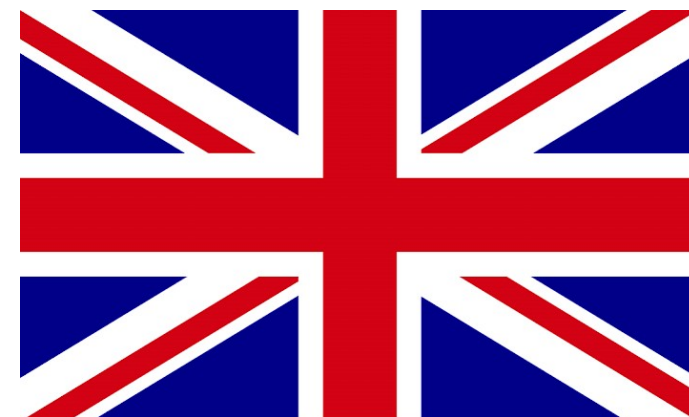


GaitSmart Made in Britain Used in the NHS Helping the Community



DR. DIANA HODGINS MBE

**EMMA DEBBAGE Practice Manager West Street Surgery
PCN Manager Chiltern Hills PCN**



How do we measure gait kinematics?

Our Kit – Developed by Dynamic Metrics and provided to user
Video of test <https://www.dynamicmetrics.com/products/gaitsmart.html>

