

BLOOD FLOW RESTRICTION THERAPY FOR ACHILLES TENDON REPAIRS

What is Blood Flow Restriction Therapy?: Blood flow restriction (BFR) therapy uses a tourniquet to decrease arterial blood flow and prevent venous return while exercising. BFR can help to build muscle with minimal stress on joints and, in the case of a surgically repaired Achilles tendon rupture, the Achilles tendon repair site. There is growing data to suggest that this form of therapy can accelerate recovery and reduce atrophy by stimulating muscle hypertrophy in the setting of metabolic and mechanical stresses.

Information about the BFR Program: At the onset of the BFR therapy sessions which will occur 2 – 3 times per week, the tourniquet cuff will be placed around the patient's thigh. The electronic tourniquet system will be used to determine each patient's individualized limb occlusion pressure (LOP), and then will be used to maintain tourniquet pressure at 60% - 80% of this value for the duration of the set of strengthening exercises. Physical therapists will aim to have patients complete exercises at 80% of LOP, but final pressure for the duration of the exercises will be the maximum pressure tolerated by the patient between 60% and 80% LOP. Four sets of each exercise will be completed for reps of 30, 15, 15, and 15 during each set. 30 second breaks will be taken between each set. By maintaining a cadence of "2 seconds up, 2 seconds down" when performing reps, each exercise should take approximately 7 minutes, during which time the tourniquet remains inflated. After 7 minutes, the tourniquet will deflate for a 1-minute break and the patient will take a break between exercises for this minute.

Anticipated BFR Program:

0 – 2 Weeks Post-Operatively	
No blood flow restriction therapy. BFR begins at week 2 postoperatively.	
2 – 6 Weeks Post-Operatively	
Exercise	Description
Ankle Plantarflexion / Dorsiflexion AROM 1. Knee bend to 90 degrees (foot off the table sitting) 2. Push the foot down and then slowly flex up to neutral (foot parallel to the ground)	<p>The progression for this exercise movement will be ankle pumps (active plantarflexion and active dorsiflexion to neutral with no resistance) to ankle pumps with a resistance Thera-band, and finally, to pumps using a leg press machine with increasing weighted resistance. Resistance and loading will not be used until approved by the physician and physical therapist. <i>NO PASSIVE ANKLE DORSIFLEXION.</i></p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none">• 30 second break between sets• Tourniquet deflates for 1 minute after 4 sets

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<p>Straight Leg Raises</p> <ol style="list-style-type: none"> 1. Lie on back with knee straight and the other knee bent 2. Keep the leg completely straight, then raise it up to the other knee, slowly lower 	<p>Progress to using Thera-band or weights over time based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets
<p>Side Lying Leg Raises</p> <ol style="list-style-type: none"> 1. Lie on side with straight leg on top, lower leg bent, abdominals engaged. 2. Lift the top leg straight up and then slowly lower <p>*Do not crunch at waist</p>	<p>Progress to using Thera-band or weights over time based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets
<p>Long Arc Quads</p> <ol style="list-style-type: none"> 1. Sit with knee bent at 90 degrees 2. Fully straighten knee so that leg is parallel to the ground 3. Slowly return leg to starting position 	<p>Progress to using Thera-band or weights over time based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets

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6 – 12 Weeks Post-Operatively

<p>Leg Press Toe Raises</p> <ol style="list-style-type: none"> 1. Begin in a neutral position: both feet, toes only on the press plate; bottom of feet parallel to plate 2. Activate calf muscles pushing toes down and away (plantarflexion) 3. Slowly and in control return to neutral position 	<p>Start initially doing the exercise bilaterally with approximately 40 lbs or whatever weight the patient can tolerate. Progress to using additional weight and performing the exercise unilaterally based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets
<p>Leg Press</p> <ol style="list-style-type: none"> 1. Sit in machine, knee(s) at 90 degrees, feet flat against press plate 2. Push down and away extending at the knee(s) until full extension reached 3. Slowly and under control return to start position with knee(s) at 90 degrees 	<p>Begin doing exercise bilaterally. Progress to using weight over time and doing the exercise unilaterally based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets

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<p style="text-align: center;">Glute Bridges</p> <ol style="list-style-type: none"> 1. Lie on table/flat surface, back flat 2. Activate lower abdominals and glutes, pressing through the heels to lift hips toward ceiling 3. Under control return to starting position 	<p>Begin doing exercise bilaterally. Progress to using resistance or weight over time and doing the exercise unilaterally based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes</p> <p>Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets
<p style="text-align: center;">Romanian Deadlift (RDL)</p> <ol style="list-style-type: none"> 1. Begin standing straight up, shoulders back and core activated (good posture) 2. Maintain activated core and good posture, hinge forward at the waist pushing hips back, lowering the bar held in your hands to the floor. Shins should remain vertical. 3. Slowly and under control return to starting position 	<p>Progress to using resistance or weight over time and doing the exercise unilaterally based on individual patient's capabilities.</p> <p>Tourniquet Inflated: 5 – 7 minutes</p> <p>Four Sets: (1) 30 reps, (2) 15 reps, (3) 15 reps, (4) 15 reps</p> <ul style="list-style-type: none"> • 30 second break between sets • Tourniquet deflates for 1 minute after 4 sets

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