



BFR Team

BFR Web application, team 2

Ian Hanby, Tony Garnett, Connor Bodell, Dane Dingman, Akshay Kumar Dosapati, Seth Stajdl, Ben Cauley
Graduate: Siddhesh Mahadeshwar



Users and Stakeholders

Users

- Athletic Coaches
- Physical Therapists
- Personal Trainers

Stakeholders

- Athletes
- People in Physical Rehabilitation
- Elderly People
- Anyone that wants to exercise while using Blood Flow Restriction



Use Scenario 1 - Physical Therapist

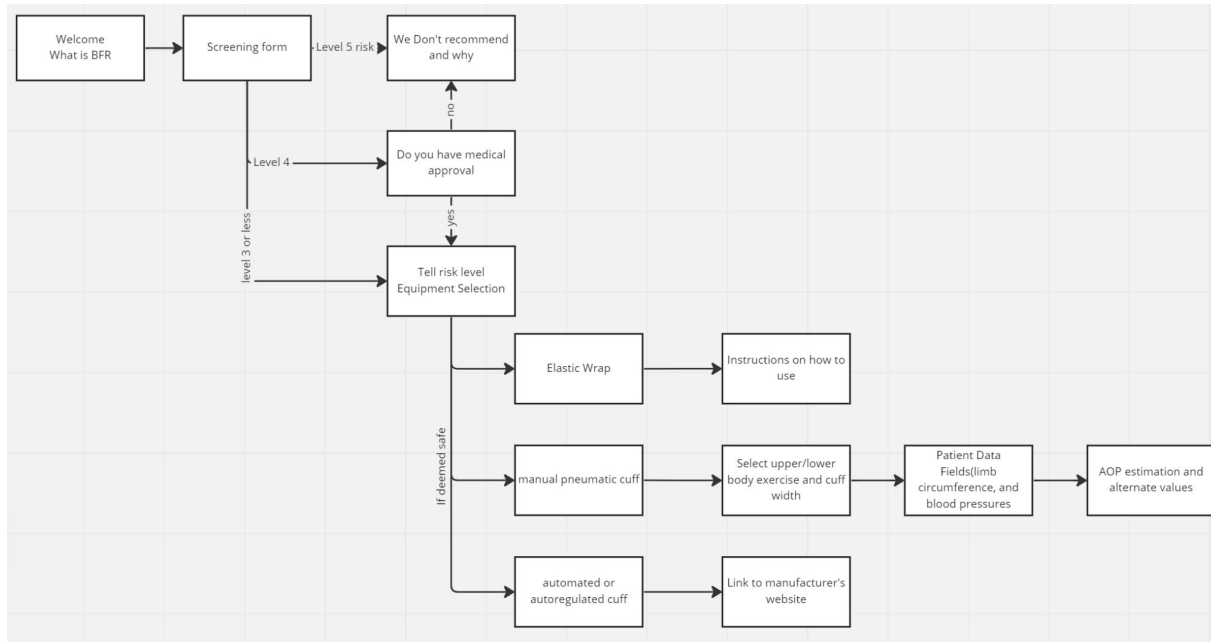
The PT fills out medical screening form with client information. Form is submitted, and risk level is presented to PT. The client is at a low risk level. Methods of BFR implementation deemed safe for the client are presented to the PT. The PT selects the manual pneumatic cuff. Options for device application are presented, and a pneumatic cuff is selected. The PT then selects the 5cm cuff size. The PT sees a screen with fields for systolic blood pressure, arm circumference, and diastolic blood pressure. The PT then takes the client's blood pressure and arm circumference and inputs the client's data on the page. A new page then loads and shows the results. The PT sees the recommended % of AOP and associated pressure for training the upper limb. The PT also sees a couple higher and lower % options which can be used depending on how the client feels and what the medical professional thinks.



Use Scenario 2 - Personal Trainer

A personal trainer's athlete will come to them for their first training session. The personal trainer will fill in the medical screening form with client information. Form is submitted, and risk level is presented to the PT. The client is at a moderate risk for BFR training. The trainer is then prompted to select a method of calculating the athletes AOP. The trainer has automated pneumatic cuffs and selects that option. The trainer is then shown links to various websites that will explain how to use this technology. The trainer then follows these instructions then proceeds with the training they have planned for the day.

General App Flowchart





Welcome Page

Welcome to the BFR Guide! ^{-bold}

Blood flow restriction (BFR) training can help patients make greater strength gains while lifting lighter loads. To begin, a medical screening will assess your risk in performing BFR Training.

