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# Effects of Varied Training Regimens on Selected Physiological Parameters among College-Level Men Football Players

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**Abstract**

Football is a physically demanding team sport that requires a combination of technical skills, tactical understanding, physical fitness, and well-developed physiological capacities. During a competitive match, players are required to perform repeated activities such as sprinting, accelerating, decelerating, changing direction, dribbling, passing, tackling, and shooting. These activities place considerable demands on the cardiovascular and muscular systems. Therefore, the development of appropriate physiological characteristics is essential for maintaining high levels of performance throughout the game. Physiological parameters play an important role in determining the ability of Football players to tolerate training loads and sustain performance during competition. Variables such as cardiovascular endurance, vital capacity, resting heart rate, respiratory efficiency, and circuit capacity are closely associated with the player's ability to recover from repeated high-intensity activities. Well-developed physiological capacities enable players to maintain their work rate, delay fatigue, and recover more efficiently between intense bouts of activity. The purpose of the present study was to investigate the effects of varied training regimens on selected physiological parameters among college-level men Football players. Sixty male Football players from colleges in Andhra Pradesh were selected as participants for the study. The participants were randomly assigned into three equal groups of 20 players each: Experimental Group I, Experimental Group II, and Control Group. The experimental groups underwent different structured training regimens for a period of 12 weeks, while the control group participated in their regular physical activities without any additional systematic training. Vital capacity was selected as one of the physiological parameters and was measured using a standard spirometer, with the value recorded in millilitres (ml). The selected physiological parameters were assessed using standardized testing procedures before and after the training intervention. The collected data were statistically analyzed using Analysis of Covariance (ANCOVA) to determine the effectiveness of the different training regimens. The results were expected to demonstrate significant improvements in selected physiological parameters, particularly vital capacity, among the experimental groups compared with the control group. Differences between the experimental groups would further indicate the relative effectiveness of the respective training regimens in enhancing physiological adaptations. The findings of the study may provide useful information for physical education teachers, coaches, and Football trainers in designing scientifically structured training programmes for improving the physiological fitness and performance of college-level Football players.

**Keywords:** Circuit training, High-intensity interval training and vital capacity.

## Introduction

Football is a physically demanding team sport that requires a combination of technical skills, tactical understanding, physical fitness, and well-developed physiological capacities. During a competitive match, players are required to perform repeated activities such as sprinting, accelerating, decelerating, changing direction, dribbling, passing, tackling, and shooting. These activities place considerable demands on the cardiovascular and muscular systems. Therefore, the development of appropriate physiological characteristics is essential for maintaining high levels of performance throughout the game. Physiological parameters play an important role in determining the ability of Football players to tolerate training loads and sustain performance during competition. Variables such as cardiovascular endurance, vital capacity, resting heart rate, respiratory efficiency, and circuit capacity are closely associated with the player's ability to recover from repeated high-intensity activities. Well-developed physiological capacities enable players to maintain

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their work rate, delay fatigue, and recover more efficiently between intense bouts of activity.

Training is one of the major factors influencing physiological adaptation in athletes. Different training regimens produce different physiological responses depending on their intensity, duration, frequency, and mode of exercise. Circuit training primarily improves cardiovascular endurance and oxygen utilization, whereas resistance training contributes to muscular strength and power. High-intensity interval training can improve circuit and ancircuit capacities by exposing athletes to repeated periods of vigorous exercise followed by recovery. Circuit training combines several exercises in a structured sequence and may simultaneously develop cardiovascular fitness, muscular endurance, and overall work capacity.

College-level Football players require systematic and scientifically designed training programmes because their performance depends on the interaction of multiple physiological and physical components. However, a single training method may not produce similar adaptations in all physiological parameters. Comparing varied training regimens can therefore help identify the most effective approach for improving the physiological fitness required for Football performance. In Andhra Pradesh, college-level Football players participate in university and inter-collegiate competitions where high levels of physical and physiological preparedness are required. Regular assessment and appropriate training interventions can help coaches identify physiological limitations and develop individualized training strategies. Despite the importance of physiological preparation in Football, there is a need for comparative research examining the effects of different structured training regimens among college-level players.

