OS2- Foundations for Rehabilitation Robotics in Clinical Practice
Time Course of Recovery during Robotic Neurorehabilitation of the Upper Limb in Sub-acute and Chronic Stroke Patients

Roberto Colombo1,**, Irma Sterpi1, Carmen Delconte3, Alessandra Mazzone2, and Fabrizio Pisano3

1 Service of Bioengineering, Fondazione Salvatore Maugeri, IRCCS, Rehabilitation Institute of Pavia, Italy
roberto.colombor@fsm.it
2 Service of Bioengineering, Fondazione Salvatore Maugeri, IRCCS, Rehabilitation Institute of Veruno (NO), Italy
3 Neurologic Rehabilitation Dept., Fondazione Salvatore Maugeri, IRCCS, Rehabilitation Institute of Veruno (NO), Italy

Abstract. The high number of patients involved every year in stroke rehabilitation interventions calls for urgent understanding of the neural mechanisms underlying both spontaneous and rehabilitation-induced recovery. The aim of this study was to analyze how the time since the acute event of patients may influence the motor recovery processes during robot-assisted rehabilitation of the upper limb. The study was conducted in two groups of patients after stroke in Sub-acute (n=10) and Chronic (n=10) phase who underwent robot-assisted rehabilitation of the upper limb. After training, both groups improved their level of impairment and quality of movement thus indicating effectiveness of the rehabilitation intervention. The preliminary analysis of the time course of recovery evidenced a specific pattern of recovery in the two groups of patients.

1 Introduction

Recovery from a stroke event is a complex process that likely occurs through a combination of spontaneous and learning mediated processes. The recovery related to spontaneous biological processes seems to improve performance across a range of tasks whereas recovery mediated by training, e.g. sensorimotor learning, is more task specific [1]. Knowledge of the pattern of recovery after stroke is helpful in determining when to expect recovery and in customizing appropriate treatment and timing of rehabilitation [2]. Most recovery in functional performance is obtained by patients in the first four weeks after stroke, as reported in previous studies [3]. After this period there follows an epoch that lasts weeks to

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** Corresponding author.