



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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Project Title The Smart Socket	
<p style="text-align: center;">Abstract</p> <p>Objectives The purpose of this project is to design an above-the-knee prosthetics that would allow amputees to move comfortably without having to worry about prosthetic-inflicted irritations/sore and the cost.</p> <p>Methods Created a silicone mold (from store-bought silicone) and a homemade papier-mache mold of the thigh, covered exterior with nitinol sheets and interior with memory foam, cut 4 slits of equal widths and lengths, attach rollerblade buckles across each slit and cover each slit on the inside with fabric to cover existing gaps. Put weights of various pressures to test durability and expanded and contracted the socket for adjustability test.</p> <p>Results The final design of the prosthetic socket was able to hold 63lbs of pressure without changing its shape, which surpassed our 40lb requirement. It was able to expand over 25 inches in circumference and 15 inches at its smallest. All of the materials were synthetic, which meant that it wasn't biodegradable (sustaining its durability).</p> <p>Conclusions The socket we created is able to distribute the weight of an adolescent on both legs while being cost-effective through repeated trials. In addition, the socket attains to the adjustability test of having the ability to increase or decrease its size, benefiting growing individuals of various sizes.</p>	
Summary Statement Our project is about designing a low-cost, adjustable prosthetic socket that can distribute weight evenly.	
Help Received We designed the prototypes out of a combination of store-bought materials and materials we created ourselves, with minor informational help from Kaiser Permanente.	