[Access Screening](#)

Medical Screening Page

Medical Screening ^{-bold}

Check all that apply: ^{-italic}

Patient is 40-50 years old

Patient Sex is Female

Patient BMI is 25-50

000 More Q's

Submit



RISK LEVEL 1

Very Low risk
BFR is safe to perform

select one option

Automated
pneumatic
Cuff system

Manual
Pneumatic
Cuff System

Knee wraps/
bands



RISK LEVEL 2 & 3

Low & Moderate Risks
BFR is safe to perform

Select one option

Automated
pneumatic
Cuff system

Manual
Pneumatic
Cuff System



RISK LEVEL 4

Must need medical clearance to perform BFR exercise

If clearance has been given

user will be redirect to the manufacturer's website

If clearance has not been given, then user should not perform BFR

BFR not recommended and medical approval page

BFR Training not recommended



Due to the client's risk level as determined by the Medical Screening Questionnaire, it has been determined that BFR training cannot be recommended due to the medical risk it may pose.

OK

Do you have medical approval?



Due to the client's risk level as determined by the Medical Screening Questionnaire, it has been determined that BFR training may not be safe for the client. BFR training can only be recommended for the client under medical supervision and approval.

Yes

No

Knee Wrap/Elastic band type selection and data input pages

Knee Wraps/Bands

Where will the wrap be applied?



Lower Body



Upper Body

Upper Body Instructions

1. Measure the circumference of the patient's limb where the wrap will be applied.
 - The measurement should be 50% of the distance from acromion to olecranon process.
2. Take 25% of the arm's circumference. Measure and mark that distance from the end of the knee wrap.
3. Apply the knee wrap. Stretch so that the marked distance reaches the start of the wrap, resulting in one full revolution around the limb.
 - Apply wrap to a perceived tightness of "7 out of 10" based on the metrics below.

| Rating | Description |
|--------|---------------------------------|
| 0 | "No tightness" |
| 7 | "Moderate tightness w/ no pain" |
| 10 | "Intense tightness w/ pain" |

Lower Body Instructions

1. Measure the circumference of the patient's limb where the wrap will be applied.
 - The measurement should be 33% of the distance from inguinal crease to proximal patella
2. Take 30% of the thigh's circumference. Measure and mark that distance from the end of the knee wrap.
3. Apply the knee wrap. Stretch so that the marked distance reaches the start of the wrap, resulting in one full revolution around the limb.
 - Apply wrap to a perceived tightness of "7 out of 10" based on the metrics below.

| Rating | Description |
|--------|---------------------------------|
| 0 | "No tightness" |
| 7 | "Moderate tightness w/ no pain" |
| 10 | "Intense tightness w/ pain" |

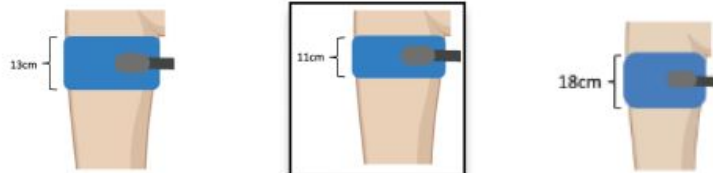
Manuel Cuff type selection and data input pages

Select which type of limb you will be training

Upper Body

Lower Body

Select the size of cuff you will be using



Take the blood pressure of the individual using blood flow restriction

systolic measurement

diastolic measurement

Measure the circumference of the lower body limb



Be sure to measure in the same place the cuff will go

circumference in inches



Your AOP (Arterial Occlusion Pressure) Estimates

Based off of your input

AOP: 190

80%: 152 mmHg

70%: 133 mmHg

60%: 114 mmHg

RECOMMENDED

50%: 95mmHg

40%: 76 mmHg

30%: 57 mmHg

20%: 38 mmHg



Manufacturers Page

Automated Cuff

- [SmartCuffs](#)
- [SAGA BFR Cuffs](#)
- [Airbands Wireless BFR Cuffs](#)

Knee Wraps/Bands

- [Bfr_shop](#)
- [hytro](#)

Manuel Cuff Products

- [EDGE Restriction System](#)
- [B Strong Training System](#)
- [BODYPRO BFR Cuff Set](#)
- [Hokanson Rapid Cuff Inflator System](#)



Usability Goals and concerns list

Usability Goals

- Allow the user to fill out their screening form to assess risk
- Allow the user to safely administer blood flow restriction
- Allow the user to implement manual cuff BFR safely
- Allow the user to interpret instructions for safe elastic band usage

Concerns List

- How a medical professional or coach might change a field in the screening form after they submit if they selected wrong
- How a medical professional or coach might change the type of AOP device they are using after they select one if they want to change their choice