

BIOMECHANICAL ASSESSMENT REPORT

Emma Clarke

Treadmill gait

DATE

6 October 2026

AGE

35 years

SPORT

Running and football

PROFESSIONAL

Sarah Lee

We analysed the way you walk, from the front and from the side, to see how your hips, knees and ankles move.

Your summary

For each exercise, the traffic light sums up what we saw. Below we explain, in plain words, what is going well, what we can improve and where to focus your training.

● Good ● Keep an eye on ● To work on ● No reference

Gait: front view

● Keep an eye on

Your movement is generally good, with a few points to improve that can be addressed with training.

● WHAT IS GOING WELL

- Knee alignment: within the expected range.
- Trunk balance: within the expected range.
- Step symmetry: within the expected range.

● WHAT WE CAN IMPROVE

- During stance on the left, the pelvis drops on the opposite side more than expected.

● SUGGESTED TRAINING FOCUS

- Gluteus medius and hip abductor strengthening, integrated into walking and single-leg exercises.

Gait: right and left side views

● Keep an eye on

Your movement is generally good, with a few points to improve that can be addressed with training.

● WHAT IS GOING WELL

- Step rate: within the expected range.
- Time on each foot: within the expected range.
- Knee at heel strike: within the expected range.

● WHAT WE CAN IMPROVE

- On the right and left, push-off at the end of the step is weaker than expected.
- Knee shock absorption: notable difference between sides, less favourable on the left leg.

● SUGGESTED TRAINING FOCUS

- Calf strengthening (heel raises) and push-off practice while walking.
- Single-leg exercises with extra work on the less favourable side, to reduce the difference between sides.

Notes from your professional

Sample report with fictitious data.

This video assessment is a movement screen, not a diagnosis. Results should be interpreted by your health professional together with the clinical assessment.

TASK 1 OF 2

Gait: front view

Keep an eye on

Treadmill walking filmed from the front. It assesses pelvic drop, knee alignment, step width and lateral trunk sway.

Speed: 5.0 km/h

CAPTURE QUALITY

Valid cycles: R 14 · L 14 · Tracking 100 % · 60 fps

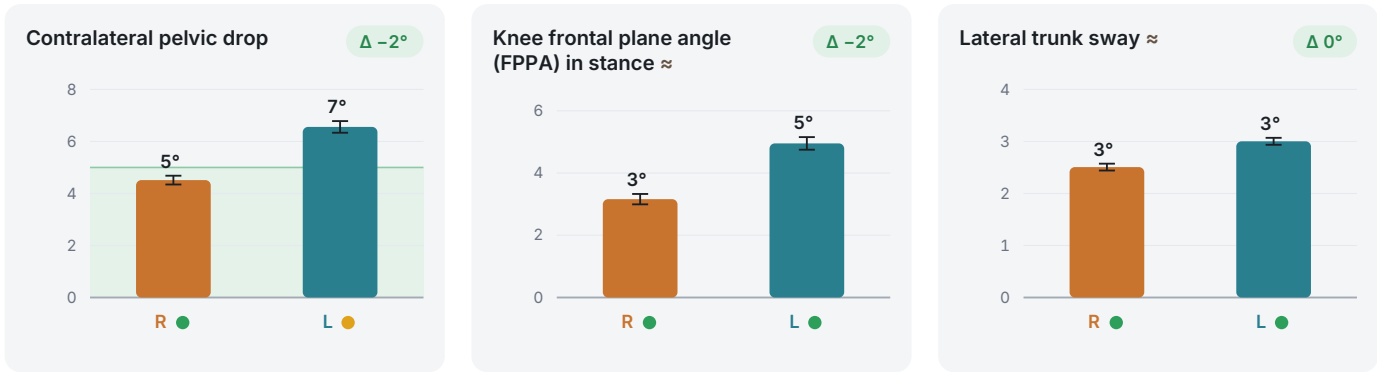
Results

Metric	Right	Left	Asymmetry LSI · R – L	Reference
Contralateral pelvic drop	● 5° ± 0.2	● 7° ± 0.2	● -2°	0–5° Perry & Burnfield 2010
Knee frontal plane angle (FPPA) in stance ≈	● 3° ± 0.2	● 5° ± 0.2	● -2°	No 2D norm: compare sides and progress
Lateral trunk sway ≈	● 3° ± 0.1	● 3° ± 0.1	● 0°	No 2D norm: compare sides and progress
Step width ≈	● 0.71		—	No 2D norm (adults 5–13 cm): track over time Hollman 2011
Step time symmetry *	● 98 %		—	95–100 %

