Extending MOBILISE-D digital mobility assessment to ataxia

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FACTS & FIGURES

Start date:	01 Apr 2019
End date:	30 Jun 2024
IMI / EU funding:	€25.40 million
EFPIA + other contribution:	€24.52 million
Total cost:	€49.91 million
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Project website:	mobilise-d.eu
Social media:	LinkedIn / X: Mobilise-D

CHALLENGE

Walking is a vital sign, but clinic-based tests give only a snapshot of how people move in daily life. **MOBILISE-D** addressed this gap by validating **digital mobility outcomes from a single lower-back sensor** across different pathological populations through the use of the **MobGap pipeline** (Kirk et al., *Sensors* 2026).

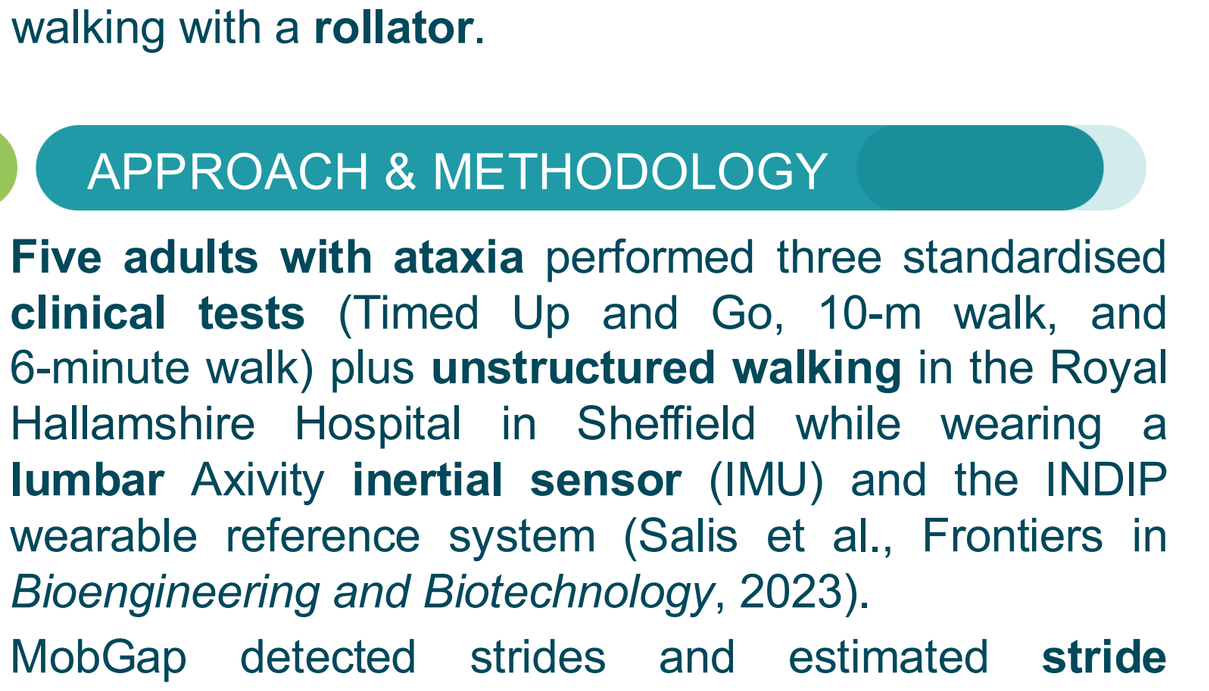
Ataxia was not included in the original technical validation cohorts. This work asked whether the MobGap pipeline can reliably detect strides and estimate stride duration, stride length and walking speed in adults with ataxia, including **turns** and walking with a **rollator**.

APPROACH & METHODOLOGY

Five adults with ataxia performed three standardised **clinical tests** (Timed Up and Go, 10-m walk, and 6-minute walk) plus **unstructured walking** in the Royal Hallamshire Hospital in Sheffield while wearing a **lumbar** Axivity **inertial sensor** (IMU) and the INDIP wearable reference system (Salis et al., Frontiers in *Bioengineering and Biotechnology*, 2023).

MobGap detected strides and estimated **stride duration**, **stride length** and **walking speed**.

