

# BRICK PERFORMANCE

## BIOMECHANICAL ASSESSMENT

### Range of Motion

When we consider range of motion, we are looking at asymmetries and deficiencies, but also how the length tension relationship affects the bone in the joint. Our gold standards are taken from various papers and research. We expect some variation from gold standard (up to 15%) but the data suggests that the closer you are to the gold standards, the less stress on the joint.

### Ankle

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Dorsiflexion Range	28°	26°	30°	93%	87%	6.5%
Plantarflexion Range	147°	147°	165°	89%	89%	0.0%

### Knee

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	154°	152°	160°	96%	95%	1.0%
Extension Range	163°	167°	170°	96%	98%	2.0%

### Ribcage

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Ribcage Rotation	61°	63°	45°	81%	84%	3.2%
Ribcage Flexion	52°	53°	30°	95%	96%	1.9%

### Hip

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	92°	91°	90°	102%	101%	1.0%
Extension Range	22°	23°	30°	73%	77%	5.2%
Abduction Range	62°	68°	55°	113%	124%	8.9%
Adduction Range	35°	42°	35°	100%	120%	16.7%
Ext Rotation Range	62°	52°	45°	138%	116%	15.9%
Int Rotation Range	29°	39°	40°	73%	98%	25.5%

## Ankle

Movement	Left	Right	Left %	Right %	Asymmetry %
Dorsiflexion Force	302	339	88%	93%	11.0%
Plantarflexion Force	1556	1637	63%	69%	5.0%

### Force

When we consider force, we are looking at asymmetries and deficiencies, but also how the length tension relationship affects the bone in the joint. Your percentiles are from your population group which factors in your age, gender and weight.

## Ankle

Movement	Left	Right	Left %	Right %	Asymmetry %
Dorsiflexion Force	302	339	88%	93%	11.0%
Plantarflexion Force	1556	1637	63%	69%	5.0%

## Knee

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	277	281	60%	62%	1.4%
Extension Force	419	455	52%	61%	8.0%

## Hip

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	283	321	61%	73%	11.9%
Extension Force	0	0	66%	71%	0%
Abduction Force	162	213	42%	72%	24.0%
Adduction Force	296	279	92%	89%	6.0%
Ext Rotation Force	230	242	88%	90%	5.3%
Int Rotation Force	280	331	94%	100%	15.4%

# 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 6.1cm (normal is deemed 0-3cm). Your thoracic (upper back) curvature was above our gold standard range, you measured 49.0 degrees, normal is considered 30-35. We saw an increased curvature in your lumbar spine, you measured 37.0 degrees with normal being considered 30-35.

These readings indicate you have a sway back posture. So where your forward head posture is 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). An increased 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 61.0 degrees to the left and 63.0 degrees to the right, and could laterally flex (side bend) 52.0 degrees to the left and 53.0 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 7.0 (left) and 7.0 (right), normal is 4-7 degrees for males.

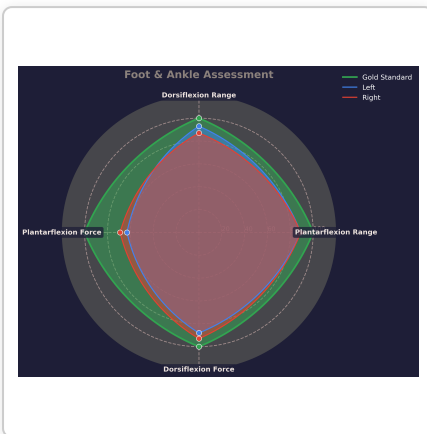
# Core Assessment

The core function assessments primarily evaluate TVA strength, coordination, and multifidus activation. Your results indicate a slightly increased lumbar curvature, which is likely contributing to the reduced strength in your lower abdominal muscles. This curvature can lead to compensatory patterns, where the quadratus lumborum (QL) and lower back musculature may dominate, attempting to stabilize the pelvis and spine during movement.

The Lower Abdominal Coordination Test resulted in a fail, indicating difficulties in coordinating the activation of your lower abdominal muscles. While your upper core demonstrated sufficient bracing capabilities, your lower core was unable to brace efficiently. This discrepancy suggests that while your upper core can engage effectively, there is a significant need for improvement in the lower core region.

We would like to teach you to use your deep lying core muscles, build their strength, and work on their coordination with a larger emphasis on your lower abdominals.

# Ankle Assessment



The Left foot: Your left foot is positioned in a slightly everted alignment, with the center of mass located at the 0th metatarsal. This positioning allows for effective pronation and supination capabilities, indicating a functional range of motion. Dorsiflexion demonstrates both good range and strength, while plantarflexion shows good range but a notable deficiency in strength. To address this, we recommend focusing on overcoming isometric exercises to enhance strength in the plantar flexors, as well as increasing your control and proprioceptive awareness.

The Right foot: The right foot mirrors the left in terms of positioning, also exhibiting a slightly everted stance with the center of mass at the 0th metatarsal. Both feet share similar movement capabilities, with the right foot demonstrating the same strengths and weaknesses in dorsiflexion and plantarflexion. However, the presence of asymmetry suggests that while the movement patterns are comparable, there may be subtle differences in strength or control that need to be addressed.