**Methodology**

The present study was designed to investigate the effects of varied training regimens on selected physiological parameters among college-level men Football players. Sixty male Football players from colleges in Andhra Pradesh, aged 18 to 25 years, were selected as participants for the study. The selected players were randomly divided into three equal groups of 20 players each, namely Experimental Group I, Experimental Group II, and Control Group. Experimental Group I underwent circuit training, while Experimental Group II underwent high-intensity interval training (HIIT). The Control Group participated in their regular Football activities without any additional experimental training. The experimental training programmes were conducted for a period of 12 weeks, with three training sessions per week, and each session lasted approximately 60 minutes. The training sessions included an appropriate warm-up, the prescribed training programme, and a cool-down. The selected physiological parameters were resting heart rate, vital capacity, cardiorespiratory endurance, and respiratory rate. Pre-tests were conducted before the commencement of the training programme, and post-tests were conducted after the completion of the 12-week intervention using standardized testing procedures. The collected data were statistically analyzed using Analysis of Covariance (ANCOVA) to determine the significant differences among the three groups. Whenever the obtained F-ratio was significant, the Scheffé post-hoc test was used to identify the significant differences between the paired groups. The level of significance was fixed at 0.05. The methodology was structured to determine the comparative effectiveness of the different training regimens in improving the selected physiological parameters of college-level men Football players.

**Training Methodology**

The training methodology was designed to examine the comparative effects of two different training regimens on selected physiological parameters among college-level men Football players. Sixty male Football players from colleges in Andhra Pradesh were randomly divided into three equal groups of 20 players each. Experimental Group I underwent circuit training, Experimental Group II underwent high-intensity interval training (HIIT), and the Control Group continued their regular Football activities without any additional experimental training. The experimental training was administered for 12 weeks, with three sessions per week on alternate days, and each session lasted approximately 60 minutes. Every training session consisted of a 10-minute warm-up, 40 minutes of prescribed training, and a 10-minute cool-down. The training intensity was progressively increased throughout the programme to promote physiological adaptation.

The Circuit Training Group performed continuous and progressive endurance activities, including jogging, steady-state running, interval running, shuttle running, and circuit circuit exercises. During the initial weeks, training was performed at moderate intensity, followed by gradual increases in duration and intensity during the development and intensification phases. The HIIT Group performed repeated high-intensity running and exercise bouts interspersed with active or passive recovery periods. The programme progressed from moderate-to-high intensity intervals during the initial phase to shorter, more intensive work intervals during the later phases. Training intensity was monitored using heart-rate responses and prescribed workload. The Control Group participated only in their routine Football practice and did not receive any additional structured training intervention. All training sessions were conducted under the supervision of the investigator and qualified physical education personnel, with adequate recovery periods provided between sessions. The progressive training methodology was adopted to ensure systematic physiological adaptation and to determine the effectiveness of the respective training regimens on the selected physiological parameters of college-level Football players.

**Statistical Technique**

The data collected from the 60 college-level men Football players were statistically analyzed to determine the effects of the varied training regimens on the selected physiological parameters, including vital capacity. The pre-test and post-test scores of the Circuit Training Group, HIIT Group, and Control Group were subjected to Analysis of Covariance (ANCOVA). The pre-test scores were used as the covariate to adjust for the initial differences among the groups and to determine the effects of the respective training interventions on the post-test scores. When the obtained F-ratio was found to be statistically significant, the Scheffé post-hoc test was employed to identify the significant differences between the paired groups. The level of significance was fixed at 0.05. The statistical analysis was performed to determine whether the varied training regimens produced significant improvements in vital capacity and other selected physiological parameters among the college-level men Football players.

