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Passive Exoskeleton

-While advancements in exoskeletons have grown by leaps and bounds in the past decade or so, the majority still provide powered or active assistance, few provide a passive solution. However, many people have difficulty rising from the ground, bed, a chair or other similar surfaces because of knee or leg muscle injuries, aging, obesity, or even simply from repetitive strain injuries. Thus, these users would benefit from a passive assistance device so that they can safely lift and lower themselves with minimal strain on their lower body joints and muscles.

Researchers at Arizona State University have developed a portable, lightweight and low-profile passive leg exoskeleton that supports the legs, knees and feet of a user. This passive exoskeleton allows the user's trunk and center of mass to be transferred to either a lower sitting or a higher standing position. This device alleviates muscle and knee strain and is portable, lightweight and easy to don and doff, making it ideal for extended wearing. Furthermore, it is affordable so the average person can purchase it.

This affordable, passive exoskeleton provides a simple solution which can be used in both home and workplace environments to help individuals with lower-body impairments resume daily activities, extend their tenure in the workforce and improve their quality of life.

Potential Applications

- Assists users in rising from and lowering to the ground, a chair, a bed, the lavatory, etc.
- Can be used at home or while traveling for personal assistance
- Can be used in work/industrial settings where frequent sitting and standing transitions are made
- Can be used in assisted living settings
- Can help elderly users regain or maintain independence

Benefits and Advantages

- Affordable – uses light-weight composites for device construction
- Can work with any existing shoe – sneakers, boots, sandals, etc.
- In use it reduces the strain on lower-body joints or muscles
- Portable, lightweight and low-profile – suitable for long- or short-term use
- Provides users with increased strength to transfer from a sitting to a standing position and vice versa
- Easy to don and doff in 30 seconds or less

For more information about this opportunity, please see

[Okun - FURI Poster - 2022](#)

For more information about the inventor(s) and their research, please see

[Dr. Sugar's departmental webpage](#)

[Dr. Sugar's laboratory webpage](#)