Sensors



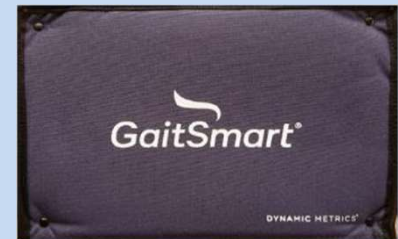
Straps



Tablet



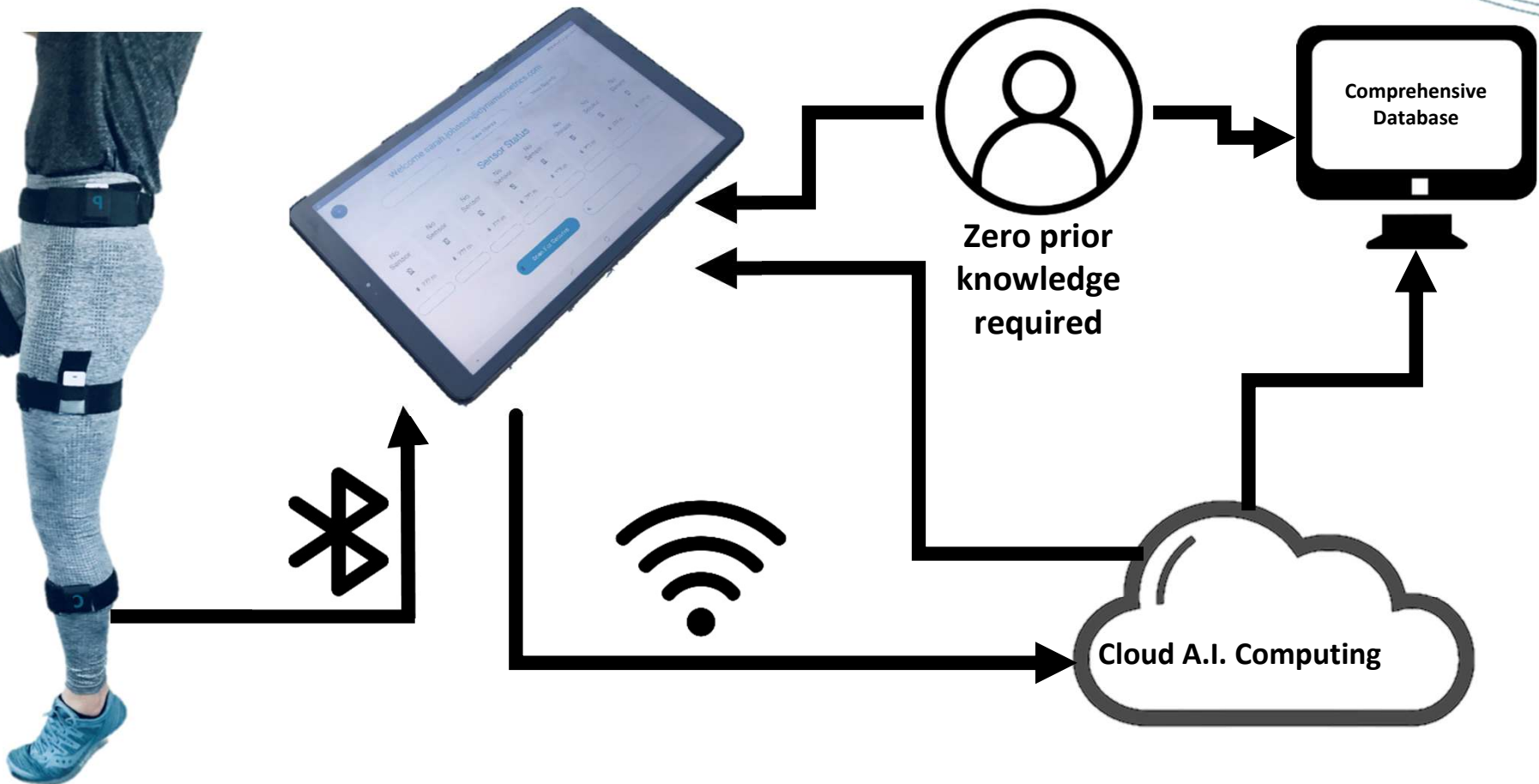
Case



Data communication – invisible to the person being tested


Minutes to do
a test

Testing can be
done in a
corridor



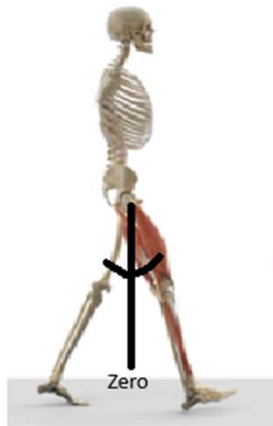
GaitSmart measures hip and knee angle through the gait cycle