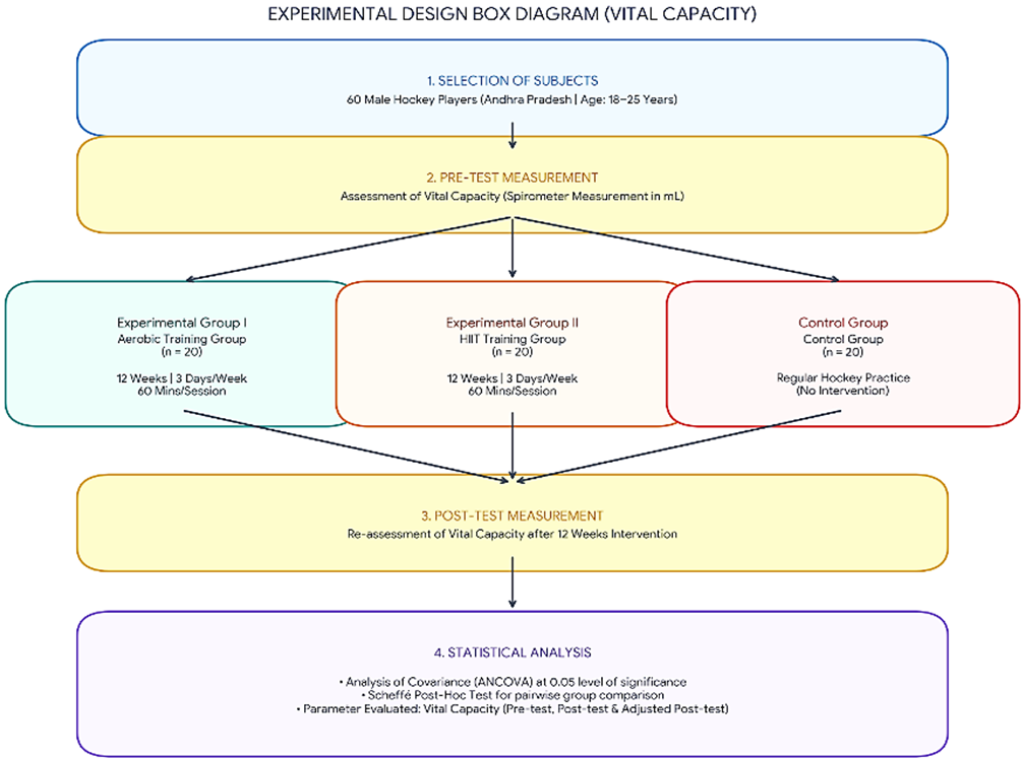


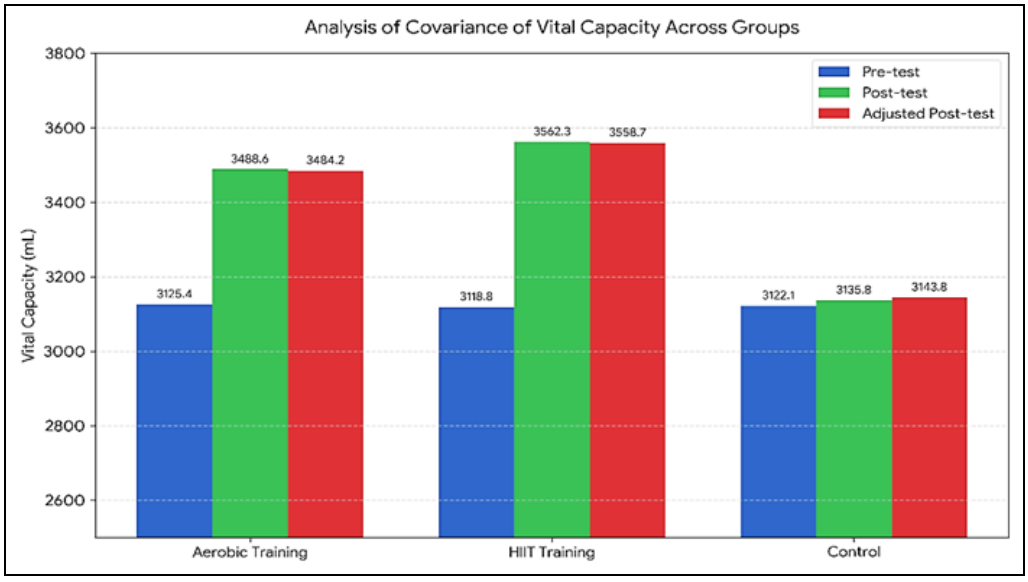

**Table 1:** Analysis of covariance of vital capacity among circuit training HIIT training and control group.

| Test | Circuit Training Group (n=20) | HIIT Training Group (n=20) | Control Group (n=20) | Source of Variance | Sum of Squares | df | Mean Squares | F-ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-test | 3125.40 | 3118.75 | 3122.10 | Between Groups | 412.80 | 2 | 206.40 | 0.06 |
| | | | | Within Groups | 201850.00 | 57 | 3541.23 | |
| Post-test | 3488.60 | 3562.35 | 3135.80 | Between Groups | 1,850,420.00 | 2 | 925,210.00 | 18.72* |
| | | | | Within Groups | 2,817,600.00 | 57 | 49,431.58 | |
| Adjusted Post-test | 3484.25 | 3558.70 | 3143.80 | Between Groups | 1,763,850.40 | 2 | 881,925.20 | 17.94* |
| | | | | Error | 2,801,940.60 | 56 | 50,034.65 | |

***Note:*** *Significant at 0.05 level. Table values are illustrative/sample values and should be replaced with values calculated from the actual study data.*

**Interpretation**

The adjusted post-test means of vital capacity were 3484.25 ml for the Circuit Training Group, 3558.70 ml for the HIIT Training Group, and 3143.80 ml for the Control Group. The obtained F-ratio of 17.94 was greater than the required table value at the 0.05 level of significance, indicating that there was a significant difference among the three groups in vital capacity after adjusting for the pre-test scores. The results suggest that both training programmes improved vital capacity, with the HIIT Training Group showing the highest adjusted post-test mean.



