

Towards a Functional Hybrid Walking Neuroprosthesis

Functional Electrical Stimulation (FES): Artificial innervation of limb muscles using non-invasive surface electrodes to elicit movements in persons with neurological disorders

Major Challenge: Rapid loss of muscle force due to FES-induced fatigue



Quadriceps muscle : Person with Spinal Cord Injury

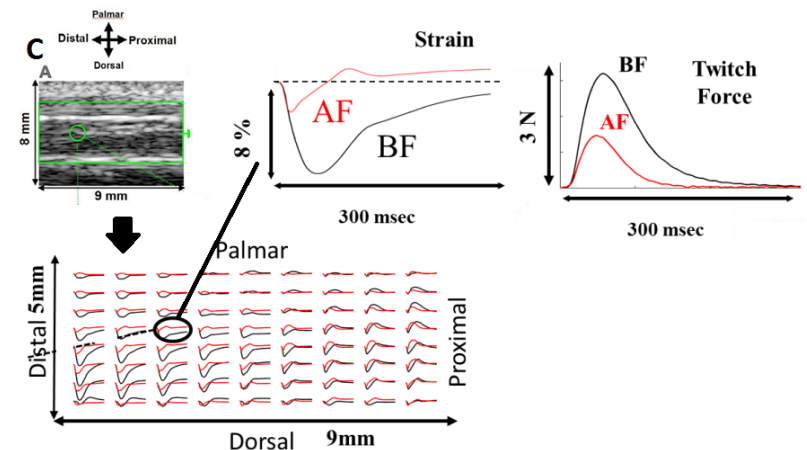
To mitigate effects of FES-induced muscle fatigue by combining FES with a powered exoskeleton



Pitt Exoskeleton

Bioinspired techniques to control multiple muscles and electric motors

Ultrasound (US) imaging as a non-invasive sensing modality to measure FES-induced muscle fatigue



US imaging-derived triggering conditions to switch between FES and powered exoskeleton