

Biomechanical Assessment Report

Ankle Data (Plain Text)

Dorsiflexion Range Left: 17.1°
Dorsiflexion Range Right: 24.0°
Plantarflexion Range Left: 128.7°
Plantarflexion Range Right: 135.3°

Dorsiflexion Left %: 57%
Dorsiflexion Right %: 80%
Dorsiflexion Asymmetry: 28.7%
Plantarflexion Left %: 78%
Plantarflexion Right %: 82%
Plantarflexion Asymmetry: 4.9%

Dorsiflexion Force Left: 0.2
Dorsiflexion Force Right: 0.2
Plantarflexion Force Left: 1.0
Plantarflexion Force Right: 1.0

Dorsiflexion Force Left %: 63%
Dorsiflexion Force Right %: 59%
Dorsiflexion Force Asymmetry: 0.0%
Plantarflexion Force Left %: 69%
Plantarflexion Force Right %: 68%
Plantarflexion Force Asymmetry: 0.0%

Assessment Data Overview

Range of Motion Assessment

Ankle/Foot Range of Motion

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Dorsiflexion Range	17.1°	24.0°	30°	57%	80%	28.7%
Plantarflexion Range	128.7°	135.3°	165°	78%	82%	4.9%

Knee Range of Motion

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	137.6°	137.6°	160°	86%	86%	0.0%
Extension Range	163.2°	166.6°	170°	96%	98%	2.0%

Hip Range of Motion

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	83.7°	84.6°	90°	93%	94%	1.1%
Extension Range	18.0°	12.9°	30°	60%	43%	28.3%
Abduction Range	56.1°	47.9°	55°	102%	87%	14.6%
Adduction Range	21.0°	18.9°	35°	60%	54%	10.0%
Ext Rotation Range	45.0°	41.0°	45°	100%	91%	8.9%
Int Rotation Range	35.2°	31.2°	40°	88%	78%	11.4%

Shoulder Range of Motion

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Ext Rotation Range	88.2°	88.2°	90°	98%	98%	0.0%
Int Rotation Range	65.8°	63.7°	70°	94%	91%	3.2%
Flexion Range	171.0°	174.6°	180°	95%	97%	2.1%
Extension Range	0°	0°	60°	%	%	0%

Force Production Assessment

Ankle/Foot Force Production

Movement	Left	Right	Left %	Right %	Asymmetry %
Dorsiflexion Force	0.2	0.2	63%	59%	0.0%
Plantarflexion Force	1.0	1.0	69%	68%	0.0%

Knee Force Production

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	1.2	1.2	69%	69%	0.0%
Extension Force	1.8	1.7	61%	57%	6.6%
Hamstring/Quad Ratio	0.0	0.0	0.6612903225806451%	0.6890756302521008%	4.0%

Hip Force Production

0.3

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	0.1	0.1	9%	9%	0.0%
Extension Force	1.2	1.2	49%	47%	0.0%
Abduction Force	0.6	0.3	53%	27%	50.0%
Adduction Force	0.3		40%	32%	0.0%
Ext Rotation Force	0.1	0.0	11%	8%	100.0%
Int Rotation Force	0.1	0.1	22%	21%	0.0%

Shoulder Force Production

0.2

Movement	Left	Right	Left %	Right %	Asymmetry %
Ext Rotation Force	0.1	0.1	16%	20%	0.0%
Int Rotation Force	0.2		38%	53%	0.0%
Flexion Force	0.3	0.2	46%	37%	33.3%
I ISO	0	0	unavailable data%	unavailable data%	0%
Y ISO	0	0	unavailable data%	unavailable data%	0%
T ISO	0	0	unavailable data%	unavailable data%	0%

Ribcage/Thoracic Assessment

Increased Reduced

Measurement	Value	Gold Standard	Percentage	Status
Thoracic Curvature	53.0°	30-35°	163.1%	
Lumbar Curvature	27.0°	30-35°	83.1%	
Forward Head Posture	4.0 cm	0-3 cm	75.0%	Excessive

Posture Assessment

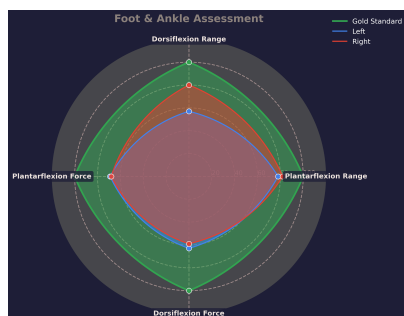
From the postural assessment we found some positive results as well as some areas we could concentrate on for improvement. Your forward head posture was measured at 4.0cm (normal is deemed 0-3cm). Your thoracic (upper back) curvature was above our gold standard range, you measured 53.0 degrees, normal is considered 30-35. We saw a reduced curvature in your lumbar spine, you measured 27.0 degrees with normal being considered 30-35.

These readings indicate you have both a forward head posture and kyphosis. So where your forward head posture is slightly increased we could expect increased levels of force and tension being applied to the discs and muscles of your cervical and thoracic spine (neck and upper back). A reduced curve in your lumbar spine (lower back) this can be associated with worse force absorption and transference and therefore increased loading through the joints of the spine.

You were able to rotate your spine 65.0 degrees to the left and 62.0 degrees to the right, and could laterally flex (side bend) 0 degrees to the left and 0 degrees to the right.

The angle of pelvic tilt in quiet standing describes the orientation of the pelvis in the sagittal plane. It is determined by the muscular and ligamentous forces that act between the pelvis and adjacent segments. You were 8.0 (left) and 7.0 (right), normal is 4-7 degrees for males.