● within reference ● borderline ● outside reference ● no norm (compare sides)
* threshold proposed from published mean ± SD (to be validated)
≈ no reliable 2D norm: compare sides and track over time
Asymmetry: LSI = smaller side ÷ larger side × 100 %; or difference R – L (right – left).
Values: mean ± SD of valid repetitions/cycles.

Right vs left

Right Left Reference range



Throughout the movement

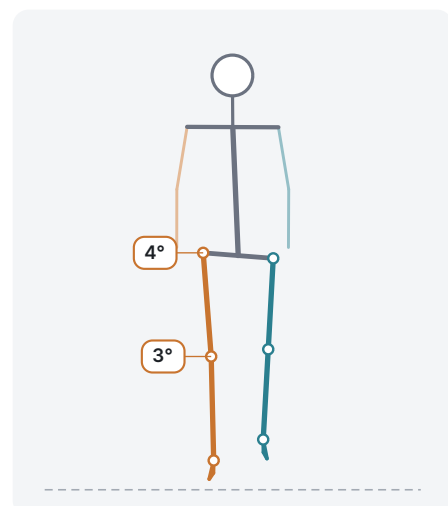
Overall mean $\pm$ SD reference limit



Key positions

Front view: the client's right side appears on the left of the image.

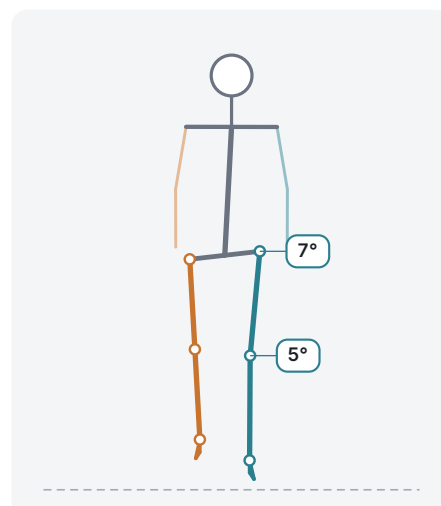
Walking, front view: midstance **Right leg**



