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“Noninvasive Optical Diagnosis of Chronic Exertional Compartment Syndrome”

Athletes, workers, and military personnel affected by chronic exertional compartment syndrome (CECS) of the leg experience progressive leg pain during exercise or physical activity, which can limit their performance and work capabilities. Currently, the standard method for diagnosing this condition involves inserting multiple needles into the leg compartments and measuring intra-compartment pressure (ICP) changes while the patient runs on a treadmill, or before and after the exercise protocol.

In a clinical research project, we aim to evaluate the feasibility, effectiveness, and accuracy of an optical technique based on near-infrared spectroscopy (NIRS) for the non-invasive diagnosis of lower leg CECS. We hypothesize that an advanced transcutaneous NIRS sensor equipped with diagnostic software can non-invasively and accurately diagnose CECS by analyzing trends in tissue oxygenation and perfusion within the leg compartments following a 10-minute exercise protocol. If successful, this project will introduce a novel, simple, non-invasive, and cost-effective method for the rapid diagnosis of CECS in clinical settings.