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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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**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 validity 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 ( $D_m$ ) and M-wave ( $M_{ptp}$ ) responses, as well as for EME derived as  $D_m / M_{ptp}$ , in 18 healthy participants (55% males;  $30.3 \pm 10.3$  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 ( $D_m$ ) to 0.97 ( $M_{ptp}$ ); 0.88 ( $D_m$ ) to 0.92 EME and from 0.96 (both  $D_m$  and  $M_{ptp}$ ) to 0.98 (EME), for intra-day, inter-day and inter-rater, respectively. CV% ranged from 5.3 ( $M_{ptp}$ ) 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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