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Reliability of the twitch evoked skeletal muscle electromechanical efficiency: a ratio between tensiomyogram and M-wave amplitudes

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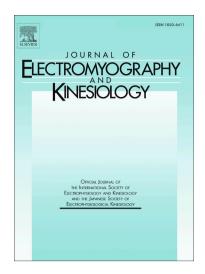
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CCEPTED MANUSCRIPT

Title: Reliability of the twitch evoked skeletal muscle electromechanical efficiency: a ratio between

tensiomyogram and M-wave amplitudes

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**Abstract:** 

Electromechanical efficiency (EME) of skeletal muscle represents the dissociation between the

mechanomyographic (MMG) to electromyographic (EMG) amplitudes and was commonly used in

clinical settings (e.g. muscle disease, atrophy, rehabilitation). However, due to lower reliability and of

both MMG and EMG as well as lower yalidity of MMG we aimed to establish the intra-day, inter-day

and inter-rater reliability of modified EME. Reliability was examined for maximal soleus twitch

amplitudes of tensiomyographic (Dm) and M-wave (Mptp) responses, as well as for EME derived as

Dm /  $M_{ptp}$ , in 18 healthy participants (55% males; 30.3±10.3 years) in three consecutive days. A

reliability analysis was performed with calculations of bias, random error, standard error of

measurement, coefficient of variation (CV), intra-class correlation coefficient (ICC) and minimal

detectable change with a 95% confidence interval. Average ICCs ranged from 0.92 (Dm) to 0.97

(M<sub>ptp</sub>); 0.88 (Dm) to 0.92 EME and from 0.96 (both Dm and M<sub>ptp</sub>) to 0.98 (EME), for intra-day, inter-

day and inter-rater, respectively. CV% ranged from 5.3 (M<sub>ptp</sub>) to 16.05% (EME). Our findings show

that adopted EME for the use in soleus elicited twitch contraction show high to very high reliability,

both absolute and relative, of all dependent variables.

Key words: TMG; EMG; Mechanomyography; Muscle tone; Atrophy; Sarcopenia

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