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EXTENDED ABSTRACT

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THE ACUTE BLOOD FLOW RESTRICTION AND ITS IMPACT ON HEART RATE AND ENDURANCE PERFORMANCE AMONG RECREATIONALLY ACTIVE STUDENTS

Nazurah Atiqa Abd Aziz, & Nurul Ain Abu Kasim*
Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Negeri Sembilan Branch, Seremban Campus, Negeri Sembilan, MALAYSIA
*Corresponding author: nurulain755@uitm.edu.my

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I. Introduction

Blood flow restriction (BFR) training has gained attention for its potential to enhance performance [1], yet its acute cardiovascular and endurance effects remain unclear. This study investigates the immediate impact of BFR training on heart rate variability (HRV) and endurance performance in recreationally active students, addressing mixed findings in prior research. Understanding these acute responses is essential for determining BFR's safety and optimizing its application in fitness and performance settings [2].

II. Methods

This study involved 12 recreationally active male students (age 21.79 ± 3.21 years) who completed the Yo-Yo Intermittent Recovery Test Level 1 under BFR. HRV was measured using the Polar H10 heart rate monitor, and endurance performance was assessed via a 15-minute jogging test with GPS tracking. Participants were selected using convenience sampling for homogeneity in fitness levels and training experience.

III. Results and Discussion

A. BFR Effects on Heart Rate

BFR training significantly increased resting heart rate (65.7 ± 12.7 bpm vs. 63.2 ± 8.04 bpm), maximum heart rate (168 ± 14.0 bpm vs. 157 ± 30.1 bpm), and slowed recovery rate (137 ± 17.7 bpm vs. 127 ± 32.7 bpm) compared to non-BFR (p<0.05). These findings align with studies showing heightened cardiovascular demand under BFR, emphasizing the protocol's influence on HRV dynamics [2].

B. BFR Effects on Endurance Performance

Participants in the BFR group showed reduced total distance (2.40 ± 0.06 km) compared to non-BFR (2.29 ± 0.11 km) during a 15-minute jog (p<0.05). The results highlight immediate fatigue under BFR while demonstrating preserved endurance. These findings underscore BFR's balance between acute strain and the potential for long-term adaptive endurance benefits [3].

TABLE I
Independent Sample T-Test Descriptives of Heart Rate

	Group	N	Mean	Median	SD	SE
Resting Heart Rate (bpm)	BFR	6	65.7	60.0	12.7	5.17
	Non-BFR	6	63.2	60.0	8.04	3.28
Maximum Heart Rate After Each Speed (bpm)	BFR	6	167.7	167.5	14.1	5.75
	Non-BFR	6	157.5	167.5	30.31	12.37
Recovery Rate (bpm)	BFR	6	136.8	133.5	17.7	7.25
	Non-BFR	6	126.5	121.5	32.67	13.34

TABLE II
Independent Sample T-Test Descriptives of Endurance Performance

	Group	N	Mean	Median	SD	SE
Total Distance before Yo-Yo IR1 (Km)	BFR	6	2.46	2.46	0.0480	0.0196
	Non-BFR	6	2.32	2.30	0.120	0.0490
Total Distance after Yo-Yo IR1 (Km)	BFR	6	2.40	2.41	0.0590	0.0241
	Non-BFR	6	2.29	2.29	0.111	0.0454

IV. Conclusions

BFR training significantly impacts heart rate variability, increasing cardiovascular demand and slowing recovery. Despite immediate fatigue, endurance capacity is preserved, highlighting BFR's potential for adaptive endurance benefits. These findings contribute to optimizing BFR protocols for recreational athletes while addressing its acute cardiovascular effects.

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References

[1] Angelopoulos, P., Tsekoura, M., Mylonas, K., Tsigkas, G., Billis, E., Tsepis, E., & Fousekis, K. (2023). The effectiveness of blood flow restriction training in cardiovascular disease patients: A scoping review. Journal of Frailty, Sarcopenia and Falls, 8(2), 107–117. https://doi.org/10.22540/JFSF-08-107

[2] Miller, B. C., Tirko, A. W., Shipe, J. M., Sumeriski, O. R., & Moran, K. (2021). The systemic effects of blood flow restriction training: A systematic review. International Journal of Sports Physical Therapy, 16(4), 978–990. https://doi.org/10.26603/001c.25791

[3] Patterson, S. D., Hughes, L., Warmington, S., Burr, J., Scott, B. R., Owens, J., ... & Laurentino, G. (2019). Blood flow restriction exercise: considerations of methodology, application, and safety.

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Frontiers in Physiology, 10, 533. https://doi.org/10.3389/fphys.2019.00533

[4] Spranger, M. D., Krishnan, A. C., Levy, P. D., O'Leary, D. S., & Smith, S. A. (2020). Blood flow restriction training and the exercise pressor reflex: a call for concern. Journal of Applied Physiology, 128(4), 1196–1205. https://doi.org/10.1152/japplphysiol.00982.2020