rehabweek london '17

ICORR 2017
15th IEEE International Conference on Rehabilitation Robotics

Biomechanical Effects of Robot Assisted Walking on Lower Limb Joint Kinematics and Muscle Activation Pattern

Thangavel, Pavithra; S., Vidhya; Bezerianos, Anastasios; Yu, Haoyong; Chew, Effie

Presenting Author: Yu, Haoyong

Abstract

Since manual rehabilitation therapy can be taxing for both the patient and the physiotherapist, a gait rehabilitation robot has been built to reduce the physical strain and increase the efficacy of the rehabilitation therapy. The prototype of the gait rehabilitation robot is designed to provide assistance while walking for patients with abnormal gait pattern and it can also be used for rehabilitation therapy to restore an individual's normal gait pattern by aiding motor recovery. The Gait Rehabilitation Robot uses gait event based synchronization, which enables the exoskeleton to provide synchronous assistance during walking that aims to reduce the lower-limb muscle activation. This study emphasizes on the biomechanical effects of assisted walking on the lower limb by analyzing the EMG signal, knee joint kinematics data that was collected from the right leg during the various experimental conditions. The analysis of the measured data shows an improved knee joint trajectory and reduction in muscle activity with assistance. The result of this study does not only access the functionality of the exoskeleton but also provides a profound understanding of the human-robot interaction by studying the effects of assistance on the lower limb.