Land on your heel

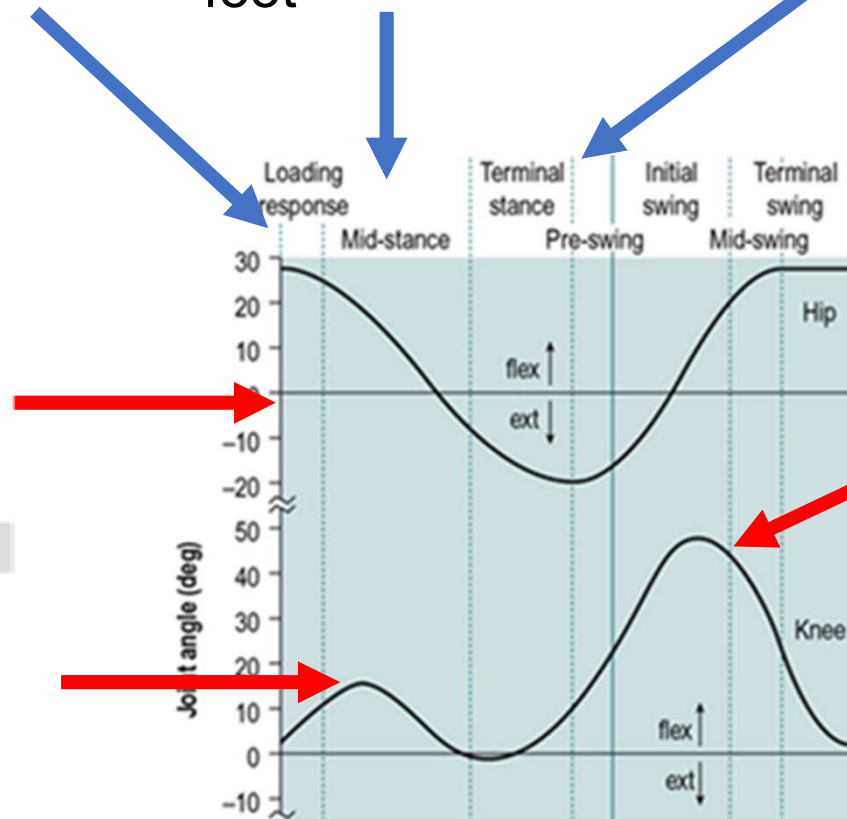
Roll over your foot

Push off with your toes

Hip flexion
extension
are similar



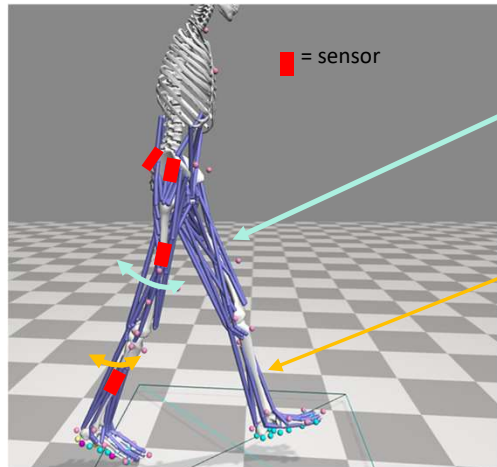
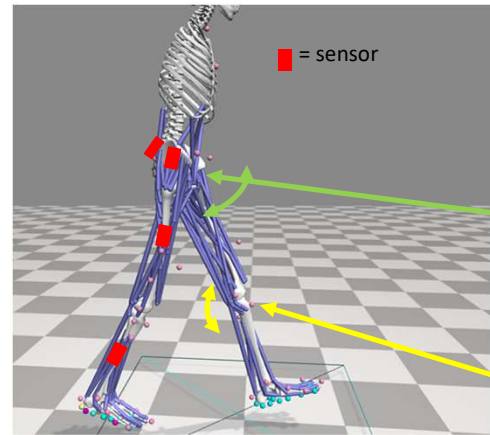
Knee bends
when loaded



