Biomechanical Behavior of the Diabetic Foot in Patients with Neuropathy

Manuel Portela[1], Liliana Ávidos[1], João Neves[2], Henrique Vicente[3,4], and José Neves[1,4(✉)]

[1] Instituto Politécnico de Saúde do Norte, CESPU, Famalicão, Portugal
liliana.avidos@ipsn.cespu.pt
[2] Mediclinic Arabian Ranches, Dubai, United Arab Emirates
[3] Departamento de Química e Bioquímica, Escola de Ciências e Tecnologia, REQUIMTE/LAQV, Universidade de Évora, Évora, Portugal
hvicente@uevora.pt
[4] Centro Algoritmi/LASI, Universidade do Minho, Braga, Portugal
jneves@di.uminho.pt

Abstract. This study proposes a *Technology-enabled Learning and Social Computing* (*TeL&SC*) approach to forecast the *Biomechanical Behavior of Diabetic Foot* in patients with Neuropathy, based on an integrated *Entropic* and *Mathematical Logic* (*ML*) approach to *Problem Solving*. The research aims to address the challenge of predicting diabetic foot complications in patients with neuropathy, which is complicated by the foot's complex biomechanical behavior and can lead to adverse outcomes such as amputation. The proposed approach addresses TeL&SC techniques to develop a predictive model for assessing the risk of diabetic foot complications. The study seeks to create a collaborative platform where patients, clinicians, and researchers can collect and analyze data on foot biomechanics, leading to personalized risk profiles for each patient. This approach enables early intervention and improves patient outcomes, reducing the risk of amputation. In conclusion, the integration of ML and Entropy in the TeL&SC approach for predicting diabetic foot complications in patients with neuropathy stands for a concept that involves committing to specific outcomes or consequences like *Improved Prediction Accuracy*, *Personalized Risk Assessment*, or *Improved Patient Outcomes.* With great promises comes great responsibility to fulfill them, and one must also take into account the various factors that could impact the actual outcomes of employing such a technique.

Keywords: Technology Enabled Learning · Social Computing · Machine Learning · Mathematical Logic · Logic Programming · Entropy · Diabetic Foot Neuropathy

A. González-Briones et al. (Eds.): PAAMS 2024, CCIS 2149, pp. 226–238, 2025.
https://doi.org/10.1007/978-3-031-73058-0_19