

Preventing Weightlifting Injuries by Barbell Modifications

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Client: Mr. Robert Gold

Advisor: Prof. William Murphy

Team Members:

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Problem Statement

Thousands of weightlifting injuries occur every year. Injuries are often caused by an uneven distribution of load on the barbell, leading to the weight lifter favoring one arm over the other. The team has been tasked with designing a biomedical device that can prevent weight lifting injuries by targeting, identifying, and correcting improper form.

Brief Status Update

The team has made progress with the coding of the Arduino and MPU-6050, and is currently working on graphing on MATLAB. We have fabricated a test casing for the technology via 3D print, and have begun the 3D printing of the final technology housing.

Team Goals

Examine test casing for technology, and make necessary adjustments for the actual final design. Continue coding and working on MATLAB, as well as outline testing.

Individual Accomplishments and Goals

Jackson: After Show and Tell on Friday, the team received a good number of suggestions which we will build on. More specifically, the question of surface area and how we will attach our technology was brought up. We will outline testing in order to determine the best way to move forward with attachment. Another valuable piece of information that we took away from our peers was the need to solder wire connections. This will aid with our connection issues. Moving forward, we will perform necessary testing and begin final coding and MATLAB performance in the coming weeks.

Kai: This week the team met to adjust the dimensions of the housing box for the circuitry. We were also able to gain some valuable information from other groups during the show and tell on Friday. Some key takeaways from show and tell were to potentially split up the box element into two sections to optimize the height of the box relative to the clips. The wiring could then be across the hinge of the clip and water-tightened with rubber/caulk of some type to maintain sweat resistance. Soldering the IMU to fix

inconsistent readings was another topic of discussion. The team took all of this into consideration and we plan to solidify our prototype and get some data results for our final presentation.

Luke: This week on Thursday I met with Gavin in order to discuss the future of the design of the compartments for our electronics and batteries. We discussed certain design changes we could apply in the future for our final design and spoke about how we can improve the design that we will use for testing next week. We kept the main idea for the 3D print design the same but were able to shrink down the dimensions due to the idea we came up with last week regarding two separate compartments on the clip, one for the breadboard and the other for the batteries. We then began the 3D printing process for this new design and it should be ready Friday when the makerspace reopens. This upcoming week we plan to make testing procedures and begin the testing process.

Gavin: This week Luke and I designed a new smaller box with bigger channels and started the 3D print on that box. I have also received all of the parts we ordered in the mail. After the print for the new box is done we will start attaching our components to the barbell clamps we have. In this next week we will be starting our testing with our prototype.

Design Accomplishments

Test model for technology casing. The weightlifting clips have arrived. We have calibrated the MPU-6050 to show coordinates on Arduino. We have made beginning progress on MATLAB coordination.

Weekly/Ongoing Difficulties:

N/A

Project Timeline:

Week #	Task
1	Choose project Assign roles
2	Finish first progress report BSAC meeting First client meeting
3	PDS, Brainstorm, Research
4	Brainstorm, Literature Search, Design matrix

	criteria and design ideas (at least three) due
5	Preliminary Oral Presentation
6	Preliminary Report, Electronic Notebook, Peer/Self Evaluation, Decide on final design
7	Final Design
8	Order materials, consider submitting invention disclosure
9	Fabrication, show and tell
10	Fabrication
11	Fabrication
12	Design Testing and Modification, Poster Draft Review
13	Design Testing and Modification, Final Report
14	Poster Presentation, Final Report, Final Electronic Notebook, Team Evaluation, Peer/Self Evaluation

Expenses [+](#) BPAG Expense Spreadsheet