Walking

Clinician	Jerry Ditz
Assessment date	6/10/2026

Patient details

Name	sprain ankle
Age	41
Sex	Male
Height	73in
Weight	215lb
Shoe size	45
Address	United States

Stride Quality Index (SQI)	Gait Variability Index (GVI)	Risk of Fall	Symmetry
82	L: 100 R: 100 0 - 200	Very Low	71%

Cadence	Speed	Distance
102 102 - 124 step/min	2.7 2.9 - 3.7 miles/h	160.7 yd

Global Summary

Patient Profile

41-year-old male (1.85 m, 98 kg) with a history of **right ankle sprain** and current **right ankle pain (intensity 4/10)** . Gait analysis reveals significant biomechanical deviations, particularly in supination dominance, propulsion inefficiency, and asymmetry.

Summary of Key Findings

The gait pattern shows **bilateral supination dominance** across all phases (heel impact, foot flat, propulsion), with **higher supination angles on the right** (e.g., -21.3° at heel impact vs. -15.7° left). This suggests a **compensatory avoidance strategy** post-ankle sprain, reducing medial foot loading but impairing natural pronation for shock absorption.

Propulsion is inefficient bilaterally (low propulsion ratio: -18% left, -11% right), indicating reduced plantarflexor contribution to push-off. **Stance time is prolonged on the left (0.735 s vs. 0.709 s right)**, likely compensating for right ankle discomfort. **High asymmetry in impact intensity (17.1%)** and mild asymmetry in pronation/supination angles at heel strike (8.4%) further highlight **right-side overload risk**.

Clearance is reduced bilaterally (0.005-0.007 m), increasing tripping risk. **Flat foot time is prolonged bilaterally** (0.368-0.408 s), suggesting delayed transition to propulsion-a common adaptation to ankle instability.

Implications

- **Injury Risk**: Chronic supination dominance may predispose to **lateral ankle sprains, peroneal tendinopathy, or stress fractures** (e.g., 5th metatarsal) due to reduced shock absorption. The right ankle's higher supination angles exacerbate this risk.
- **Joint Stress**: Prolonged flat foot time increases **tibial rotation torque**, potentially straining the knee and hip over time.
- **Cumulative Load**: Over **1 month**, assuming ~5,000 steps/day, the right foot may absorb **~120 extra tons of force** due to asymmetry and supination dominance, accelerating degenerative changes.
- **Efficiency**: Low propulsion ratios imply **hip flexors compensate for weak plantarflexors**, increasing energy expenditure and fatigue risk.

Recommendations

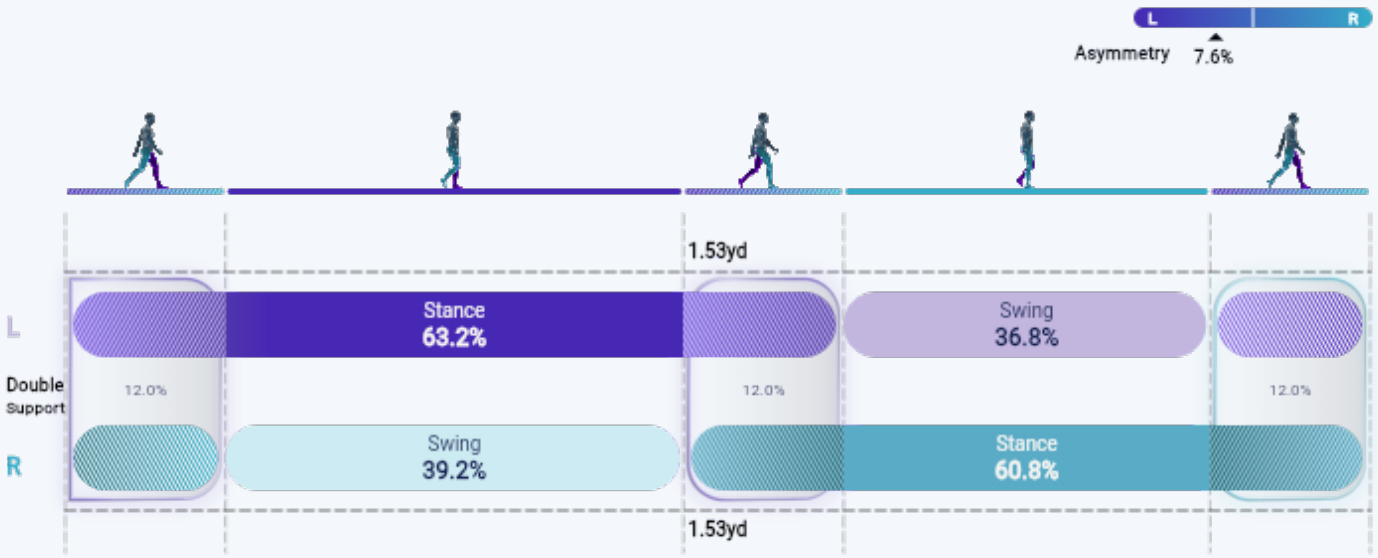
- **Strengthening**:
- *Focus on eccentric peroneal and tibialis posterior exercises* to counteract supination dominance and improve medial arch control.
- *Progressive plantarflexor loading* (e.g., heel raises with eccentric control) to restore propulsion efficiency.
- **Mobility**:
- *Ankle dorsiflexion mobility drills* (e.g., knee-to-wall stretches) to reduce compensatory flat foot time.
- **Gait Retraining**:
- *Encourage midfoot strike* to redistribute load and reduce supination angles.
- *Step rate increase* (e.g., +10% cadence) to shorten stance time and mitigate impact asymmetry.
- **Monitoring**:
- *Reassess propulsion ratios and supination angles* in 4-6 weeks to track adaptation.