● Knee frontal plane angle (FPPA) in stance · R: 3°

● Contralateral pelvic drop · R: 4°

Walking, front view: midstance **Left leg**



● Knee frontal plane angle (FPPA) in stance · L: 5°

● Contralateral pelvic drop · L: 7°

TASK 2 OF 2

Gait: right and left side views

Keep an eye on

Speed: 5.0 km/h

CAPTURE QUALITY

Valid cycles: R 14 · L 13 · Tracking 100 % · 60 fps

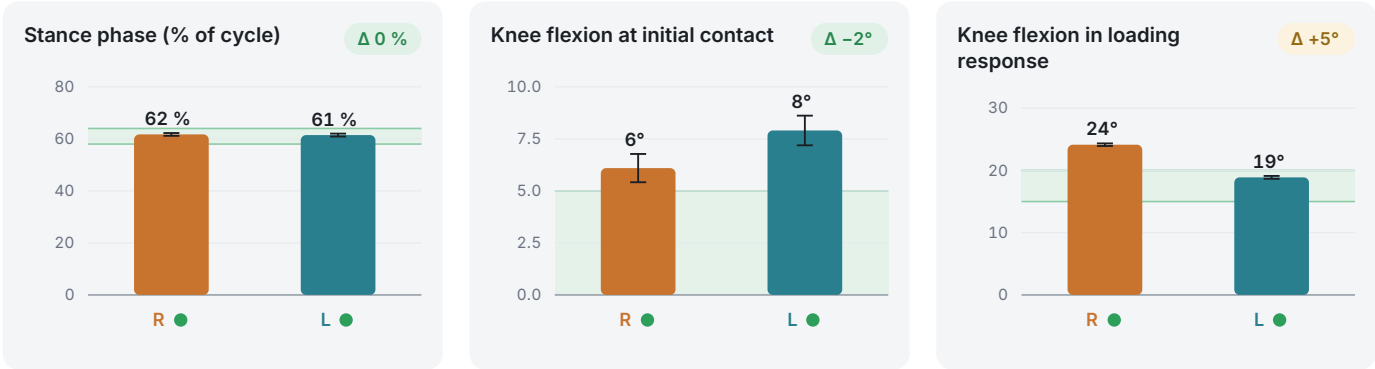
Results

Metric	Right	Left	Asymmetry LSI · R – L	Reference
Cadence	109 spm		—	100–120 spm Tudor-Locke 2020; Oberg 1993
Stance phase (% of cycle)	62 % ± 0.5	61 % ± 0.6	0 %	58–64 % Perry & Burnfield 2010
Knee flexion at initial contact	6° ± 0.7	8° ± 0.7	–2°	0–5° Perry & Burnfield 2010
Knee flexion in loading response	24° ± 0.2	19° ± 0.2	+5°	15–20° Perry & Burnfield 2010
Peak knee flexion in swing	62° ± 0.2	58° ± 0.2	+3°	60–65° Perry & Burnfield 2010
Hip flexion at initial contact	29° ± 0.4	28° ± 0.6	+1°	25–35° Perry & Burnfield 2010
Peak hip extension	14° ± 0.2	11° ± 0.2	+2°	10–20° Perry & Burnfield 2010
Peak ankle dorsiflexion in stance	20° ± 0.5	16° ± 0.4	+4°	8–12° Perry & Burnfield 2010
Plantarflexion after toe-off	10° ± 0.5	8° ± 0.5	+2°	15–20° Perry & Burnfield 2010
Forward trunk lean	3°		—	0–5° Perry & Burnfield 2010

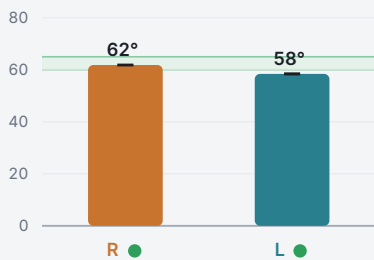
within reference borderline outside reference no norm (compare sides)
Asymmetry: LSI = smaller side ÷ larger side × 100 %; or difference R – L (right – left).
Values: mean ± SD of valid repetitions/cycles.