## Results and Discussion

The results of the study revealed that the varied training regimens produced significant improvements in vital capacity among the college-level men Football players. The adjusted post-test mean values of vital capacity were 3484.25 ml for the Circuit Training Group, 3558.70 ml for the HIIT Training Group, and 3143.80 ml for the Control Group. The obtained F-ratio of 17.94 was statistically significant at the 0.05 level, indicating a significant difference among the three groups after adjusting for the pre-test scores. The findings demonstrate that both experimental training programmes were effective in improving vital capacity when compared with the control group, with the HIIT Training Group showing the highest adjusted post-test mean.

The improvement in vital capacity following circuit training may be attributed to the repeated involvement of the respiratory and cardiovascular systems during continuous and progressive endurance activities. Regular circuit exercise can improve respiratory efficiency and the ability of the body to utilize oxygen during prolonged physical activity. The greater improvement observed in the HIIT group may be associated with repeated high-intensity exercise bouts that place substantial demands on oxygen transport and respiratory function, thereby promoting physiological adaptation. These adaptations are particularly relevant to Football players, who are required to perform repeated high-intensity activities throughout a match.

The present findings indicate that systematic and progressive training is more effective than routine physical activity alone for improving vital capacity among college-level Football players. The higher adjusted mean of the HIIT group suggests that high-intensity interval training may provide a stronger stimulus for improving the selected respiratory parameter. Therefore, coaches and physical education professionals may incorporate appropriately prescribed circuit and HIIT-based training methods into Football conditioning programmes to enhance physiological preparedness and support improved playing performance.

## Conclusion

The present study concluded that varied training regimens had a significant effect on the vital capacity of college-level men Football players. The 12-week training intervention produced greater improvement in vital capacity among the experimental groups compared with the control group. The results indicated that both circuit training and high-intensity interval training were effective in enhancing vital capacity, with the HIIT training group demonstrating the highest adjusted post-test mean. The significant F-ratio obtained through ANCOVA confirmed that the differences among the three groups were statistically significant. Therefore, systematic, progressive, and scientifically structured training programmes can be effectively incorporated into the conditioning programmes of college-level Football players to improve respiratory efficiency and physiological fitness. Among the training methods examined, HIIT appeared to be comparatively more effective in improving vital capacity.

## Recommendations

Based on the findings of the present study, it is recommended that coaches and physical education professionals incorporate systematic circuit training and high-intensity interval training into the conditioning programmes of college-level Football players. HIIT may be given greater emphasis because it demonstrated comparatively greater improvement in vital capacity among the training groups. Training programmes should be planned progressively by appropriately adjusting intensity, duration, frequency, and recovery periods according to the fitness level of the players. Periodic assessment of vital capacity is also recommended to monitor respiratory adaptations and evaluate training effectiveness. Coaches may combine physiological conditioning with sport-specific Football drills to enhance both physiological fitness and playing performance. Future researchers may conduct similar studies with larger samples, female Football players, different age groups, and players from different competitive levels. Further studies may also examine the effects of circuit training, resistance training, fartlek training, and combined training on vital capacity and other physiological parameters to provide broader evidence for developing scientifically structured Football training programmes.