Relevant Metrics for Ankle Sprain Context

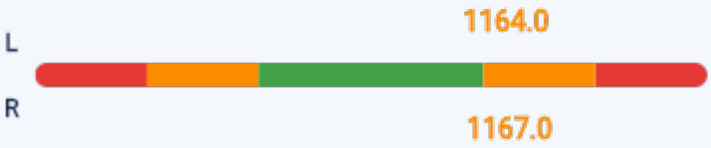
- Pronation/Supination Angle at Heel Impact
- Pronation/Supination Angle at Propulsion
- Propulsion Ratio
- Stance Time
- Flat Foot Time
- Impact Intensity Asymmetry
- Clearance

Walk profile

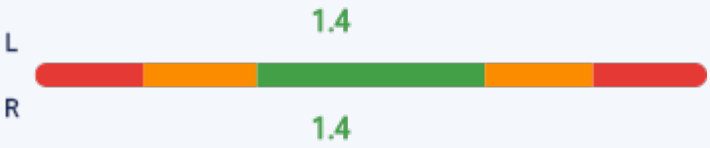
Average duration of the stance and swing phases related to the total cycle time.
Normal: stance 60% and oscillation 40%
In case of an asymmetry, there is a compensation by the stronger limb (longer stance time), and potential limping.



Stride duration (ms)



Stride length (in)



Swing time (ms)



Contact Time (ms)



