

BIOMECHANICAL ASSESSMENT REPORT

Emma Clarke

Sprint (S-MAS)

DATE

6 October 2026

AGE

35 years

SPORT

Running and football

PROFESSIONAL

Sarah Lee

We analysed your sprint technique at top speed, filmed in slow motion.

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

Sprint: maximum velocity

● 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

- Trunk posture: within the expected range.

● WHAT WE CAN IMPROVE

- Sprint technique shows several patterns that can be improved.
- The sprint technique score is above the reference average.
- Your trunk and shoulders twist too much while sprinting.
- Your lower back arches too much as the leg comes forward.
- Your foot lands too far in front of your body, which acts as a brake.

● SUGGESTED TRAINING FOCUS

- Sprint technique training targeting the flagged items, with hamstring and core strengthening.
- Reassess after a block of sprint technique training to track progress.

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 1

Sprint: maximum velocity

Keep an eye on

35 m sprint filmed in slow motion in the maximum-velocity zone (25–30 m). It is the basis for the S-MAS score (12 items) and the touchdown angles.

CAPTURE QUALITY

Valid cycles: R 3 · Tracking 100 % · 240 fps

Side view: only the RIGHT leg (facing the camera) was assessed; the other leg is not visible and was not assessed.

Sprint assessment (S-MAS)

Sprint Mechanics Assessment Score: 12 technical patterns observed on video, each scored 0 (adequate) or 1 (to improve). The lower the score, the better the mechanics.

TOTAL SCORE

3 / 12

T-SCORE

47

CATEGORY

Average

Reference: Elite female footballers: 3.8 ± 2.5

Higher scores are associated with a greater risk of hamstring injury: each additional point ≈ +33 % risk; cut-off 5.5 points (Bramah 2025).

Item	Score	Measured	Source
CONTRALATERAL TOE-OFF			
Excessive trailing-limb extension	0	31°	reviewed
MAXIMAL VERTICAL PROJECTION			
Back kick	0	-10°	reviewed
Trunk rotation	1	—	reviewed
LATE SWING			
Limited thigh separation in late swing	0	6°	reviewed
Lumbar extension in swing	1	—	reviewed
TOUCHDOWN			
Excessive forward trunk lean	0	12°	reviewed
Lumbar extension at touchdown	0	—	reviewed
Trailing knee behind at touchdown	0	40°	reviewed
Foot far ahead of the centre of mass	1	26 %	reviewed
Shin angle at touchdown	0	-6°	reviewed
Foot inclination at touchdown	0	-12°	reviewed
MIDSTANCE			
Collapse at midstance	0	31°	reviewed

0 = adequate pattern · 1 = pattern to improve · auto = automatic suggestion · reviewed = confirmed by the professional

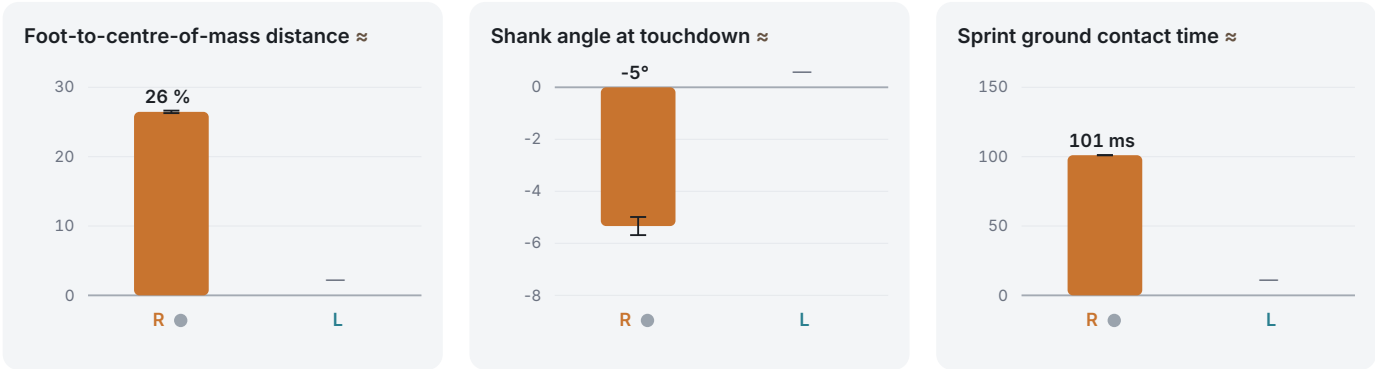
Results

Metric	Right	Left	Asymmetry LSI · R – L	Reference
Trunk lean at touchdown ≈	● 12°	—	—	≤ 15° Bramah 2024 (item qualitativo >15°)
Foot-to-centre-of-mass distance ≈	● 26 % ± 0.2	—	—	No 2D norm: compare sides and progress Bramah 2024 (item qualitativo)
Shank angle at touchdown ≈	● -5° ± 0.3	—	—	No 2D norm: compare sides and progress Bramah 2024 (item qualitativo)
Sprint ground contact time ≈	● 101 ms ± 0.1	—	—	Track over time

