Dynamic Stability

Hunt, Mackenzie (School: New Tech Institute)

Persons who use wheelchairs without the ability to flex and extend the knee and ankle joint suffer from pain, fixed joint syndrome, and early set arthritis. If intense force is applied to the knee joint consistently or suddenly, tearing and rupture of the joint's structure can occur. There are few wheelchair footrests on the market that provide accommodations for low tension and flexion movement, but for stronger persons, or those with repeated actions, the wear and tear of the products are quick to break the expensive brackets. Utilizing the Design Process, designs were created and chosen based on wants and needs in a design matrix. The specified categories of investigation were defined by those who would later utilize the product in their daily lives and by professionals from a wheelchair customization firm. A final product was 3-D rendered in order to produce professional grade stress testing and mechanical simulation. The product created is only a little over half the weight, is able to accommodate 450 lbs of force, and provide more features than the leading product on the market. Creating a useful footrest that allows for user's support while mobilizing the knee joint, absorbing leg extension, and allowing plantar and dorsal flexion, will generate a flourishing relationship with its future user. From veterans of war suffering from head trauma to those born with cerebral palsy both will have a wheelchair footrest capable of supporting their future and adventures.

Awards Won: