UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

Dibris

Thesis Project Form

Title (tentative): Fatigue in Multiple Sclerosis measured by electromyography during a walking test: Comparison between traditional and pool settings.

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Description

Motivation and application domain

Multiple Sclerosis (MS) manifests through a wide range of symptoms, including cognitive decline, muscle weakness, spasticity, and severe fatigue. The fatigue experienced by individuals with MS is markedly different from that of those without the condition, presenting considerable physical and psychological hurdles even in everyday tasks, like walking. Muscle fatigue significantly alters gait patterns, resulting in a noticeable shift in muscle activities. This change can affect the coordination, timing, and efficiency of movements, impairing overall mobility and performance. Additionally, walking in different environments has a significant impact on muscle activity and gait performance. Walking in water compared to walking overground affects muscle activity and fatigue by offering greater resistance, thereby increasing muscle engagement and leading to a quicker onset of fatigue. In this context, the aim is to observe how water-based gait protocol can impact muscle fatigue and gait patterns in individuals with MS respect to traditional assessment.

General objectives and main activities

The primary objective of this study is to characterize the muscular activity in individuals with MS during gait exercises, such as the 6-minute walking test, performed in both dry and aquatic environments. Additionally, the study aims to investigate the impact of water on fatigue levels experienced by these individuals.
The main activities will consist in:
- Perform a muscle analysis of gait data collected in both environments
- identify how water influence the fatigue, muscle patterns and gait parameters
- evaluate how eventual modification in muscle activity might depend on fatigue and individualsâ€™ pathology

Training Objectives (technical/analytical tools, experimental methodologies)

Literature Review
Pipeline Development for Movement Segmentation, Analysis, and Characterization
Data Collection and Analysis

Place(s) where the thesis work will be carried out:

Additional information

Maximum number of students: 1