ELECTROMECHANICAL DESIGN OF MOTOR ASSISTED DYNAMIC LEG BRACE FOR POST-POLIO PATIENT SUPPORT AND THERAPY

By

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Revision after the Thesis Defense on 5th August 2015

STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

ELECTROMECHANICAL DESIGN OF MOTOR ASSISTED DYNAMIC LEG BRACE FOR POST-POLIO PATIENT SUPPORT AND THERAPY

By

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Development in medical technologies enables modification and improvement in procedures to be less invasive to patient. Prosthetic and orthotics technology help people regarding structural disability. The development of Orthotics and Prosthetics in Indonesia has not yet improved and there is no combination between mechanical aspects and electrical aspects regarding prosthetics and orthotics. In the thesis, the author customized an orthosis, which is a leg brace. Standard leg brace is static and the joint lock has to be manually operated. The customization automates the locking operation and assists gait improvement of a polio patient. To enable the patient to automatically control the leg brace, an electromyography (EMG) system was used as signal and input acquisition from the patient. The EMG system provides muscle activity monitoring. The signal from the muscle was amplified and conditioned as a proper input to microcontroller. The signal was then processed to give commands to actuators which are directly involved in the leg brace to retain patient's walking gait.

Keywords: Electromyography, Leg Brace, Orthotics, Polio, SCKAFO.

DEDICATION

I dedicate this thesis work to God, both my parents, advisor, co-advisor and friends that always support me during hard times and give me strength when I almost give up.
Special dedication to Bp. Mustiantono for his contributions, willingness, kindness, and patience as a patient and model of leg brace in this thesis.
We are honored to have him as a big part in the making of this thesis

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