Clinical Evaluation

<table>
<thead>
<tr>
<th>Week</th>
<th>Left (Affected) Thigh Circ (18 cm above superior patellar pole)</th>
<th>Right (Unaffected) Thigh Circ (18 cm above superior patellar pole)</th>
<th>MMT (Left/Right)</th>
<th>Knee Flexion ROM (Left/Right)</th>
<th>Knee Extension ROM</th>
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</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>40 cm</td>
<td>44 cm</td>
<td>(L) Unable to assess (0/5/5)</td>
<td>(L) 85 degrees (R) 137 degrees</td>
<td>(L) -5 degrees (R) 2 degrees</td>
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<tr>
<td>Week 4</td>
<td>41.5 cm</td>
<td>44 cm</td>
<td>(L) 4/5 -5</td>
<td>5/5</td>
<td>(L) 102 (R) 137</td>
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<td>Week 8</td>
<td>42 cm</td>
<td>44 cm</td>
<td>(L) 4/5 -5</td>
<td>(L) 130 (R) 137</td>
<td>(L) 0 degrees (R) 2 degrees</td>
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</table>

Purpose

The purpose of this case is to examine the viability of BFR training as a treatment modality in the post-operative management and rehabilitation of an ACL reconstruction and meniscus repair in a young, female soccer player.

Treatment

Weeks 1, 3
- **BFR Goal:** Full gait training and tolerance to BFR
- **BFR Goal:** Full function with minimal residual edema
- **Exercises:**
  - Squat bar exercise: (10 reps, 3 sets)
  - Lunges (each leg): (10 reps, 3 sets)
  - Leg extensions (each leg): (10 reps, 3 sets)
  - Seated hip abduction (each leg): (10 reps, 3 sets)
  - Stirrups (each leg): (10 reps, 3 sets)
  - Renal isometric (each leg): (10 reps, 3 sets)

Weeks 1, 5
- **BFR Goal:** Full gait training and tolerance to BFR
- **BFR Goal:** Full function with minimal residual edema
- **Exercises:**
  - Straight leg raise (each leg): (10 reps, 3 sets)
  - Stirrups (each leg): (10 reps, 3 sets)
  - Seated hip abduction (each leg): (10 reps, 3 sets)
  - Renal isometric (each leg): (10 reps, 3 sets)
  - Stirrups (each leg): (10 reps, 3 sets)
  - Core stability exercises (each leg): (10 reps, 3 sets)

Weeks 1, 5
- **BFR Goal:** Full gait training and tolerance to BFR
- **BFR Goal:** Full function with minimal residual edema
- **Exercises:**
  - Straight leg raise (each leg): (10 reps, 3 sets)
  - Stirrups (each leg): (10 reps, 3 sets)
  - Seated hip abduction (each leg): (10 reps, 3 sets)
  - Renal isometric (each leg): (10 reps, 3 sets)
  - Stirrups (each leg): (10 reps, 3 sets)
  - Core stability exercises (each leg): (10 reps, 3 sets)

Conclusion

The largest improvement in thigh girth appeared to come between week 0 and week 4, as the girth of the affected limb increased from 40 cm to 41.5 cm. This was likely due to a large increase in the amount of activity and implementation of exercise. Blood flow restriction has been shown to mitigate disuse atrophy therefore coupling BFR with therapeutic exercise in the early post-op stages can certainly have a drastic effect on the development of muscle size (Takarada, Takazawa, & Ishii, 2000).

It is, however, difficult to isolate the effect of a single treatment method as part of a comprehensive treatment plan, but the results do demonstrate BFR to be an effective treatment option in the post-operative management of ACL and meniscus tears. Subsequent studies should focus on use of objective measurement (e.g. Boxer machine) during the early post-operative phase. Longer studies will also allow for returns to sport to be more properly tracked since clearance for more advanced activities has been granted. In the current case report, the patient demonstrated significant functional improvement overall and is expected to make a full recovery and return to sport within the expected timeline.

Clinical Implications

BFR appears to play a role in the acute post-operative stage of ACL reconstruction with minimal repeat, however, the significance of its clinical impact can only be putatively evaluated in light of objective measurements related to strength (i.e. Boxer). However, there are a number of subjective improvements that occur as a result of implementing BFR in the early stages, such as return to a "normal" gait pattern and improved quadriceps activation.
Abstract

XXXXX

Results

XXXXX

Methods

XXXXX

Discussion

XXXXX

Introduction

XXXXX

Objectives

XXXXX

Title (Experimental Study)

Authors

Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL, USA

Table: Importance of Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1</th>
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Note: Total Score is a sum of the ranked item options. Top positioned options have higher rank.