



Special Interest Report A Proposed Evidence-based Blood Flow Restriction Screening and Application Algorithm

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INTRODUCTION

Recent systematic reviews have demonstrated that blood flow restriction training (BFRT) is superior at increasing both muscle strength, muscle hypertrophy, bone metabolism, and functional capacity in comparison to workload matched controls.¹⁻⁵ However, amongst rehabilitation professionals there is considerable variability in the cuff size, cuff pressures, and exercise parameters during the clinical application of BFRT.^{6,7}

PURPOSE

To propose an evidence-based BFRT screening and initial application algorithm for stratifying patient risk.

DESCRIPTION

The proposed algorithm was designed from multiple resources to provide a comprehensive risk stratification and then proposes a clinical-friendly workflow of screening patients and the initial application of BFRT.⁸⁻¹⁰

Algorithm Components

FIVE SCREENING DECISION POINTS:

1. Can this patient's outcome be accelerated or improved by utilizing BFRT?
2. Does this patient have any contraindications or precautions to BFRT?
3. Does the "educated" patient consent?
4. If the patient post-op OR are relative contraindications in question, is the referring physician okay with BFRT?
5. Is there active inflammation or joint effusion in the occluded limb?

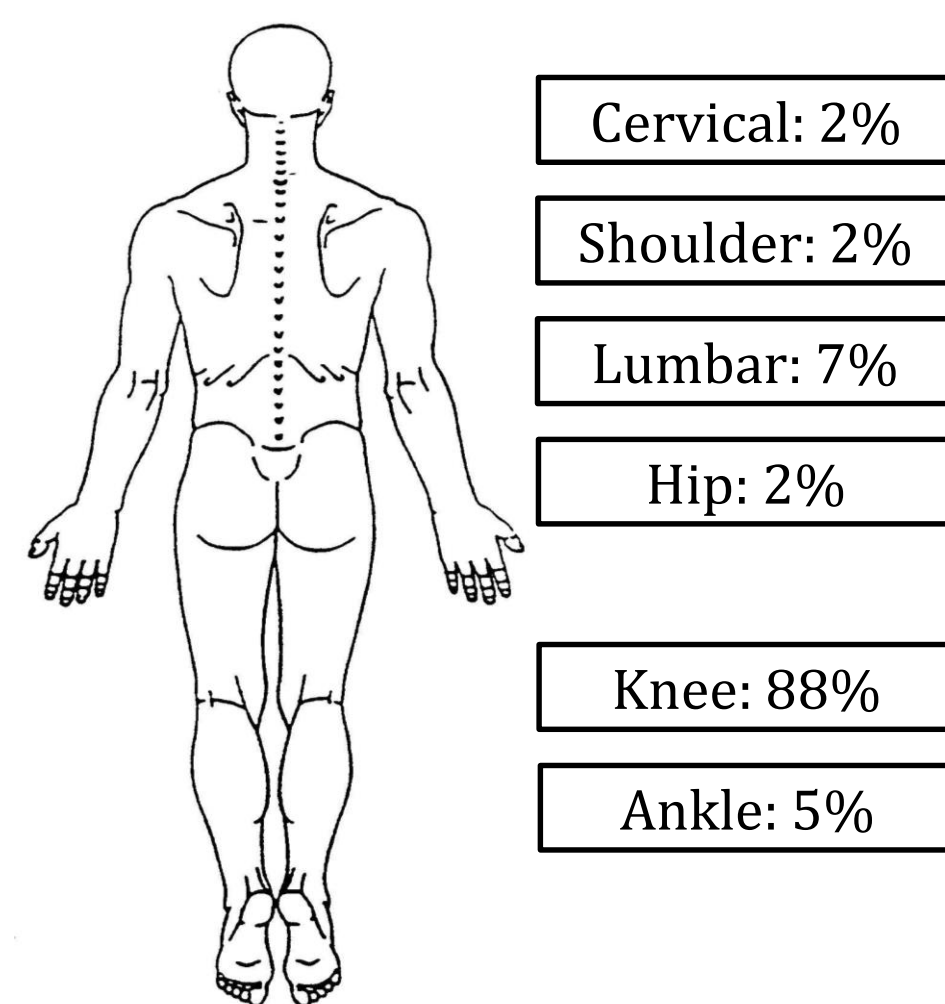
THREE INITIAL BFRT APPLICATION DECISION POINTS:

1. Can this patient tolerate active exercise?
2. Are desired physiological outcomes aerobic or resistance training in nature?
3. Can this patient tolerate >70% one-repetition max (1RM) resistance exercise?

