male soccer players.

Conclusion

Both, high intensity interval training in hard and sand surface group influence on anaerobic power when compared with control group. From the results of the study, it was concluded that high intensity interval training in hard surface group was better than sand surface training group in increasing anaerobic power among male soccer players. Also concluded that there was significant difference between experimental and control groups.

Recommendations

The following recommendations were drawn, from the results of the present study:

1. It is recommended high intensity interval training in hard and sand surface training may be introduced in schools and colleges curriculum so that all the soccer players could be benefited.
2. It is recommended to the fitness trainers, coaches and physical educators to include high intensity interval training in hard and sand surface training for making positive changes on game related fitness and striking variables among male soccer players.
3. The government and the educational authorities may come forward to include soccer game along with physical exercises in schools and colleges for the benefit of players.

References

1. Edward L. Fox and Donald K. Mathews (1974), **Interval Training**, London: W.B. Saunders Company, p. 36.
2. Benjamin J. Ryan (2020), "Moderate-Intensity Exercise and High-Intensity Interval Training Affect Insulin Sensitivity Similarly in Obese Adults", *J. Clin. Endocrinol Metab.* 105(8): e2941–e2959.
3. Catherine, F. S. Marriott (2021), "High-Intensity Interval Training in Older Adults: a Scoping Review", *Sports Med Open.* 7: 49.
4. Meyer, T. (2007). "Effectiveness of low-intensity endurance training." *Int. J. Sports. Med.* Jan; 28(1): 33-9.
5. Muhammed Mustafa Atakan, M.M. *et al.* (2021), "Evidence-Based Effects of
6. High-Intensity Interval Training on Exercise Capacity and Health: A Review with Historical Perspective", *Int. J. Environ. Res. Public Health.* 18(13): 7201.
7. Qian-Qi Liu, *et al.*, (2022), "High Intensity Interval Training: A Potential Method for Treating Sarcopenia", *Clin. Interv. Aging.* 17: 857–872.
8. Thomas Bossmann (2022), "Effects of Different Types of High-Intensity Interval Training (HIIT) on Endurance and Strength Parameters in Children and Adolescents", *Int. J. Environ Res Public Health.* 19(11): 6855.
9. Thorland, W.G. (1987), "Strength and anaerobic responses of elite young female sprint and distance runners", *Medicine and Science in Sports and Exercise*, Vol. 19, pp. 56-61.
10. Ullrich, I. (1993). "The effects of exercise intensity on body composition in women", *Medicine and Science in Sports and Exercise*, Vol. 25(5), Supplement abstract, p. 316.