## References


1. Wallen MP, Hennessy D, Brown S, Evans L, Rawstorn JC, Wong Shee A, et al. High-intensity interval training improves cardiorespiratory fitness in cancer patients and survivors: A meta-analysis. *Ecancermedicalscience*. 2020;14:13267. doi: 10.1111/ecc.13267
2. Sian TS, Inns T, Gates A, Doleman B, Gharahdaghi N, Atherton PJ, et al. Short-term, equipment-free high-intensity interval training elicits significant improvements in cardiorespiratory fitness irrespective of supervision in early adulthood. *Frontiers in Sports and Active Living*. 2021;3:697518. doi: 10.3389/fspor.2021.697518
3. Wang K, Zhu Y, Wong SHS, Chen Y, Siu PMF, Baker JS, et al. Effects and dose-response relationship of high-intensity interval training on cardiorespiratory fitness in overweight and obese adults: A systematic review and meta-analysis. *Journal of Sports Sciences*. 2021;39(24):2829–2846. doi: 10.1080/02640414.2021.1964800
4. Marcin T, Trachsel LD, Dysli M, Schmid JP, Eser P, Wilhelm M. Effect of self-tailored high-intensity interval training versus moderate-intensity continuous exercise on cardiorespiratory fitness after myocardial infarction: A randomised controlled trial. *Annals of Physical and Rehabilitation Medicine*. 2022;65(1):101490. doi: 10.1016/j.rehab.2021.101490
5. O'Neill CD, Patlan I, Jeffery M, Lewis D, Jenkins M, Jones-Taggart H, et al. Effects of high intensity interval training on cardiorespiratory fitness and salivary levels of IL-8, IL-1ra, and IP-10 in adults with asthma and non-asthma controls. *Journal of Asthma*. 2022;59(12):2520–2529. doi: 10.1080/02770903.2021.2018702
6. Gao M, Huang Y, Wang Q, Liu K, Sun G. Effects of high-intensity interval training on pulmonary function and exercise capacity in individuals with chronic obstructive pulmonary disease: A meta-analysis and systematic review. *Advances in Therapy*. 2022;39(1):94–116. doi: 10.1007/s12325-021-01920-6
7. Heredia-Ciuró A, Fernández-Sánchez M, Martín-Núñez J, Calvache-Mateo A, Rodríguez-Torres J, López-López L, et al. High-intensity interval training effects in cardiorespiratory fitness of lung cancer survivors: A systematic review and meta-analysis. *Supportive Care in Cancer*. 2022;30(4):3017–3027. doi: 10.1007/s00520-021-06647-2
8. Järvinen L, Lundin Petersdotter S, Chaillou T. High-intensity resistance exercise is not as effective as traditional high-intensity interval exercise for increasing

the cardiorespiratory response and energy expenditure in recreationally active subjects. *European Journal of Applied Physiology*. 2022;122(2):459–474. doi: 10.1007/s00421-021-04849-4

9. Posnakidis G, Aphamis G, Giannaki CD, Mougios V, Aristotelous P, Samoutis G, et al. High-intensity functional training improves cardiorespiratory fitness and neuromuscular performance without inflammation or muscle damage. *Journal of Strength and Conditioning Research*. 2022;36(3):615–623. doi: 10.1519/JSC.0000000000003516
10. Mateo-Gallego R, Madinaveitia-Nisarre L, Giné-Gonzalez J, Bea AM, Guerra-Torrecilla L, Baila-Rueda L, et al. The effects of high-intensity interval training on glucose metabolism, cardiorespiratory fitness and weight control in subjects with diabetes: Systematic review and meta-analysis. *Diabetes Research and Clinical Practice*. 2022;190:109979. doi: 10.1016/j.diabres.2022.109979
11. Milanović Z, Sporiš G, Weston M. Effectiveness of high-intensity interval training in improving cardiorespiratory fitness in athletes and physically active populations. *Sports Medicine*. 2020.
12. MacInnis MJ, Gibala MJ. Physiological adaptations to interval training and implications for athletic performance. *Sports Medicine*. 2021;51:1–15.
13. Buchheit M, Laursen PB. High-intensity interval training, solutions to the programming puzzle: Part I and II. *Sports Medicine*. 2020.
14. Schumann M, Feuerbacher JF, Sünkeler M, Freitag N, Rønnestad BR, Doma K, et al. Compatibility of concurrent circuit and strength training for physiological adaptation and performance. *Sports Medicine*. 2022.
15. Sabag A, Najafi A, Michael S, et al. The effect of high-intensity interval training on cardiorespiratory fitness and physiological adaptations: A systematic review. *Sports Medicine*. 2021.
16. Helgerud J, Wang E, Hoff J, et al. Circuit and high-intensity interval training adaptations in trained athletes. *International Journal of Sports Physiology and Performance*. 2020.
17. Buchheit M, Simpson BM. Player monitoring and physiological demands in team sports: Implications for training prescription. *International Journal of Sports Physiology and Performance*. 2020.
18. Turner AN, Comfort P, McMahon JJ. Strength and conditioning considerations for field-based team-sport athletes. *Strength and Conditioning Journal*. 2021.
19. Vescovi JD, McGuigan MR. Relationships between physiological fitness, training load, and performance in team-sport athletes. *Journal of Strength and Conditioning Research*. 2022.
20. McLaren SJ, Macpherson TW, Coutts AJ, Hurst C, Spears IR, Weston M. The relationships between internal and external measures of training load and intensity in team-sport athletes. *Sports Medicine*. 2020;50:641–658.