ROBOESPAS: Active rehabilitation of patients with upper limb spasticity using collaborative robots

Name: Surname(s):

We invite you to participate in a research project at the Carlos III University of Madrid (UC3M). The objective of the research study is to compile a database to generate an objective scale of upper limb spasticity assessment.

1. What is this research study about?

The user will interact with a collaborative robot, first, the user will move the robot in an elbow flexion movement, and afterwards, the robot will mobilize the patient's arm during a series of repetitions of the elbow flexo-extension movement, while capturing some variables.

2. How will the research study be conducted?

The total duration of the whole session for each user will be around 10 and 20 minutes. First, some data will be asked to the user, such as age, gender, right/left-handed and previous conditions on the upper limb. Besides, height and weight will be fathered, as well as some biometrical measurements (distances sternum-shoulder, should-cubital fossa, cubital fossa-wrist and wrist-fingers).

Then, 4 electromyographic sensors (EMG) will be placed on the user's arm at specific locations to monitor the activity of the main flexor and extensor muscles of the elbow. To improve the adhesion of the sensor to the skin, the area will be cleaned with ethyl alcohol. In case of excessive body hair in the sensor area, shaving of this area may be requested.

Once the user is prepared, the interaction with the robot will begin, which will be divided into two parts: (1) Capture of patient's natural elbow flexion movement. (2) The capture of EMG signals and other variables characteristic of each trial during the passive mobilization of the user's arm in a flexo-extension movement assisted by the collaborative robot. The instructions for the correct development of the trial will be continuously provided by the researcher.

After this process, the collected data will be saved for later analysis.

3. Benefits and risks

The study does not involve relevant risks for the participants. The robot used is a collaborative robot, specially prepared for physical interaction with people. Besides, the movement of the patient is never restricted during the trial, so the user can get away from the robot whenever he or she wants to.

Collected data will allow creating a strategy to automate and obtain an objective description of the level of spasticity of patients with this sensorimotor condition, and thus enable to establish a more precise rehabilitation plan, contributing to the improvement of the current clinical processes.

4. Data and images confidentiality

Following the Law 15/1999 of Personal Data Protection, the personal data gathered will be only the strictly necessary. None of this data will be disclosed to external people. Your participation is anonymous; however, your name and surname will be registered in a list of participants that will be stored at the Carlos III University of Madrid, and will only be accessed at essential times. Under current legislation, concerning the personal data gathered in this research study, you have the right to access, rectify, cancel and/or oppose. You have the right to revoke your consent to participate in this study at any time, without any justification for it.

The results of the research study will be provided if requested by the researchers Dr. Alberto Jardón Huete and Dr. Edwin Daniel Oña Simbaña, who will attend any question related to the study. You can contact them at the following email addresses: ajardon@ing.uc3m.es and eona@ing.uc3m.es.

I have read the information sheet I have been given, I have been able to ask the necessary questions and I have voluntarily accepted my participation in this study.

Date: Signature: