Effect Of Core Stability Training And Fartlek Training On Endurance Among Football Players

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ABSTRACT

The purpose of this study was to investigate the effect of core stability training and fartlek training on endurance among football players. Sixty (N=60) male football players from Kadapa district, aged 17–23 years, who had participated in inter-collegiate tournaments, were randomly divided into three groups: Core Stability Training Group (n=20), Fartlek Training Group (n=20), and Control Group (n=20). The experimental groups underwent their respective training programs for 12 weeks, while the control group did not receive any special training. Endurance was assessed through a standard test before and after training, and the data were analyzed using ANCOVA.

The pre-test mean values of endurance were 5.11 (CST), 5.22 (FT), and 5.42 (CG), with no significant difference among the groups ($F=1.34$, $p>0.05$). The post-test mean values improved to 5.69 (CST), 6.23 (FT), and 5.46 (CG), showing a significant difference ($F=6.27$, $p<0.05$). The adjusted post-test means were 5.84 (CST), 6.26 (FT), and 5.28 (CG), with an obtained F-value of 58.98, which was greater than the critical value of 3.16 ($p<0.05$). Post hoc analysis confirmed that both CST and FT significantly improved endurance compared to the control group, with fartlek training producing superior gains (mean difference = 0.98) compared to CST (mean difference = 0.56).

The findings indicate that both core stability training and fartlek training are effective in enhancing endurance, but fartlek training is more impactful due to its direct stimulation of aerobic and anaerobic systems relevant to football performance. Core stability training, while less effective than fartlek, still provides meaningful improvements by enhancing posture, trunk control, and running economy.

Keywords : Core Stability Training, Fartlek Training, Endurance and Football Players.

INTRODUCTION

Endurance is a fundamental physical quality for football (soccer) players: match play requires repeated high-intensity efforts interspersed with lower-intensity recovery, sometimes for 90 minutes or more. Aerobic endurance underpins the ability to sustain pace across a match, recover between sprints, and maintain technical and tactical effectiveness late in games. Improving players' endurance therefore remains a central goal of conditioning programs at all levels of the sport.

Two training approaches commonly used to develop footballers' endurance are fartlek training and core stability training (CST), though they operate through different mechanisms. Fartlek — "speed play" — is a variable-pace continuous run that mixes harder efforts with recovery sections; it is practical for football because it mimics the variable, intermittent nature of match play. Fartlek sessions can be easily integrated within field work and adapted for age, fitness level and game demands.

Core stability training targets trunk musculature and neuromuscular control to improve the ability to transfer force between lower and upper limbs, maintain posture under perturbation, and stabilize the torso during rapid changes of direction or contact. Although CST is often promoted for injury prevention, it may also indirectly support endurance performance by improving movement economy, postural control and efficient breathing mechanics during prolonged activity.

Physiologically, fartlek training stresses the aerobic system and, through properly dosed faster segments, places players near their VO_2max or lactate threshold intermittently — stimuli known to improve maximal oxygen uptake and endurance performance. Core training, conversely, primarily improves intramuscular endurance of trunk stabilizers and neuromuscular coordination; when combined with running work this may reduce wasted movement and improve running economy, thereby helping players sustain a given speed for longer with lower relative effort.

Because the two methods address complementary determinants of endurance (cardiorespiratory and biomechanical/neuromuscular), combining CST with field-based fartlek sessions may yield additive benefits. Several applied studies and reviews in team sports suggest that integrated programs — e.g., stability and movement control work plus interval or variable-pace running — can improve endurance measures and match-related fitness more than isolated approaches.

EXPERMENTAL DESIGN

Find out the study effect of core stability training and fartlek training on endurance among football players .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects men football players who are participated inter collegiate tournaments in kadapa district (N=60) were randomly assigned to three equal groups of twenty and their age ranged between 17-23 years . The selected subjects were divided into three groups randomly. Experimental Group I was considered core stability training group, experimental group II was fartlek training group and control

group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on endurance. Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

RESULTS ON ENDURANCE

The statistical analysis comparing the initial and final means of endurance due to Core stability training and Fartlek training among football players is presented in Table I

Table I

ANCOVA RESULTS ON EFFECT OF CORE STABILITY TRAINING AND FARTLEK TRAINING COMPARED WITH CONTROLS ON ENDURANCE

	CORE STABILITY TRAINING	FARTLEK TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	5.11	5.22	5.42	Between	0.97	2	0.48	1.34
				Within	20.61	57	0.36	
Post Test Mean	5.69	6.23	5.46	Between	6.21	2	3.10	6.27*
				Within	28.20	57	0.49	
Adjusted Post Test Mean	5.84	6.26	5.28	Between	9.39	2	4.69	58.98*
				Within	4.46	56	0.08	
Mean Diff	0.58	1.01	0.04					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.

