

Optimising 100-Meter Sprint Performance through Blood Flow Restriction Training: A Review

ANAMIKA THAKUR¹, DEVANSH GOSWAMI², PIOUS DIVYA³, BARNALI BHATTACHARJEE⁴

ABSTRACT

The 100 m sprint demands exceptional explosive strength, power generation, and rapid recovery. Conventional high-load resistance training ($\geq 80\%$ 1RM) has long been the cornerstone of sprint preparation, but often leads to increased fatigue and musculoskeletal strain. Emerging evidence suggests that Blood Flow Restriction (BFR) training, which combines low-intensity resistance exercise (20-30% 1RM) with controlled vascular occlusion, can elicit comparable hypertrophic and strength adaptations to high-load training while minimising joint stress.

This literature review explores the efficacy of low-intensity BFR training as a supplementary modality for improving power output, muscle hypertrophy, and recovery in elite 100 m sprinters.

A comprehensive review of peer-reviewed literature from databases including PubMed, Scopus, and Web of Science was conducted. Studies investigating low-load BFR training and its effects on muscular adaptations, performance metrics, and recovery parameters in athletic populations were analysed. Key findings were synthesised to assess the potential transferability of BFR protocols to sprint-specific training contexts.

Evidence consistently demonstrates that BFR training induces significant increases in muscle cross-sectional area and strength comparable to high-intensity protocols (Slysz et al., 2016; Patterson et al., 2019). Furthermore, neuromuscular adaptations and enhanced fast-twitch fibre recruitment under hypoxic stress has been reported, suggesting potential benefits for sprint performance. BFR has also been associated with reduced perceived muscle soreness and faster recovery, likely due to lower mechanical strain and metabolic stress-mediated hormonal responses. Limited but promising data indicate improvements in sprint-specific power outputs, such as vertical jump height and short-distance acceleration.

Low-intensity BFR training offers a novel, evidence-based adjunct to traditional resistance programs for 100 m sprinters. By promoting hypertrophy and strength adaptations while minimising fatigue, BFR can optimise both in-season performance maintenance and rehabilitation strategies. Future longitudinal studies should investigate the direct impact on sprint times, optimal cuff pressures, and individualised application protocols for elite and youth athletes.

Keywords: Low-load training, Muscle hypertrophy, Power development, Recovery

PARTICULARS OF CONTRIBUTORS:

1. BPT Student, Department of Physiotherapy, K.R. Mangalam University, Gurugram, Haryana, India.
2. BPT Student, Department of Physiotherapy, K.R. Mangalam University, Gurugram, Haryana, India.
3. Assistant Professor, Department of Physiotherapy, K.R. Mangalam University, Gurugram, Haryana, India.
4. Associate Professor, Department of Physiotherapy, K.R. Mangalam University, Gurugram, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Pious Divya,
Assistant Professor, Department of Physiotherapy, K.R. Mangalam University, Gurugram-122103, Haryana, India.
Email: pious.divya@krmangalam.edu.in