

Modernization of MedX Rehab Medical Machines

Project Description:

The purpose of this project is to review and analyze the current MedX Lumbar Extension & Cervical Extension machines and identify how advancements in materials science and modern manufacturing can allow the team to develop a more efficient machine that can also be produced at a lower cost.

Current Progress:

- Govsphere has delivered one MedX Lumbar Extension Machines and one MedX Cervical Extension Machine.
- The team has spent the last few weeks familiarizing themselves with the machines.
- Plans for motorization have begun, as well as static and dynamic calculations for the weight stack and counterweight mass reductions.
- The team is currently seeking IRB approval to facilitate more testing.

Planned Solutions:

- Weight stack mass will be reduced by half, with a change in sprocket size allowing for equal torque
- Electric motors will be introduced to allow for easier setup of restraint devices
- Counterweight mass will be reduced while maintaining moment of inertia; potential introduction of sensors will allow for automated counterweight setup
- Frame will be redesigned to reduce mass, using bent elliptical tubing wherever possible to minimize production time and costs

Deliverables:

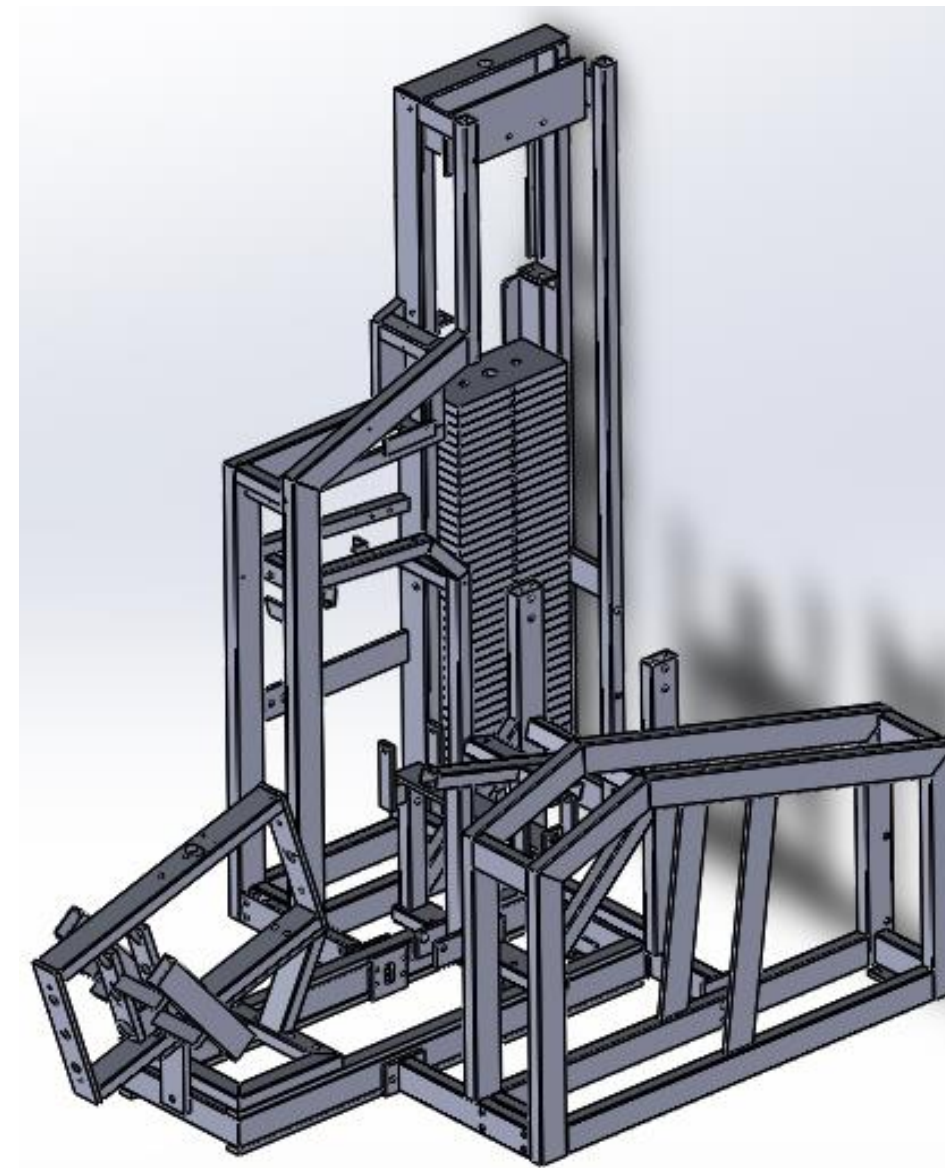
1. Analyze current machine structure and mechanical operation of MedX Rehab Lumbar Extension and Cervical Extension machines
2. Identify potential engineering modifications and enhancements to the frame and structure of the MedX Rehab Lumbar Extension machine
3. Identify potential engineering modifications and enhancements to the frame and structure of MedX Rehab Cervical Extension machine
4. Identify potential engineering modifications and enhancements to the weight stack of the MedX Rehab Lumbar Extension machine
5. Identify potential engineering modifications and enhancements to the weight stack of MedX Rehab Cervical Extension machine
6. Identify potential engineering modifications and enhancements to the restraint mechanism of the MedX Rehab Lumbar Extension machine
7. Identify potential engineering modifications and enhancements to the restraint mechanism of MedX Rehab Cervical Extension machine
8. Identify potential engineering modifications and enhancements to the counterbalance of the MedX Rehab Lumbar Extension machine
9. Identify potential engineering modifications and enhancements to the counterbalance of MedX Rehab Cervical Extension machine
10. Identify other engineering improvements and enhancements to the MedX Rehab Lumbar Extension and Cervical Extension machines