*Significant

As shown in Table I, the obtained pre test means on endurance on Core stability training group was 5.11, Fartlek training group was 5.22 was and control group was 5.42. The obtained pre test F

value was 1.34 and the required table F value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post test means on endurance on Core stability training group was 5.69, Fartlek training group was 6.23 was and control group was 5.46. The obtained post test F value was 6.27 and the required table F value was 3.16, which proved that there was significant difference among post test scores of the subjects.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 58.98 was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table II

Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on endurance

MEANS				Required . C I
Core stability training Group	Fartlek training Group	Control Group	Mean Difference	
5.84	6.26		-0.42*	0.22
5.84		5.28	0.56*	0.22
	6.26	5.28	0.98*	0.22

***** Significant

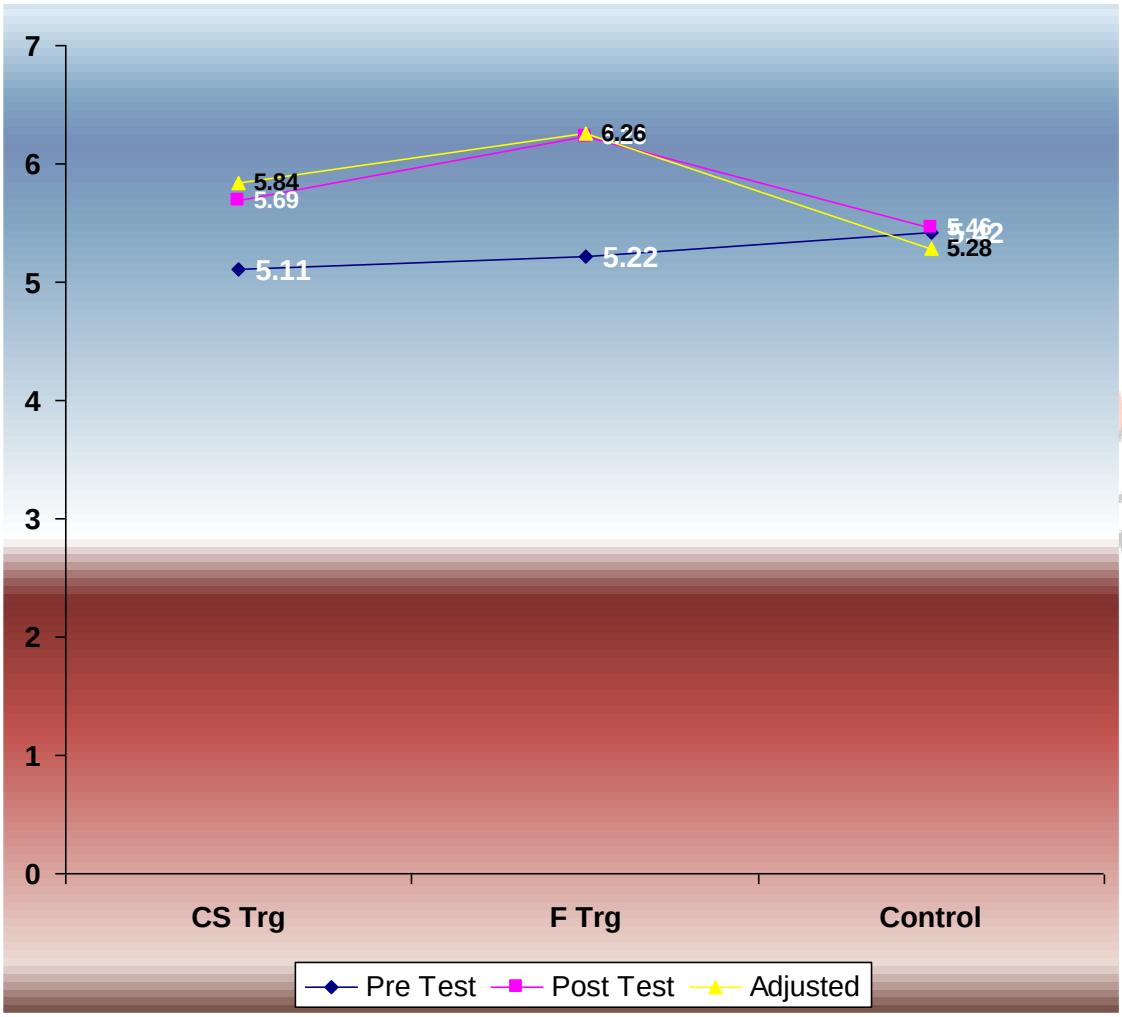
The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Core stability training group and control group (MD: 0.56). There was significant difference between Fartlek training group and control group (MD: 0.98). There was

