BFR Exerciser App

Design Support Documents

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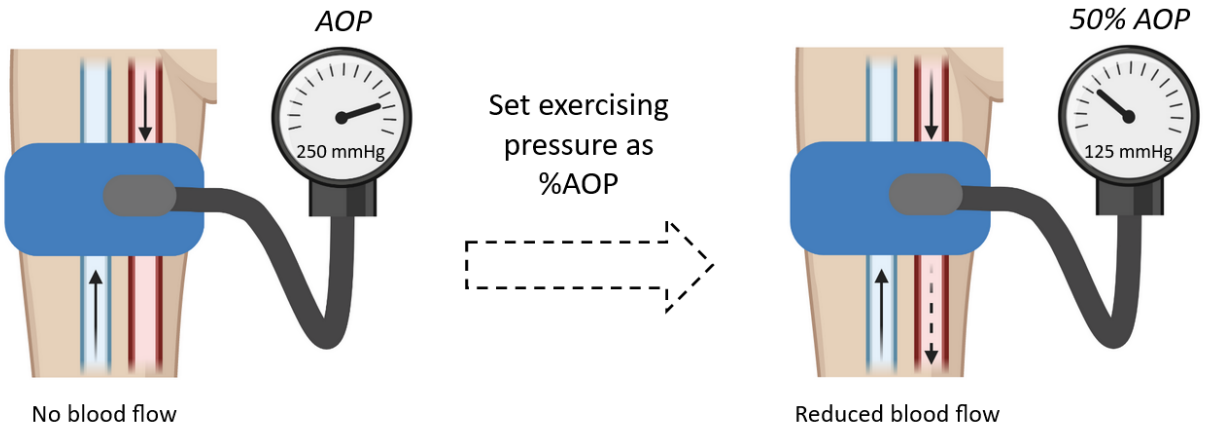
System Description:

Blood Flow Restriction supported exercise relies on the fundamentals of limiting the flow of blood and oxygen to a given muscle group. Doing so enables the targeted muscles to strengthen without the heavy use of weights as they are trained to work with limited levels of oxygen. Generally, the blood flow is restricted to 50-80% of its original capacity. This method can be tremendously helpful when it comes to physiotherapy, sport performance, or personal training as clients/patients may not always be capable of handling heavy weights. There are a set number of equations that can be used along with an ultrasound machine to determine the maximum Arterial Occlusion Pression (AOP) needed to fully cut off blood flow. A percentage of that number will be utilized to carry out the actual exercises. The application will accomplish its goal in three steps. Step one will be a questionnaire to fill out by the medical practitioner or trainer. It will determine if the client/patient is fit and suitable for BFR exercises. Step two will suggest appropriate technologies that can be used based on the data from the questionnaire. Step three will suggest safe and appropriate numbers for AOP and exercise levels. This application may be built as a base level system that requires user input each time or it may be able to save user data for progress tracking.

Clinical

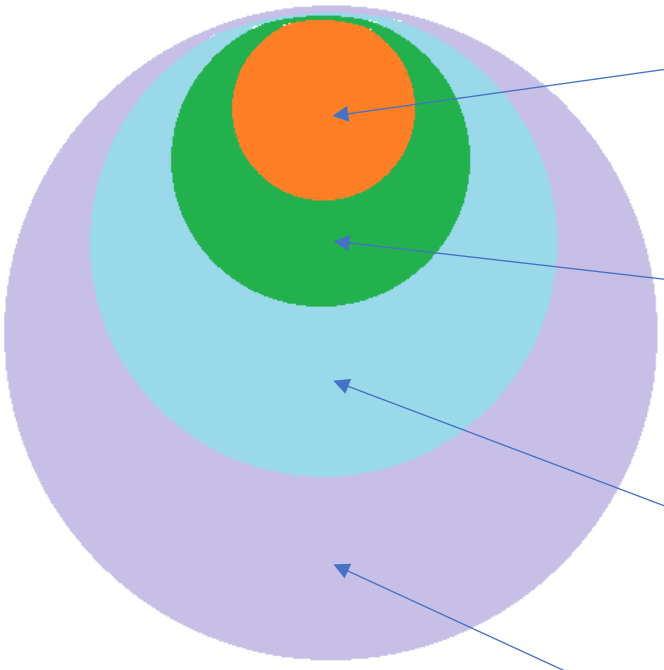
Health & Fitness

Sport Performance



Stakeholder Analysis

Onion Model of Stakeholder



Stakeholder Descriptions:

- Sport Performance Trainers: These will be performance coaches working with athletes who have fitness or competitive goals.
- Personal Trainers: These will be personal fitness trainers working with individual client goals such as weight loss or muscle building.
- Physiotherapists: These will be doctors or rehabilitation experts working with clients who are recovering from injuries.
- Scientist: This is the architect for this idea. They will be responsible for leading the project's direction and some key decision-making processes.
- UX Consultant: The UX Consultant will be responsible for ensuring that the application is thoroughly user-tested and ready for public usage. They will also be ensuring that the project's requirements are thoroughly understood and communicated with the development team.
- Developers: These will be the software developers responsible for building, testing, debugging, and enhancing the technical aspects of the application.