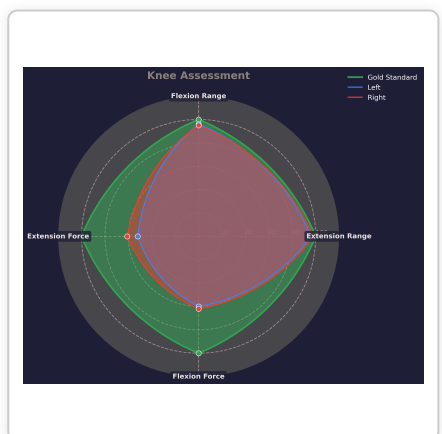
Foot and Ankle summary: There is a noticeable asymmetry between the left and right feet, despite their similar everted positioning. Both feet exhibit good dorsiflexion range and strength, but the weakness in plantarflexion is a common concern that requires targeted intervention. To improve overall function, we recommend integrating isometric strengthening exercises for the plantar flexors, alongside dynamic movements that enhance midfoot articulation and fascial control. Additionally, incorporating subconscious movement practices, such as barefoot walking or balance exercises, will aid in developing greater awareness and control of foot mechanics.

# Knee Assessment

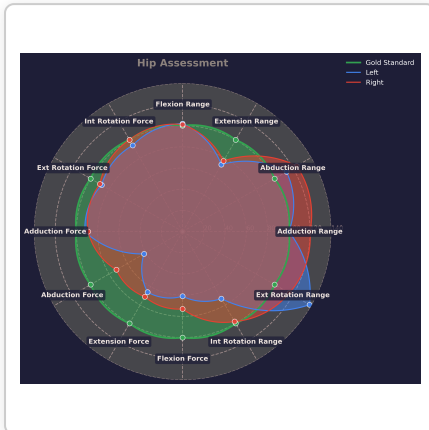
The Left knee achieved sufficient range in both flexion and extension, being 4% below the gold standard in each. However, the left knee demonstrated poor strength in both flexion and extension, with flexion being 40% below the gold standard. Notably, the hamstring to quadriceps ratio on the left side was classified as good, indicating a relatively balanced strength between the distal hamstring and distal quadriceps despite the overall strength deficits.

The Right knee also showed sufficient range in flexion and extension, with the extension being only 2% below the gold standard. The right knee was slightly stronger than the left in both flexion and extension, with strength deficits of 38% and 39% below the gold standard, respectively. The hamstring to quadriceps ratio on the right side was also classified as good, although it was 7.1% lower than that of the left knee.

Knee summary: Both knees exhibit sufficient range but significant strength deficits in flexion and extension. The good hamstring to quadriceps ratios suggest a favorable balance in muscle strength, yet there is a critical need to enhance overall strength in both knees to improve joint stability and performance during high stability movements. Focus should be placed on increasing peak force in both flexion and extension to mitigate joint stress and enhance functional outcomes.



# Hip Assessment



The Left hip showed excellent range in flexion and abduction, but significant deficits in hip extension and internal rotation. The large deficits in strength across flexion, extension, and abduction indicate compromised force production, which negatively impacts movement patterns and overall hip joint integrity.

The Right hip demonstrated similar range of motion to the left, particularly excelling in hip abduction. However, it also exhibited deficits in hip extension and internal rotation, with strength deficits in flexion, extension, and abduction. The notable asymmetry, particularly in hip abduction, suggests a potential imbalance that could affect propulsion and stability during movement.

**Hip summary:** The large deficits in hip extension range of motion on both sides compromise pelvic alignment and stability, which are crucial for efficient movement patterns. The strength deficits in flexion, extension, and abduction on both sides further hinder propulsion and may lead to compensatory strategies that affect overall biomechanics. The significant asymmetries, especially in hip abduction and internal rotation, highlight the need for targeted interventions to improve strength and range of motion, ensuring optimal hip joint integrity and function during both closed and open-chain movements. Addressing these deficits will enhance energy transfer and overall performance in functional activities.

## Conclusion

Our results indicate you have a Sway Back Posture. This posture is characterized by a posterior pelvic tilt and an increased thoracic kyphosis, which can lead to a forward displacement of the head and a rounding of the shoulders. This positioning often results in a loss of internal rotation at the hips and can create compensatory patterns throughout the kinetic chain, affecting overall movement efficiency and stability.

There are significant compensations occurring at the hip, particularly with deficits in extension and internal rotation on the left side, and extension on the right side. Strength deficits in flexion, extension, and abduction are also noted bilaterally. The largest range variation in hip internal/external rotation on the left side indicates changes in femur positioning, which can further complicate movement patterns and contribute to overuse of the spine during activities requiring hip extension.

In terms of integration, there are notable strength deficits in both flexion and extension at the knee, which may affect overall joint articulation and muscle contraction quality. Addressing these deficits will be crucial for improving range of motion and ensuring efficient tissue loading patterns, ultimately reducing the risk of injury and enhancing performance.

The assessment of the ankles reveals a slight everted alignment in both feet, with good dorsiflexion range and strength, but a deficiency in strength during plantarflexion. This asymmetry suggests that while movement capabilities are similar, there may be subtle differences in strength or control that need to be addressed. To improve overall function, we recommend integrating isometric strengthening exercises for the plantar flexors, alongside dynamic movements that enhance midfoot articulation and fascial control. Incorporating subconscious movement practices, such as barefoot walking or balance exercises, will also aid in developing greater awareness and control of foot mechanics.

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**Please book in a call so we can talk through your findings and get you back to pain free performance.**

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