

Movement as a Neurological Biomarker

ABSURD HEALTH INSTITUTE · 08 · Signals, measurement and responsible medical AI · 15 OCTOBER 2026

Abstract

Gait, tremor and fine motor movements are observable manifestations of nervous-system function. Video and wearable sensors may capture frequency, amplitude, speed and asymmetry more consistently than informal descriptions. This paper develops movement tracking as a longitudinal biomarker while warning that a measured tremor signal is not a diagnosis of Parkinson disease or another neurological disorder.

The Clinical Question and Its Context

Movement disorders require phenomenology: rest versus action tremor, rhythmicity, posture, task dependence, accompanying slowness, stiffness or ataxia. Video can help document some features repeatedly, but camera angle, frame rate, lighting, background and voluntary effort influence analysis. Rigidity cannot be directly assessed in a standard video, and clinical bradykinesia involves decrement and neurological examination beyond mere movement speed.

Proposed Biological or Explanatory Model

A research-worthy device would standardize tasks, document the conditions of capture and compare measurements against specialist assessments. It could track within-person change during medication adjustment or rehabilitation, provided confounding from fatigue, anxiety and time of day is considered. Capturing a movement abnormality is a useful measurement; assigning its cause requires clinical history, examination and often additional testing.

Mechanism-Specific Interpretation

Tremor frequency can sometimes be quantified more consistently from accelerometer or video signals than from memory, but frequency alone is rarely diagnostic. The same person may display different movement patterns during rest, posture, finger tapping and purposeful action. Camera-based tools may capture amplitude and velocity but cannot reliably infer every element of a neurological examination. Stress, caffeine, sleep deprivation and medication timing change movement. A standardized capture workflow is therefore inseparable from the meaning of the output. Without it, apparent disease progression might simply reflect different filming conditions.

Competing Explanations and Limits of Inference

Algorithm performance may look strong in a curated dataset of severe disease and fail among patients with subtle presentations, essential tremor or medication-induced symptoms. Labels inherited from inconsistent clinical diagnoses can further distort training. Even perfect recognition of a tremor frequency does not prove an underlying neurodegenerative pathology.

Discriminating Observations and Evidence Thresholds

The critical validation question is whether the digital measurement corresponds to a clinically meaningful endpoint such as specialist-rated severity or longitudinal functional change. If a model accurately classifies tremor frequency but fails to distinguish essential tremor from parkinsonian tremor, it should be described as a measurement aid rather than a diagnostic system. Clear labeling protects patients and improves clinician trust.

Implications for Interpretation and Future Inquiry

The strongest application is objective, standardized description and follow-up, not unsupervised diagnosis. Signals could frame movement tracking as a way to help patients bring better longitudinal information to clinicians, with privacy, consent and clear escalation guidance for new neurological deficits.

Selected Evidence and Further Reading

1. [Cerebrotendinous Xanthomatosis: Molecular Pathogenesis, Clinical Spectrum, Diagnosis, and Disease-Modifying Treatments](#)
2. [Recommendations for detection and diagnosis of Niemann-Pick disease type C](#)

Source lineage: Signals movement video; Parkinson tremor investigation

Editorial note: Conceptual scientific commentary; not an original clinical trial, systematic review, peer-reviewed publication, or medical advice. Hypotheses are not established treatment effects.