Ridgeline Performance PT

BIOMECHANICAL MOTION ANALYSIS

PATIENT & ASSESSMENT

Brian · Age 37 · Running · Dual-plane (Side view + Posterior view) · April 16, 2026 · 8 frames · Pose Landmarker Heavy

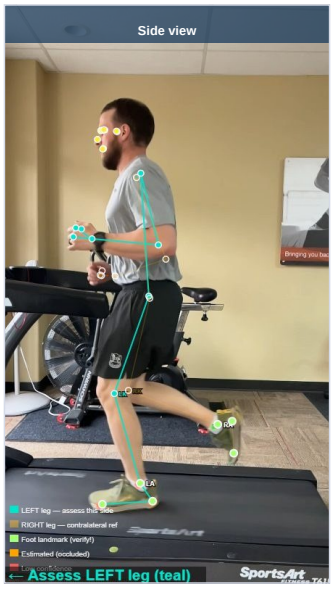
MOVEMENT QUALITY SCORE

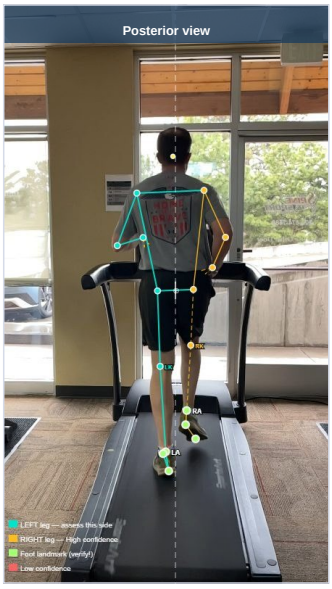
7/10

Running	1
Movement Assessed	High Priority Findings

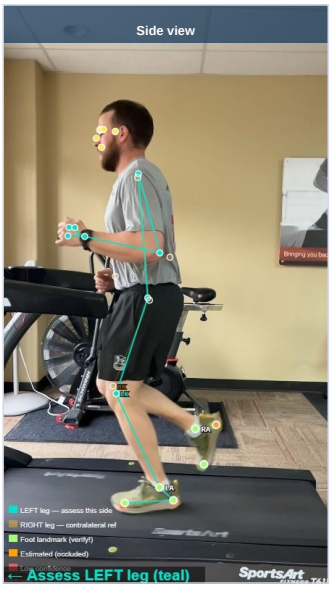
DUAL-PLANE ANALYSIS

Left Initial Contact

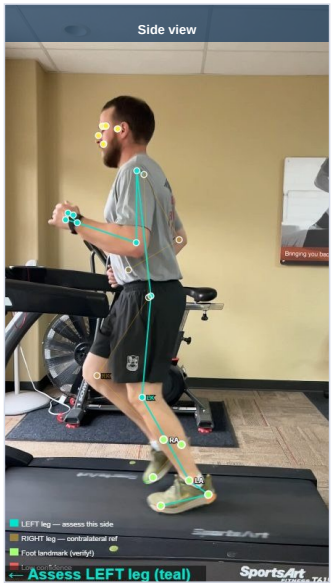


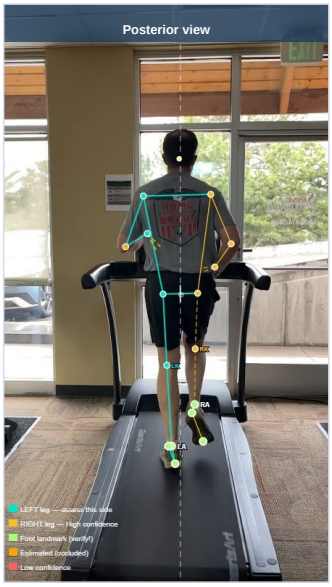


Left Loading Response

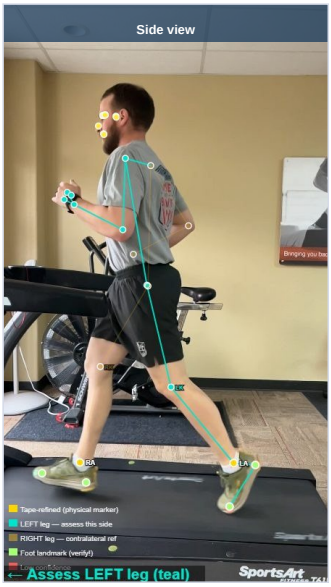


Left Mid Stance

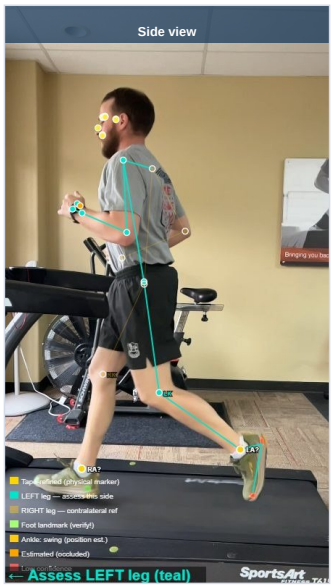


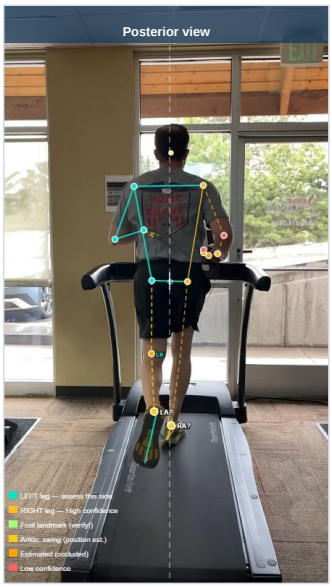


Left Propulsion

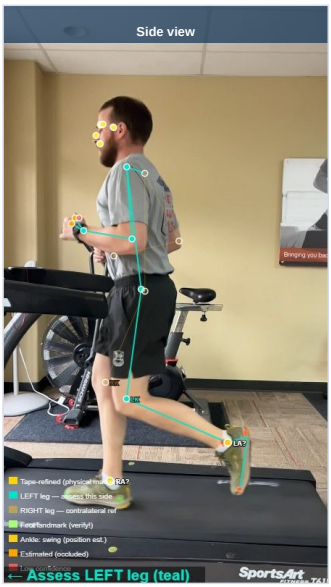


Left Toe Off

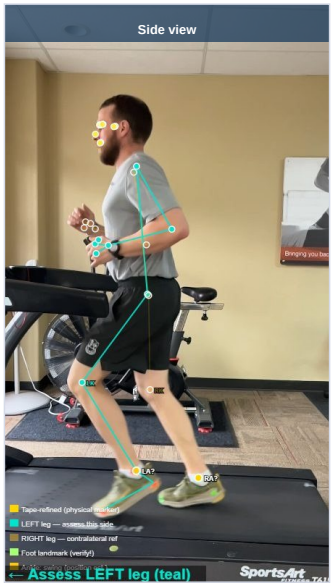


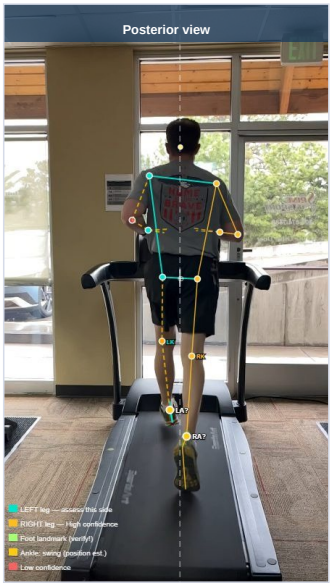


Left Early Swing

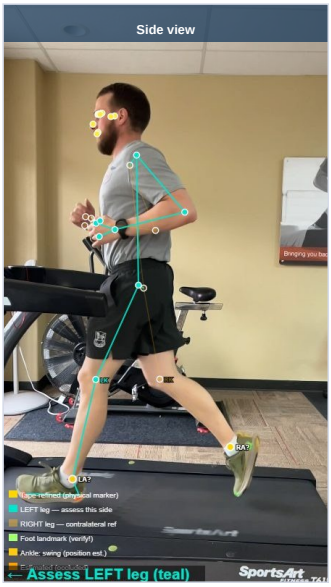


Left Mid Swing





Left Late Swing



