1 PATIENT & ASSESSMENT DETAILS

RUNNER **Ms. Sample Running**	AGE **29 yrs**	SEX **Female**	HEIGHT / WEIGHT · BMI **172 cm / 68 kg · 23.0**
CONSENT **Obtained – 12/10/2026**	ASSESSMENT DATE **12/10/2026**	CLINICIAN **Dr. A. Sample (PT)**	ASSESSMENT **Running Movement Analysis**
FRAMES ANALYSED **10 of 10**	REPORT ID **RX-R20261012-SR-102930**	CHIEF COMPLAINT **Left anterior knee pain after 5 km runs for 6 weeks**	

2 CLINICAL IMPRESSION

MOVEMENT FINDINGS (FOR CLINICAL INTERPRETATION)

Overstriding / extended-knee landing (left)

With knee travelling ahead of the toes (bilateral). Common underlying causes to consider: Long stride / low step rate; Reaching forward to gain speed; Fatigue.

FOOT STRIKE – LEFT
Rearfoot strike (estimate)
angle (+) 9.0°

FOOT STRIKE – RIGHT
Forefoot strike (estimate)
angle (−) 4.0°

CADENCE
171 steps/min
Left: contact 240 ms · duty 34%
Right: contact 240 ms · duty 34%

3 FINDINGS AT A GLANCE

#	FINDING	SIDE	SEVERITY	MATCH
F1	**Overstriding / extended-knee landing** Foot lands ahead of the knee with a straight leg	Left	Major	Strongly consistent
F2	**Knee travelling ahead of the toes** Anterior knee translation at mid stance (left side: moderate)	Bilateral	Major	Strongly consistent

20 measurements — Normal 15 · Minor 3 · Major 2

4 OPTIONS TO CONSIDER (CLINICIAN DECISION)

F1 **Increase step rate by 5-10% (metronome / watch cadence alert)**
Overstriding / extended-knee landing · left · MODERATE EVIDENCE

F2 **Hip (posterolateral) and quadriceps strengthening**
Knee travelling ahead of the toes · bilateral · STRONG EVIDENCE

This report is generated from 2D video / photographic measurements and rule-based interpretation against published reference values. Marker placement: manual selection by the assessor (10 frames). Generated by Rollaxis Research & Education Edition for teaching, learning and research only – not for clinical diagnosis or treatment.

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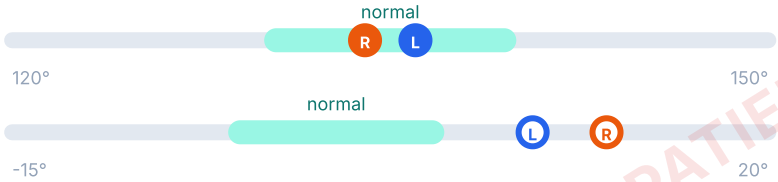
5 SIDE VIEW

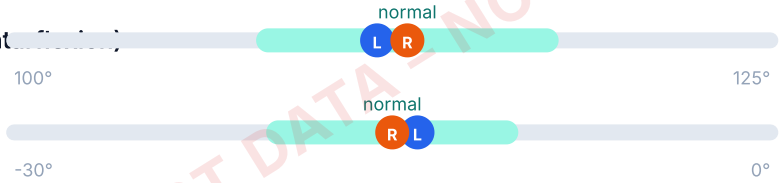
Initial Contact



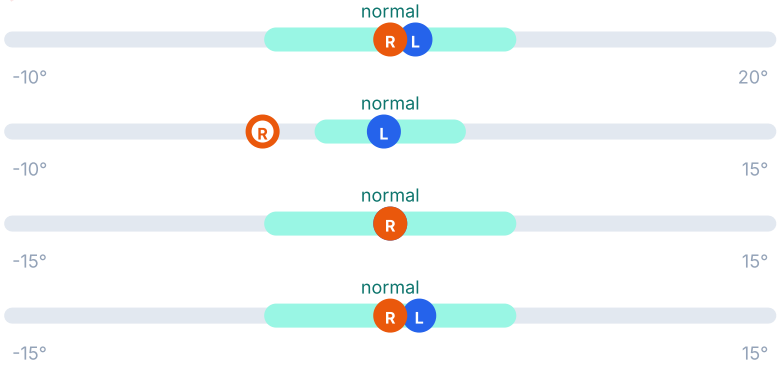
Mid Stance



Push-off (toe-off)



6 REAR AND FRONT VIEWS (MID STANCE)



● Left ● Right ▭ Normal range ○ outside normal

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7 MEASUREMENT TABLE

MEASURE	PHASE	LEFT	RIGHT	NORMAL
Knee angle at initial contact	Initial Contact	**166.0°**	160.0°	155° to 165°
Leg (tibia) inclination	Initial Contact	**(−) 14.0°**	(−) 2.0°	(−) 5° to (+) 5°
Knee angle at mid stance	Mid Stance	136.0°	134.0°	130° to 140°
Knee–toe alignment	Mid Stance	**(+) 9.1°**	**(+) 12.5°**	(−) 5° to (+) 5°
Ankle angle at toe-off (> 90° = plantarflexion)	Push-off (toe-off)	112.0°	113.0°	108° to 118°
Hip extension at push-off	Push-off (toe-off)	(−) 14.0°	(−) 15.0°	(−) 10° to (−) 20°
Rear-foot angle	Mid Stance	(+) 6.0°	(+) 5.0°	0° to (+) 10°
Pelvic drop	Mid Stance	(+) 2.3°	**(−) 1.7°**	0° to (+) 5°
Trunk side-bend	Mid Stance	0.0°	0.0°	(−) 5° to (+) 5°
Patella vs 2nd toe	Mid Stance	(+) 1.1°	0.0°	(−) 5° to (+) 5°

