

# Effect of Fartlek Training Combined with Different Running-Based High Intensity Interval Training on Cardio Respiratory Endurance of Men Soccer Players

Dinil S<sup>1\*</sup>, Prof D. Maniazhagu<sup>2</sup>, Dr. M. Kalaiselvi<sup>3</sup>

<sup>1</sup>Research Scholar, Department of Physical Education and Health Sciences, Alagappa University, TN

<sup>2</sup>Research Supervisor, Department of Physical Education and Health Sciences, Alagappa University, TN

<sup>3</sup>Co-Supervisor, Department of Physical Education and Health Sciences, Alagappa University, TN

DOI: <https://doi.org/10.36348/jaspe.2026.v09i04.005>

| Received: 07.02.2026 | Accepted: 02.04.2026 | Published: 06.04.2026

\*Corresponding author: Dinil S

Research Scholar, Department of Physical Education and Health Sciences, Alagappa University, TN

## Abstract

**Objectives:** This study aimed to investigate the effect of fartlek training combined with different running based high intensity interval training on cardio respiratory endurance of men soccer players. **Methods:** The experimental study enrolled 60 men soccer players who taking part in the inter collegiate level football tournament from University, Calicut Kerala. The age ranged between eighteen to twenty-one years, which were selected to carry out the research. The subjects who met the inclusion criteria were selected using random sampling and divided into three intervention groups and a control group. The test items used to collect the cardio respiratory endurance was tested by coppers 12 minutes run or walk test and performance recorded in meters. The 12 weeks of stipulated training was provided to the participants for the period of 60-minute sessions for the three alternative days in a week. **Statistical Procedure:** To process the results of the study, analysis of the data was done with the IBM SPSS Statistics 22 software. The statistics obtained were provided by way analysis of co variance. The level of confidence was fixed at 95% and values below  $p < 0.05$  were considered significant. **Results:** The one-way analysis of co variance showed a significant ( $p < 0.05$ ) improvement in cardio respiratory endurance over the 12 weeks of stipulated training. **Conclusion:** The results indicate considerable significant improvement on cardio respiratory endurance was observed. The findings indicate that the selected training regimes led to significant improvement on cardio respiratory endurance.

**Keywords:** Fartlek, Sprint interval, Pyramid sprint, cardio respiratory endurance, Ancova.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Many training programme have influenced in the game of soccer to enhancing the performance of the game (Plyometric, Interval and Resistance training). However, the fartlek training has most vital training to attacking the three major energy systems. It is a good way to train all three of the energy systems and also different muscle fibre types because of the large variations in intensity. The fartlek, Swedish for "Speed Play," Training method is an exceptional fitness tool that is excellent for soccer-specific conditioning. First used by runners, Fartlek features short bursts of all-out effort interspersed with less demanding longer intervals at a slower pace. The long-range benefit of fartlek training is an improved ability to adapt quickly to changes in intensity during perpetual motion, as on the football field. Fartlek helps to train player body to react to

changing intensities which can be very important in some sports, especially team sports such as hockey, rugby or soccer. This type of training can improve both aerobic and anaerobic energy levels. In addition to runners, fartlek training helps players of field games such as football, soccer, rugby, hockey and lacrosse as it develops aerobic and aerobic capacities. Soccer is characterized by high aerobic demands interspersed with frequent bursts of anaerobic activity. High-intensity interval training (HIIT) is considered a viable alternative to traditional endurance conditioning and offers the additional time-saving benefits of anaerobic training.

## METHODOLOGY

The experimental study enrolled 60 men soccer players who taking part in the inter collegiate level football tournament from University, Calicut Kerala. The

age ranged between eighteen to twenty-one years, which were selected to carry out the research. The subjects who met the inclusion criteria were selected using random sampling and divided into three intervention groups and a control group. The test items used to collect the cardio

respiratory endurance was tested by coppers 12 minutes run or walk test and performance recorded in meters. The 12 weeks of stipulated training was provided to the participants for the period of 60-minute sessions for the three alternative days in a week.

