

Aira Patrice R. Ong ¹, Nilo T. Bugtai ²

^{1,2} *Manufacturing Engineering and Management Department, Gokongwei College of Engineering
De La Salle University
2401 Taft Avenue, Manila, Philippines
aira_patrice_ong@dlsu.edu.ph*

Abstract: Over the years, exoskeleton devices for rehabilitation technology have advanced. But because of the complex structure and intricateness of the human hands, it imposes a great difficulty on the development of a hand exoskeleton system. Hands play one of the most significant roles in living an independent and healthy life. Its natural motor capability is crucial for Activities of Daily Living (ADL). However, stroke remains a leading cause of physical impairments and functional disability. Post-stroke hemiparesis frequently results in persistent hand dysfunction. Rehabilitation therapy during post stroke activities with highly repetitive exercises is an effective method to improve the recovery process to regain previous dexterity and to combat long-term effects. Conventionally, most physiotherapists perform these therapy exercises manually or use simple devices offering passive assistance. To overcome the inefficiency of traditional therapy, robotic exoskeletons, have been developed to help regain motor function by means of repetitive and task-oriented exercises. Though, this technology should not replace the therapists, but should come hand in hand and complement each other for increased efficiency. In this paper, the current developments of robotic exoskeletons for hand rehabilitation are showcased that includes a review of the progress, concepts, prototypes and commercially available devices for hand rehabilitation. It also discussed the future directions and challenges of hand exoskeletons.

Key Words: hand rehabilitation; robotic exoskeletons; stroke

1. INTRODUCTION

Hand is one of the most vital part of the human body. Its natural motor capability is crucial for Activities of Daily Living (ADL). The hands offer of a wide variety of functions, such as touching, feeling, holding, grasping, typing, writing, molding and the like. Although, there are neuromuscular

disorder or aging may lead to losing or weakening hand functions. Worldwide, stroke remains a leading cause of physical impairments and functional disability (Mozaffarian, 2014). According to research, the most prevalently affected neurological domain of stroke is the motor system (Rathore et al., 2002). Most patients may regain the ability to walk, but they still suffer from mild to severe upper limb hemiparesis. Hemiparesis is the paralysis or loss of



Presented at the DLSU Research Congress 2016
De La Salle University, Manila, Philippines
March 7-9, 2016



Presented at the DLSU Research Congress 2016
De La Salle University, Manila, Philippines
March 7-9, 2016

and delivers a real-time hand modelling