significant difference between treatment groups, namely, Core stability training group and Fartlek training group. (MD: -0.42).

The ordered adjusted means were presented through line diagram for better understanding of the results of this study in Figure I.

Figure I

LINE DIAGRAM SHOWING PRE TEST, POST TEST AND ORDERED ADJUSTED MEANS ON ENDURANCE



DISCUSSIONS ON FINDINGS ON ENDURANCE

In order to find out the effect of Core stability training and Fartlek training on endurance the obtained pre and post test means were subjected to ANCOVA and post hoc analysis through Scheffe's confidence interval test.

The effect of Core stability training and Fartlek training on endurance is presented in Table I. The analysis of covariance proved that there was significant difference between the experimental group

and control group as the obtained F value 58.98 was greater than the required table F value to be significant at 0.05 level.

Since significant F value was obtained, the results were further subjected to post hoc analysis and the results presented in Table II proved that there was significant difference between Core stability training group and control group (MD: 0.56) and Fartlek training group and control group (MD: 0.98). Comparing between the treatment groups, it was found that there was significant difference between Core stability training and Fartlek training group among football players.

Thus, it was found that Fartlek training was significantly better than Core stability training and control group in improving endurance of the football players.

CONCLUSION

The findings of the present study revealed that both core stability training and fartlek training significantly enhanced endurance performance among football players when compared to the control group. However, fartlek training produced greater improvements than core stability training, indicating its superior effectiveness in developing aerobic capacity and sustaining high-intensity intermittent efforts required in football. Core stability training, though less impactful on endurance than fartlek, also contributed positively by improving trunk control and running economy. Overall, the results suggest that incorporating fartlek training into football conditioning programs can yield substantial endurance benefits, while core stability training may serve as a complementary method to support functional efficiency and injury prevention.

REFERENCES

1. Milanović, Z., Sporiš, G., & Weston, M. (2015). *Effectiveness of high-intensity interval training (HIT) and continuous endurance training for VO_2max improvements: a meta-analysis.*
2. Buchheit, M., & Laursen, P. B. (Review materials 2015–2016). *Practical programming and physiological rationale for high-intensity work in team sports.*
3. Hammami, M., Negra, Y., Aouadi, R., Shephard, R. J., & Chelly, M. S. (2016). *Effects of in-season plyometric/HIIT programs on repeated change-of-direction and sprint performance in junior soccer players.* Journal of Strength & Conditioning Research
4. Asadi, A., Arazi, H., Young, W. B., & Sáez de Villarreal, E. (2016). *The effects of plyometric training on change-of-direction ability: a meta-analysis.* Int J Sports Physiol Perform
5. Rodríguez-Rosell, D., Franco-Márquez, F., Pareja-Blanco, F., Mora-Custodio, R., Yáñez-García, J. M., González-Suárez, J. M., & González-Badillo, J. J. (2016).
6. NSCA (practical resource). *Fartlek training: Programming considerations for varied-pace conditioning* (2015–2016 practical guidance). Useful for designing football-specific fartlek sessions.
7. Ozmen, T., & colleagues (2015–2016). *Relationship between core stability, dynamic balance and jumping/sprint performance in team-sport players.* (conference/paper series)