

## **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. Recently a novel technique, Blood Flow Restriction Training, has demonstrated that the utilization of a tourniquet system applied proximal to 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 Blood Flow Restriction Training

08:25 Overview of Muscle Physiology

08:50 Muscle Stress, Adaptation, and Healing

09:10 Blood Flow Restriction History

09:30 BFR Safety and Tissue Damage

10:00 5 Minute Break

10:05 Lab One: Application of Blood Flow Restriction Training to the Lower Extremity and Lower Extremity Exercises

11:05 5 Minute Break

11:10 Application: Best Practices, Safety, and Objectivity

11:45 Anabolic Resistance and Muscle Protein Synthesis

12:00 Lunch Break (1 hour)

1:00 Anabolic Resistance and Muscle Protein Synthesis (cont'd)

1:15 Cellular Swelling and Ischemic Preconditioning

1:45 Cell Morphology and Satellite Cells

2:00 Lab Two: Application of Blood Flow Restriction Training to the Upper Extremity and Upper Extremity Exercises

2:45 5 Minute Break

2:50 Myostatin and Scar

3:15 Analgesia

3:30 Physiology of Bone and BFR

3:55 Changes in Proximal Muscles

4:15 Endurance Exercise and Adaptation with BFR

4:35 Lab Three: Application of Blood Flow Restriction Training to Endurance exercises for the Upper and Lower Extremity

5:10 Rehabilitation Prescription and BFR: Recap of Best Evidence

5:30 Post Course Testing/Test Review

6:00 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

## **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



OWENS RECOVERY SCIENCE

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.