

Kinesis QTUG™
Mobility and Falls Risk Assessment Technology
Evidence Base





Introduction

Kinesis QTUG™ is an evidence-based technology for the assessment of falls risk, frailty and mobility. Based on the standard Timed Up and Go test, QTUG™ employs body-worn sensors and machine learning algorithms and is based on 10 years of peer reviewed research.

Our technology uses advanced wearable sensors suitable for the objective assessment of gait and mobility, measurement of response to rehabilitation and treatment and well as screening for falls risk, mobility impairment and frailty.

It is intended for use by a health or social care worker in assessing the mobility and falls risk of an older adult. QTUG™ uses body-worn inertial sensors along with questionnaire data to objectively assess movement. It produces a validated falls risk score (known as the falls risk estimate) as well as a frailty score (known as the frailty estimate). In addition, it tracks clinical risk factors, provides a detailed 71 parameter gait and mobility assessment which provides an indication of the source of falls risk (through comparison against a large reference data set) as well as advice on intervention to prevent falls.

Regulatory

QTUG™ is a Class I medical device, registered under the Medical Device Directive (MDD), notified body: Health Products Regulatory Authority (HPRA, Ireland). Kinesis are also registered as a medical device manufacturer with the FDA in the USA, in Canada with Health Canada and in Australia with the Therapeutic Goods Administration. Kinesis products are compliant with the EU General Data Protection Rules (GDPR) for storage of personal information and with the US HIPAA privacy laws.

QTUG™ Features:

- Validated statistical prediction of Falls Risk and Frailty.
- Precise measurement of patient's performance both pre and post rehabilitation or intervention.
- Comprehensive mobility assessment based on the Timed Up & Go test.
- Colour-coded comparison of patient to population across 69 parameters.
- Portable solution that is suitable for use in home and in the community.
- Real-time reporting; generates detailed results at the point and time of assessment.
- Ability to integrate with 3rd party Electronic Health Record (EHR) systems.
- Usability – quick and easy to use; can be administered by a broad range of health/care workers.

Evidence

Kinesis products have been shown to be Valid, Reliable and Accurate in measuring Gait and Mobility, as well as assessing Falls and frailty in older adults.

The following is a brief summary of the evidence supporting the product:

- QTUG™ has been validated both prospectively (N=226) and cross-sectionally (N=748), and has been shown to provide an accurate measure of falls risk in older adults^{4, 6, 8, 9, 12}.
- In a comparison against standard measures (the time to complete TUG test and the Berg balance scale), QTUG has been shown to be significantly more accurate in assessing risk of falls^{9, 12}.
- Mobility parameters derived using Kinesis QTUG™ have been shown to provide reliable measurement of gait and mobility in: patients with multiple sclerosis (MS)⁷, Parkinson's disease (PD)¹⁰, older adults¹⁸ and healthy controls¹⁴.
- A study of 399 older adults showed that QTUG™ provides a robust and reliable estimate of patients' frailty state¹¹ as defined using the Fried frailty phenotype¹.
- A study of 38 MS patients and 33 controls showed that that mobility parameters derived from MS patients while completing the TUG test are reliable, are associated with disease state in MS and may have utility in screening for early stage MS⁷.
- A longitudinal study of patients with Parkinson's disease found that QTUG™ predicts falls in PD within 3 months of assessment¹⁰. In addition, results showed that mobility parameters obtained using QTUG showed excellent inter-session reliability for assessment of patients with PD.
- The inertial sensor algorithms contained in Kinesis QTUG™ have been validated against gold standards (optical motion capture system⁵, forceplate⁵ and GAITRite²) for assessment of temporal and spatial gait parameters in normal and pathological gait as well as treadmill running¹⁵.
- Mobility parameters derived using Kinesis QTUG™ have been shown to be strongly linked to Minimum Ground Clearance (MGC)¹⁶, which is strongly linked to risk of falls in older adults¹³.
- A longitudinal study of 189 older adults showed that the change in mobility parameters obtained using QTUG™ measured two years after baseline assessment are associated with cognitive decline in older adults³.
- A study of 119 older adults showed that changes in QTUG parameters were strongly associated with decline in balance as measured using the Berg Balance Scale (BBS)¹⁷.

References

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