

EFFECTIVENESS OF BLOOD FLOW RESTRICTION THERAPY IN THE GERIATRIC POPULATION

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OBJECTIVES

1. To understand of the mechanism of blood flow restriction.

2. To understanding the reasoning for using blood flow restriction in the geriatric population.

3. To understand the results of using high-load resistance training compared to low-load resistance training in combination with blood flow restriction in the geriatric population.

4. To understand the clinical implications of the strength and functional results of using blood flow restriction with low-load training in the geriatric population.

WHAT IS BLOOD FLOW RESTRICTION (BFR)?



- External pressure applied to an extremity via an inflated cuff to occlude venous flow distal to the cuff site
- Anaerobic metabolism and the recruitment of type 2 muscle fibers
- Used with low-load resistance training to increase strength without placing a heavy load on a joint

WHY USE BFR?

- Increases strength and physical function in patients unable to place heavy loads on their joints due to pain or other precautions
- Beneficial for the elderly population, specifically those with osteoarthritis with limited strength and function secondary to pain
- Safe alternative for the elderly population with comparable benefits to high-load resistance training

Blood Flow Restriction Therapy and The Elderly

BENEFITS:

- Improved Muscle Mass
- Improved Muscle Strength
- Improved Cardiovascular Status
- Increased Positive Bone Density Markers
- Increased Functional Outcomes
- Increased Self Efficacy



BFR provides an alternative to traditional management with superior results!

Ozaki et al., 2011; Fry et al., 2010; Clarkson et al., 2017



OVERVIEW OF THE LITERATURE ON BFR IN THE GERIATRIC POPULATION²⁻¹¹

- Systematic reviews and randomized control trials
- Ages from 50-75 years old
- Interventions for 4-12 weeks focusing on the muscle group assessed
- Outcome measures:
 - 1 repetition maximum (1RM) of the muscle group assessed
 - Level of function
 - Short Form Health Survey
 - Timed Up and Go
 - Late Life Function and Disability Instrument
 - Western Ontario and McMaster Universities Osteoarthritis Index
- High-load training defined as 60-80% 1RM
- Low-load training defined as 10-40% 1RM according to the study

RESULTS²⁻¹¹

BFR with low-load training leads to similar strength and function gains compared to high-load training without BFR

The increase in strength with high-load training is greater compared to low-load training with BFR

BFR with low-load training still creates statistically significant increases in strength and size compared to low-load training alone

RESULTS²⁻¹¹

Using BFR while walking leads to increases in muscle size and strength in older adults

BFR used with low-load training produces increases in muscle hypertrophy that are significantly more than use of low-load training alone

SAFETY¹²⁻¹⁴

- BFR is not associated with additional cardiovascular stress compared to traditional resistance training
- Potential side effects: increased rate of exertion, dizziness, delayed onset of muscle soreness, and numbness
 - Preventable with adjustments in cuff size, pressure, and duration of treatment
- Possible contraindications: unstable hypertension, hemophilia, open fracture, pregnancy, dehydration, clotting disorder, cancer, medication that increases blood clotting risk, or an unstable cardiopulmonary condition
 - PT should evaluate the patient's medical history prior to initiating BFR training

CLINICAL IMPLICATIONS²⁻¹¹

Due to BFR with low-load training producing responses comparable to high-load training for muscle strength, muscle volume, pain, and function, it is recommended for use in geriatric populations, especially those with osteoarthritis that are limited in therapy secondary to their pain in order to reduce the likelihood of muscle atrophy secondary to inactivity.



CLINICAL IMPLICATIONS

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BFR can be a safer, effective, and less painful alternative by placing less mechanical stress on the joints

BFR with low-load training can lead to similar strength improvements while keeping the patient safe



CLINICAL IMPLICATIONS²⁻¹¹



Pertinent for the geriatric post-surgical and arthralgia populations due to their increased risk of muscle atrophy



Improving strength in the elderly population can lead to improved function that is necessary for maintaining a healthy quality of life

FUTURE RESEARCH

Larger sample sizes to determine adequate and appropriate BFR parameters as well as intervention parameters specific to the geriatric population that will produce the most effective results



THANK YOU!

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