Right vs left

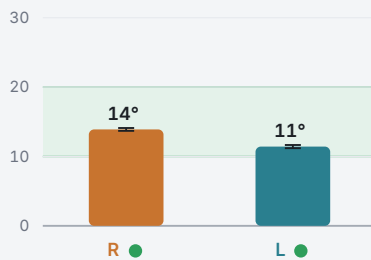
Right Left Reference range



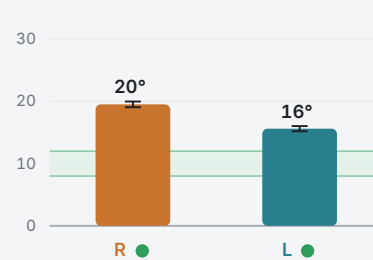
Peak knee flexion in swing

 $\Delta +3^\circ$ 

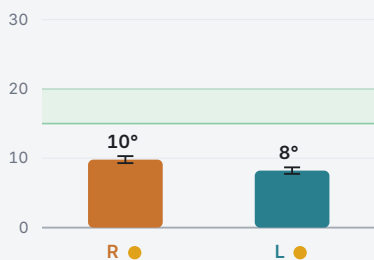
Peak hip extension

 $\Delta +2^\circ$ 

Peak ankle dorsiflexion in stance

 $\Delta +4^\circ$ 

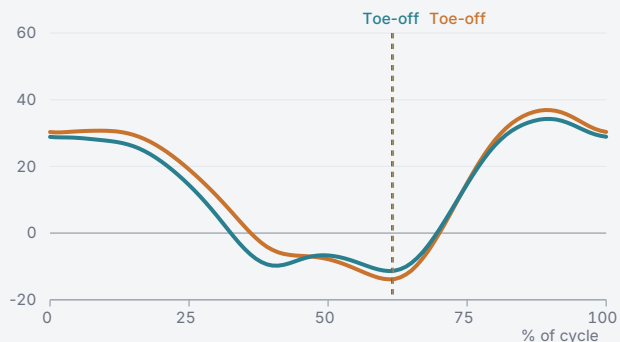
Plantarflexion after toe-off

 $\Delta +2^\circ$ 

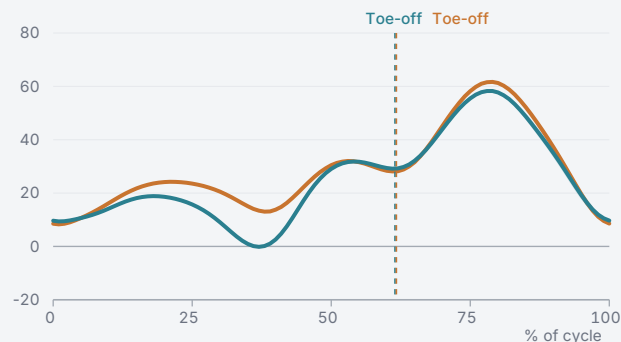
Throughout the movement

— Right — Left — mean $\pm$ SD

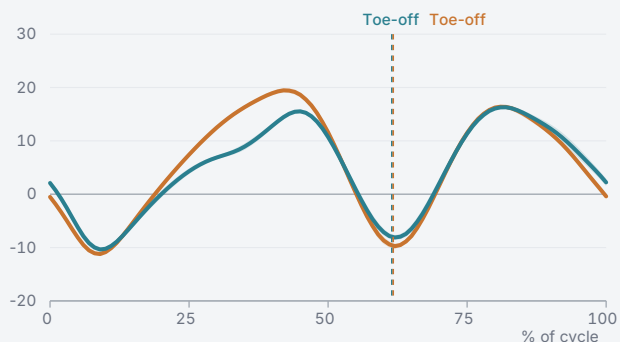
Hip: flexion (+) / extension (-) over the gait cycle (°)



Knee: flexion over the gait cycle (°)



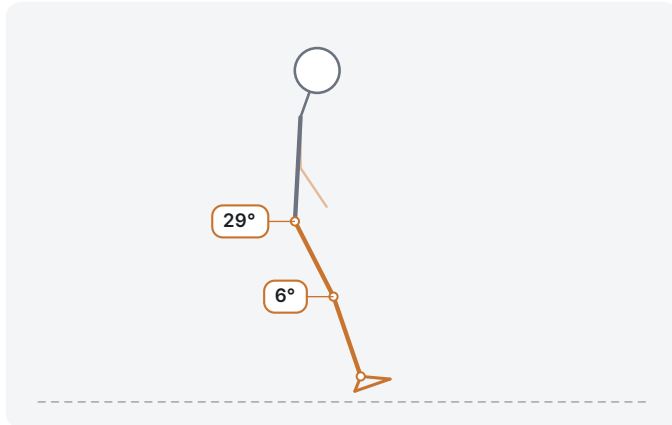
Ankle: dorsiflexion (+) / plantarflexion (-) (°)



Key positions

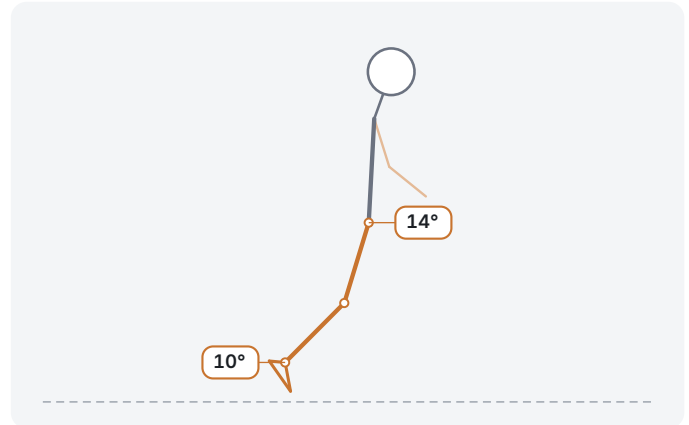
Side view, rebuilt from the detected joints (no photo).