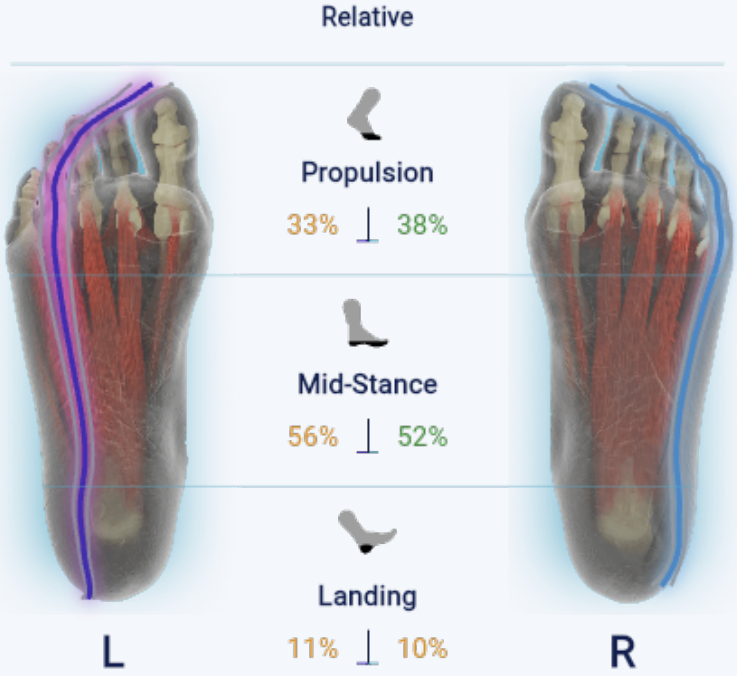
Walk profile AI Interpretations

Your patient exhibits a mild but clinically meaningful asymmetry in **stance time** (left > right: 7.6%), with the left side spending 26 ms longer in stance than the right. This suggests a subtle compensatory shift in load distribution, likely to offload the right ankle given the reported pain (VAS 4/10). The prolonged left stance time (63.2% of gait

cycle vs. 60.8% right) and reduced right swing time proportion (39.2% vs. 36.8% left) further support a right-side avoidance strategy during propulsion. While stride length remains symmetrical (1.4 m both sides), the prolonged stance phase on the left may indicate reduced push-off efficiency on the right, potentially increasing cumulative stress on the left limb over time. The double support time proportion (12%) is within normal limits, suggesting no significant balance impairment. These findings align with a protective adaptation to right ankle discomfort, warranting targeted assessment of right ankle mechanics (e.g., talocrural joint mobility, peroneal strength) and potential gait retraining to restore symmetrical propulsion.

Gait line

Projected trajectory of the center of pressure during the stance phase. Provides also the average duration of each sub-phases of the contact phase (Loading, mid-stance, propulsion)



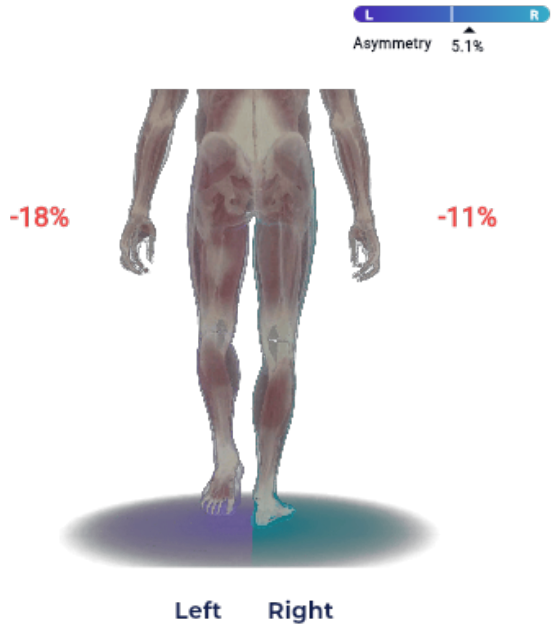
Gait line AI Interpretations

Your gait analysis reveals **biomechanical inefficiencies** linked to **reduced propulsion** and **prolonged flat-foot phase**, particularly on the left side. The **propulsion time proportion** is below optimal (left: 33%, right: 38%), indicating weaker push-off, which may contribute to compensatory strain on the right ankle-consistent with the reported pain (4/10). The **flat-foot time proportion** is elevated bilaterally (left: 56%, right: 52%), suggesting delayed transition from heel strike to toe-off, further reducing gait efficiency. Mild asymmetry in

pronation/supination angles at heel impact (8.4%) and propulsion (8.7%) may reflect subtle compensatory adaptations, though not severe. These findings suggest **suboptimal ankle mechanics**, potentially exacerbating the prior ankle sprain's impact on propulsion and load distribution. Focused strengthening of the triceps surae and peroneal musculature, alongside proprioceptive retraining, may improve push-off and reduce flat-foot duration.

Propulsion rate

Stress repartition between hips and plantar flexors during the walk



Foot progression angles

Foot Progression Angle : Measures how much the foot points inward or outward during the walk relative to the direction of movement
Normal between 4.6° and 16.6° .
To be correlated with pronation-supination angles to better understand the entire foot movement during stance phase.