Knee bends to
give foot
clearance



We quantify the range of movement through the gait cycle



GaitSmart Score™ 63.6%

An assessment of stability & strength when walking

Pelvis: trunk movement

7.01° 5.28°

Hip: stability & speed

26.47° 28.42°

Thigh: stability & speed

27.65° 27.39°

Knee: foot clearance

47.19° 55.98°

Calf: stability & speed

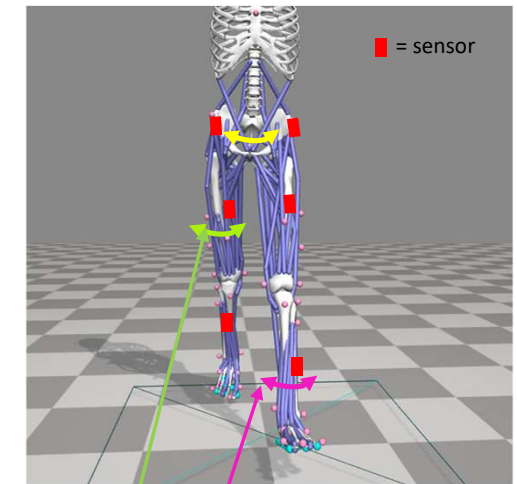
57.28° 58.9°

0.98s

Average Duration:
stride time

Left

Right



GaitSmart Quality Score™ 66.7%

Left Right

9.79%

12.12%

Thigh: side to side movement

5.2%

8.81%

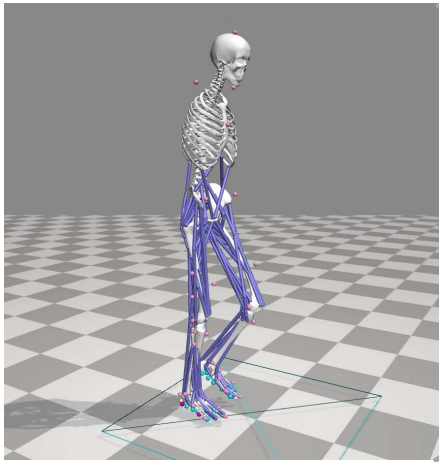
Calf: side to side movement

9.06°

9.95°

Knee Stance Flexion

Using gait data to identify muscle weakness



Gait

GaitSmart data as input drives
musculoskeletal model



Muscle weaknesses identified
from model



GaitSmart report



The AI driven solution for a personalised exercise plan

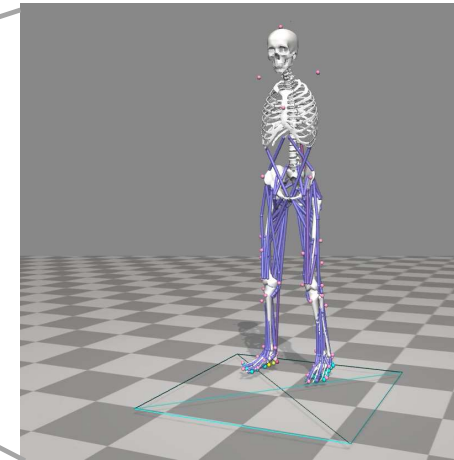
Our large database of muscle activation patterns for rehabilitation exercises (using musculoskeletal modelling)



Machine learning used to identify **optimum exercise set** specific to patient



GaitSmart report with exercises



Muscle activation patterns



The strength and balance exercise plan

Six strength and balance exercises are prescribed to address gait deficiencies identified

Balance - For 80% of the gait cycle you are on just one leg, so you need balance

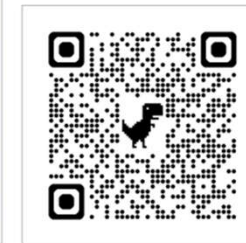
Strength – To walk well you need good working muscles to move the lower limbs and propel your weight forward

Your Exercises

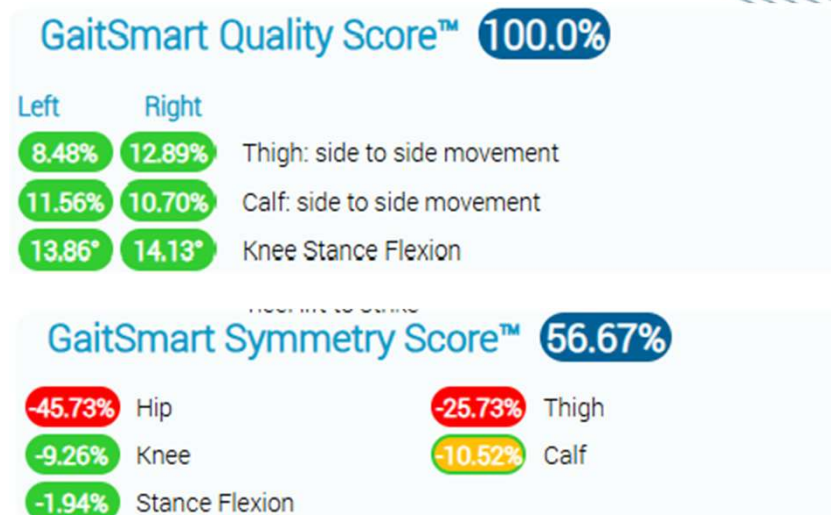
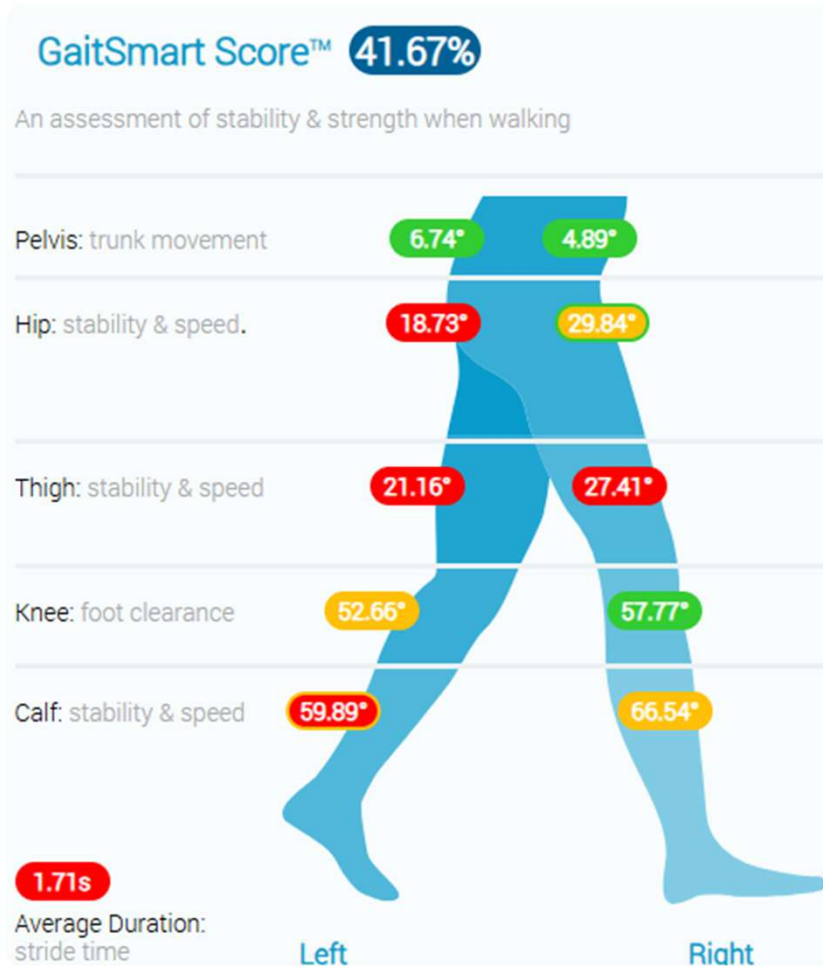
1. Knee Drive Left
2. Lunge Left
3. Quad Extension Left
4. Single Leg Balance Right
5. Lunge Right
6. Pelvic Raise Right

