Abstract Submitted
for the OSF08 Meeting of
The American Physical Society

Long-time Behavior of Surface Electromyography Time Series BRIAN VYHNALEK, Physics Dept, Cleveland State University, ULRICH ZURCHER[1], MIRON KAUFMAN, Physics Dept, Cleveland State University, PAUL SUNG, Health Sciences Dept, Cleveland State University — We have previously reported that the mean-square displacement from the sEMG time series x_i with $i = 1, 2, ..., 2^{16}$ exhibits diffusive behavior for short times, $t \lesssim 50\,\text{ms}$, which is followed by a plateau-like behavior for intermediate times, $50\,\text{ms} \lesssim t \lesssim 500\,\text{ms}$. For long times, $t \gtrsim 500\,\text{ms}$, the msd increases as time t increases. We show that the long-time behavior reflects non-stationarity of the signal; we find that for a fixed time interval $t = \text{const}$, the displacement $X_{s,t} = \sum_{i=0}^{t-1} x_{s+i} \simeq \mu_1$ for $s \in [s_0, s_1]$ and $X_{s,t} = -\mu_2$ for $s \notin [s_0, s_1]$. This property explains the fit of the probability distribution $p_t(X) = \langle \delta(X - X_{s,t}) \rangle_s$ as a superposition of two Gaussians that we reported in Physica A **386**, 698-709 (2007). Supported by a grant from the Research Corporation [UZ].

[1]corresponding author

Ulrich Zurcher
Physics, Cleveland State University

Date submitted: 17 Sep 2008 Electronic form version 1.4