

EU R&D Project

CP-WATCHER: WEARABLE SYSTEM FOR CEREBRAL PALSY PATIENTS



Ερευνά, Αντιμετωπίζει, Καινοτομεί

POLYTECH S.A. in cooperation with BIOMECHANICAL SOLUTIONS - BME and ANIMUS A.E., will proceed with the implementation of the project "**CP-WATCHER - Wearable gait monitoring system for patients with Cerebral Palsy to support clinicians' decision-making based on machine learning algorithms**" after submitting the research proposal which was approved by the ESPA 2014-2020 "Research-Create-Innovate" business program.

PARTICIPANTS

SCOPE

1. POLYTECH SA
2. BIOMECHANICAL SOLUTIONS -BME
3. ANIMUS A.E.

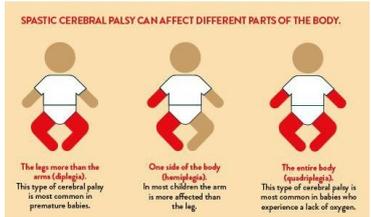
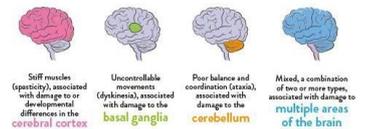
Cerebral palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. Impaired gait is one of the most debilitating effects of Cerebral palsy. Gait analysis provides the optimal information with which to make treatment decisions and evaluate treatment outcomes. Instrumented gait analysis is the most common quantitative method used for clinical gait assessment. The technique is laboratory based and most commonly uses optical motion capture to characterize walking biomechanics. Motion capture systems are considered the industry gold standard,

but they are costly, cumbersome and because they require a dedicated motion laboratory with specialists to collect and analyze movement data, are not easily integrated into a different environment. Thus, there is a need for an easy to use system to provide objective measurements of gait that are critical for rehabilitation therapy for patients with Cerebral Palsy.

The aim of this project is to develop a wearable system to assess easily and accurately walking ability in patients with Cerebral Palsy. The proposed system will be functional and "intelligent" and gather information from two wearable sensors placed on the patient's upper-limbs. This information will help the clinicians to monitor patients' progress remotely, make treatment decisions and evaluate treatment outcomes.

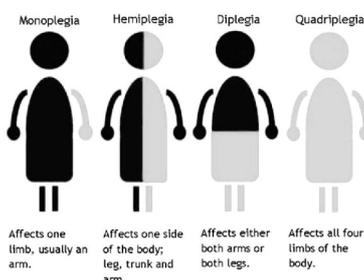
The decision to place sensors on the upper-limbs is based on research that shows that the upper limbs biomechanics and posture in patients with cerebral palsy are related to gait stability parameters. The software will be based on novel techniques and allow the clinicians and the families/carers to monitor patients' walking ability using a single Gait Score. Specifically, for the first time in the wearable devices sector, machine learning and deep learning techniques will be employed to identify accurately pathological gait patterns in patients with cerebral palsy, compare them with healthy individuals and evaluate the progress made following an individualized treatment intervention. The final decision regarding patients' progress will be derived by applying fusion techniques on the individual decisions made by analyzing the biomechanics of each upper limb.

What are the Types of Cerebral Palsy?



OBJECTIVE

Types of Cerebral Palsy



The project aims to create a new product that is missing from the international market. After a thorough search, there seems to be a lack of supply industry interest despite a great deal of customer interest from patients, physicians and rehabilitation centers for innovative, cost-effective and user-friendly remote gait monitoring systems and more generally the functional capacity of patients with CP. This enables the CP-Watcher Partnership to penetrate a growing global marketplace and to be identified with its own wearable product through the use of sensors and remote patient monitoring. The product that will emerge, because of its originality internationally and its usefulness in supporting medical decision making and also the personalized support for CP patients, is expected to generate strong buying interest from several countries, generating significant revenue for the Greek medical and surgical industry.