Wheelchair Harnessing System to Allow and Assist Trunk Movement

(VA Reference No. 10-141)

Unique device for standing wheelchairs that allows trunk range of motion to perform functional activities in a safe manner

Technology
Harnessing system for wheelchairs allowing trunk range of motion

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Key Features
- Novel device allowing trunk range of motion for performing functional activities safely
- Passive version utilizes retractable belts
- Active version utilizes motorized belts

Stage of Development
Conceptual stage with models developed to determine optimal range of motion

Keywords
Wheelchair harness system
Safety restraint
Paraplegia
Spinal cord injury
Personal mobility device

Patent Status
Patent application

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Technology
The Department of Veterans Affairs (VA) has developed a device for wheelchair users that allows range of motion of the trunk to perform functional activities. The developed device is comprised of two versions, passive and active. Both devices include a belt or belts that go through the back of the wheelchair and attach to the user's torso or around the shoulders. The lengths of the belts are adjustable, allowing a therapist to set up a safe but functional range of motion for each individual wheelchair user. The passive version of the device utilizes passive retractable belts while the active version utilizes motorized belts that can be controlled by a chin switch or a tilt sensor around the ear or attached to a hat.

Opportunity
Patients with debilitating medical conditions such as spinal cord injury prefer to maintain their mobile independence and benefit their health by preserving a certain level of physical activity. Due to developments in modern wheelchairs, people with paraplegia have access to working, shopping, and other activities requiring travel outside the home. Standing wheelchairs have provided patients the ability to interact with people and objects at eye level, gain a higher level of freedom and independence, and provided life-changing mobility.

However, the current design of standing wheelchairs has prevented sufficient range of motion (in the sitting position) for many tasks of daily living resulting in an opportunity for a long-term reliable solution for paraplegia patients that will facilitate mobility. The global market for wheelchairs and scooters is significant and estimated at $3.9 billion in 2009 with over 4 million units (manual and powered) sold. The overall market is expected to grow to $7.9 billion by 2015.

Competitive Advantage
The developed concept for wheelchair harnessing system wheelchair has a number of competitive advantages when compared to existing restraint and safety systems used with wheelchairs. The safety belt restraint utilized in most standing wheelchairs on the market provides a high level of safety when used properly, but prevents sufficient range of motion in the sitting position. The bar restraint system utilized in some standing wheelchair models provides a high degree of safety in the standing position, however the bar restraint system does not enable safe range of motion in the sitting position. Unlike existing restraint systems, the VA technology provides both extended, safe range of motion in the sitting position and a high degree of safety in the standing position allowing users an increased range of motion of the trunk to perform functional activities.

Status
The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).