IIP International Multidisciplinary Research Journal
IIPIMRJ

An Online Peer-Reviewed / Refereed Journal

Vol: 03 No. Issue I, (January-March) (2026)
Impact Factor: GSRD-IF: 5.001
ISSN: 3049-2734 (Online)

Impact of High-Intensity Interval Training (HIIT) on Explosive Strength among College Athletes

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Article Info

Article History:
Received: 17th January 2026
Accepted: 22nd January 2026
Published: 02nd February 2026

Keywords:

High-Intensity Interval Training, Explosive Strength, Vertical Jump, Physical Fitness, Athletes

ABSTRACT

Explosive strength is a crucial physical fitness component required for optimal performance in many sports. High-Intensity Interval Training (HIIT) has gained popularity as an effective training method for improving muscular power and neuromuscular efficiency within a short duration. The present study aimed to examine the impact of High-Intensity Interval Training on explosive strength among college athletes. Thirty male college athletes aged 18–22 years were selected using random sampling. A single-group pre-test and post-test experimental design was adopted. Explosive strength was assessed using a standardized Vertical Jump Test. The participants underwent a structured HIIT programme for eight weeks. Mean, standard deviation, and paired't' test were used for statistical analysis. The results revealed a significant improvement in explosive strength following the HIIT intervention. The study concludes that HIIT is an effective training method for enhancing explosive strength among college athletes.

How to Cite: Girnar, H., & Jadhav, N. (2026). Impact of High-Intensity Interval Training (HIIT) on Explosive Strength among College Athletes. IIP: International Multidisciplinary Research Journal (IIPIMRJ), 3(1), 478–482.

Background of the Study

Explosive strength, defined as the ability to exert maximal force in the shortest possible time, is a vital component of athletic performance. It plays a decisive role in activities such as jumping, sprinting, throwing, and rapid changes of direction. Sports like athletics, football, basketball, volleyball, and kabaddi require high levels of explosive strength for success. Therefore, developing this physical quality is a major objective of sports training programmes.

Traditional strength training methods, while effective, often require long training durations and high training volumes. In recent years, High-Intensity Interval Training (HIIT) has emerged as a time-efficient and scientifically supported training approach. HIIT involves short bouts of high-intensity exercise interspersed with brief recovery periods. This training method places significant demands on the neuromuscular system and energy pathways, thereby promoting rapid physiological and performance adaptations.

Research evidence suggests that HIIT can improve muscle power, anaerobic capacity, and neuromuscular coordination. The repeated exposure to maximal or near-maximal efforts during HIIT stimulates fast-twitch muscle fibers, which are primarily responsible for explosive movements. Despite its growing popularity, limited empirical research has focused specifically on the effect of HIIT on explosive strength among young athletes. Hence, the present study was undertaken to investigate the impact of High-Intensity Interval Training on explosive strength.

Objectives of the Study

The objectives of the present study were to assess the baseline level of explosive strength among college athletes and to determine the effect of High-Intensity Interval Training on explosive strength. Specifically, the study aimed to evaluate changes in explosive strength before and after the implementation of a structured High-Intensity Interval Training programme in order to examine its effectiveness in enhancing explosive strength performance among college athletes.

Methodology

Research Design

The study employed a **single-group pre-test and post-test experimental design**.

Sample

The sample consisted of **30 male college athletes** aged **18–22 years**, selected from a college of physical education.

Sampling Technique

Random sampling technique was used to select the participants.

Tool Used (Standardised Test)

- **Vertical Jump Test (Sargent Jump Test)** was used to measure explosive strength.
  This test is widely accepted for assessing lower-body explosive power and has established reliability and validity.

HIIT Training Schedule

Duration: 8 Weeks
Frequency: 4 Days per Week
Session Duration: 40 Minutes

Week	Exercise	Repetitions	sets	Duration	Rest	Warm-up	Cool-Down
1- 4	Sprint Intervals	30 sec	6	30 Min	90 sec	5 min Jog + Dynamic Stretches	5 min Stretching
	Burpees	15 reps	4		60 sec		
	Jump Squats	15 reps	4		60 sec		
	Mountain Climbers	20 reps	4		60 sec		
	High Knees	30 sec	4		60 sec		
	Kettlebell Swings	15 reps	4		60		

					sec		
	Jumping Lunges	15 reps	4		60 sec		
	Tuck Jumps	15 reps	4		60 sec		
	Box Jumps	15 reps	4		60 sec		
	Plank Jacks	45 sec	4		60 sec		
Week	**Exercise**	**Repetitions**	**sets**	**Duration**	**Rest**	**Warm-up**	**Cool-Down**
5 - 8	Sprint Intervals	30 sec	8	35 Min	90 sec	5 min Jog + Dynamic Stretches	5 min Stretching
	Burpees	20 reps	4		60 sec		
	Jump Squats	20 reps	4		60 sec		
	Mountain Climbers	25 reps	4		60 sec		
	High Knees	45 sec	4		60 sec		
	Kettlebell Swings	20 reps	4		60 sec		
	Jumping Lunges	20 reps	4		60 sec		
	Tuck Jumps	20 reps	4		60 sec		
	Box Jumps	20 reps	4		60 sec		
	Plank Jacks	45 sec	4		60 sec		

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Structure of Each Session

Component	**Activity**	**Duration**
Warm-up	Jogging, dynamic stretching	8 min
HIIT Main Set	High-intensity exercises (see below)	25 min
Cool-down	Slow jogging, static stretching	7 min

HIIT Exercise Protocol

Exercise	**Work : Rest Ratio**	**Repetitions**
Squat Jumps	30 sec : 30 sec	4
Burpees	30 sec : 30 sec	4
High-Knee Running	30 sec : 30 sec	4
Jump Lunges	30 sec : 30 sec	4
Box Jumps	30 sec : 30 sec	4

(2–3 sets per session with 2 minutes recovery between sets)

Statistical Analysis

The collected data were analyzed using:

- Mean
- Standard Deviation
- Paired 't' test

The level of significance was set at **0.05**.

