Non-Invasive Muscle Force Assessment Apparatus for Use in the Intensive Care Unit

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Objective
- Develop clinical instrumentation for objective, quantitative assessment of human whole muscle function using electrical stimulation as the input
- Create next-generation assessment device suitable for use in the ICU
- Torque, angle, ENG, surface temperature, electrode impedance measurements of tibialis anterior muscle
- Small, light, easy to use

Why
- Non-invasive assessment of muscle function is useful for differential disease diagnosis and for tracking muscle disease progression and treatment
- A rapid “muscle checkup” test that can be conducted easily in the clinic is needed
- Stimulating the muscle provides known input not influenced by patient

Background
- Growing need in clinical medicine to validate the quantitative outcomes of an applied therapy
- Measurement of muscle function is a routine component of many neurological and physical exams
- Evaluation of muscle strength is used for differential diagnosis, to determine if an impairment or disability is present, to decide if a patient qualifies for treatment, and to track the effectiveness of a treatment.
- Critical illness polyneuromyopathy (CIPNM) and critical illness myopathy are common in ICU patients and associated with significant muscle weakness.
- Monitoring muscle force in long-term, mechanically ventilated, immobilized ICU patients can assist in assessing health and treatment, and may be useful in long-term outcomes assessment.

References

Old Device

New Device

Electronics and Control

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