Device to Enable Person With Disability and Caregiver to Hold Pants

Overview
Tetraplegic patients experience complete paralysis below the waist and limited mobility in the arms, with complete loss of fine motor function in the fingers. They also experience lack of bladder control, creating a need for self-catheterization. A device to enable tetraplegic users to self-catheterize would greatly increase their quality of life and grant them more independence.

Objectives
We sought to create a device that would pull a user’s waistband away from the groin area. This device frees a tetraplegic patient to use both hands for self-catheterization with minimal spillage.

Approach
• Keith Parsons, a C5/C6 spinal cord injury patient, was the intended user for the device
• Keith’s needs for the device guided concept generation and selection
• Design concepts were both novel and inspired by existing products in the market
• The final device design was reached by using iterative prototyping
• Two site visits to Hershey Medical Center to meet with Dr. Hills, Nancy Lokey, and Keith helped provide feedback on each device design
• Each prototype was tested by the design team, sponsors, and Keith
• The prototypes were fabricated in the Learning Factory at PSU
• Models were created in Solidworks to generate prototype images for manufacturing
• The final device consists of a plate that slides underneath a user’s seat cushion and a vertical hinged component with a bungeed hook that pulls a user’s waistband away from the groin
• Keith provided final feedback on the device design to rank customer satisfaction based on how well the device met his individual needs

Outcomes
• Manufacturing times for the device were minimal, with the final design taking approximately 4 hours to construct
• The final prototype cost approximately $45.00 to manufacture
• The final design is much more efficient and user-friendly than the device Keith currently uses
• This device meets Keith’s needs and will allow him to self-catheterize independently with minimal spillage