

EFFECTS OF BLOOD FLOW RESTRICTION TRAINING IN A YOUNG MALE WITH SUBSTANTIAL FEAR AVOIDANCE BELIEFS

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Background: Blood flow restriction training (BFRT) is a safe rehabilitation tool to use with patients with musculoskeletal injuries. It produces similar muscle strengthening effects seen with high intensity resistance training (HI-RT), but requires much lower loads comparatively. Another benefit of BFRT is an increased exercised induced analgesia effect as compared to HI-RT. There is however, currently no literature exploring the effectiveness of BFRT with patients that have a musculoskeletal injury and significant fear avoidance beliefs that have delayed their progress with standard PT intervention.

Purpose: The purpose of this case report is to describe the use of BFRT in a patient with significant fear avoidance beliefs post arthroscopic Anterior Cruciate Ligament (ACL) reconstruction with a medial and lateral meniscus repair.

Description: The subject is a 21-year-old male who underwent an arthroscopic ACL reconstruction using an autogenous hamstring graft as well as a medial and lateral meniscus repair after a knee injury sustained during a basketball game. The patient reported no history of previous knee pathology and was physically active and healthy. The patient presented with fear avoidance beliefs about pain and re-injury at the initial evaluation which continued during therapy. The patient avoided home program (HEP) exercise that caused knee flexion, reporting a 10/10 rating on the numeric pain rating scale (NPRS). Five weeks after surgery, the patient was actively resisting any knee flexion movement during therapy. By 8 weeks, the patient was significantly delayed in his expected rehabilitation progress. He exhibited a Lower Extremity Functional Scale (LEFS) score of 12/80, indicating poor function, due to his fear avoidance beliefs towards pain and reinjury inhibiting his participation in PT intervention.

Examination: Active range of motion (AROM) of the affected leg was reduced (101°-3° flexion-extension), pain at rest was 1/10 Numeric Pain Rating Scale (NPRS), pain with activity was 6/10 (NPRS), Fear Avoidance Beliefs Questionnaire (FABQ) was 24/24 for physical activity (PA) and 31/42 for work (W), LEFS was 14/80, single leg one repetition maximum (SL 1-RM) was 32.5 lbs., thigh circumference was 30cm, knee joint circumference was 39.5cm, and single leg anterior reach (SL ant. reach) was 58.75cm.

Intervention: BFRT intervention was set at 4, 40-minute sessions per week for 4 weeks. The patient performed a 10 minute self-paced warm up on a recumbent bike at the start of each session. BFR cuff occlusion pressure was 80% (127 mmHg) of limb occlusion pressure. BFRT included 4 lower extremity exercises consisting of 4 sets of 30, 15, 15, and 15 repetitions respectively. The patient had a 30 second rest with the cuff inflated between each set, and a 1 minute deflate time between each exercise. He was instructed to daily perform mobility exercises at home each day.

Outcomes: After 4 weeks of BFRT, the patient demonstrated the following changes from baseline measures AROM (+27° flex, +5° ext), pain with activity NPRS (-40%), FABQ (-6 PA, -14 W), LEFS (+22), SL 1-RM (+27.5 lbs.), thigh circumference (+15.5cm), and SL ant. reach (+22.08cm). There was not a large change in knee joint circumference (-1 cm) or pain at rest NPRS (+/- 0%).

Discussion: After 4 weeks of BFRT intervention, the patient caught up to within 2 weeks of his expected rehabilitation timeline and showed significant improvements in almost all outcome measures. Based on this improvement, he is much more likely to exhibit good outcomes with further PT intervention, although he may still be slightly delayed in his rehabilitation timeline.

Conclusion and relevance to Allied Health: BFRT may be an effective strengthening intervention to use with patients that have musculoskeletal injuries and significant fear avoidance beliefs. As allied health professionals it is important to know foundational information regarding different interventions.