



PERSONALIZED BLOOD FLOW RESTRICTION REHABILITATION

A REVOLUTION IN MUSCLE RECOVERY

WHAT IS PBFR

Personalized Blood Flow Restriction (PBFR) Rehabilitation is a paradigm shifting intervention for the rehabilitation professional with over 160 peer-reviewed articles in the scientific literature. By applying a surgical-grade tourniquet briefly and intermittently to an exercising limb you can induce significant and substantial strength, hypertrophy and endurance changes while using a very light load.

RESULTS WITH PBFR

Personalized Blood Flow Restriction Rehabilitation is a game-changing injury recovery therapy that is producing dramatically positive results:

- Diminish atrophy and loss of strength from disuse and non-weight bearing after injuries
- Increase strength with only 30% loads
- Increase hypertrophy with only 30% loads
- Improve muscle endurance in 1/3 the time
- Improve muscle protein synthesis in the elderly
- Improve strength and hypertrophy after surgery
- Improve muscle activation
- Increase growth hormone responses

WHO IS APPROPRIATE TO TREAT WITH IT

Clinically PBFR has been applied to many diagnoses with very positive results including but not limited to total joint arthroplasties, Achilles tendon repairs, fractures, rotator cuff repairs, muscle strains, nerve injuries, post-operative cartilage arthroscopies and reconstructions, and tendinopathies.

WHY IS CLINICAL TRAINING REQUIRED

PBFR involves the use of clinically proven low intensity exercise protocols while restricting blood flow with a surgical-grade Personalized Tourniquet System that has safety and performance features unique to PBFR. By attending the course clinicians will:

- Understand the history and scientific theory behind PBFR
- Learn to manipulate protocols to create a local or systemic response
- Understand tourniquet use and safety
- Learn how to determine individual limb occlusion pressures
- Learn to apply PBFR to rehabilitating patients

GET STARTED. **GET CERTIFIED.**

Course Date
June 3, 2017
Vancouver, BC

To Register Contact Us
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COURSE INFORMATION

JUNE 3 - VANCOUVER, BC

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, Personalized Blood Flow Restriction (PBFR) Rehabilitation, has demonstrated that the utilization of a surgical-grade tourniquet system applied proximal to an exercising limb can enable 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).

COURSE OBJECTIVES

At the conclusion of the course the participant will learn how to:

- Translate the physiology behind mechanical tension compared to metabolic accumulation training and the downstream effects.
- Manipulate PBFR 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 personalized rehabilitation blood flow restriction protocol for patients after injury or surgery.

DESIRED EDUCATION LEVEL

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

TARGET AUDIENCE

Physiotherapists, Occupational Therapists and Medical Doctors

PROGRAM PURPOSE

Successful mastery of the course objectives will prepare the healthcare professional to understand and utilize Personalized Blood Flow Restriction Rehabilitation. This is a rigorously researched area (> 300 published peer reviewed articles) that allows individuals to restore strength and hypertrophy safely after injury with very low loads.

The healthcare professional will learn the physiological principles behind Personalized Blood Flow Restriction Rehabilitation to include enhanced muscle protein synthesis, systemic responses and increased gene expression. From this the healthcare professional will be introduced to the use of PBFR 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 PBFR on bone healing.

To perform this technique the healthcare professional will need to use a specialized surgical-grade tourniquet. The FDA regulates tourniquets and lists them as a Class I medical device. This course will instruct the healthcare professional 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 PTs and OTs.

EXPECTED OUTCOMES

At the conclusion of the course the healthcare professional will be proficient in the science and mechanisms of PBFR. Additionally, they will be versed in the application of PBFR 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 on a post-course examination ($\geq 80\%$ score) is mandatory.



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OBJECTIVES BY LECTURE/ACTIVITY

JUNE 3 - VANCOUVER, BC

LECTURE

Introduction to Personalized Blood Flow Restriction Rehabilitation

- History of Blood Flow Restriction Training
- How and Why I Implemented PBFR in the Military
- A Paradigm Shift in Rehabilitation
- Current and Future Clinical Trials

Evidence for Strength and Hypertrophy with PBFR

- ACSM Guidelines
- Low Intensity vs. Low Intensity with PBFR
- High Intensity vs. Low Intensity with PBFR

Mechanisms

- Mechanical Tension
- Metabolic Accumulation
- Cell Swelling

Metabolite Theory: Lactate Production

- Utilization of PBFR to Induce the Cori Cycle
- The Accumulation of Lactate During PBFR and Exercise

Metabolite Theory: Increased Muscle Activation

- Inducing a Hypoxic State to Increase Motor Unit Recruitment
- Increased Lactate Production and its Role in Increased iEMG

Metabolite Theory: Growth Hormone (GH) Production

- Inducing a Systemic Response Through Metabolite Accumulation
- Evidence and Science to Support Increased GH Production
- Growth Hormones Role in Recovery and Repair

Metabolite Theory: Insulin Like Growth Factor (IGF1)

- Inducing IGF1 With Metabolite Accumulations
- The Role of IGF1 in Muscle Hypertrophy
- Proliferation and Differentiation of Satellite Cells with PBFR
- Making Lasting Changes in Muscle Through These Pathways

Metabolite Theory: Down Regulation of Myostatin

- Utilizing PBFR to Block the Bodies Negative Hypertrophy Switch
- Clinical Studies to Support Down Regulation of Myostatin
- Potential Uses of PBFR to Reduce Fibrotic Changes After Injury