Propulsion rate AI Interpretations

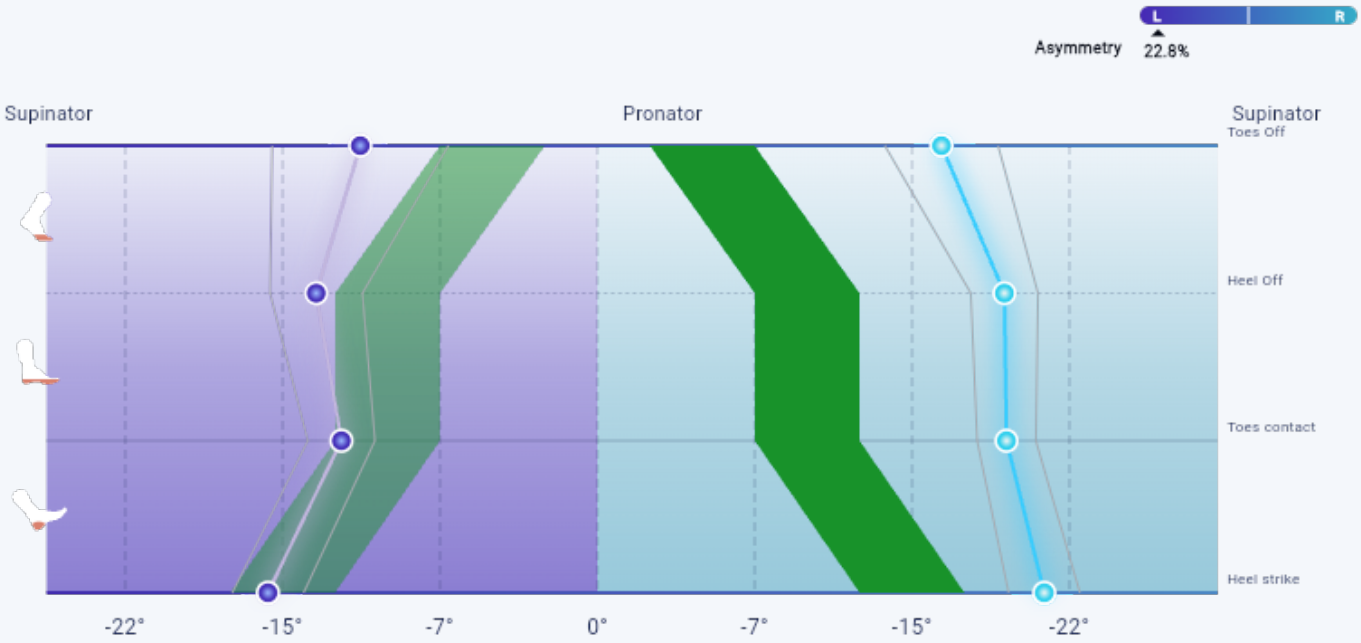
Foot progression angles AI Interpretations

Your patient demonstrates **bilaterally reduced propulsion efficiency**, with the left side showing a more pronounced deficit (-18%) compared to the right (-11%). This indicates a **compensatory reliance on hip flexors** rather than plantar flexors for foot clearance during push-off, which may contribute to altered load distribution and increased stress on the ankle complex. Given the reported right ankle pain (4/10) and history of ankle sprain, this pattern suggests **persistent post-injury biomechanical adaptation**, potentially delaying full recovery or predisposing to recurrent issues. The asymmetry in propulsion reduction (left > right) may reflect **compensatory strategies** to offload the symptomatic right ankle, warranting targeted strengthening of the triceps surae and peroneal musculature to restore balanced propulsion and reduce ankle strain.

The analysis reveals a **narrowed foot progression angle** bilaterally (*Left: 2.6°*, *Right: -2.5°*), indicating an in-toeing gait pattern. While the asymmetry between sides is minimal (5.1%), this alignment may contribute to altered lower limb biomechanics, potentially increasing stress on the ankle joints and surrounding soft tissues. Given the patient's history of right ankle sprain and reported pain (4/10), this gait deviation could exacerbate existing dysfunction or predispose to recurrent injury by reducing the foot's ability to dissipate ground reaction forces efficiently. Further assessment of dynamic ankle stability and rearfoot kinematics is warranted to address potential compensatory mechanisms.