Knee Drive Left

1. Start in a standing position with the left foot slightly behind the body and your hands on your hips.
2. Keep the chest lifted and an upright posture.
3. Lift the left leg that is positioned behind the body forwards, until it is level with the hip, as shown in the example picture.
4. Allow the knee bend throughout the movement.
5. Once the left leg is level with the hip and in front of the body, lower your leg back down to the floor returning to the start position. Repeat the exercise.
6. To view a video of the exercise, copy the link into a browser or use the QR code. https://youtube.com/shorts/i22_dzDtKVk



How easy is it to identify gait issues from gait kinematics?



Some clear issues that need addressing

- The left side has less movement
- Poor hip range on the left – Unstable base
- Low knee angle on the left – Left foot clearance of concern
- Poor calf range on the left
- Poor symmetry at the hip and thigh

The result of these issues is a slow stride time

The GaitSmart intervention programme - DEMO

Four appointments over a **12 week period**

Straps are placed over clothing and **sensors** placed in pockets

You walk 10 metres, turn and walk back

Data is uploaded to the 'cloud' for analysis

Your report identifies your walking issues

Your six strength and balance exercises are prescribed to address your muscle weakness

At each **30 minute appointment** you will have your report explained and run through your exercises



GaitSmart fits within the Central East Frailty Programme

The eFI identifies patients who would benefit from exercise intervention

GaitSmart shows **functional improvement in 75%** of participants

Average saving of over **£2,000 per patient**

Proactive identification before a crisis and **supervised exercise programme** provided

We know how to implement the solution and can roll out at scale across Central East



The Keeping Well Pathway - Can be scaled across Central East

3-year partnership with secondary care

Weekly Keeping Well clinics

Team: Care coordinators, pharmacists, GPs, frailty nurses, consultant geriatrician and hospital team

Innovation: **GaitSmart**, which provides assessment and personalised load bearing Strength and Balance exercises

Results from the GaitSmart programme

388 patients have completed the 12 week intervention programme

Average age **77 years** with a variety of MSK and neurological conditions

75% improved their gait speed. Average increase was **14%**.