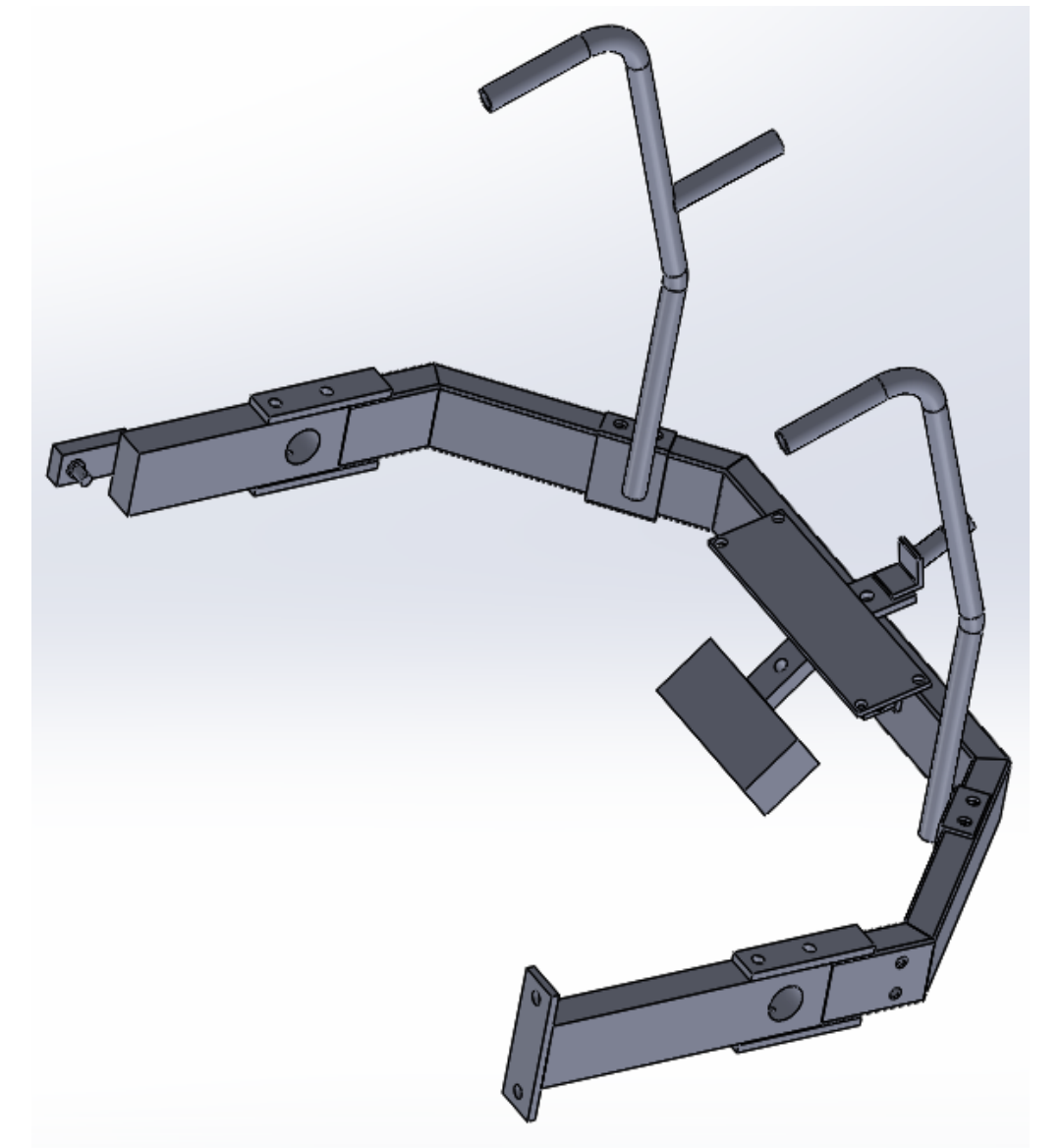
MedX Rehab Lumbar Extension



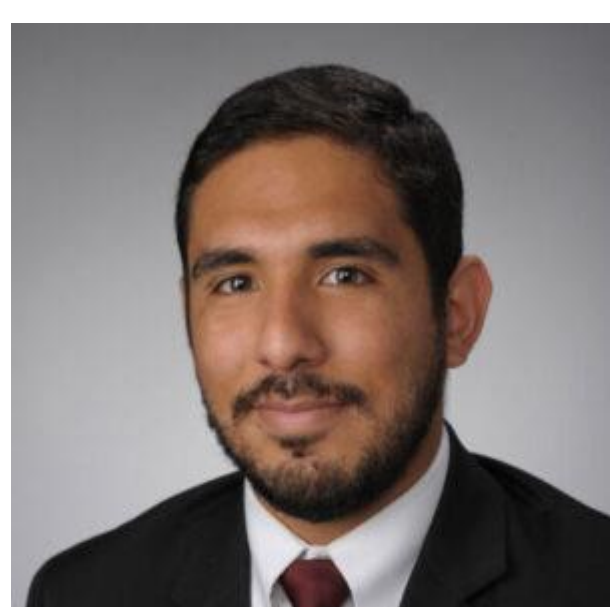
MedX Rehab Cervical Extension



MedX Rehab Lumbar Extension
Frame and Weight Stack