8 HOW TO READ THE ANGLES

Knee 180° = straight. Tibia inclination: (+) knee ahead of the ankle, (−) ankle ahead of the knee (overstride). Knee–toe: (+) knee ahead of toes. Ankle > 90° = plantarflexion. Hip (−) = extension. Rear foot (+) eversion; reference range as shown in the table. Pelvic drop (+) contralateral; reference up to 5°. Trunk (+) lean toward the stance side. Patella (+) medial to 2nd toe.

9 METHOD

2D treadmill running video. Frames at initial contact, mid stance and push-off from side views, and mid stance from rear and front views; skin markers placed by the assessor (or suggested automatically and then checked and corrected by the assessor). Treadmill running; 120 fps or higher.

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10 INTERPRETATION & MANAGEMENT

F1 Overstriding / extended-knee landing

Left · Foot lands ahead of the knee with a straight leg

Strongly consistent

The foot lands well ahead of the body with a straight knee and a backward-reaching tibia. This increases braking forces and the load absorbed at the knee and hip.
Reported associations in the literature (not an individual risk prediction): Patellofemoral pain, tibial stress, ITB syndrome; seen more often in injured runners

WHAT WE MEASURED

- ✓ Tibia inclined backward (> 5° extended) at initial contact
  Left Tibia at Initial Contact: (−) 14.0° (ref (−) 5° to (+) 5°)
- ✓ Knee too straight at initial contact (above the reference range)
  Left Knee at Initial Contact: 166.0° (ref 155° to 165°)
- ✓ Pronounced rearfoot strike (foot-strike angle > 8°)
  Left foot-strike angle 9.0° (Rearfoot strike (estimate))
- – Low cadence (< 160 steps/min)

CONSIDER CAUSES

Long stride / low step rate · Reaching forward to gain speed · Fatigue · Footwear with high heel-to-toe drop

SUGGESTED CLINICAL EXAMINATION

Count cadence (steps/min) at usual training pace · Observe heel position relative to hips at contact · Footwear review

TREATMENT OPTIONS (CLINICIAN DECISION)

MODERATE EVIDENCE **Increase step rate by 5-10% (metronome / watch cadence alert)**
Higher step rate reduced knee (and at +10% hip) energy absorption and hip adduction (Heiderscheit 2011); RCT benefit in patellofemoral pain (de Souza Jr 2024).

MODERATE EVIDENCE **Cue: "land under your hips", "run softer and quieter"**
Shortens step length and brings foot contact closer to the centre of mass.

MODERATE EVIDENCE **Gait-retraining block: about 8 sessions with gradually faded feedback**
Protocol used by Willy et al. 2012; changes were retained at 3 months.

MODERATE EVIDENCE **Hip and knee strengthening alongside retraining**
Supports the new pattern.

F2 Knee travelling ahead of the toes

Bilateral · Anterior knee translation at mid stance (left side: moderate)

Strongly consistent

At mid stance the knee travels well in front of the toes, a knee-dominant loading strategy that raises patellofemoral joint stress.
Reported associations in the literature (not an individual risk prediction): Patellofemoral pain, patellar tendinopathy

WHAT WE MEASURED

- ✓ Knee in front of the toes beyond reference
  Right Knee–toe at Mid Stance: (+) 12.5° (ref (−) 5° to (+) 5°)
- ✓ Knee in front of the toes beyond reference
  Left Knee–toe at Mid Stance: (+) 9.1° (ref (−) 5° to (+) 5°)
- – Deep stance knee flexion (< 125°)

CONSIDER CAUSES

Knee-dominant (quadriceps) strategy · Weak hip extensors · Upright trunk; excessive ankle dorsiflexion

SUGGESTED CLINICAL EXAMINATION

Single-leg squat / step-down quality · Weight-bearing lunge (ankle DF) · Gluteal and quadriceps strength

TREATMENT OPTIONS (CLINICIAN DECISION)

STRONG EVIDENCE **Hip (posterolateral) and quadriceps strengthening**
Most effective treatment for patellofemoral pain per APTA clinical practice guideline.

MODERATE EVIDENCE **Step rate +5-10% to reduce stance knee flexion and knee extensor load**
Lenhart et al. 2014; Heiderscheit 2011.