● within reference ● borderline ● outside reference ● no norm (compare sides)
≈ no reliable 2D norm: compare sides and track over time
Values: mean ± SD of valid repetitions/cycles.

Right vs left

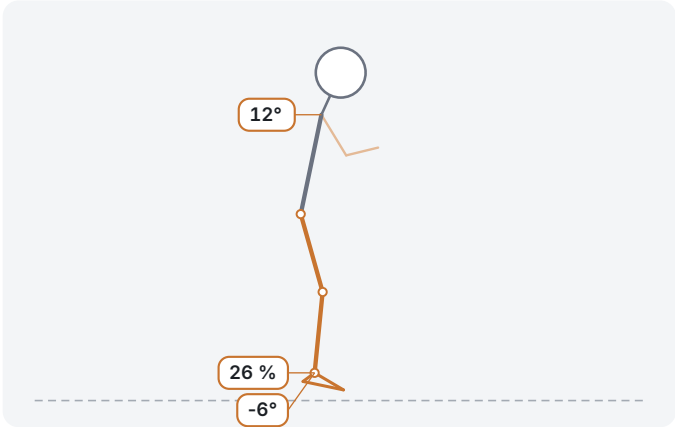
Right Left Reference range



Key positions

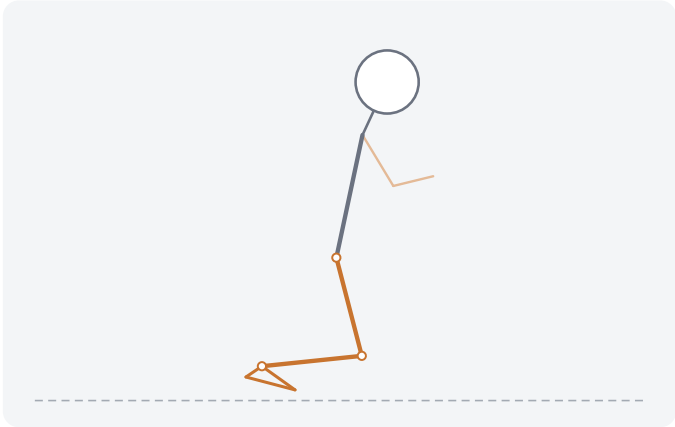
Side view, rebuilt from the detected joints (no photo).

Sprint: touchdown Right leg

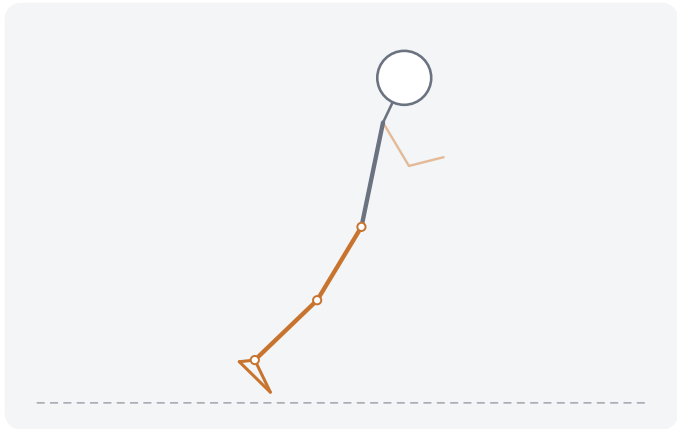


- Foot-to-centre-of-mass distance · R: 26 %
- Shank angle at touchdown · R: -6°
- Trunk lean at touchdown · R: 12°

Sprint: maximal vertical projection Right leg



Sprint: toe-off Right leg



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. Bramah 2024. Am J Sports Med. doi:10.1177/03635465241235525
2. Bramah 2025. Br J Sports Med. doi:10.1136/bjsports-2024-108600
3. Stenum 2021. PLoS Comput Biol. doi:10.1371/journal.pcbi.1008935