Next Gen Balance Measurement

According to the CDC, falls were responsible for more than 43,000 deaths in people ages 65+ in 2024. At UpRight Science, we believe we can help stem the tide of falls—and death from falls—among people ages 65+ by measuring and monitoring balance.

How Does it Work?

Our FDA-cleared balance software technically measures balance by utilizing a mobile device's internal tri-axial Micro Electro- Mechanical Systems (MEMS) accelerometer to quantify postural sway and body tilt.

Fundamental Scientific Mechanisms

Tri-axial Accelerometry

Captures linear acceleration on x, y, and z axes to quantify sway path, directional instability, and movement intensity.

Postural Stability

Measures center-of-mass control and postural corrections under static stance conditions to identify fall-risk signatures.

Algorithmic Methodology

Sampling and Calculation

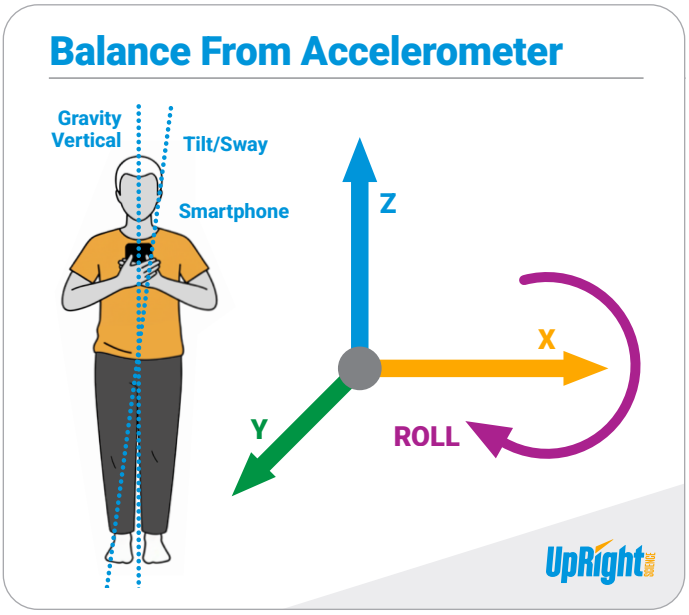
Signal streams are normalized and segmented per stance to derive time-domain and dispersion features.

Balance Scoring

A weighted model maps extracted features to a unified stability score and classifies performance bands.

Standardized Stances

Five validated stance conditions reduce variability and support repeatable comparison across sessions.



Scientific Validation

Bench Testing

Sensor output and derived metrics were verified against known movement patterns and controlled stimuli.

Test-Retest Reliability

Repeat assessments demonstrate stable outputs under equivalent stance conditions and protocols.

Sensitivity to Impairment

The model differentiates subtle stability changes associated with neurological and musculoskeletal decline.

What is the Measurement Process?

Data Collection and Sampling

Sensor Usage
The protocol uses smartphone accelerometer data and orientation context during each timed stance.

Sampling Rate
Motion is sampled continuously at high frequency to preserve micro-movement details.

Test Duration
Each stance window is fixed so data quality and score comparability remain clinically consistent.

Device Placement
Standardized placement against the person's chest reduces positional noise and supports repeatable acquisition.

Algorithmic Calculation

Raw movement streams are processed through filtering and signal quality checks, then transformed into interpretable stability indicators.

Raw Measurements
Axis-level acceleration and derived sway vectors feed feature extraction for each stance trial.

Test Conditions
Condition-specific coefficients account for stance difficulty while preserving cross-test consistency.

Thresholding
Decision thresholds convert continuous metrics into graded risk bands and pass/fail signals.

Scoring Output

Pass Score
Minimum performance criteria indicate whether baseline stability is within accepted bounds.

Final Result
A consolidated clinical output summarizes balance status and flags potential fall-risk concerns.

Average Score
Rolling score history helps clinicians monitor trend direction, recovery, and intervention response.

For more information or to learn how UpRight Science can expand your clinical practice, visit uprightscience.com