DOI.10.7860/JCDR/2026/90232.23773 Abstract No.: 03

Effects of Open Kinetic Chain versus Closed Kinetic Chain Exercise with Common Use of Blood Flow Restriction Therapy among Athletes with Hamstring Strain: A Pilot Study

ARTI GUPTA[1], JASOBANTA SETHI[2], ROHIT RATHORE[3]

ABSTRACT

Introduction: Hamstring strain injuries are frequent in athletes and often result in pain, reduced strength, poor movement control, and delayed return to sport. Inadequate rehabilitation increases the risk of reinjury. Blood Flow Restriction Training (BFRT) enables strength and functional improvements at low exercise loads by creating controlled muscular hypoxia. However, limited evidence exists comparing the effects of BFRT combined with Open Kinetic Chain (OKC) and Closed Kinetic Chain (CKC) exercises in hamstring rehabilitation.

Aim: To compare the effects of OKC exercises with BFRT, CKC exercises with BFRT, and BFRT alone on pain, hamstring strength, and functional performance in athletes with hamstring strain.

Materials and Methods: Ten athletes with grade I hamstring strain were allocated into three groups: OKC+BFRT (n=4), CKC+BFRT (n=4), and BFRT-only (n=2). All groups trained three times per week for six weeks using 20% of one-repetition maximum with 40% arterial occlusion. Pain intensity {Visual Analogue Scale (VAS)}, hamstring strength, and functional performance scores were assessed pre- and post-intervention. Data were analysed using mean±standard deviation.

Results: Pain reduction was observed in all groups, with the greatest reduction in the CKC+BFRT group (4.8±0.5), followed by OKC+BFRT (3.5±0.6) and BFRT-only (2.0±0.7). Strength gains were highest in the CKC+BFRT group (23.0±1.8 kg), compared with the OKC+BFRT group (18.0±2.1 kg) and the BFRT-only group (8.0±1.4 kg). Functional performance improved most with CKC+BFRT (27.5±2.1 points), followed by OKC+BFRT (22.3±2.4), while smaller gains were seen with BFRT alone (10.0±1.6). No adverse events were reported.

Conclusion: BFRT enhances hamstring rehabilitation outcomes when combined with exercise. CKC exercises with BFRT provide superior strength and functional recovery, while OKC exercises with BFRT are effective for early strength restoration. BFRT alone reduces pain but does not produce optimal functional recovery.

Keywords: Athletic rehabilitation, Functional recovery, Hamstring strain injury.

PARTICULARS OF CONTRIBUTORS:
1. PG Scholar, Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Noida, Uttar Pradesh, India.
2. Professor and Director, Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Noida, Uttar Pradesh, India.
3. Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Noida, Uttar Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Jasobanta Sethi,
Professor and Director, Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Noida-201301, Uttar Pradesh, India.
Email: jasobantsethi@yahoo.co.in