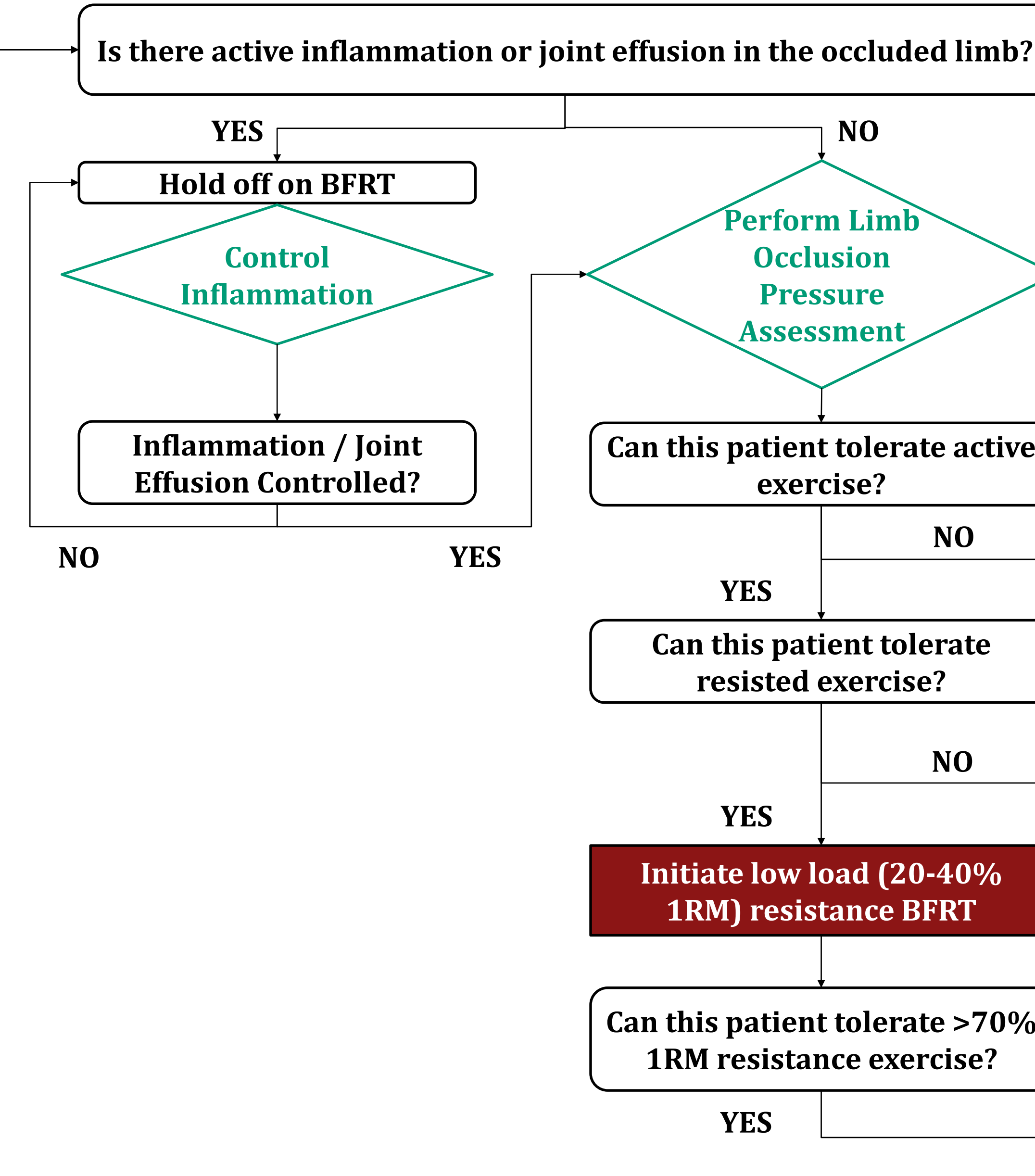
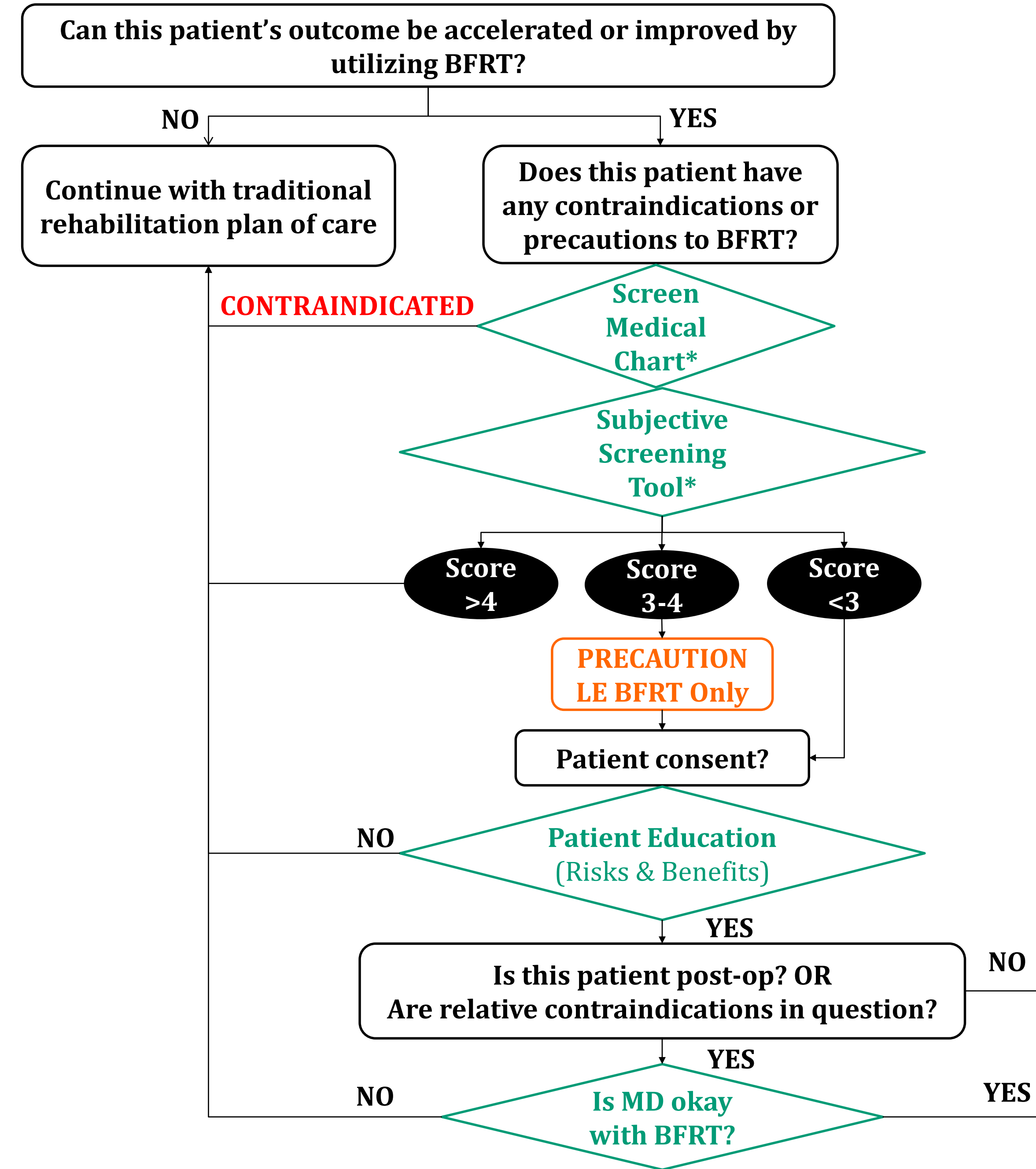
Algorithm Implementation