Ankle Assessment



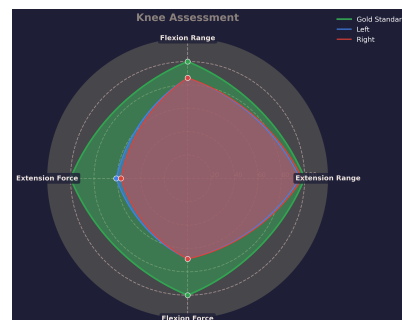
1. The Left foot: Your left rear foot had a centre of mass over the 2nd metatarsal which demonstrates you naturally stand in a neutral position. With your ankle in a state of dorsiflexion (knees over toes) you couldn't evert and dorsiflex further than your resting position and as such had poor pronation. You were not able to supinate very effectively as there was little translation of this through your medial arch. Your left ankle had very poor range and strength in dorsiflexion. You also need to start building some more control and awareness.
2. The Right foot: Your right foot had the same resting position but had similar deficiencies in dorsiflexion force, as well as range. However, your dexterity and motor control on the right was much better.
3. Foot and Ankle summary: Asymmetry is there with poor range and strength at the left ankle. What was most notable was your inability to effectively articulate the bones of the mid-foot and dorsiflex the ankle, both of which go hand in hand in the gait cycle. There is a lack of movement and control through the fascia on the sole of the foot. Subconscious movement (not controlled gym based movement but more dynamic gait cycle movements) should be introduced along with motion to promote lengthening of the tissues in your foot. In order to generate force or contract, we must first lengthen the tissue through articulation.

Knee Assessment

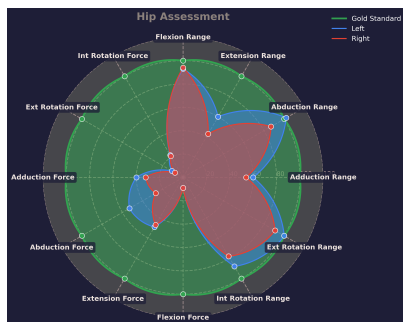
The Left knee achieved sufficient range, 14% below our gold standard in flexion (distal hamstring), and was 4% below our gold standard in extension (distal quadriceps). Your left knee was surprisingly weak, both in flexion and extension. The left knee force is notably weaker than the right knee.

The Right knee also achieved sufficient range, 14% below our gold standard in flexion and was 2% below our gold standard in extension. The main difference to the left knee comes when we profiled your force as your right knee was 8% stronger in both flexion and extension. While your hamstring to quad ratio is good at the knee, the total force needs to be brought inline with the left knee.

Knee summary: There is some good range available at the knee but would like to improve your peak force (especially the left knee). It is likely the left knee extension is weaker due to the meniscus injury history. Overcoming isometrics should be incorporated to increase your knee extension force on the left.



Hip Assessment



The Left hip showed sufficient but below gold standard range of motion for flexion and extension movements, with large deficits in force production affecting hip joint integrity and movement patterns.

The Right hip showed similar range compared to the left side. The right hip was notably 33% weaker than left in extension, creating bilateral strength imbalances affecting pelvic alignment during functional activities.

Hip summary: Significant reduction in hip extension range of motion compromises pelvic stability. Hip extension helps stabilise the pelvis and when range of motion and strength are poor this influences proper alignment of the lower limb. Hip extension strength is essential for propulsion and preventing excessive back extension, leading to inefficient movement patterns and increased injury risk.

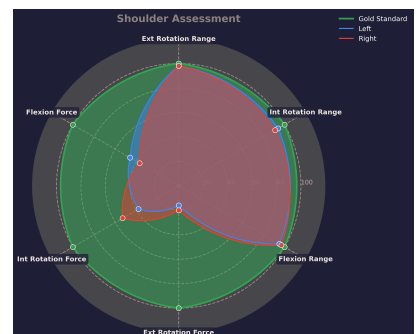
Large deficits in external rotation and flexion strength affect functional capacity. External rotation in closed & open-chain movements plays important roles in squatting and deadlifting activities. Having range and strength here is vital for maintaining hip joint integrity and stability. The flexor mechanism also plays a role in force transmission from hip muscles to the lower limb and ultimately to the ground. Optimising external rotation mechanics will allow for more efficient energy transfer during both closed and open-chain movements. It's necessary to reduce the current asymmetry present at the hip.

Shoulder Assessment

The Left Shoulder had good range in all movements but demonstrated a notable reduction in force production across external rotation, internal rotation, and flexion when compared to the gold standard. However, it was stronger than the right shoulder in internal rotation.

The Right Shoulder had good range but notably reduced force production in all movements when compared to the left. It also showed a greater reduction in force production during internal rotation compared to external rotation.

Shoulder Summary: Your transverse plane range is within acceptable limits, but your force production across all planes and directions is significantly reduced on both sides. This suggests a need for progressive overcoming isometrics and heavy eccentric loading to improve your strength deficits. Additionally, unilateral movements can help target the asymmetries observed in this assessment. It would also be beneficial to address any potential underlying issues that may be limiting your force production, such as muscle imbalances or joint restrictions.



Note: All values are normalized to the patient's body weight and compared to gold-standard ranges. Range measurements are in degrees, force measurements are relative to body weight. "Unavailable data" indicates measurements that could not be obtained during the assessment. Asymmetry percentages: Green (0-10%), Yellow (11-20%), Red (>20%)