EXPERT OPINION **Hip-dominant cue: slight forward trunk lean, "push the ground back"**

MODERATE EVIDENCE **Training-load management (volume, hills, stairs)**

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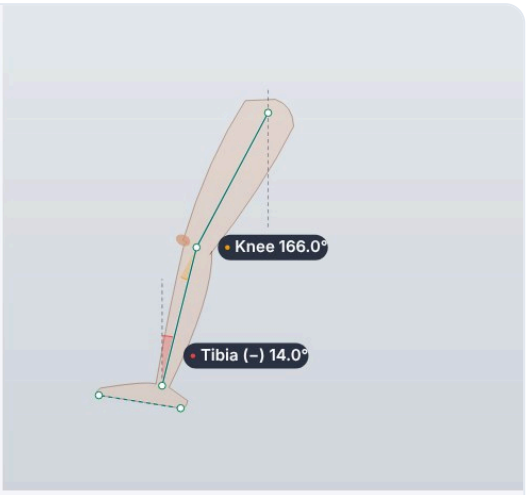
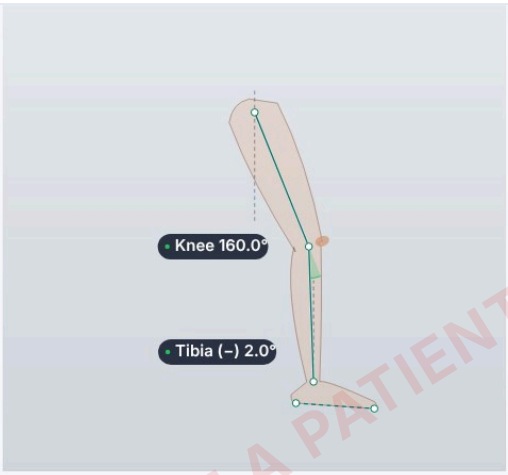
11 RUNNING PHASES – MARKED FRAMES

Initial Contact
The instant the foot first touches the ground / belt.

LEFT

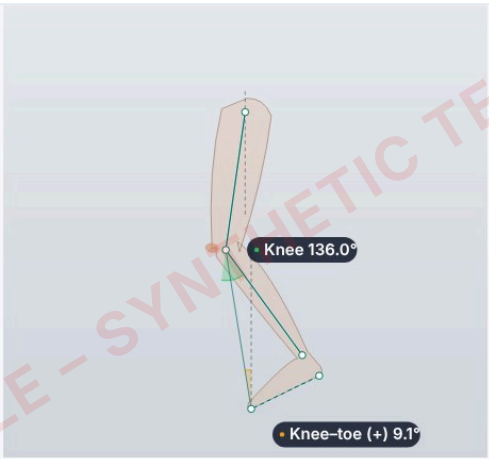


RIGHT

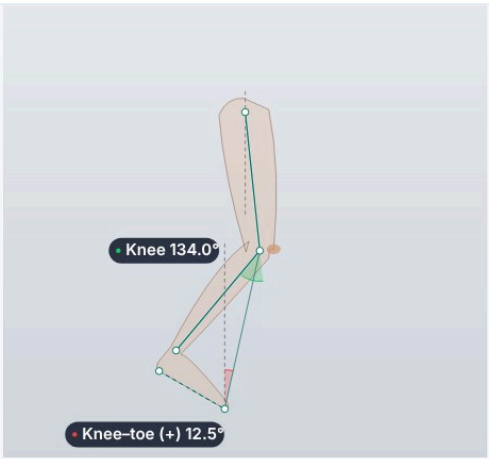


Mid Stance
Centre of mass passing over the supporting foot (deepest knee bend in stance).

LEFT



RIGHT



Push-off (toe-off)
The last frame in which the foot touches the ground (toe-off).

LEFT



RIGHT



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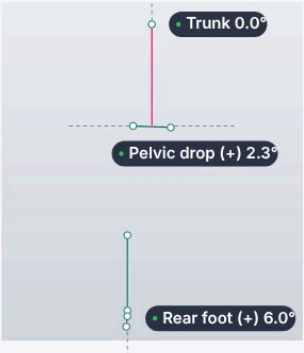
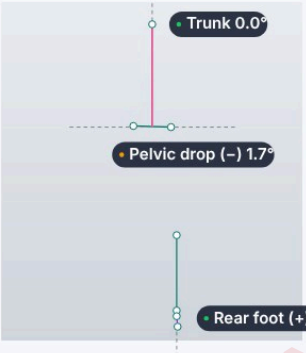
Mid Stance – rear view