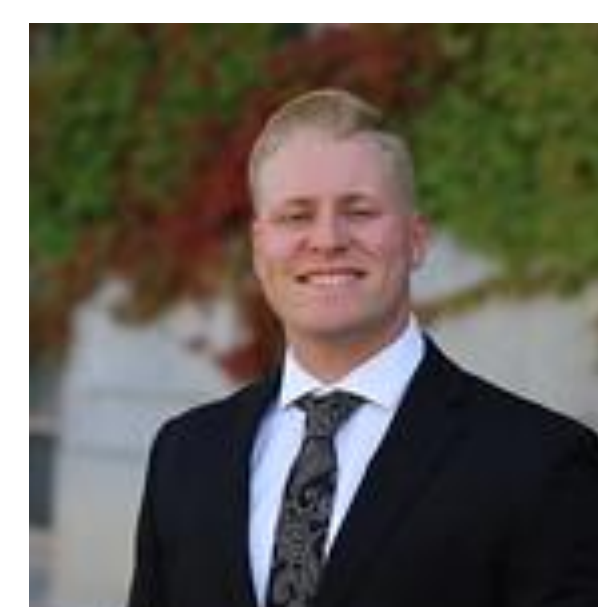
MedX Rehab Lumbar Extension
Arm Assembly



Faculty Mentor: Dr. Victor Duenas



Mr. Joshua Cully



Mr. Samuel Getman



Mr. MaCauley Kastner