

# Preventing Weightlifting Injuries by Barbell Modifications

November 18th- November 22th, 2024

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

We have completed our 3D printing portion of the project, and made additional adjustments to the lid so that the clip is more functional.

## Team Goals

We are looking to implement a button into the Arduino coding in order to start and stop the collection of Arduino data so that we aren't taking an infinite amount of data sources. We will complete testing as well as move forward with starting our poster for the upcoming poster presentation.

## Individual Accomplishments and Goals

Jackson: This week Kai and I met to implement a button in the Arduino code in order to stop and start the collection of data, in order for the EEPROM data storage system to not fill up with data immediately. We also met with Dr. Wille in order to look into further filters that we can implement in order to gather more linear data that aligns with the direct movement of the accelerometer. We completed testing this week, and in the upcoming week we look forward to finalizing our product, and then moving into the creation of our poster and pitch for the upcoming poster presentation.

Kai: This week Jackson and I worked on adding a button system to the circuitry so that a new trial could be run and stored in the EEPROM without needing to be directly plugged into a serial port. We also worked with our biomechanics professor regarding trend filtering on our data as it appeared to have some noticeable drift when recording. In the coming days the team will make sure both sensors work properly and will work on our poster for the presentation after thanksgiving, as well as the other deliverables that will be due at that time.

Luke: This week I researched some testing techniques with which we can test the box that would be applicable. I started to write out some drafts that we could put into the final report for this project. Other than that it was a busy week and there was difficulty with our group finding a time to meet. However, next week as our exams begin to wind down before break we will be meeting both with our advisor and with each other to implement the tests we have planned as well as to test the usability of this device.

Gavin: This week I printed a new sliding lid for our 3D printed box as well as printed a second 3D box. I also worked on attaching the 3D-printed box and battery pack to our barbell clips. This week I also made a hole in the 3D-printed box and put the wire through it, then I sealed it with hot glue. We also met and completed testing. In the upcoming weeks we will be working on our final poster and other final deliverables.

### **Design Accomplishments**

We made a necessary change to the lid of our box, which included a bigger lip in order to lock in place. We drilled holes in the box for the battery wires to be able to power the technology, and we created a button start in order for data collection to be started, and then timed, in order to not fill our data collection EEPROM.

### **Weekly/Ongoing Difficulties:**

N/A

### **Project Timeline:**

<b>Week #</b>	<b>Task</b>
<b>1</b>	<b>Choose project Assign roles</b>
<b>2</b>	<b>Finish first progress report BSAC meeting First client meeting</b>
<b>3</b>	<b>PDS, Brainstorm, Research</b>
<b>4</b>	<b>Brainstorm, Literature Search, Design matrix criteria and design ideas (at least three) due</b>
<b>5</b>	<b>Preliminary Oral Presentation</b>
<b>6</b>	<b>Preliminary Report, Electronic Notebook, Peer/Self Evaluation, Decide on final design</b>
<b>7</b>	<b>Final Design</b>
<b>8</b>	<b>Order materials, consider submitting invention</b>

	<b>disclosure</b>
<b>9</b>	<b>Fabrication, show and tell</b>
<b>10</b>	<b>Fabrication</b>
<b>11</b>	<b>Fabrication</b>
<b>12</b>	<b>Design Testing and Modification, Poster Draft Review</b>
<b>13</b>	<b>Design Testing and Modification, Final Report</b>
<b>14</b>	<b>Poster Presentation, Final Report, Final Electronic Notebook, Team Evaluation, Peer/Self Evaluation</b>

Expenses [+](#) BPAG Expense Spreadsheet