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ABSTRACT N. 013

FES AND ES IN DENERVATION AND AGING

## **INTEGRATION OF ELECTROMYOGRAPHY AND MUSCLE ULTRASOUND IN REHABILITATION**

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The integration of electromyography (EMG) and muscle ultrasound (US) is progressively redefining diagnostic and prognostic workflows in rehabilitation medicine. While EMG remains the reference standard for functional assessment of peripheral nerve and muscle disorders, ultrasound provides complementary structural and dynamic information, enabling real-time visualization of nerve morphology, muscle architecture, and secondary changes such as atrophy or fibrosis. A combined electrodiagnostic-imaging approach enhances diagnostic accuracy, shortens time to etiological definition, and supports targeted rehabilitation planning. EMG allows functional localization and grading of axonal loss or demyelination,

whereas ultrasound can detect focal nerve swelling, structural discontinuity, entrapment sites, and early muscle changes before irreversible degeneration occurs. The integration of EMG and muscle US supports a pathophysiology-driven model of rehabilitation, facilitating individualized prognosis, monitoring of reinnervation, and adjustment of therapeutic strategies. The limited body of literature on specific nerve branches, particularly the deep fibular nerve, should stimulate further research aimed at standardizing combined protocols and defining diagnostic thresholds. A multimodal approach appears essential for precise, rapid diagnosis and for optimizing outcomes in patients with peripheral nerve injuries undergoing rehabilitation.

**Keywords:** *rehabilitation, electromyography, ultrasound, muscle*