TITLE: Mobile Arm Support

GOAL: The goal of this project is to build an improved mobile arm support that provides high functionality of motion and adjustability while staying at relatively low cost.

ABSTRACT:

Every day functions such as eating, drinking, dressing, grooming, and brushing teeth require muscle strength in the upper extremities. Individuals with diagnoses that result in proximal weakness to the trunk and shoulders, such as cervical spinal cord injury, muscular dystrophy, ALS, and multiple sclerosis, may experience difficulty performing tasks which involve lifting the arm. In general, activities of daily living (ADL), mobility, and access to communication devices may be impaired due to these limitations. Mobile arm supports (MASs) are used to assist those with upper extremity weakness in completing these daily functions and to restore independence for these individuals. A survey of current MASs, however, reveals that problems exist with the portability, versatility, and affordability of today's mobile arm support options. A need exists for a mobile arm support that provides high functionality of motion and adjustability while staying relatively low cost. In order to address this need we have designed, built and tested a new MAS. We approached the problem by first breaking it down into four sub-functions (wheelchair attachment, arm interface, vertical motion and horizontal motion). We then brainstormed how each sub-function could be accomplished and combined and refined our ideas into one final device. Our design uses a locking attachment base, elastic bands to provide lift, a padded forearm support and multiple points of rotation to create a MAS that is portable, comfortable and functional. We have had the opportunity to test our device with two clients (one man with ALS and one man with spinal cord injury) and learned two things about our design. First, that the horizontal range of motion for our device needs to be improved and second, that our device greatly reduces fatigue and assists in increasing vertical range of motion.