Stakeholders' Goal-influence Table

Stakeholder	**Goal**	**Influence**
Sport Performance Trainers	Coaches will aim to obtain a streamlined process for themselves to understand what technologies they will need to use and at what level it will be for a given athlete.	Coaches may influence the project by providing feedback on the UI or UX aspects of the application based on their professional needs with clients/athletes.
Personal Trainers	Personal Trainers will aim to obtain a set of instructions such that they will be able to assist their clients' goals through BFR.	Personal trainers may influence the project with their potential needs to train with their clients and the respective personal goals.
Physiotherapists	Physiotherapists will aim to understand how they should be operating with BFR technologies and at what levels it should be to help their patients recover from injuries or limitations.	Physiotherapists may influence the project with their clinical needs to properly aid their patients.
Scientist	The scientist will aim to provide sufficient domain-specific information that allows the UX Consultant and Developers to produce an app which is both functional and efficient for the user base.	The scientist may influence the project by providing feedback on course-correction or tips on how potential users may be using the application in the future.
UX Consultant	The UX Consultant will aim to thoroughly understand the application requirements and communicate these with the development team. They will also be responsible for ensuring that the application is fit for usage through user interface and experience testing.	The UX Consultant may influence the project by providing feedback regarding the UI/UX and a different perspective on how the application may look suitable from a third-person non-developer viewpoint.
Developers	The developers will aim to create a fully functional and accurately built application that meets the needs of the scientist and has been thoroughly tested by the UX Consultant.	The developers may influence the project by handling all the technical and development aspects of the project. They may also influence the UI/UX elements of the application and the technical ideas relating to the code base.

Personas

Two Primary Users

- Name: Jack Peters
- Attributes: Jack is from Grand Rapids, MI, and he is a physiotherapist by profession. He is 35 years old and has been practicing physiotherapy for over 10 years.
- Description: Jack has gained his expertise in treating athletes who are injured and aim to recover as quickly as possible through muscle building around the affected regions. He will be using the BFR app to understand and properly implement its benefits to assist his patients who may not be capable of working with heavy weights due to injury limitations. He is primarily a traveling physiotherapist who deals with new injuries daily as he meets athletes and learns more about physiology.

- Name: Jane Lawrence
- Attributes: Jane is 50 years old and from Los Angeles, California. She is an experienced personal trainer who has been working with weight-loss clients for over two decades.
- Description: Jane has earned a formidable reputation and respect with her clients for her rapid and sustained successes with weight-loss. She often encounters clients with weakened joints as the neighboring muscles have weakened after sustaining heavier than expected body weight on her clients. BFR will aid her in building her clients' muscles without relying too heavily on external weights training.

Two Secondary Users

- Name: Peter Parker
- Attributes: Peter is 32 years old, a former professional athlete, and a sports performance trainer from Miami, Florida.
- Description: As a performance trainer, Peter knows exactly what athletes need as he has gone through this process himself. As most of Peter's clients are already professional athletes and generally fit as well as injury-free, Peter only requires BFR for the limited purpose of strengthening muscles on light-intensity training days. Peter intends to use BFR to continue muscle growth with clients on days when they are having excessive soreness or recovery.

- Name: Mary Jones
- Attributes: Mary is 47 years old and has been a sports performance trainer for over three decades. She is from Dallas, Texas.
- Description: Mary has been working with clients aiming to enter sports like biking or rowing at a professional level. Most of these clients may not be physically capable of carrying out extended hours of single-muscle group exercises at an initial stage. Mary aims to use BFR to first strengthen the targeted muscle groups with her clients before she begins her intensive sport-specific workouts. She has observed common mistakes and injuries through her years in the field and believes that BFR can prevent a lot of those initial career-ending mishaps.

Hierarchical Task Analysis

Task Type	**Description**
Task (Goal)	Answer a questionnaire about the client or patient for medical screening.
Subtask	- Collect all necessary information from clients or patients - Obtain permission from the client to input this data onto the BFR App's questionnaire
Action	- Fill out the questionnaire - Ensure that all the details are accurate - Submit the questionnaire

Task Type	**Description**
Task (Goal)	Select from a range of recommended technologies for BFR.
Subtask	- Carefully consider all the recommended BFR technologies based on the questionnaire's analysis - Understand the benefits and risks for the client/patient
Action	- Explain all the risks and benefits to the client/patient - Select an appropriate technology for BFR usage

Task Type	**Description**
Task (Goal)	Set exercising Arterial Occlusion Pressure based on recommendations.
Subtask	- Consider if the client/patient will be able to handle the discomfort of the recommended AOPs - Consider the client/patient's pain threshold - Consider the patients anxiety levels to undergo BFR
Action	- Explain the pain and discomfort expected with BFR - Calm the patient down by explaining that BFR is a monitored procedure - Select an appropriate AOP level accordingly

NOTE: Scientist meeting notes were taken collectively by the development team. The UX Consultant primarily focused on thoroughly understanding the project background and asking questions to enhance the team's understanding of the requirements and goals.