

## Tesi su proposta

MIODIN, Instrument to Monitor Lower Limb Kinetics and Muscle Activation during rehabilitation

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Place of development: NIB Universidad de la República, Uruguay

Timing: 1 month preparation in Torino & 5 months at NIB, prior to defense in POLITO July 2020

Rehabilitation of lower limbs is important after reconstructive surgery of the Anterior Cruciate Ligament (ACL), specially for elite sportspersons. Hamstring exercise with elastic band both standing and supine may be of risk to the integrity of weakened muscles and thus an objective measurement is needed to alert in real time the acting physiotherapist. Moreover the sequence of activation of the main muscles defines the effort of the sportsperson both during repeated exercise as well as gait.

After the development of DINABANG, an instrument to measure force and record the kinematics of the lower limb movement, presently under licence to a start-up company MOVI Ltd., a new instrument, MIODIN, is defined to be designed, build and tested in volunteers, both healthy and patients in rehabilitation.

MIODIN includes the simplified approach of statistical EMG activation analysis of the main four main lower limb muscles to define the type of rehabilitation exercise performed by the patient, along with a new statistical analysis of force, linear and angular velocity. MOIDIN includes processing and GUI in a mobile App. The rehabilitation session with a summary of data gathered is made available by MIODIN as a CDA format file for the ECR, should there

The “laurea magistrale” thesis starts with the study of previous instruments STEP 32 at POLITO and DINABANG at NIB the analysis of the problem leading to a detailed specifying of MIODIN including EMG sensors and inertial sensors as building blocks. Prototyping with standard boards, programming, construction, documentation and testing follows, prior to writing a paper and preparation of the written thesis.