Stride fluctuations in walking: Do fractal correlations really extinguish in metronomic walking?

Didier DELIGNIÈRES* and Kjerstin TORRE

E.A. 2991 Motor Efficiency and Deficiency
University Montpellier I, France

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Stride interval series have been shown to exhibit fractal fluctuation over time during free (self-paced) walking. This result has been interpreted as reflecting the complexity of the locomotor system. In contrast, when walking is paced by a metronome, this pattern of correlation is altered and stride fluctuation become random. This suggests that supraspinal influences could completely override the complexity of the system. We propose in this paper a reassessment of the original data on which these results were established. We confirm, using ARFIMA/ARMA modeling, the presence of genuine fractal correlations in stride interval series in self-paced conditions. In contrast with the initial conclusions, we show that correlations did not disappear in metronomic conditions: The series of stride intervals presented anti-persistent correlations, and 1/*f* fluctuations were evidenced in the asynchronies to the metronome. We show that the Super Central Pattern Generator model allows accounting for the experimentally observed correlations in both self-paced and metronomic conditions, by the simple setting of the coupling strength parameter. We conclude that 1/*f* fluctuations in gait are not overridden by supra-spinal influences when walking is paced by a metronome. The source of 1/*f* noise is still at work in this condition, but expressed differently under the influence of a continuous coupling process.