

BFR Exerciser App

Heuristic Evaluation

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Description of Design

The goal of the BFR Exerciser App (website) will be to provide its users with an effective one-stop solution to determine some key instructions and technologies for their blood flow restriction exercises. According to the requirements as discussed with the project's scientist, the application will be divided into three major steps: medical screening, selecting technology, and setting pressure. With that said, the proposed design by the development team has been carried out with those steps in consideration.

The web application will begin with a simple Welcome Page that will briefly describe the purpose of BFR with some illustrative images of BFR in action and provide a button to access the first step for a medical screening. The medical screening step will be presented in form-style layout where the user will be asked several questions with multiple-selection boxes about their patients/clients. Upon submitting the responses, the user will be given a risk analysis that can be one of three possible outcomes: Risk Level 1 (low risk), Risk Level 2 & 3 (moderate risk), or Risk Level 4 (either not cleared to use BFR or requires medical clearance). Another page/modal that may appear based on the Risk Level will be a BFR Not Recommended page and/or a Medical Approval page. The BFR Not Recommended page will serve the purpose of a disclaimer that the use of BFR is not suggested based on medical risks. The Medical Approval page will mention that BFR may not be safe for the patient/client and may only be carried out under medical supervision/approval. Based on the responses obtained on the previous steps, questions will be asked regarding the intended use of BFR (either upper or lower body). The response will trigger a set of instructions for that section of the body. A selection will be necessary for the cuff size as well as data input regarding the blood pressure and circumference measurements of the intended limb. Accordingly, a scale will be provided by the application that estimates the Arterial Occlusion Pressure. This will complete all the intended behavior of the application.

Identification of the UI Domain

Based on the services provided, this app will fall in the user interface domain of web applications for questionnaire-based recommendations. The UI of the application will mainly serve the purpose of clearly presenting a set of questions in the form of a screening/questionnaire and accordingly display BFR medical recommendations, information, and disclaimers.

Heuristic Usability Principles

- 1) **Appropriate Terminology for the Medical Field of BFR**
Given that the app will be providing medical recommendations for the use of BFR, it is imperative that there is an appropriate use of terminology. The direct users of this app will likely be people who have some baseline knowledge such as performance coaches, physiotherapists, or personal trainers.
- 2) **User Control for Selections**
The users should have the ability and control to alter, add, or remove their selections on any stage if they desire. Based on descriptions provided for each selection, the user may have a developing understanding of BFR.
- 3) **Clear and Consistent Display of Associated Images**
For a medical practice such as BFR, it is vital to provide a consistency in the display of images whenever a new concept or terminology is being introduced. This will minimize risk and misunderstandings for the user.
- 4) **Error Prevention**
If there are inputs that can be deemed as anomalies or outliers, the application should be able to identify and prompt a confirmation from the user to prevent errors or inaccurate recommendations.
- 5) **Recognition rather than Recall**
Provide a summarized version of the user's selections that are impacting the application's recommendations. This will aid the user in the understanding of their decisions.
- 6) **Clear and Minimalistic Design**
The users of this application may not have a technical background of using technology. Keep the application as minimalistic as possible without compromising aesthetics or the service itself.
- 7) **Help and Documentation**
Provide a possibility to find explanations and documentations on every page of the application. The user should have access to help whenever they may need it. The possibility of any confusions or the lack of clarity should be minimized.
- 8) **Effective and Appropriate Use of Color Coding**
An appropriate use of color coding should be utilized to convey the messages of low, medium, or high-risk decisions/recommendations. E.g., high risk recommendations should be labelled in a representative red color if required.

Potential Usability Problems

- The use of colors on objects with text is not easily readable on some stages such as Risk Level 4 and the Manual Cuff Selection page. This could violate the Clear and Minimalistic Design Principle.
- The animated images of limbs may not be obvious to all users. This violates the Clear and Consistent Display of Associated Images principle.
- Given the number of questions that are asked during the screening process, there should be a way for the user to see a summarized version of their responses. Not having this can create confusion and violate the Recognition rather than Recall principle.
- Although most users will be aware of this, it would be helpful to provide an image of where systolic and diastolic measurements can be found on a blood pressure machine. These can be confused and may cause a violation of the Error Prevention principle.

Critical Usability Concerns

- There needs to be access to a documentation page from every stage of the application. For new users, it may not be entirely clear what certain terminologies mean and this could lead to misunderstandings, incorrect responses, and/or unsafe recommendations. This would violate the Help and Documentation principle.
- All pages of the application should have an option to go to the previous screens and alter selections upon making a mistake. The current design does not include this, and it violates the User Control for Selections principle.

Critical Usability Scenarios

- Critical Scenario 1

Take a scenario where a new user is browsing through every step of the BFR app. Although they are a medical professional, they may be entirely new to the concept of BFR and its terminologies. Without the existence of a proper documentation page accessible from every location/stage of the app, the user would be compelled to use either prior (possibly incorrect) knowledge of BFR and its terminology, or enter incorrect information based on guesses. In both scenarios, this greatly increases the risk of administering BFR with any patient/client along with its critical usability and safety concerns for all parties involved.

- Critical Scenario 2

Take a scenario where a user is inputting data into the screening questionnaire. After proceeding to some of the later stages, they find out that a mistake was made on the earlier pages. However, they are unable to return to a previous page and correct it. The user is now forced to either continue with incorrect data or start over with a process that may be considerably time consuming when a patient/client is waiting for them. This could be a critical usability concern as well as a possible safety concern for everyone involved.