Relationship of mechanomyographic amplitude to torque using a new accelerometer based device.

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Purpose: Investigate the relationship of Mechanomyographic (MMG) amplitude to isokinetic torque at the biceps brachii and vastus lateralis, using a new sensor. **Methods:** 14 adults (7 men, 7 women) aged, 22.2 (± 2.6) years, performed 15 maximal, concentric elbow flexions and knee extensions at three isokinetic velocities (60 deg·s^{-1}, 150 deg·s^{-1}, 240 deg·s^{-1}) in randomized order. Surface MMG was recorded from both muscle sites using a sampling rate of 2,000 Hz. Group mean MMG data were regressed against isokinetic torque per repetition using polynomial regression models (linear, quadratic, cubic). **Results:** Coefficients of determination (R^2, *p < 0.05) for each regression model are depicted below:

	Elbow Flexion			Knee Extension		
Isokinetic Velocity	Linear	Quadratic	Cubic	Linear	Quadratic	Cubic
60 deg·s^{-1}	0.66*	0.76*	0.77*	0.74*	0.75*	0.83*
150 deg·s^{-1}	0.47*	0.48*	0.48*	0.48*	0.52*	0.52*
240 deg·s^{-1}	0.05	0.05	0.11	0.24	0.24	0.36

Conclusion: Isometric or isokinetic step contractions have been previously used to investigate the MMG amplitude and torque relationship. However, to our knowledge, this is the first study to examine this relationship using standard recommendations for strength endurance training (1- 3 sets, ≥ 12 repetitions). The relationship between MMG and torque is best fit by either quadratic or cubic models. These results are consistent with previous investigations, which suggest the lack of linearity is due to increases in intramuscular pressure and varied motor unit recruitment strategies. Further, the declining R^2 values across the isokinetic velocities can be attributed to the force/velocity relationship. Exercise routines for strength endurance training produce similar MMG responses as incremental static and dynamic protocols.