INTEGRATION OF SIMULATED ENG/EMG MULTIPOTENTIAL: THE ROLE OF INTEGRATION WINDOW WIDTH AND THE NUMBER OF SPIKES

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Electrical signals recorded from nerves/muscles represent the fundamentals of experimental data analysis including an assessment of respiratory motor output. Our work, based on theoretical model, was focused on the linearity and variability of rectified and integrated electroneurogram (ENG)/electromyogram (EMG) signals in relation to the frequency of spike incidence and moving average window width used for the processing of signals. Our simulations of multipotential signals (multiunit action potentials) originating from an overlap of four single units with phase shift firing at two frequencies demonstrated that (1) integrated ENG/EMG signals are only approximately linearly proportional to the frequency of action potentials in the superposition – multipotential, (2) the width of the moving average window strongly influences the range (dispersion) of integrated values. A better quality of EMG recordings, higher number of action potentials within the multipotential, and wider width of the moving average window increase the accuracy of integrated ENG/EMG values during processing of motor output signals.

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