Walking: initial contact Right leg



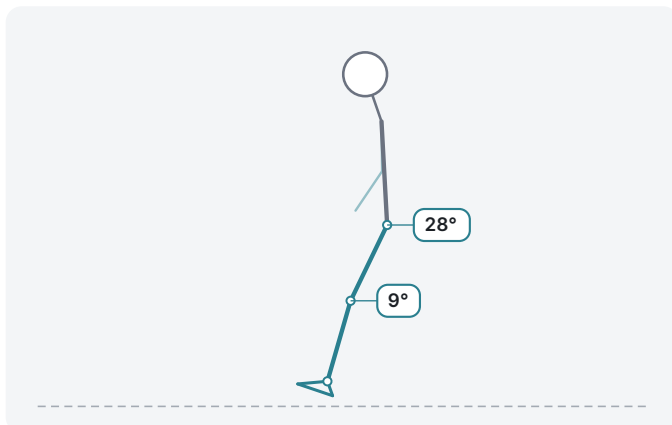
- Hip flexion at initial contact · R: 29°
- Knee flexion at initial contact · R: 6°

Walking: toe-off Right leg



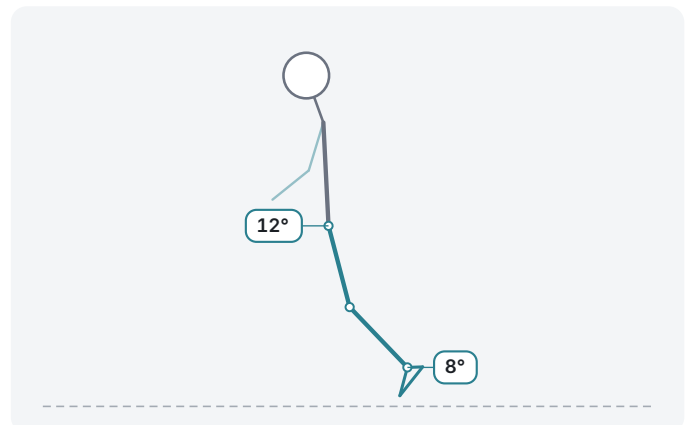
- Plantarflexion after toe-off · R: 10°
- Peak hip extension · R: 14°

Walking: initial contact Left leg



- Hip flexion at initial contact · L: 28°
- Knee flexion at initial contact · L: 9°

Walking: toe-off Left leg



- Plantarflexion after toe-off · L: 8°
- Peak hip extension · L: 12°

Methods and references

How the assessment was done

The assessment used 2D video recorded on an iPhone. A pose-estimation model automatically detects the joints in every frame; angles, distances and times are the mean of the valid repetitions or cycles on each side. Curves show the mean $\pm$ standard deviation normalised to 0–100 % of the repetition or cycle (or in milliseconds after contact).

Limitations

Angles measured in 2D are projections onto the camera plane and depend on camera alignment and distance, clothing and lighting. Compared with reference 3D analysis, the typical error of 2D pose estimation is 4–7° (Stenum 2021). Differences between assessments smaller than the measurement error should be interpreted with caution.

How to read the results

Traffic light: green = within reference; amber = borderline, keep an eye on it; red = outside reference, to work on; grey = no reliable 2D norm — compare both sides and track over time. Asymmetry is given by the limb symmetry index (LSI = smaller side $\div$ larger side $\times$ 100 %) or by the right – left difference.

References: unmarked values are published norms; * = threshold proposed from published means $\pm$ standard deviation or measurement error (to be clinically validated); $\approx$ = no reliable 2D norm. References depend on sex and profile (athlete or general population).

This assessment is a movement screening, not a diagnosis. Results should be interpreted by the health professional together with the clinical history and physical examination.

References cited

1. Hollman 2011
2. Oberg 1993
3. Perry & Burnfield 2010. Gait Analysis: Normal and Pathological Function, 2nd ed.
4. Stenum 2021. PLoS Comput Biol. doi:10.1371/journal.pcbi.1008935
5. Tudor-Locke 2020