Setting: Hospital-based, Outpatient Orthopedic & Sports Medicine Clinic
 Timeframe: May 2019 – July 2020
 Personnel: 5 BFR Trained Physical Therapists
 Subjects: n = 60 | Female 41%, Male 59% | Age: 36.7±9.8 | 70% Post-operative
 BFRT System: FDA Approved Pneumatic Tourniquet System (Smart Tools Plus®)
 Cuff Pressure: Individualized cuff pressures (50% and 80% limb occlusion pressure (LOP) for the upper and lower extremities, respectively)

Encounters: 408
 Adverse Responses: 8 (2%)
 •Feeling faint or lightheaded: 5
 •Increased pain/pressure: 2
 •Syncope: 1



EVIDENCE-BASED BLOOD FLOW RESTRICTION SCREENING ALGORITHM



Scan QR Code for Youtube Presentation of Clinical Application of Algorithm

Initiate Ischemic Pre-Conditioning BFRT Protocol

Initiate low intensity cycling/walking BFRT

Initiate low load (20-40% 1RM) resistance BFRT

Combine LL-BFRT & high load traditional resistance training

*Screening of Medical Chart and Subjective Screening Tool used in the algorithm can be accessed by clicking [HERE](https://1drv.ms/b/s!ApLD5E1U1Zn4TmLW3pHCQ1msvGp?e=D4ftTi) or by navigating to this URL: <https://1drv.ms/b/s!ApLD5E1U1Zn4TmLW3pHCQ1msvGp?e=D4ftTi>

Clinical Implications

By implementing the proposed BFRT algorithm, clinicians in an outpatient orthopedic and sports medicine setting can efficiently and effectively stratify patients' risk in participating in BFRT. The advantages for rehab professionals standardizing the screening process include:

1. Improved consistency of clinical practice with current guidelines
2. Enhances inter-therapist reliability of patient screening
3. Mitigates patient risk and prioritizes patient safety
4. Offers a comprehensive and repeatable screening process that be used in clinical practice and future research endeavors
5. May reduce legal and financial implications of clinician negligence should a patient have an adverse reaction to BFRT.

Potential future implications of BFRT in rehabilitation and return to activity are promising. The described algorithm will assist PTs to pioneer and establish clinical practice standards of the safety and proper application of BFRT.

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