INTERNATIONAL GRADUATE COLLOQUIUM

i-SPEAK 2025

SPORTS AND PHYSICAL EXERCISE ASSEMBLY OF KNOWLEDGE SHARING

COLLOQUIUM PROCEEDINGS

EXTENDED ABSTRACT

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AN ACUTE EFFECTS OF BLOOD FLOW RESTRICTION ON MUSCLE OXYGENATION AND BLOOD GLUCOSE DURING YO-YO INTERMITTENT RECOVERY LEVEL 1 TRAINING AMONG HANDBALL ATHLETES

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Keywords: Muscle oxygenation, Blood glucose, Athletic training, Blood flow restriction, Endurance performance

I. Introduction

Blood flow restriction (BFR) training may enhance muscle oxygenation and blood glucose levels [1]. However, its acute effects remain unclear during high-intensity intermittent exercise like Yo-Yo Intermittent Recovery Level 1 (Yo-Yo IR1) [2,3]. This study evaluates the impacts of BFR on muscle oxygenation, blood glucose, and performance metrics in handball athletes during Yo-Yo IR1 training sessions.

II. Methods

The Yo-Yo IR1 test was conducted on a handball court using standardized protocols with cones, audio cues, and precise measurements. Muscle oxygenation was monitored using a MOXY device placed on the right hamstring [4], while blood glucose levels were assessed pre- and post-test using the GE Max Plus system with a finger-prick method. Athletes were randomized into BFR (using 60 mmHg Dura-Cuff pressure) and control groups. Key metrics, including performance, oxygenation, and glucose levels, were analyzed.

III. Results and Discussion

A. Muscle Oxygenation Level

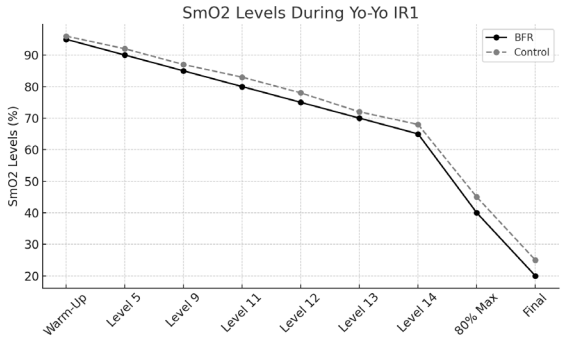

Fig. 1 Change Δ in muscle oxygenation (SmO_2%) during pre- and post-tests in Yo-Yo IR1 (mean ± SD).

Muscle oxygenation levels (SmO_2%) significantly decreased from pre- to post-test in both BFR and control groups (p<0.001, Figure 1). The BFR group exhibited a larger decline in SmO_2%, reflecting increased muscular stress during training. These results align with prior findings indicating BFR enhances training stimulus, though oxygenation demands are greater under restricted conditions.

A. Blood Glucose Analysis

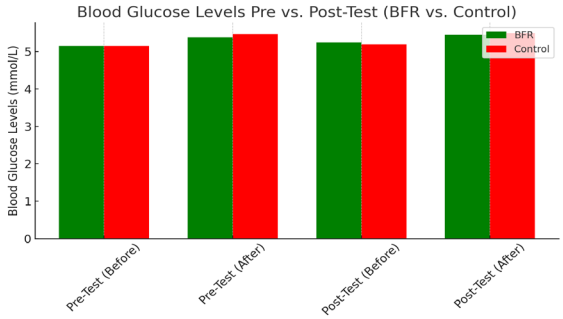

Fig. 2 Change Δ in blood glucose levels during pre- and post-tests in Yo-Yo IR1 (mean ± SD).

Blood glucose levels significantly increased after the post-test for all individuals (p<0.001, Figure 2). The blood glucose increase observed after the post-test compared to the pre-test reflects the physiological response to exercise. However, individual variations in blood glucose increase were noted post-recovery, with no consistent patterns of significant change observed (p>0.05).

B. Endurance Performance

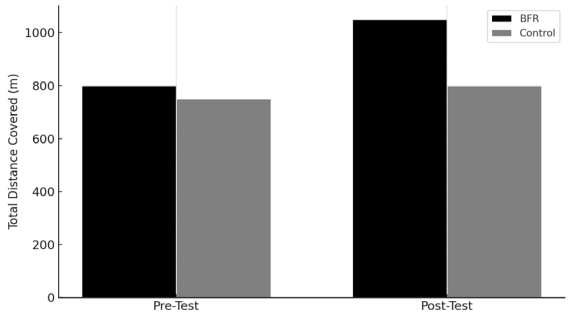

Fig. 1 Change Δ in total distance covered in Yo-Yo IR1 by the BFR and control groups (mean ± SEM).

The BFR group showed a statistically significant improvement in total distance covered during Yo-Yo IR1

M.S.I., Ishak, & N.A.A., Kasim, *Proceedings of the International Graduate Colloquium: Sports and Physical Exercise Assembly of Knowledge Sharing, i-SPEAK, 2025, 05th–06th February, Malaysia.*

compared to the control group (p<0.05, Figure 3). This indicates that BFR training may elicit superior performance adaptations during high-intensity intermittent exercise. These findings align with previous research highlighting the potential of BFR to enhance endurance and recovery performance [6,7,8].

IV. Conclusions

This study highlights the excellent effectiveness of blood flow restriction in enhancing performance during the Yo-Yo IR1. Athletes in the blood flow restriction condition demonstrated significant improvements in total distance covered and blood glucose levels, with significant increases in muscle oxygenation levels demands. These results emphasize the outstanding potential of blood flow restriction to optimize recovery, endurance, and overall athletic performance in high-intensity intermittent exercises.

Acknowledgment

The author would like to thank all participants for their time and effort in this study.

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