42% were physically frail but with no MSK diagnosis.

Number and type of conditions does not affect the success rate.

Number of conditions	Test 1 Speed (m/s)	Test 4 Speed (m/s)	Improvement (%)	Age	Population
No MSK history	0.7361	0.8570	+16%	77.25	164
1	0.7244	0.7965	9%	78.17	118
2	0.6995	0.7704	10%	75.86	77
3+	0.6507	0.7708	18%	76.28	29
Total	0.7027	0.7987	14%	76.89	388

Where GaitSmart Fits

Risk stratification → GaitSmart assessment → 12-week programme

Follow-up recalls at 6 & 12 months

Objective mobility measurement

A Patients Story



Before the programme

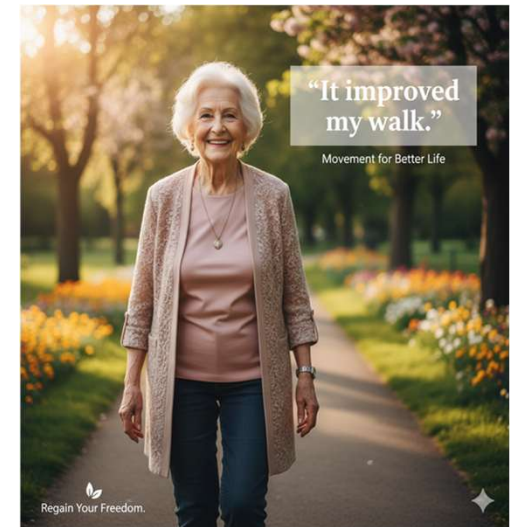
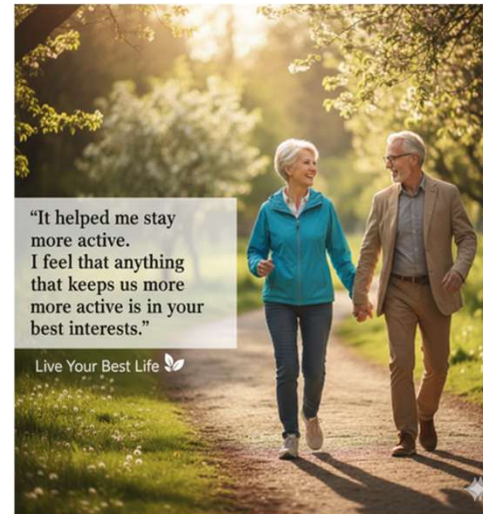
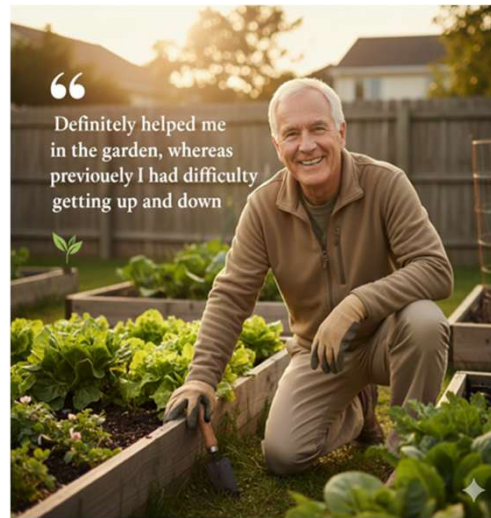
- Early frailty identified
- Reduced confidence in walking
- Using a stick as a walking aid

After the programme

- Increased walking speed
- Improved strength and balance
- Increased confidence
- Their walking stick stays in the cupboard

When technology shows patients tangible improvements in their mobility, it stops feeling like AI – it simply becomes art of their care.

Comments from people who have completed the programme



Future Direction

- Expanding to younger patients
- Supporting patients waiting for physiotherapy
- Interest from teenagers with mobility concerns
- Focus on early intervention



Our Final Message

GAITSMART...

- Technology + proactive primary care = prevention
- Helping patients stay stronger, mobile, and independent for longer



CONTACT US

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