Pronation/ Supination angles

Provides the angles of pronation/supination during the 4 key stages of the contact phase (Heel Strike, toes contact, heel off, toes off).
The graph shows the average values (colored lines) as well as the standard deviations (thin lines), and the statistical norms (green corridor).



Pronation/ Supination angles AI Interpretations

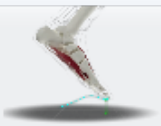
Your patient demonstrates **consistently high supination angles** across all gait phases (heel impact, foot flat, and propulsion), with the right side exhibiting more pronounced deviations (e.g., -21.3° at heel impact vs. -15.7° left). This excessive supination, particularly on the right, may reflect residual biomechanical adaptations following the reported ankle sprain, potentially increasing lateral ankle strain and predisposing to reinjury or chronic instability. The asymmetry (right > left) aligns with the patient's reported right ankle pain (4/10), suggesting a localized

dysfunction rather than a systemic issue. While no stride or timing abnormalities were flagged, the supination pattern alone warrants targeted proprioceptive or strengthening interventions to restore neutral foot positioning during gait.

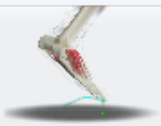
Clearance

Steppage: Angle formed between the foot and the ground at heel strike.
Normal if the angle is around 20° and above : The patient strikes with the heel
Pathological if less than than 20° or equal to 0° , indicates either excess plantar flexion of the ankle or lack of knee extension.





Left 0.2in



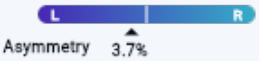
Right 0.3in

Clearance AI Interpretations

Your patient demonstrates **reduced foot clearance** during swing phase bilaterally, with the left foot at 5 mm and the right at 7 mm. This indicates a potential risk for tripping or compensatory strategies, particularly in the context of prior ankle sprain history. While asymmetry is minimal (2%), the low clearance values suggest cautious gait, possibly to avoid discomfort in the right ankle (pain intensity 4/10). Further evaluation of ankle dorsiflexion range and proprioception is warranted to address underlying deficits.

Circumduction

Measures the lateral outward movement of the foot during the swing phase.
If >5.2 cm, may indicate increased hip external rotation, compensation for reduced toe clearance, limited knee flexion, or neurological impairment.





0.0in

Left



-0.3in

Right

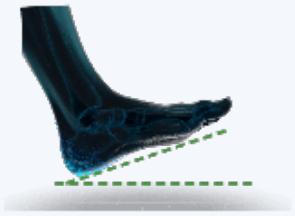
Circumduction AI Interpretations

Your patient demonstrates a **very narrow swing width bilaterally** (0.0 m left, -0.007 m right), indicating a constrained foot trajectory during swing phase. This may reflect compensatory strategies to reduce ankle joint excursion, potentially linked to **right ankle pain (intensity 4/10)** and prior ankle sprain history. While asymmetry in swing width is minimal (3.7%), the bilateral reduction suggests a primary gait adaptation rather than isolated side-specific dysfunction. The findings warrant further assessment of ankle joint mobility and peroneal/tibialis posterior function to address potential instability or pain-driven compensation.

Attack angle

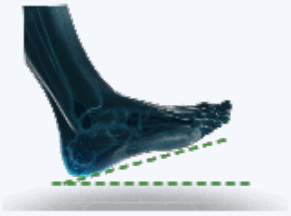
Steppage: Angle formed between the foot and the ground at heel strike.
Normal if the angle is around 20° and above : The patient strikes with the heel
Pathological if less than than 20° or equal to 0° , indicates either excess plantar flexion of the ankle or lack of knee extension.





18.2°

Left



15.1°

Right

Attack angle AI Interpretations

The analysis reveals a neutral attack angle at initial contact for both limbs, with no clinically meaningful asymmetry (6.2% difference). Given the patient's history of right ankle sprain and reported pain (4/10) on the same side, this suggests a cautious gait strategy to avoid excessive loading or instability at heel strike. The absence of significant deviations in this parameter indicates that the primary concern may lie in other phases of gait (e.g., midstance or propulsion), which were not captured in the provided data. Further evaluation of dynamic stability and joint loading during stance and push-off is recommended to assess potential compensatory mechanisms or residual deficits from the prior injury.

Comments