

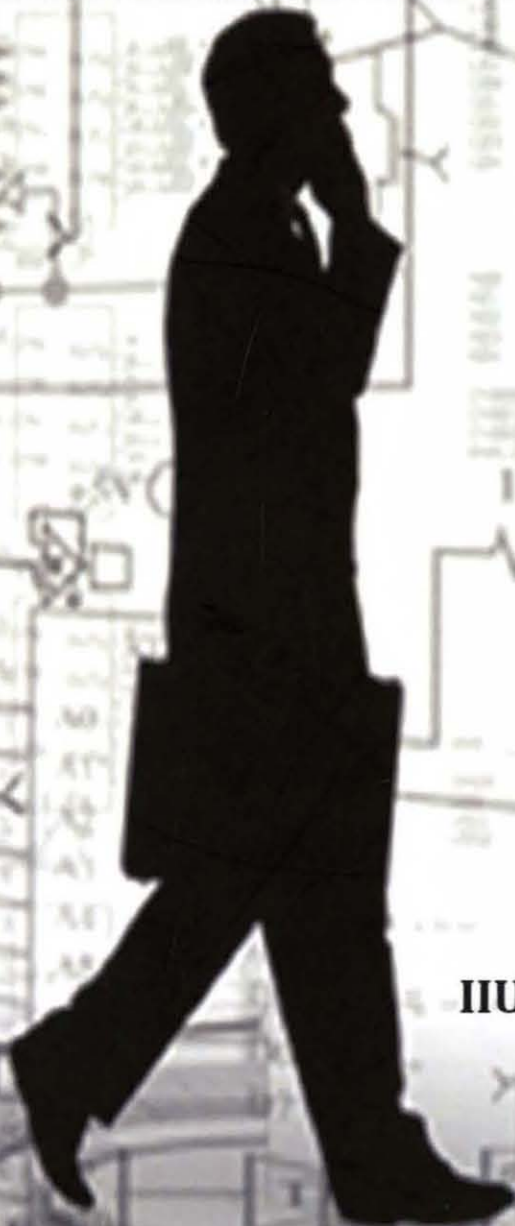
PRINCIPLES OF TRANSDUCER DEVICES AND COMPONENTS

Edited by

Sheroz Khan, International Islamic University Malaysia

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Chapter 33

FUNCTIONAL ELECTRICAL STIMULATION SYSTEM AND PROFILE FOR WALKING

NOREHA ABDUL MALIK

33.0 INTRODUCTION

Functional Electrical Stimulation (FES) helps to restore muscle function for dropped foot correction in patients having neurological disorders such as cerebro-vascular accident or stroke, multiple sclerosis and spinal cord injury by stimulating the tibialis anterior muscle or common peroneal nerve. As the result of stimulation, the patients are able to lift their foot during the swing phase of their walking. The stimulator is triggered by the sensor namely the footswitch that detects foot contact and un-contact with the ground during walking.

33.1 FES AS A FUNCTIONAL THERAPY FOR WALKING

Cerebrovascular accident (CVA), spinal cord injury (SCI) and multiple sclerosis (MS) are a few examples of neurological disorders. These disorders cause muscle paralysis as reflected by the abnormal gait. Dropped foot is the most common abnormal gait accounted in these patients. Patients having dropped foot are not able to lift their foot during the swing phase of their walking. In order to restore this muscle function, the tibialis anterior or peroneal nerve is stimulated using the functional electrical stimulation. The functional electrical stimulation is one of the options of functional therapy for walking. It helps to restore muscle function in these patients to enable them to walk with less effort and energy. As described in literature by [1-6], neurological patients using FES showed improvement in their gait. Stimulation of other muscles groups such as gluteals or hamstrings can further improve the gait of neurological patients [20,22].

33.2 FES SYSTEM

Functional Electrical Stimulation (FES) is used as therapy to restore muscle function of the paralysed limb in neurological patients. In hemiplegic patients, the stimulation of the common peroneal nerve has successfully increased the speed of walking and reduced the effort of walking [2]. Similar improvements are also reported for stroke or multiple sclerosis patients especially when they walk on an uneven surface [3]