**Table-1: The End Results of Analysis of Covariance on Cardio Respiratory Endurance of Experimental and Control Group (Scores in Meters)**

Test	FT	FTSI	FTPS	CG	SV	SS	Df	MS	'F' Ratio	p value
<b>Pre Test</b>										
Mean	2005.46	2003.13	2003.13	2003.13	B	61.25	3	20.41	0.045	0.987
S.D.	28.01	22.75	15.93	15.56	W	25184.9	56	449.7		
<b>Post Test</b>										
Mean	2261.46	2450.46	2444.2	2000.6	B	2011365.5	3	670455.1	1352.1*	0.00
S.D.	16.01	23.00	30.81	15.76	W	27767.46	36	495.8		
<b>Adjusted Post Test</b>										
Mean	2261.13	2450.5	2444.3	2000.7	B	2011701.3	3	670567.1	1373.9*	0.00
					W	26843.00	55	488.05		

The pre-test means of cardio respiratory endurance were 2005.46 and SD 28.01 for fartlek training, 2003.13 and SD 22.75 for fartlek training with sprint interval, 2003.13 and SD 15.93 for fartlek training with pyramid sprint training and 2003.13 and SD 15.56 for control group. The obtained F ratio 0.045 was lesser than the table F ratio 2.77 Hence the pre-test was not significant at 0.05 level of confidence for the degrees of freedom 3 and 55. The post-test means of cardio respiratory endurance were 2261.46 and SD 16.01 for fartlek training, 2450.46 and SD 23.00 for fartlek with sprint interval training, 2444.2 and SD 30.81 for fartlek with pyramid sprint training and 2000.6 and SD 15.76 for control group. The obtained F ratio 1352.1 was higher

than the table F ratio 2.77 Hence the pot-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 55. The adjusted post-test means of cardio respiratory endurance were 2261.13 for fartlek training, 2450.5 for fartlek with sprint interval training, 2444.3 for partlek with pyramid sprint training and 2000.7 for control group. The obtained F ratio 1373.9 was higher than the table F ratio 2.77 Hence the adjusted pot-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 55. The results has clearly proved that there was a significant difference noticed among the experimental groups. To observe the superiority effect among the training group the bonferroni multiple pair wise test was observed.

**Table-2: Bonferroni Pair Wise Multiple Comparison on Cardio Respiratory Endurance Among the Experimental and Control Group**

FT	FTSI	FTPS	CG	Mean Differences	P value
2261.13	2450.5	-	-	189.44*	0.00
2261.13	-	2444.3	-	183.18*	0.00
2261.13	-	-	2000.7	260.42*	0.00
-	2450.5	2444.3	-	6.26	1.00
-	2450.5	-	2000.7	449.86*	0.00
-	-	2444.3	2000.7	443.6*	0.00

(Significant at 0.05 level)

#### Significant comparisons:

- 1) The fartlek training and fartlek training combined with sprint interval
- 2) The fartlek training and fartlek training combined with pyramid sprint
- 3) The fartlek training with control group
- 4) The fartlek training with sprint interval and fartlek training with pyramid sprint
- 5) The fartlek training with sprint interval and control group.
- 6) The fartlek training with pyramid sprint control group.

The mean differences values of above comparisons were 189.44, 183.18, 260.42, 6.26, 449.86 and 443.6 respectively, which is lesser than the p values of 0.05 level of confidence. Hence the above all comparisons were show the significant different improvement of cardio respiratory endurance.

#### COMPARISON RESULTS

- 1) The fartlek training combined with sprint interval has better than fartlek training combined with pyramid sprint

- 2) The fartlek training combined with pyramid sprint has shown the second best than the fartlek training alone.
- 3) The training also shows the least improvement on cardio respiratory endurance

## DISCUSSION OF FINDINGS

The Twelve weeks of fartlek training (FT), fartlek training combined with sprint interval training (FT+ST), fartlek training combined with pyramid sprint training (FT+PS) resulted in greater improvements in respiratory endurance compared to the control group. The following studies in line with the current studies.

Nimeshkumar D Chaudhari (2017), his present study examined to examine the effect of sand running on speed and cardiorespiratory endurance among male students aged 18-24 years from Gujarat Vidyapith. The study highlights the effectiveness of sand running as a training method for enhancing key physical fitness components. Mansi Shingala & Yagna unmesh Shukla (2019), their study was undertaken to evaluate the effectiveness of Fartlek training a Swedish method meaning speed play on cardiorespiratory fitness and muscular endurance among young adults. The findings suggest that Fartlek training is more effective than conventional aerobic exercise in enhancing cardiorespiratory fitness and muscular endurance in young adults. Yashoda Rani (2018), her study was conducted to determine the effect of Fartlek training on cardiorespiratory endurance and resting pulse rate among male kabaddi players. The results revealed a significant improvement in cardiorespiratory endurance and a reduction in resting pulse rate in the Fartlek training group compared to the control group. The study concludes that Fartlek training is effective in enhancing endurance and improving cardiovascular efficiency among kabaddi players. M, E., & R, M. E. (2014), their study explored to examine the effect of Fartlek training on cardiorespiratory endurance, breath holding time, and resting pulse rate among school boys. The results revealed a significant improvement in cardiorespiratory endurance in the experimental group, whereas no significant changes were observed in breath-holding time and resting pulse rate. The findings indicate that Fartlek training is effective in improving endurance but has limited impact on other physiological variables within the duration of the study. Anoushka Bhutada & Nidhi Ladha (2024), their research analyzed to investigate the effect of Fartlek training on cardiovascular endurance and speed among amateur basketball players. The results revealed a highly significant improvement in VO<sub>2</sub> max, indicating enhanced cardiovascular endurance, along with a significant improvement in speed performance. The findings suggest that Fartlek training is an effective method for improving both aerobic capacity and speed in young basketball players. Liang W *et al.*, (2024), their systematic review and meta-analysis compared the effects of Sprint Interval Training (SIT) and Moderate-Intensity Continuous Training (MICT) on blood pressure

