

Methods

This project started off by drawing many sketches on paper. I also took overall measurements of Socrates in order to be ready for the next phase of this project, the CAD, the most extensive part of this project. All of the hand drawn sketches were modeled in CAD and 3D printed. Various prototypes were fitted on Socrates. Iterations were made based on those observations and general mechanical observations.

Technique 1

The first concept of the prosthetic was to be a three-component design, with a body piece, leg piece, and foot piece. The body piece would have connected to the leg piece with a ball and socket joint. However, when designing the CAD for this technique, problems such as friction arose. Since this prosthetic was primarily made of PLA plastic, a ball and socket joint would not be ideal, so another design was chosen to attach the leg component to the body component.

Technique 2

The refined approach of the prosthetic was to bolt the leg component to the body component. Although this would not allow for a 360-degree range of motion at the shoulder, the durability, a more critical criteria, was better met. The foot and leg components were planned to attach the same way.

Final Design

The final design was printed, and assembled with screws. Socrates wore the leg by using the harness to correctly position it and keep it in place.