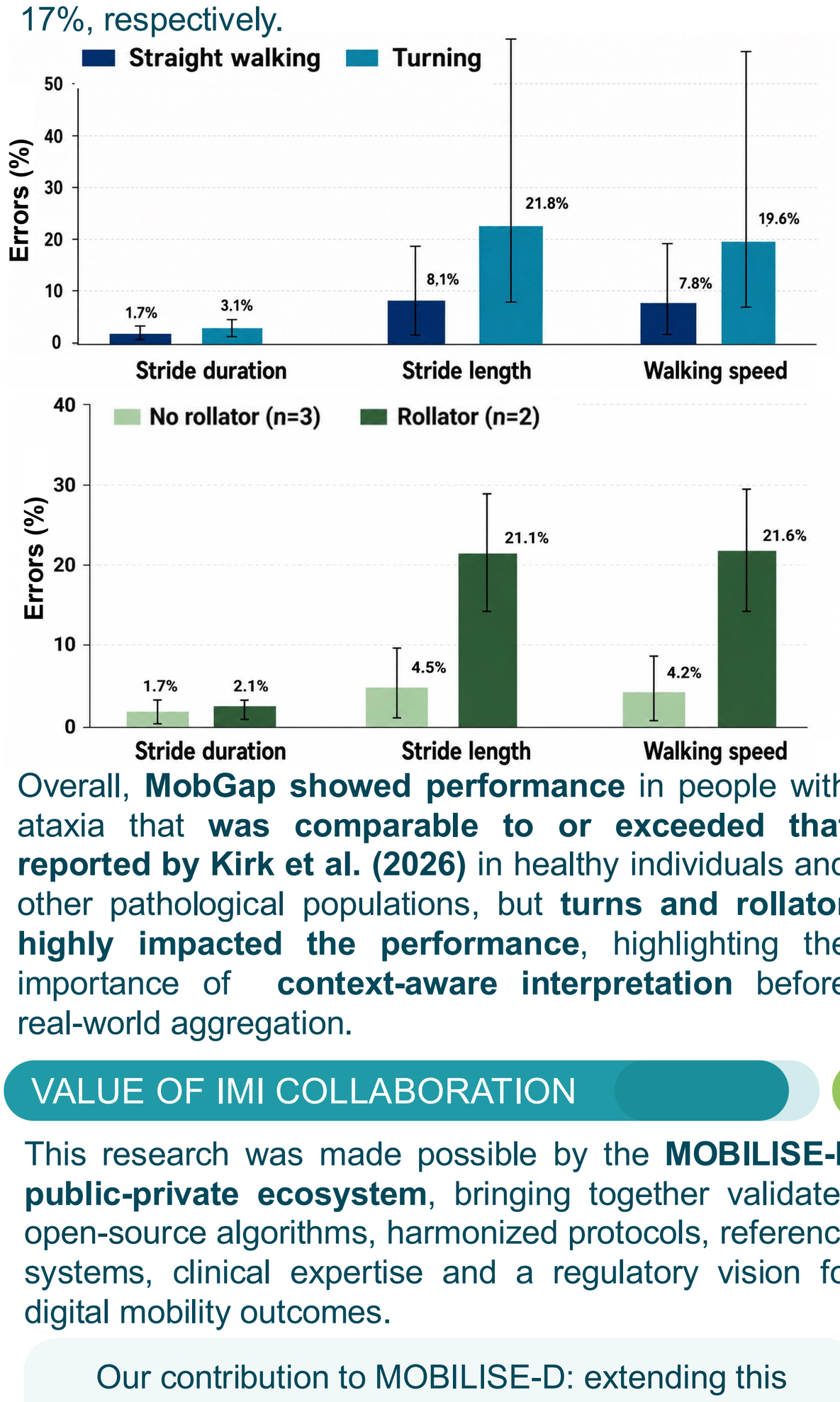
Results were compared with INDIP and stratified by straight walking, turning and rollator use.



RESULTS

A total of 4151 reference strides were detected and the 69% was concurrently detected by INDIP and MobGap (with 83% classified as straight strides and 8% as turning strides). MobGap showed errors ranging between 2-8% across gait parameters during straight walking.

Errors were both higher and more variable during turning and rollator use, increasing by up to 14% and 17%, respectively.



Overall, **MobGap showed performance** in people with ataxia that **was comparable to or exceeded that reported by Kirk et al. (2026)** in healthy individuals and other pathological populations, but **turns and rollator highly impacted the performance**, highlighting the importance of **context-aware interpretation** before real-world aggregation.

VALUE OF IMI COLLABORATION

This research was made possible by the **MOBILISE-D public-private ecosystem**, bringing together validated open-source algorithms, harmonized protocols, reference systems, clinical expertise and a regulatory vision for digital mobility outcomes.

Our contribution to MOBILISE-D: extending this framework to ataxia, a population with complex gait, testing MobGap generalizability and supporting recommendations for prolonged real-world monitoring.

CAREER IMPACT

Participation in an IMI project provided **multidisciplinary training** at the interface of biomechanics, clinical neurology, data analytics and translational digital health. It fostered skills in sensor-data processing, reference-system validation and translating algorithmic evidence across clinical, engineering and industry perspectives, shaping a research profile focused on **digital biomarkers** and **real-world mobility assessment**.

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