

Owens Recovery Science: Personalized Blood Flow Restriction Rehabilitation

Brief Abstract:

Current ACSM guidelines recommend that individuals perform resistance training at a load of >65% 1 repetition maximum (1RM) to achieve strength and hypertrophy gains. However, individuals undergoing rehabilitation after injury or surgery are often contraindicated to perform such loads. A novel technique, Blood Flow Restriction Training, has demonstrated that the utilization of a tourniquet system applied to the proximal portion of an exercising limb can allow individuals to gain strength and hypertrophy greater than work matched controls and similar to high load training while utilizing very low loads (20-30% 1 RM).

Outline

Personalized Blood Flow Restriction Rehabilitation

- 08:00 Introduction to ORS and Blood Flow Restriction Training
- 08:15 History of Blood Flow Restriction and Evolution into Clinical Practice
- 08:40 BFR Methods: Occlusion Pressure
- 09:00 5 Minute Break
- 09:05 Lab One: Cuff Selection and Measuring Occlusion Pressure
- 9:40 5 Minute Break
- 9:45 BFR Methods: Intro to Passive, Endurance, and Resistance Applications
- 10:15 BFR Mechanisms: iEMG, Myostatin, IGF-1, MSC's, Myocyte Swelling, VEGF, MPS
- 10:45 Safety: Clotting, Hemodynamics, Muscle Damage
- 11:15 Lab Two: Lower Extremity Exercise
- 12:00 Lunch Break (1 hour)
- 1:00 Skeletal Muscle: Understanding Anabolic Resistance

- 1:20 Prehab: Metabolic Stress, Scar, Blood Flow, Muscle Protein Synthesis
- 1:40 Acute Rehab: Timing and Research to Support Early Interventions
- 2:05 Lab Three: Upper Extremity Exercises
- 2:45 5 Minute Break
- 2:50 Chasing Optimal: Nutritional Considerations
- 3:05 Endurance Exercise Research and Understanding Key Parameters
- 3:30 BFR for Analgesia: Research and Potential Mechanisms
- 3:45 BFR Resistance Exercise: Potential Targets and Key Parameters
- 4:10 Effects for the Proximal Muscles: Theories and Research for the Hip and Shoulder
- 4:30 Clinical Reasoning: Entry Points and Decision Making on Indications
- 4:40 BFR and Bone
- 4:50 BFR and Tendon
- 5:00 Applications for Older Populations
- 5:15 Wrap Up and Group Exam
- 5:30 Adjournment

Course Objectives

At the conclusion of the course the participant will:

- Translate the physiology behind mechanical tension compared to metabolic accumulation training and the downstream effects.
- Manipulate blood flow restriction protocols to create a local or systemic response within the soft tissues.
- Differentiate limb occlusion pressures objectively for each individual athlete/patient.
- Translate appropriate tourniquet safety measures to the outpatient/training room setting.

- Recommend and implement a rehabilitation blood flow restriction protocol for patients after injury or surgery.

Program Purpose

Successful mastery of the course objectives will prepare the clinician to understand and utilize blood flow restriction (BFR) training. This is a rigorously researched area (hundreds of published peer reviewed articles) that allows individuals to restore strength and hypertrophy safely after injury with very low loads.

The clinician will learn the physiological principles behind blood flow restriction training to include enhanced muscle protein synthesis, systemic responses and increased gene expression. From this the clinician will be introduced to the use of BFR in clinical settings to improve strength and hypertrophy after surgery or injury, mitigate the atrophy associated with disuse or non-weight bearing and learn the potential role of BFR on bone healing.

To perform this technique the clinician will need to use a specialized surgical tourniquet. The FDA regulates tourniquets and lists them as a Class I medical device. This course will instruct the clinician in proper tourniquet safety including AORN guidelines. This will include the understanding and measurement of limb occlusion pressure, the use of pneumatic tourniquets and proper tourniquet cuffs that minimize potential injury.

This is an advanced level of difficulty course secondary to the need to have a strong science foundation to understand the physiological principles that take place. This is a treatment that is not covered as core coursework for ATCs, PTs and OTs.

Desired Education Level

Candidates for the course must hold an active medical license and have completed the necessary coursework and degrees fulfillment for the occupations listed below.

Target Audience Besides the Athletic Trainer

Athletic Trainers, Physical Therapists, Chiropractors, Medical Doctors and Occupational Therapists



OWENS RECOVERY SCIENCE

Expected Outcome

At the conclusion of the course the healthcare provider will be proficient in the science and mechanisms of BFR. Additionally, they will be versed in the application of BFR for clinical applications and the appropriate risks and contraindications. Competency will be demonstrated during lab check offs in proper tourniquet system use, limb occlusion pressure determination and exercise prescription and monitoring. Lastly, proficiency will also be demonstrated on a post-course examination.