Trunk side-bend, pelvic drop, rear-foot angle

LEFT



RIGHT



Mid Stance – front view

Patella relative to the 2nd toe

LEFT



RIGHT



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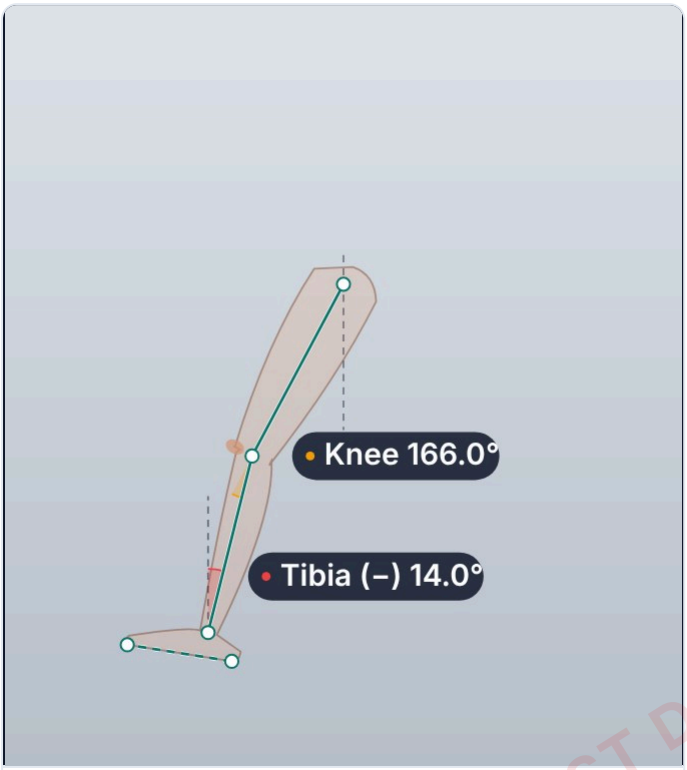
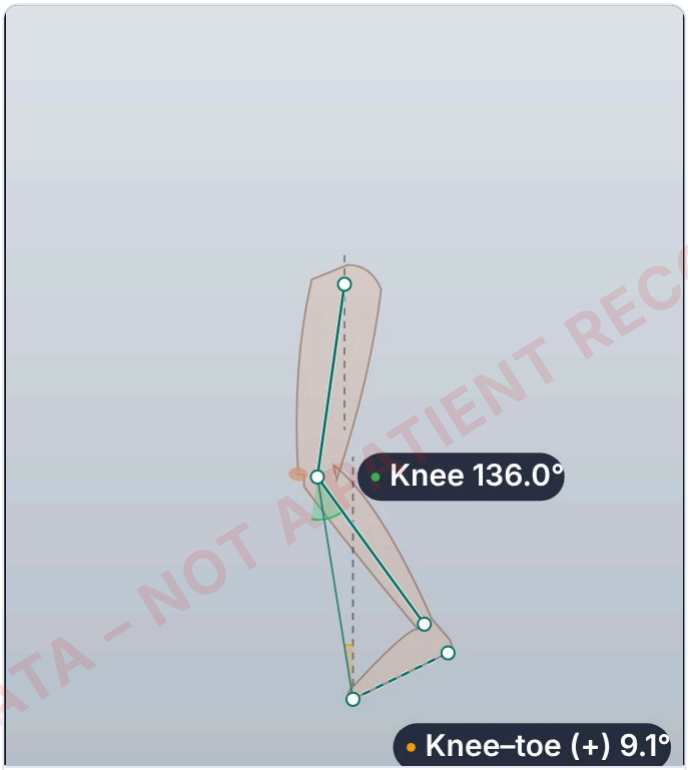
12 PATIENT PHOTOGRAPHS

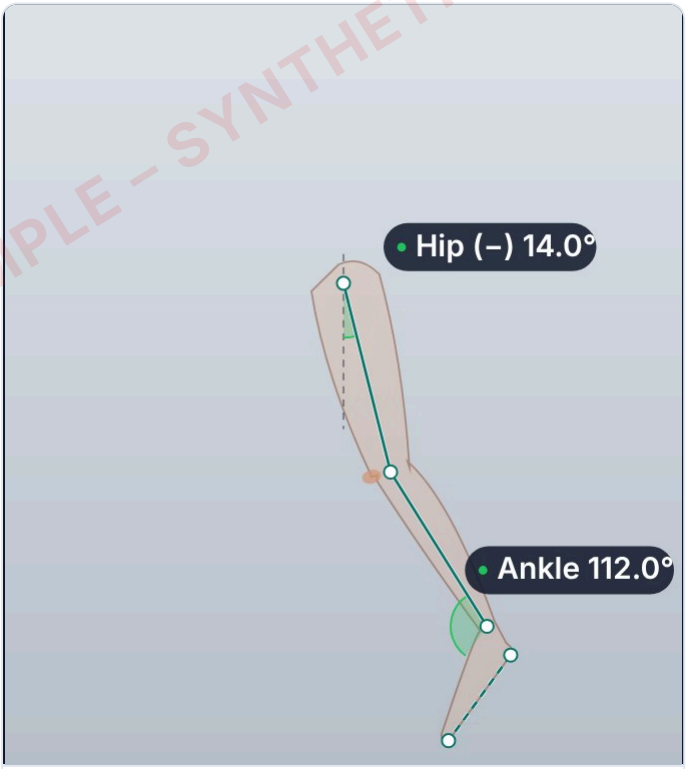
Original frames with the analysis markers, lines and angles drawn on the photograph.



