ring through voluntary muscle activity). The former is most commonly caused by idiopathic Parkinson's disease and the latter is most commonly produced by delayed antagonistic coactivation–"hypermetric" tremors–in conditions such as essential (ET) and other forms of cerebellar tremors [1]. In the absence of biologic markers, diagnosis is based on clinical categorization, with frequent misdiagnosis [2,3].

This review describes tremor quantification methods, as potential means to specify diagnosis. Tremor has been classically recorded using accelerometry and electromyography (EMG) [4]. Frequency ranges overlap between rest tremor (3–6 Hz) and ET (4–8 Hz) [4]. While EMG tremor peak power/total power ratios may reflect tremor rhythmicity, further research is needed to assess the role of tremor rhythmicity quantification in differential diagnosis.

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Measurements of smoothness might help distinguish Parkinson's disease from other bradykinesia-inducing disorders

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Keywords: Parkinson; Bradykinesia; Smoothness; Jerk metric

Background.– While often considered a "key symptom", bradykinesia is not specific of Parkinson's disease (PD), which leads to an unacceptable rate of diagnostic errors in clinical-pathological studies.

Methods.– Eight PD patients and 12 healthy subjects performed alternating, maximal speed, small and large elbow flexion-extension movements. Six controls also matched the average speed of PD patients using a metronome. From angular displacement, we derived speed, acceleration, jerk and the power spectrum of acceleration frequencies. Acceleration variability was evaluated using the normalized average rectified jerk (NARJ) and the fast-frequency to movement-frequency (FF/MF) ratio for large and small movements.

Results.– NARJ in PD was $151 \pm 14\%$ of speed-matched controls ($P = 0.004$; pairwise $P = 0.051$) for large movements and $139 \pm 11\%$ of speed-matched controls ($P = 0.032$; pairwise $P = 0.028$) for large movements and $613 \pm 73\%$ of controls and $246 \pm 29\%$ of speed-matched controls ($P < 0.001$; pairwise $P < 0.001$, $P < 0.001$ respectively) for small movements. Time since diagnosis predicted NARJ ($P < 0.05$) and FF/MF ratio ($P < 0.01$) for large and small movements.

Conclusion.– NARJ and FF/MF ratio evaluated movement smoothness by quantifying acceleration profile irregularity, distinguished parkinsonian from voluntary slowness and correlated with time since diagnosis. They are candidate physiological markers of PD.

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Rehabilitation program for camptocormia and postural instability in Parkinson's disease

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Keywords: Parkinson; Postural system; Vibratory therapy

Background.– Camptocormia (CC) is characterized by an abnormal posture with involuntary forward flexion of the trunk, which appears in erect position, increases during prolonged standing or walking, and abates in supine position. CC increases postural instability and risk of falling.

Methods.– Ten randomly selected PD patients underwent dynamic antigravity postural system (SPAD) and high-intensity focused vibratory system (VISS) treatments, 3 sessions/week for 2 months.

Results.– The rehabilitation program was associated with improved balance while walking.

Further reading

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