Tecnológico de Monterrey

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Undergraduate Research Program

Project Name	Age-related changes in balance and their association with fall risk in older age
Campus & Location in Mexico	Ciudad de México
Faculty	Engineering
Research Area	Biomedical Engineering
Research Responsible	Luis Montesinos
Description of the Project	In biomechanics, balance is defined as the dynamics of posture control that prevent falls in an individual [1]. This ability results from the complex integration of several sensorimotor systems (the visual, vestibular, somatosensory and musculoskeletal systems). Normal ageing, some pathologies and transient factors may impair one or more of those systems. These impairments produce a balance deficit, increasing the risk of falling and its consequences [2]. Therefore, the characterisation of human balance in healthy and pathological populations has drawn researchers and clinicians' attention for the last few decades. One of the most common techniques to measure human balance is static posturography, which measures the centre of pressure (COP) displacement during quiet standing. The COP is the point of application of the vertical ground reaction force. It is typically acquired with a force platform that produces a two-dimensional signal representing the COP trajectory in the anterior-posterior (AP) and medial-lateral (ML) axes. COP trajectories are characterised by computing several measures. Traditionally, time and frequency measures have been used for this purpose (e.g. total length of the COP displacement and range in the AP/ML direction, mean and median frequencies, among others) [3]. More recently, quantitative descriptors of nonlinear dynamics have been proposed to quantify balance and better discriminate between groups [4]. This project investigates age-related balance differences as measured by posturography and their association with fall-risk in older age. Accordingly, a statistical analysis on COP

Training Provided	Academic manuscript development;Statistical data analysis;Test hypothesis
Modality	Virtual
Offered During	Semester

Student

Tasks/Responsibilities	Literature review, data analysis, manuscript preparation
Required Language Proficiency	English (Medium);English (Advanced)
Required Skills and Abilities	Programming in high-level language (MATLAB or Python)
Other Documents Required to APPLY for an Internship	1) Being at least in your 2nd year of bachelor 2) Accumulative grade point average (GPA) 2.5 3) Official Transcript 4) 2 letters of recommendation of faculty members 5) Resume 6) Letter of intention explaining the reason why you would like to participate in the research program