TESTING OF A ROBOTIC PROSTHETIC LEG

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ABSTRACT

We report on our evaluation of a prototype robotic prosthetic leg on a subject with leg amputation. This biomedical device aimed to improve stance stability, increase balance confidence, and reduce the contralateral limb's kinetic stresses in gait. The objective of this study was to test the safety and feasibility of the device on an active person with leg amputation. A single female subject with a knee disarticulation (KD) is fitted with the prototype prosthesis and tested against her prescribed daily use prosthesis. In addition to extended walking on level ground, kinematic and kinetic measures were taken in an 18-camera motion capture lab with two in-floor force platforms to assess body symmetry while the subject used this prototype device. We assessed balance confidence using the activities-based balance confidence questionnaire. While performing the 10MWT, the subject could ambulate at a maximum velocity of 0.77 m/s and an average of 0.61 m/s. In the six-minute walk test (6MWT), the subject walked a distance of 206 meters with a velocity of 0.57 m/s. Kinematic symmetry of both lower extremities improved in walking tasks. However, kinetic symmetry was inconclusive. In total, the subject walked on the device for 2 km. We found the device safe on a single amputee and is feasible for future clinical testing in a larger population.

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