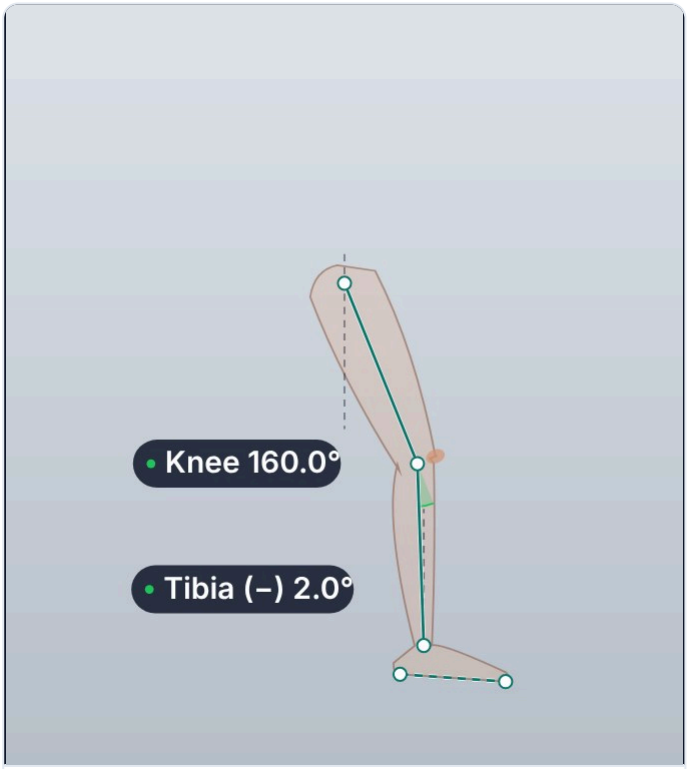
Lateral – Left · Left · Initial Contact ANNOTATED t = 0.00 s (real time)



Lateral – Left · Left · Mid Stance ANNOTATED t = 0.11 s (real time)



Lateral – Left · Left · Push-off (toe-off) ANNOTATED t = 0.24 s (real time)



Lateral – Right · Right · Initial Contact ANNOTATED t = 0.35 s (real time)

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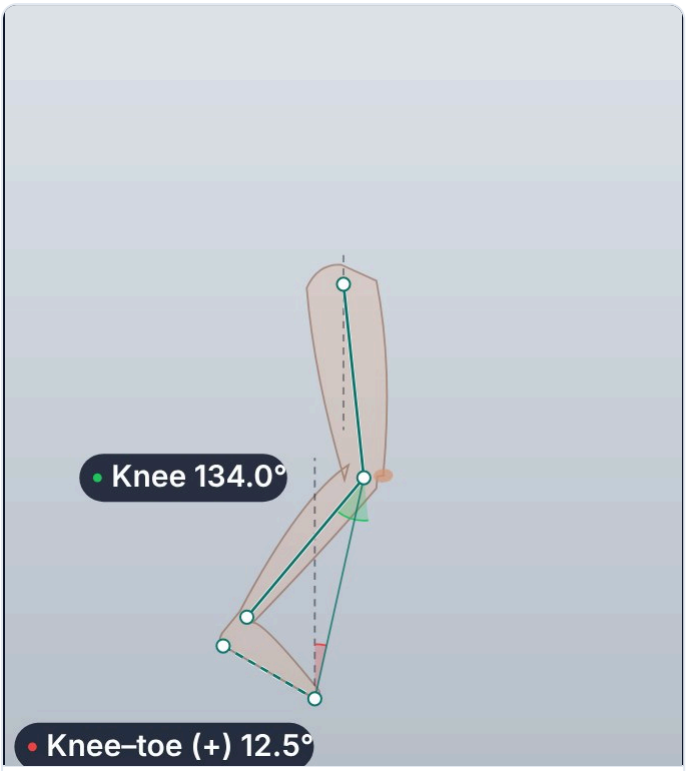
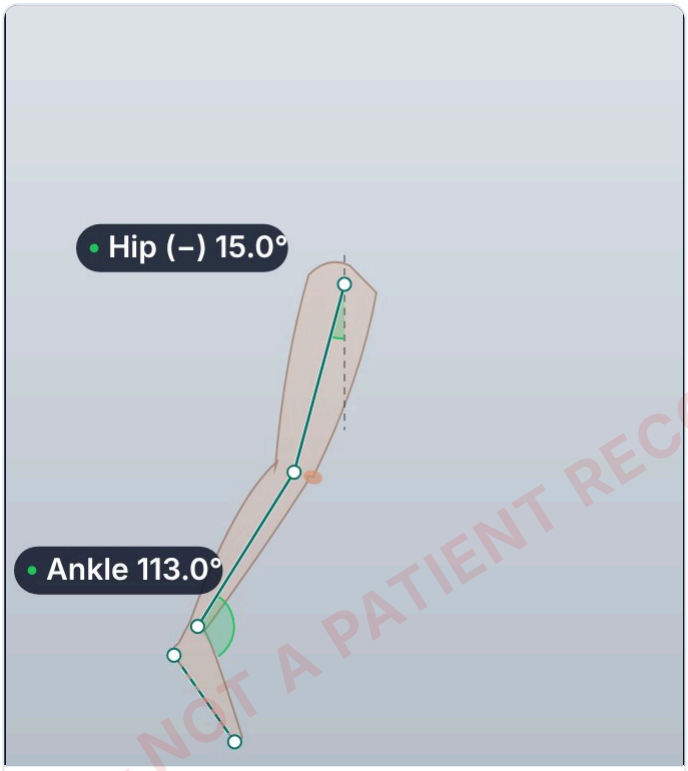
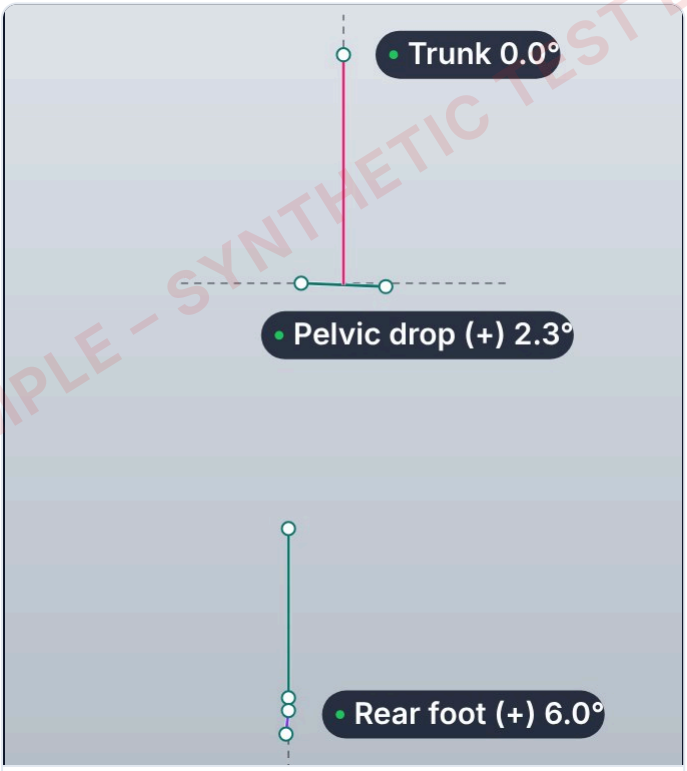