and cardiorespiratory fitness in adults. Eight randomized controlled trials with 169 participants were analyzed. Results showed that SIT significantly reduced systolic blood pressure but had no significant effect on diastolic pressure, whereas MICT significantly reduced both. Both methods improved VO<sub>2</sub> max, with MICT showing slightly greater improvement. No significant difference was observed between the two training methods in overall blood pressure outcomes. Subgroup analysis indicated that longer SIT duration and shorter sprint intervals were more effective. The study concludes that SIT is an effective and time-efficient alternative that can complement traditional MICT. Taura N. Willoughby *et al.*, (2015), their investigation focused on to determine the effectiveness of a 4-week running sprint interval training (SIT) programme on aerobic and anaerobic fitness in young (20-30 years) and middle-aged adults (40-50 years). The study concludes that SIT is equally effective in enhancing aerobic and anaerobic fitness in both young and middle-aged adults. Dean N *et al.*, (2025), their research evaluated to examine the effects of sprint-intensity arm interval training on cardiorespiratory fitness and cardiometabolic health in a 17-year-old boy with cerebral palsy. The findings suggest that arm-based sprint interval training is a safe and effective method for improving fitness in children with mobility disabilities. Further research is recommended to confirm these results. T. Madhankumar & D. Sakthignanavel (2015), their study aimed to assess to analyze the effects of continuous running and Fartlek training on cardiorespiratory and muscular endurance among football players. The findings indicated significant improvements in both cardiorespiratory and muscular endurance in the experimental groups compared to the control group. However, no significant difference was observed between continuous running and Fartlek training methods. The study highlights that both training approaches are equally effective in enhancing endurance performance among football players. Adapa Mohana Raju (2024), his present research assessed to examine the effects of circuit training and interval training on cardiorespiratory endurance and VO<sub>2</sub> max among long-distance runners. The study concludes that both training methods are beneficial, with circuit training offering a slight advantage in enhancing endurance performance. Wang S *et al.*, (2025), they evaluate the effectiveness of repeated sprint training (RST) compared to high-intensity interval training (HIIT) on aerobic and anaerobic power among collegiate male rugby players. The study concludes that RST is more effective than HIIT for enhancing performance-related fitness components in rugby players. Ron Aldren B *et al.*, (2024), their investigation analyzed to examine the effect of Fartlek training on anaerobic performance among ultimate Frisbee players using the Running Anaerobic Sprint Test (RAST). Results indicated that most players showed improvement in anaerobic performance after the training programme. However, variations were observed in fatigue tolerance among participants. The study concludes that Fartlek training is effective in enhancing

