Bilateral active exoskeleton for human gait training

Technology #cu14304

This technology describes ALEX III, a robotic bilateral exoskeleton designed for human gait training. This treadmill-based bilateral exoskeleton can be attached to patients to apply controlled forces to the pelvis, knee, and ankle joints. It has the potential for use in physical therapy, which is commonly used for gait rehabilitation following neurological or physical impairments. In addition to its use in physical rehabilitation clinics, this technology may be used to help researchers gain a better understanding of the motor control system.

Active degrees of freedom multiple joints allows for a versatile system to test motor learning theories.

Unlike its predecessor ALEX II, ALEX III contains four active degrees of freedom at the pelvis, for a total of 12 actively controlled degrees of freedom. The amount of motion provided to the person can be limited or allowed to determine what is the optimal design to gain the best rehabilitative care. Most of the mechanical components are located behind the wearer’s legs so that the subject can freely swing their arms while walking. The active degrees of freedom allow for the application of assistive, resistive or perturbing forces at the pelvis and/or legs.

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Applications:

- Improve patient gait after brain or spinal chord injury, stroke or orthopedic conditions
- Track progress of patients in rehabilitation clinics
- Strengthen the legs of an individual
- Study the motor control system in a laboratory setting
Advantages:

- Contains four additional active degrees of freedom at the pelvis
- Rear place mechanical components, providing ample room for patients to swing their arms
- Active flexion and extension at the hips, knees and ankles
- Motors for the device are located remotely at the pelvis to reduce leg inertia

Patent information:

Patent Pending

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Related Publications:


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