MEASURED JOINT ANGLES

Joint	Left	Right	Reference Range
Hip Flexion	53°	50°	Running hip flexion: 35-65° at peak swing
Hip Ext at Toe-off	14°	14°	Hip extension at toe-off: 10-25°
Knee Flexion	112°	127°	Peak knee flexion swing: 90-130°
Hip Adduction (frontal)	6°	6°	Hip adduction: 0-10° normal, >10° = crosso
Knee Valgus (frontal)	0°	2°	Dynamic valgus: <5° (frontal view)
Ankle Dorsiflexion	22°	—	Ankle dorsiflexion at loading: +10 to +25°
Trunk Lean	8°	bilateral	Forward trunk lean: 5-15° from vertical
Trunk Lateral Lean	3°	bilateral	Lateral trunk lean: <5° per step (Trendele
Pelvic Drop	1°	bilateral	Contralateral pelvic drop: <5° (hip abduct

RUNNING STRIDE METRICS

RUNNING STYLE ARCHETYPE

Overstrider — foot lands ahead of centre of mass — increased braking impulse and knee loading

moderate overstride · shin angle 29° at contact

CADENCE
179 spm
90 strides/min

STRIDE DURATION
670 ms
CV 8%

GROUND CONTACT
31%
~208ms est.

FLOAT TIME
38%
~255ms est.

