

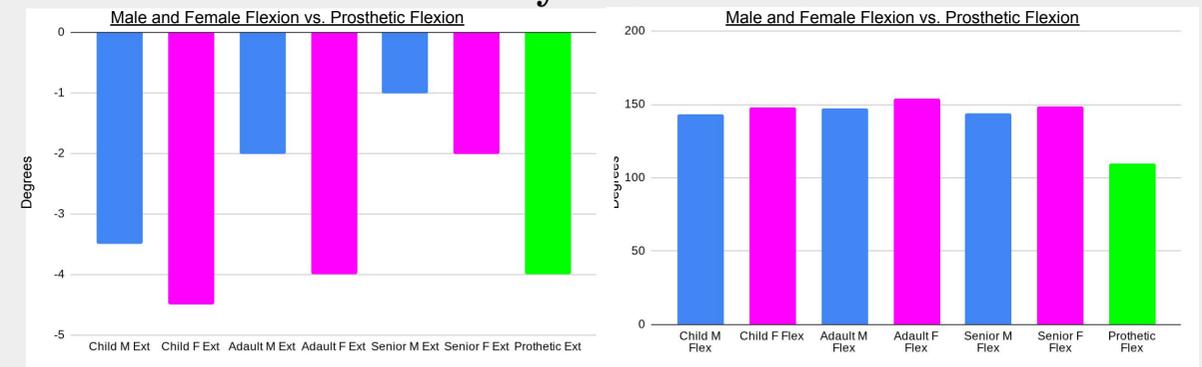
Developing a modified joint for a prosthetic arm based on joints found on full leg prosthetics

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Engineering Problem & Objectives

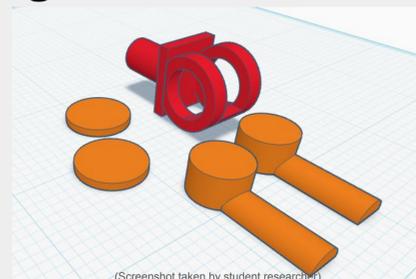
- Current prosthetic arms can cost from 2000 to 5000 dollars just for an immovable cosmetic arm that has no replication of any motion present in a regular arms joints
- There are thousands of people including many veterans who have either lost or were born without an arm that can't afford one, even the cheapest option.
- The main focus is developing a joint, specifically an elbow joint, that can effectively replicate the movements of a regular elbow whether that be extension (straightening the arm) or flexion (bending of the arm)
- Also developing it in a 3d software then printing it to help with affordability
- Science has proven that if you have a prosthetic limb that can mimic the movements of the regular limb then the brain recognizes that prosthetic as an extension of the body and phantom pain which roubles many amputees can be reduced

Data Analysis and Results



Project Design

- Start by developing a model for the joint in Tinkercad, said model must consist of two parts that can fit together and allows both flexion and extension
- After a 3d model is designed, fit the pieces together and glue if needed
- After which two smaller PVC pipes can be cut to the length of the humerus and the radius bones
- Then glue the PVC pipes to their respective parts of the joint to formulate the makeshift "arm"
- Lastly a maniquen hand can be attached to the end of the radius bone PVC to act as the fake hand of the prosthetic



Interpretations and Conclusions

- The testing posed some concerns, the main one being the Flexion of the joint.
- The Flexion of the elbow prosthetic is nowhere near any of the average degrees of flexion that the regular elbows give so there will need to be some corrections made.
- The solution for the issue isn't that difficult, I just need to cut out part of the stopper on the top of the joint to allow for further Flexion.
- One of the good parts of this testing is the extension, which resembles that of a healthy adult female
- The reason for comparing the prosthetic to different ages and genders is because the comparisons can be used to make adjustments to the prosthetic to allow different genders and ages to have a similar range of motion to the other arm