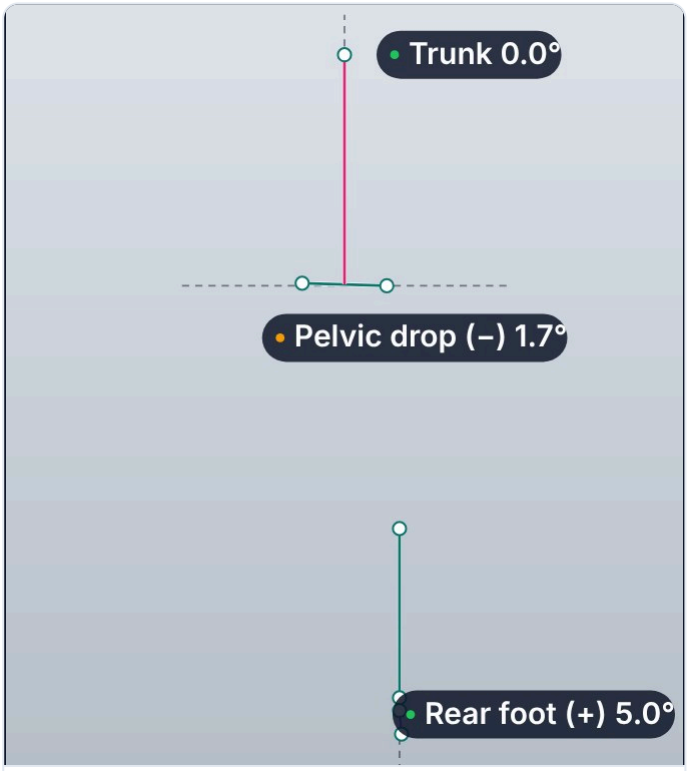
Lateral – Right · Right · Mid Stance ANNOTATED t = 0.46 s (real time)



Lateral – Right · Right · Push-off (toe-off) ANNOTATED t = 0.59 s (real time)



Posterior · Left Mid Stance ANNOTATED t = 0.11 s (real time)



Posterior · Right Mid Stance ANNOTATED t = 0.46 s (real time)