STRIDES DETECTED
18
in 14.1s clip

FOOT STRIKE
Midfoot
consensus pattern

PEAK KNEE FLEX
100°
swing phase

STEP ASYM
0%
L/R step timing

STRIDE LENGTH
2.1m
Step: 1.05m

STRIDE/LEG RATIO
2.36×
optimal range

VERTICAL OSCILLATION
5.9cm
Elite (<6cm)

OVERSTRIDE
21cm
& Moderate — increased braking

SHIN ANGLE AT CONTACT
29°
& Excessive (>20°) — braking risk

! Stride duration variability >5% — inconsistent stride timing

Timing metrics estimated from video at 120fps (±8ms resolution). GCT detection viable at 120fps. Parameters: Surface: treadmill · Speed: 7.0mph · Shoe: minimalist · Height: 168cm. Gallery phases use biomechanical timing (Zeni 2008 / Perry & Burnfield). Treadmill belt movement makes stance phases appear more compressed than overground — focus on the dense-pass measurements, not static gallery frame appearance.

FOOTWEAR RECOMMENDATION

NEUTRAL shoe category is recommended based on your excellent frontal plane mechanics, midfoot strike pattern, and minimal pronation risk. Your current minimalist footwear is biomechanically appropriate given your strong hip abductor control and efficient strike pattern, but consider transitioning to a neutral cushioned shoe (Brooks Ghost, New Balance 1080) during your knee pain recovery phase. The additional cushioning may help reduce impact forces while you work on correcting the overstriding pattern, then you can return to minimalist shoes once symptoms resolve and stride mechanics normalize.

KEY FINDINGS

Significant Shoulder Asymmetry
Left-right shoulder flexion shows 20% asymmetry (LSI 80%) indicating compensatory arm swing patterns, likely related to right knee symptoms

Knee Flexion Asymmetry
Right knee shows higher peak flexion (127°) compared to left (112°), creating 12% asymmetry that warrants monitoring given right-sided symptoms

Overstriding Pattern
Classified as Overstrider archetype with 29° shin angle at contact, indicating moderate braking forces and increased knee extensor moment

Excellent Frontal Plane Control
Minimal pelvic drop (1°), low knee valgus (2° right, 0° left), and normal hip adduction (6° bilateral) demonstrate strong hip abductor function

Optimal Stride Metrics
Cadence at 179 spm with midfoot strike pattern, 31% ground contact time, and 0% step asymmetry indicate efficient mechanics

BIOMECHANICAL ANALYSIS

Brian demonstrates generally efficient running mechanics with several notable patterns. His stride parameters are excellent with optimal cadence (179 spm), midfoot strike pattern, and symmetric step lengths. Frontal plane control is particularly strong, showing minimal pelvic drop (1°), low bilateral knee valgus ("d2°), and normal hip adduction angles abductor strength and core stability. Peak hip flexion values (50° right, 53° left) fall within normal ranges for recreational running. However, asymmetries emerge in the upper and lower extremity coordination. The most significant finding is a 20% shoulder flexion asymmetry (LSI 80%), suggesting compensatory arm swing patterns that may relate to his right knee symptoms. Additionally, right knee peak flexion is elevated at 127° compared to left at 112°, creating a 12% asymmetry that warrants monitoring. The overstriding pattern with 29° shin angle at contact indicates moderate braking forces that could contribute to his knee symptoms, though his midfoot strike pattern helps mitigate some impact loading compared to heel striking.

CLINICAL IMPRESSIONS

The biomechanical profile suggests Brian has developed subtle compensatory patterns related to his right knee pain while maintaining relatively efficient overall mechanics. The elevated right knee flexion and asymmetric arm swing likely represent protective adaptations to reduce loading or pain during the swing phase. The overstriding pattern, while not severe, creates increased braking forces and knee extensor moments that could perpetuate his symptoms. His excellent frontal plane control indicates strong hip abductor function, which is protective against further knee dysfunction. The combination of good core stability, optimal cadence, and midfoot strike provides a solid foundation for rehabilitation interventions focused on addressing the asymmetries and reducing overstriding tendencies.

CLINICAL RECOMMENDATIONS

1. Implement stride shortening drills and cadence training to reduce overstriding and decrease braking forces on the symptomatic right knee
2. Address shoulder asymmetry through arm swing coordination exercises and contralateral limb strengthening to normalize upper body mechanics
3. Monitor right knee flexion asymmetry with progressive loading exercises to ensure maintained mobility without pain compensation
4. Maintain current hip abductor and core strengthening program given excellent frontal plane control metrics
5. Consider gait retraining focused on foot strike position relative to center of mass to reduce shin angle at contact

PATIENT EDUCATION

Your running form shows good overall efficiency with strong hip and core control, but you're developing some protective patterns related to your knee pain

The slight overstriding pattern means your foot lands too far in front of your body, creating braking forces that may aggravate your knee symptoms

Your asymmetric arm swing is likely a compensation for knee discomfort - addressing both the knee symptoms and retraining arm coordination will be important