

Date: 9/12/2024

Project Title: Preventing Weightlifting Injuries by Barbell Modifications

Client: Mr. Robert Gold

Advisor: Prof. William Murphy

Team Members (full names with team role)	Email
Jackson Jarrett (Leader and BWIG)	jrjarrett2@wisc.edu
Luke Schmeling (BSAC)	laschmeling@wisc.edu
Gavin Gruber (BPAG)	gtgruber@wisc.edu
Kai McClellan (Communicator)	kamcclellan@wisc.edu

Problem Statement:

Over one million weightlifters experience serious injuries every year. These 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 diagnose this strain on the body in coordination with specific muscles in use.

Brief Status Update: (describe in 3-4 complete sentences concisely what the team accomplished in the last week.)

Last Friday, we collectively chose to begin this project. We were able to choose our team roles, and begin discussing our steps moving forward. We highlighted available meeting times, while also conversing about our available resources. Kai and Gavin met our client Mr. Robert Gold, as they talked over the direction that we will follow as a team this semester.

Difficulties/Advice Requests: (request advice from your client and explain any other difficulties – only fill out if there are difficulties or questions. If you have any pressing questions, be sure to also include them in the body of the email to your client.)

N/A

Current Design: (include detailed description of design (2-3 complete sentences) and detailed drawings, pictures, or 3D models with labels and dimensions—update this every week as needed)

N/A

Materials and Costs (update as you place orders):

N/A

Total Cost to Date: \$0

Team Goals (Current week):

- Meet with our Advisor Prof. Murphy on Friday
- Begin preliminary research
- Deepen understanding of Motion Microscope software
- Look into emg device approach and its benefits/disadvantages
- Discuss meeting times
- Converse about direction and preliminary design
- Begin PDS

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

Individual Goals for the upcoming week (each team member individually fills out their goals/plans that they hope to accomplish in the next week. Replace “Team member #” with your name):

Team Member Luke Schmeling- To find statistical data of what regions of the lower body are weakest on an average human being and would give out first in a compound lift such as back squat. Perhaps could even be expanded upon further as to what areas of the body are under the most strain in compound lifts. Short Answer: Research.

Team Member Jackson Jarrett- This upcoming week, I look forward to continuing my preliminary research on muscle strain and injury when weight lifting. I will also begin to look at microcontrollers that can read and relay the data necessary to accomplish our design goals. I will also coordinate our first meeting as team members so we can be decisive in our research and begin our PDS in the coming week.

Team Member Kai McClellan- Cost numbers of EMG’s will have to be evaluated with additional research on them to determine how to quantify their readouts so that they may be related to barbell movement devices from the previous project group. Research should go into the Motion Microscope software mentioned by the client and how it may help us with our testing and computations. Long term goals will include how to perform a computational analysis of data from the software combined with the EMG’s and data from the previous prototypes that attach to the barbell.

Team Member Gavin Gruber- In this upcoming week I will do more research on how muscle tears and injuries occur during lifting, and what the best preventative measures people use. I also want to look at ways to measure muscle tension when you are lifting.

Individual Accomplishments from previous week (each team member individually fills out the tasks/accomplishments that they completed during the last week. Replace “Team member #” with your name):

Team Member Luke Schmeling- Attended the upcoming BSAC meeting. Went to the Nickolas Davis recreation center and did some of the compound lifts we hope to focus on this semester, actively thinking about the muscles I felt under significant stress when lifting increasingly heavy weight.

Team Member Gavin Gruber- I read over the previous year's final report about their design and what they were trying to accomplish. I also did some research on products that track muscle tension during lifts as well as how most lifting injuries occur.

Team Member Jackson Jarrett- This past week, Kai and I began talking about our goals for this project and what we hope to accomplish this semester. I read through the notes from the client meeting and continued my brainstorming process based on his specific direction. I created and shared the Progress Report template, and met with our advisor Prof. Murphy on Friday.

Team Member Kai McClellan- I had the opportunity to talk with our client about his goals and means of approach for this attempt at the barbell modification project. He mentioned that he wanted to focus more on the physical muscles involved and evaluate their strain during lifting and see if “Motion Microscope”, a software he mentioned, would be beneficial in our testing and evaluation of muscle tension. I was able to get the information from other departments such as professors in Kinesiology, computer science, and biomechanics and plan on discussing important factors that should be considered with our desired approach.