Metabolite Theory: Muscle Protein Synthesis

- Using PBFR to Activate mTORC1
- Evidence for Increased Muscle Protein Synthesis After PBFR
- Manipulating Exercise Through PBFR to Increase Protein Synthesis
- Proper Nutrition to Activate Protein Synthesis
- Proper Nutrition to Maximize Protein Synthesis

Cell Swelling

- Evidence Behind Cell Swelling to Improve Protein Synthesis
- Using PBFR in the Early Phases of Rehab to Mitigate Atrophy
- Using PBFR in the Sub-Acute Phases of Rehab to Mitigate Atrophy

The Middle Ground: Cycling, Walking and Endurance with PBFR

- Changes in VO₂ max with PBFR
- Improved Endurance with PBFR Cycling and Walking
- The Role of Increased Mitochondrial Density with PBFR
- PBFR and Aerobic Work in the Rehab Continuum for Improved Oxidative Capacity, Hypertrophy and Strength

PBFR and Bone

- The Role of GH in Bone
- The Role of Interstitial Fluid Flow in Bone
- The Role of VEGF on Bone
- Evidence for Improved Bone Healing with PBFR

Proximal Effects

- Evidence for Increased Strength and Hypertrophy on the Trunk Musculature
- How to Manipulate PBFR Rehabilitation for a Proximal Effect

Safety: Muscle Damage and PBFR

- Comparison of PBFR vs. HIT
- What Does the Evidence Show Concerning Muscle Damage After PBFR
- Understanding Direct and Indirect Markers of Muscle Damage
- Staying on the Positive Side of Net Protein Balance

Safety: Cardiac and Vascular Effects of PBFR

- The Central Cardiac Effects of PBFR
- Peripheral Cardiac Effects of PBFR
- Thrombus Potential and Vascular Effects

Rehabilitation Studies

- PBFR and Rehabilitation Studies
- Translation of PBFR Evidence to the Clinic
- Ongoing PBFR Trials and Future Applications

Rehabilitation Prescription and PBFR: Best Evidence

- Frequency
- Duration (Early Hypertrophy)
- Manipulating the Rest Periods
- Limb Occlusion Pressure (LOP)
- Using LOP to Account for Cuff Application, Limb Size and Shape and Systolic Blood Pressure
- Training Intensity
- Determining 1 Rep Maximum
- Exercise Volume
- Missing the Target
- Exercise Selection
- Rehabilitation Protocols

Tourniquet Safety and Use

- Tourniquets Roles as Medical Devices
- Using 3rd Generation Systems to Improve Safety
- Avoiding Potential Nerve Injury Through Proper Cuff Selection
- Decreasing Pressure Gradients Through Contoured Cuffs
- PBFR Risks and Contraindications

Delfi Personalized Tourniquet System for Blood Flow Restriction

- Use and Understanding of the PTS for BFR
- Use and Application of Easy-Fit Variable Contour Cuff
- Determining LOP
- Proper Occlusive Pressure for Upper and Lower Extremities
- Use of the Delfi PTS for BFR During Exercise

ACTIVITIES

Lab One

Application of PBFR Rehabilitation to the Lower Extremity and Lower Extremity Exercises

Lab Two

Application of PBFR Rehabilitation to the Upper Extremity and Upper Extremity Exercises

Post Course Testing/Test Review

(Certification requires passing > 80% on post test examination)

A PERSONALIZED APPROACH WITH PREDICTABLE RESULTS

OWENS RECOVERY SCIENCE

Owens Recovery Science is the leader in clinical education and consultation of Personalized Blood Flow Restriction (PBFR) Rehabilitation. Founder Johnny Owens, is former Chief of Human Performance Optimization at the Center for the Intrepid (CFI), which is part of the SAMMC–Department of Orthopaedics and Rehabilitation (DOR). Johnny was at SAMMC for 10 years, treating service members suffering severe musculoskeletal trauma. His successes included the application of regenerative medicine for volumetric soft tissue loss and Return to Run Clinical Pathway, an internationally recognized rehabilitation program designed to combat delayed amputations and compliment a dynamic exoskeleton, the IDEO. He took part in numerous multi-center research projects involving regenerative medicine, sports medicine and rehabilitation of the combat casualty.

Johnny Owens has been applying Personalized Blood Flow Restriction Rehabilitation clinically since 2012 and credits the modality with significant strength recovery in more than 300 patients. He has trained numerous NFL, NBA, NHL, MLB, NCAA teams, and healthcare systems in PBFR Rehabilitation.

Owens has been published extensively in the peer-reviewed literature and his work has been featured on 60 Minutes, Time magazine, NPR, Discovery Channel and ESPN.



Johnny G. Owens, MPT
Director, Clinical Education



DELFI MEDICAL INNOVATIONS INC.

Delfi Medical Innovations Inc. is a Canadian company and world leader in personalized tourniquet technology, development and evaluation.

Delfi's products have been designed to meet the needs of general and specialty patients groups, surgeons, operating-room nurses and rehabilitation professionals. Delfi's patented tourniquet technology is used worldwide in more than 20,000 surgical cases each day.

Our newest development, the Personalized Tourniquet System for Blood Flow Restriction facilitates the safe use of proven PBFR rehabilitation training methods and helps provide optimal clinical outcomes.