Statistical Analysis and Interpretation

Table 1: Mean and Standard Deviation of Explosive Strength (Vertical Jump in cm)

Test	Mean	SD
Pre-test	42.60	4.85
Post-test	48.95	4.20

GRAPH NO.1

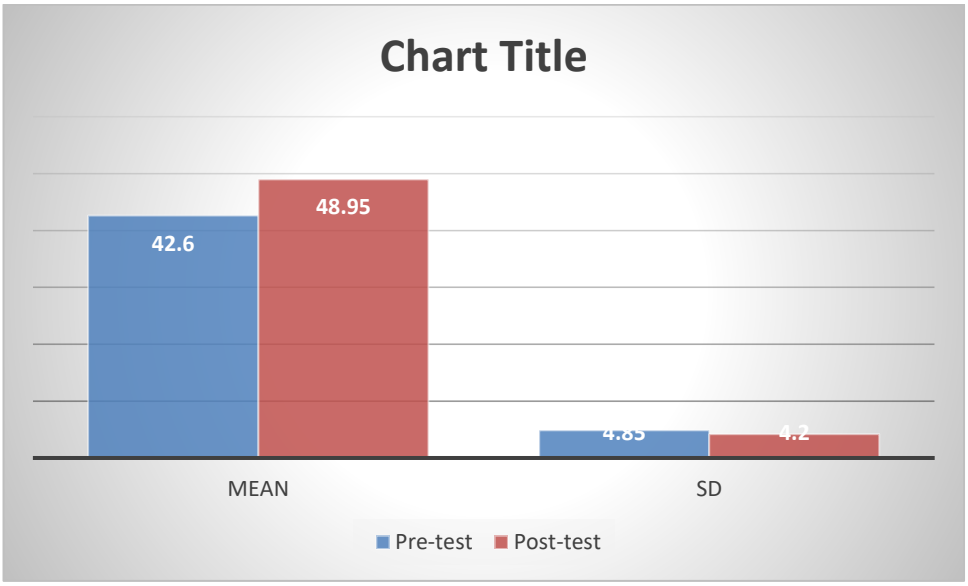

Table 2: Paired 't' Test Analysis of Explosive Strength

Mean Difference	t-value	df	Level of Significance
6.35	8.12*	29	Significant at 0.05

*Significant at 0.05 level (table value = 2.045)

Results

The results revealed a significant improvement in explosive strength following the eight-week HIIT programme. The calculated't' value (8.12) was greater than the tabulated value at the 0.05 level of significance. Hence, the null hypothesis was rejected, indicating that High-Intensity Interval Training had a significant positive effect on explosive strength among college athletes.

Conclusion

The study concludes that High-Intensity Interval Training is an effective and time-efficient training method for improving explosive strength among college athletes. The significant improvement observed in vertical jump performance may be attributed to enhanced neuromuscular coordination, increased fast-twitch muscle fiber recruitment, and improved anaerobic power resulting from HIIT. Coaches and physical education professionals are encouraged to incorporate HIIT into regular training programmes to enhance explosive strength and overall athletic performance.

References

- Bompa, T. O., & Buzzichelli, C. (2019). *Periodization: Theory and methodology of training*. Human Kinetics.
- Chu, D. A., & Myer, G. D. (2013). *Plyometrics*. Human Kinetics.
- Gibala, M. J., & Little, J. P. (2012). Just HIT it! A time-efficient exercise strategy to improve muscle metabolic health. *Journal of Physiology*, 590(5), 1077–1084.
- Markovic, G. (2007). Does plyometric training improve vertical jump height? *British Journal of Sports Medicine*, 41(6), 349–355.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). *Exercise physiology: Nutrition, energy, and human performance*. Lippincott Williams & Wilkins.

- Gréhaigne, J. F., Richard, J. F., & Griffin, L. L. (2012). Teaching and learning team sports and games. Routledge.
- Miller, B. (2005). The volleyball handbook. Human Kinetics.
- Scates, A. E., Linn, M., & Kowalick, V. (2003). Complete conditioning for volleyball.
- Human Kinetics.
- Paglia, J. (1993). A guide to volleyball basics. Sporting Goods Manufacturers Association.
- Kluka, D. A., & Hendricks, S. (2020). Volleyball. In Routledge Handbook of Global Sport (pp. 103-114). Routledge.
- Babu, N. S. (2018). Sports training. Lulu.com.
- Daniels, J., & Scardina, N. (1984). Interval training and performance. Sports Medicine, 1, 327-334.
- Uppal, A. K. (2021). Scientific principles of sports training. Friends Publications (India).
- Books, G. D. (1996). Effects of endurance intensity and rest interval on subsequent strength performance. University of North Texas.
- Macias, G. (2019). Physical education and sports training. Scientific e-Resources.
- Laursen, P., & Buchheit, M. (2019). Science and application of high-intensity interval training. Human Kinetics.
- Junior, N. (2020). Specificity principle applied in the volleyball. MOJ Sports Medicine, 4(1), 13-15.