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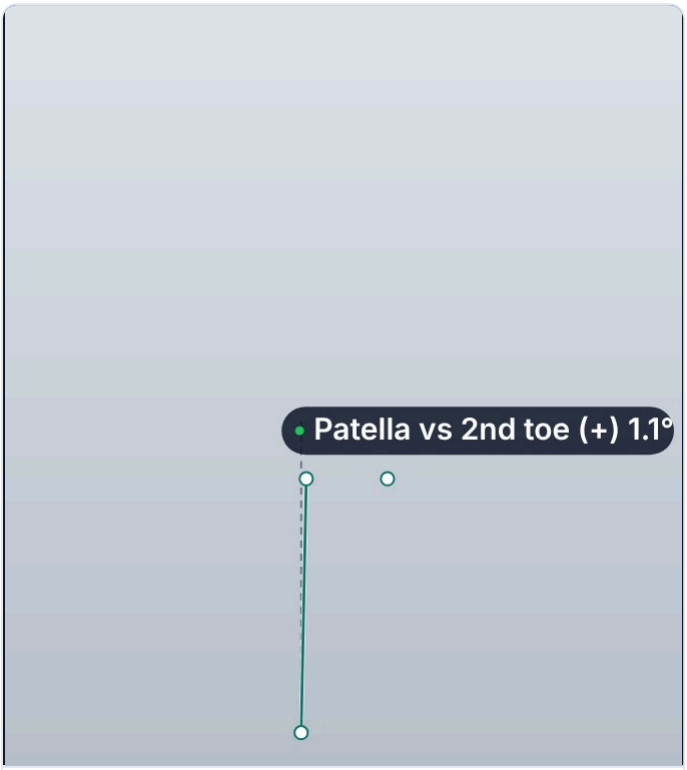
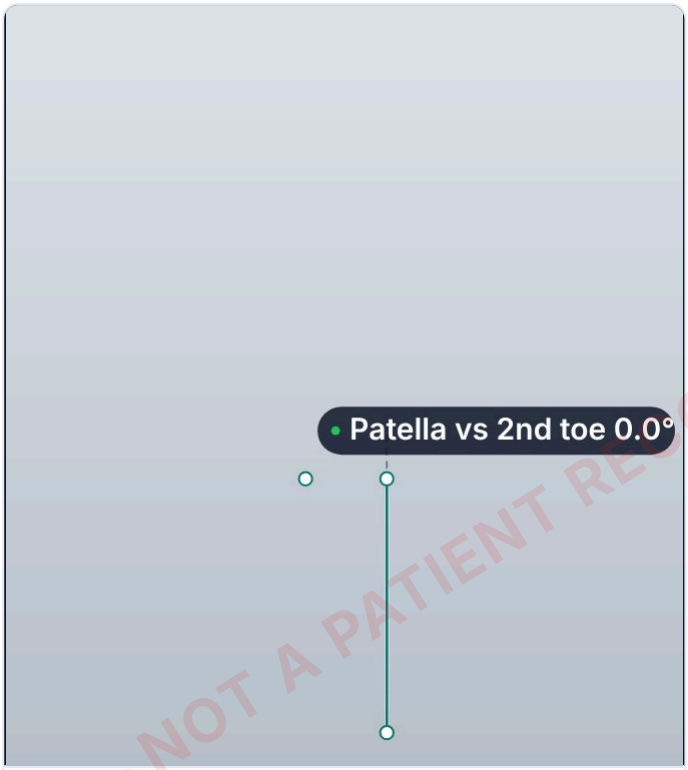


Anterior · Left Mid Stance ANNOTATED t = 0.11 s (real time)



Anterior · Right Mid Stance ANNOTATED t = 0.46 s (real time)

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13 SCREENED AND NOT PRESENT

Stiff-leg running · Reduced ankle push-off · Reduced hip extension at push-off · Contralateral pelvic drop · Excessive trunk side-bend · Over-pronation · Under-pronation · Dynamic knee valgus · Patella lateral to the 2nd toe / narrow base · Low step rate

14 NOT ASSESSABLE WITH THIS PROTOCOL

Vertical oscillation · step width (measured) · forward trunk lean · hip adduction / internal rotation (3D) · ground-reaction / loading rate.

15 REFERENCES

1. Bramah C et al. Is there a pathological gait associated with common soft tissue running injuries? Am J Sports Med 2018;46:3023-31.
2. Heiderscheit BC et al. Effects of step rate manipulation on joint mechanics during running. Med Sci Sports Exerc 2011;43:296-302.
3. Lenhart RL et al. Increasing running step rate reduces patellofemoral joint forces. Med Sci Sports Exerc 2014;46(3):557-64.
4. Altman AR, Davis IS. A kinematic method for footstrike pattern detection. Gait Posture 2012;35:298-300.
5. Willy RW, Scholz JP, Davis IS. Mirror gait retraining for patellofemoral pain in female runners. Clin Biomech 2012;27:1045-51.
6. Willy RW et al. Patellofemoral Pain Clinical Practice Guideline. JOSPT 2019 (APTA).
7. Lashien SA et al. Hip abductor training on pelvic drop and knee valgus in runners with MTSS: RCT. J Orthop Surg Res 2024;19.
8. Beyer R et al. Heavy slow resistance versus eccentric training for Achilles tendinopathy: RCT. Am J Sports Med 2015;43:1704-11.
9. Kerrigan DC et al. Hip flexor stretching in older adults: RCT. Arch Phys Med Rehabil 2003.

Evidence labels: **STRONG EVIDENCE** systematic review / RCTs · **MODERATE EVIDENCE** smaller trials or consistent studies · **EXPERT OPINION** clinical consensus.

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16 SUMMARY AND CONCLUSION

Ms. Sample Running, a 29-year-old female runner, underwent running movement analysis on 12/10/2026 with a chief complaint of "Left anterior knee pain after 5 km runs for 6 weeks". Of 20 measurements, 15 (75%) were within normal limits, 3 showed minor and 2 showed major deviation from the reference values. The findings are most consistent with **overstriding / extended-knee landing (left)**, together with knee travelling ahead of the toes (bilateral). Contributing factors to examine include long stride / low step rate, reaching forward to gain speed, knee-dominant (quadriceps) strategy, weak hip extensors.