anaerobic capacity, with limited influence on fatigue index, and can be used to optimize performance in ultimate Frisbee players. Arben Bici & Agron Kasa (2025), they The study was conducted to examine that the effects of high-intensity interval training (HIIT) incorporating Fartlek and change-of-direction (COD) exercises on aerobic and anaerobic capacities in young soccer players. The study concludes that HIIT combined with Fartlek and COD is an effective training method for improving overall fitness in young soccer players. Noor Aleem A S (2016), their study effectively examined the impact of fartlek training on key physical variables among college-level sprinters. The findings clearly demonstrated significant improvements in speed and anaerobic power among the trained group. Overall, the study highlights fartlek training as a highly effective method for enhancing sprint performance. Jose, Roy N & Sathyaraja, R (2026), their experimental study compared the effects of plyometric and fartlek training on key performance variables in basketball players. Overall, plyometric training proved superior for explosive performance, whereas fartlek training better supports cardiovascular endurance. İbrahim Halil Şahin & Ali Osman Kıvrak (2025), they explored in the influence of isokinetic leg strength, balance, and anaerobic endurance on different phases of 100 m sprint performance. The findings highlight that multiple physical factors collectively contribute to sprint performance. Overall, maximum speed and sprint maintenance phases were most strongly influenced by these variables. Tongwu Y *et al.*, (2025), their study compared the effectiveness and consistency of three HIIT protocols APR, MAP, and SIT on physiological adaptations in elite male rowers. The findings indicate that SIT provides more consistent and reliable training adaptations compared to APR and MAP methods. Overall, SIT emerges as the most efficient protocol for maximizing performance and uniformity among elite rowers. Zhao, D *et. al.* (2024), they research sought to determine that the effectiveness of low-volume, court-based sprint interval training (SIT) on anaerobic capacity and tennis specific performance in competitive players. The SIT group showed significant improvements in peak and average power, along with enhanced intermittent recovery performance. Notably, repeated sprint ability improved with reduced sprint times, indicating better sport-specific performance. SIT also resulted in higher training intensity, as reflected by greater time spent near maximal heart rate. Overall, SIT proved more effective than traditional endurance training in improving anaerobic fitness and performance in tennis players. Maximiliane Thron (2025), their study attempted to evaluate that the relationship between anaerobic speeds reserve (ASR) and acute responses to short format high-intensity interval training (HIIT) in adolescent runners. Overall, the findings highlight the importance of individualized training based on ASR to optimize performance and reduce the risk of overload. Arun P J *et al.*, (2024), their research focused on analyzing that the effects of aided and resisted sprint training on anaerobic

power among female Kho-Kho athletes. The findings revealed that both aided and resisted sprint training effectively enhanced anaerobic power. Overall, these methods are valuable for improving performance in female Kho-Kho players.

## CONCLUSIONS

- 1) Twelve weeks of fartlek training (FT), fartlek training with sprint interval training (FT+SI) fartlek training with pyramid sprint (FT+PS) resulted in greater improvements in cardio respiratory endurance compared to the control group.
- 2) Among the three experimental groups, fartlek training with sprint interval training (FT+SI), produced the greatest improvement in cardio respiratory endurance, outperforming both fartlek training with pyramid sprint (FT+PS) and fartlek training (FT).
- 3) The fartlek training with pyramid sprint (FT+PS) showed significantly greater improvement than the fartlek training (FT) group.
- 4) The least improvement among the experimental groups was observed in the fartlek training (FT) group.
- 5) The control group showed no improvement in cardio respiratory endurance among men football players.

## REFERENCES

- Adapa Mohana Raju (2024). Effect of circuit training and interval training on cardio respiratory endurance and vo2 max among long distance runner. *ShodhKosh: Journal of Visual and Performing Arts*, 5(6), 2672–2679, DOI:10.29121/shodhkosh.v5.i6.2024.4624
- Anoushka Bhutada & Nidhi Ladha (2024). Effectiveness of 4-week Fartlek Training on Cardiovascular Endurance and Speed among Amateur Basketball Players. *International Journal of Health Sciences and Research*, Volume 14; Issue: 10; October, DOI: <https://doi.org/10.52403/ijhsr.20241002>
- Arben Bici & Agron Kasa (2025). Effects of 8-week HIIT (Fartlek) combined with Change of Direction (COD) training on aerobic and anaerobic capacity in 18-year-old soccer players. *August 2025 Scientific Journal of Sport and Performance* 4(4):557-569, DOI:10.55860/NBQI8453
- Arun P J, Shibin Dev, Waseem Ahmad Bhat & Nalini B (2024). Influence of resisted and assisted sprint training on anaerobic power among women Kho-Kho players. E-ISSN: 2583-8296, Vol.2, No. 1, 2024, DOI:10.60081/SSHA.02.01.2024.193-197
- Dean N, Sinha T, Bright L, Ellison KM, Sayer D, Young R, Davis D, Rimmer JH, Lai B (2025). Sprint-Intensity Arm Interval Training May Improve Cardiorespiratory Fitness and Cardiometabolic Health Among Children with Mobility Disabilities: Case Report. *JMIR Form Res*.