17 REGIONAL SUMMARY

REGION	STATUS	KEY DEVIATIONS	MEASURES
Trunk	Normal	Within normal limits	2/2 normal
Pelvis	Minor	Pelvic drop (R)	1/2 normal
Hip	Normal	Within normal limits	2/2 normal
Knee	Major	Knee–toe (L/R) · Knee (L)	5/8 normal
Lower leg	Major	Tibia (L)	1/2 normal
Ankle & foot	Normal	Within normal limits	4/4 normal

18 KEY TAKE-HOME POINTS

- Primary finding: **Overstriding / extended-knee landing (left)** – The foot lands well ahead of the body with a straight knee and a backward-reaching tibia.
- 1 finding is bilateral; the others are one-sided – compare with symptoms on that side.
- Reported associations in the literature (not an individual risk prediction): Patellofemoral pain, tibial stress, ITB syndrome; seen more often in injured runners.
- 2 major deviations should be reviewed clinically first.

19 OPTIONS TO CONSIDER (CLINICIAN DECISION)

F1 **Increase step rate by 5-10% (metronome / watch cadence alert)**
Overstriding / extended-knee landing · MODERATE EVIDENCE

F2 **Hip (posterolateral) and quadriceps strengthening**
Knee travelling ahead of the toes · STRONG EVIDENCE

20 FURTHER ASSESSMENT & FOLLOW-UP

SUGGESTED CLINICAL EXAMINATION

- Count cadence (steps/min) at usual training pace
- Observe heel position relative to hips at contact
- Single-leg squat / step-down quality
- Weight-bearing lunge (ankle DF)

RE-ASSESSMENT

Repeat this analysis at follow-up with the same set-up to measure change; differences smaller than the measurement error (about 5° for 2D joint angles and up to about 8° for frontal-plane knee angles (Munro 2012); 0.10 for ratios; 3% for distances) should not be over-interpreted.

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21 PHYSICAL EXAMINATION & HISTORY

22 FINAL DIAGNOSIS

23 MANAGEMENT PLAN & FOLLOW-UP

RE-ASSESSMENT DUE

REFERRAL TO

Assessed by (name, qualification)

Signature & date

Reviewed by

Signature & date

SAMPLE – SYNTHETIC TEST DATA – NOT A PATIENT RECORD

24 PATIENT CONSENT RECORD

Consent given by	Ms. Sample Running
Date & time recorded	12/10/2026, 09:05:00
Recorded by	Dr. A. Sample (PT)
Purpose	Video / photographic recording and computer-assisted analysis of movement and posture for teaching, learning and research.
Use of anonymised data in teaching materials / publications	Not agreed

25 INTENDED USE

For research and education use only. Rollaxis is not a medical device. Its measurements, interpretations, provisional diagnoses and management options are teaching and research examples and must not be used to diagnose or treat any person.

Rollaxis Research & Education Edition is software for teaching, learning and research in human movement science. It measures two-dimensional (2D) joint and segment angles, timing and alignment from video recordings and photographs of posture, walking, running, a bodyweight squat and the Landing Error Scoring System (LESS) jump-landing task, using skin markers placed and confirmed by the user, and compares the measurements with published reference values. To support teaching, its reports also show worked examples of clinical reasoning – interpretation of the findings, provisional diagnoses and management options with their published evidence – generated by fixed rules from the literature. It is intended for students, educators and researchers in physiotherapy, sports science and medicine, in teaching laboratories, classrooms and approved research studies. It is not a medical device and is not intended for the diagnosis, prevention, monitoring, treatment or alleviation of any disease, injury or disability in an individual; its output must not be used as the basis for clinical decisions.

26 WARNINGS AND LIMITATIONS

Measurements are 2D projections of 3D movement and are affected by camera position, height, distance and tilt, lens distortion, patient rotation, clothing, frame rate and marker placement; rotations about the long axis of the limb are not measured. Check every marker, including automatic suggestions, before using a value. Differences smaller than the measurement error should not be interpreted as change. Reference values come from published adult populations and may not apply to every patient; they are not paediatric values. Stop the test if the patient reports pain, dizziness, chest discomfort or instability. Rule-based interpretations, provisional diagnoses and management options are teaching examples, not clinical advice. Use only the version supplied by the publisher on a computer protected as described in the user manual.

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27 PERSONAL DATA PROTECTION (DIGITAL PERSONAL DATA PROTECTION ACT, 2023)

Sample Physiotherapy Clinic is the **Data Fiduciary** for the personal data in this report, including images and health information. The data were collected with the consent recorded above, for the specified purpose only, and are stored on the institution's computer. Rollaxis does not transmit patient data; licence activation sends only the licence key, a computer identifier, the computer name and the software version to the publisher's licence server. The data principal (patient) may withdraw consent at any time, and may request access to, correction of or erasure of their personal data, or raise a grievance, by contacting Sample Physiotherapy Clinic. Withdrawal does not affect processing done before it. Data are kept only as long as needed for this purpose or as required by law for clinical records. For a child (under 18 years), verifiable consent of the parent or lawful guardian is required.

28 RESPONSIBILITIES

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29 USER DECLARATION

I confirm that the participant gave consent, that I have reviewed the measurements in this report, and that this report was produced for teaching, learning or research and will not be used as the basis for diagnosis or treatment of the participant.

Name, designation & institution

Signature & date

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