- 2025 Oct 8; 9:e64440. doi: 10.2196/64440. PMID: 41061149; PMCID: PMC12507328.
- İbrahim Halil Şahin & Ali Osman Kivrak (2025). Analysis of the phases of sprint in terms of isokinetic leg strength, anaerobic endurance, and balance. *Journal of Men's Health*. 2025. 21(10); 62-78, DOI: 10.22514/jomh.2025.127
  - January 2019 *Indian Journal of Physiotherapy and Occupational Therapy - An International Journal* 13(2):86 DOI:10.5958/0973-5674.2019.00051.0
  - Jose, Roy N & Satharaja, R (2026.). A Comparative Study on Plyometric Training Over Fartlek Training on Speed, Agility, and Endurance among Collegiate Basketball Players. *Medical Journal of Dr. D.Y. Patil Vidyapeeth* 19(3):p 251-256, March 2026. | DOI: 10.4103/mjdrdypu.mjdrdypu\_256\_25
  - Liang W, Liu C, Yan X, Hou Y, Yang G, Dai J, Wang S (2024). The impact of sprint interval training versus moderate intensity continuous training on blood pressure and cardiorespiratory health in adults: a systematic review and meta-analysis. *PeerJ*. 2024 Mar 14; 12:e17064. DOI: 10.7717/peerj.17064. PMID: 38495758; PMCID: PMC10944631.
  - M, E., & R, M. E. (2014). Effect of Fartlek Training on Selected Physiological Parameters among College Male Athletes. *International Journal of Physical Education, Fitness and Sports*, 3(4), 77–83. <https://doi.org/10.26524/14412>
  - Mansi Shingala & Yagna unmesh Shukla (2019). Effectiveness of fartlek training on cardiorespiratory fitness and muscular endurance in young adults: a randomized control trial.
  - Maximiliane Thron, Ludwig Ruf, Martin Buchheit, Sascha Härtel, Alexander Woll & Stefan Altmann (2025). Anaerobic speed reserve and acute responses to a short-format high-intensity interval session in runners. *Journal of Science and Medicine in Sport*. Volume 28, Issue 5, May 2025, Pages 408-417, DOI: <https://doi.org/10.1016/j.jsams.2024.12.012>
  - Nimeshkumar D Chaudhari (2017). Effect of fartlek training on speed and cardio-respiratory endurance of university men students. *Int J Physiol Nutr Phys Educ* 2017; 2(1): Pages: 273-275.
  - Noor Aleem A S (2016). Effect of fartlek training on selected physical variables among sprinters. 2016 *IJRAR* June 2016, Volume 3, Issue 2 [www.ijrar.org](http://www.ijrar.org) (E-ISSN 2348-1269, P- ISSN 2349-5138)
  - Ron Aldren B. Abustan, Zoe Bernadette C. Tolentino, Ma. Latiffa G. Villaluz, & Antonio F. Enriquez Jr. (2024). Effectiveness of fartlek training in anaerobic performance of ultimate frisbee players. *International Journal on Management Education and Emerging Technology (IJMEET)*, 2(2), 61–73. Retrieved from <https://ijmeet.org/index.php/journal/article/view/41>
  - T. Madhankumar & D. Sakthignanavel (2015). Effect of continuous running and fartlek training on cardio respiratory endurance and muscular endurance of football players. *International research journal of physical education and sports sciences*. ISSN: 2394 –7985 PEER REVIEWED ONLINE VOLUME: II ISSUE: II AUGUST 2015
  - Taura N. Willoughby, Matthew P.L. Thomas, Matthew S. Schmale, Jennifer L. Copeland & Tom J. Hazell (2015). Four weeks of running sprint interval training improves cardiorespiratory fitness in young and middle-aged adults. *Journal of Sports Sciences*. Volume 34, 2016 - Issue 13, <https://doi.org/10.1080/02640414.2015.1102316>
  - Tongwu Y, Jinghui Z, Chuanwei D, Zijian Z and Yuxiong X (2025) Supramaximal interval training using anaerobic speed reserve or sprint interval training in rowers. *Front. Physiol*. 16:1516268. doi: 10.3389/fphys.2025.1516268
  - Wang S, Tang J, Liu S, Li H, Li Q, Pan L, Chen Z, Liu C (2025). Improving of 6 weeks of repeated sprint training on the aerobic and anaerobic power of college-age male rugby players. *Front Physiol*. 2025 Jul 29; 16:1620197. DOI: 10.3389/fphys.2025.1620197. PMID: 40800733; PMCID: PMC12339488.
  - Yashoda Rani (2018). Effect of fartlek training cardiac-respiratory endurance and resting pulse rate and kabaddi male players. *International Journal of Multidisciplinary Research and Development*, Online ISSN: 2349-4182, Print ISSN: 2349-5979, Impact Factor: RJIF 5.72, Received: 30-12-2017; Accepted: 28-01-2018, [www.allsubjectjournal.com](http://www.allsubjectjournal.com), Volume 5; Issue 1; January 2018; Page No. 210-211
  - Zhao, D., Liu, H., Yang, W. *et al.*, (2024). Effects of low-volume court-based sprint interval training on anaerobic capacity and sport-specific performance in competitive tennis players. *Sci Rep* 14, 19131 (2024). <https://doi.org/10.1038/s41598-024-70198-9>