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	11°	14°	**30°**	37%	47%	21.3%
Plantarflexion Range	140°	139°	**165°**	85%	84%	1.1%

Knee

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	115°	118°	**160°**	72%	74%	2.7%
Extension Range	160°	156°	**170°**	94%	92%	2.1%

Ribcage

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Ribcage Rotation	70°	69°	**45°**	93%	92%	1.4%
Ribcage Flexion	60°	55°	**30°**	109%	100%	8.3%

Hip

Movement	Left	Right	Gold Standard	Left %	Right %	Asymmetry %
Flexion Range	88°	81°	**90°**	98%	90%	8.2%
Extension Range	21°	27°	**30°**	70%	90%	22.2%
Abduction Range	45°	52°	**55°**	82%	95%	13.6%
Adduction Range	31°	33°	**35°**	89%	94%	5.2%
Ext Rotation Range	40°	48°	**45°**	89%	107%	17.0%
Int Rotation Range	22°	20°	**40°**	55%	50%	9.1%

Ankle

Movement	Left	Right	Left %	Right %	Asymmetry %
Dorsiflexion Force	140	155	32%	37%	9.5%

Plantarflexion Force	2364	2457	73%	78%	3.8%

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	140	155	32%	37%	9.5%
Plantarflexion Force	2364	2457	73%	78%	3.8%

Knee

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	241	298	68%	84%	19.1%
Extension Force	345	341	59%	58%	1.1%

Hip

Movement	Left	Right	Left %	Right %	Asymmetry %
Flexion Force	209	270	40%	66%	22.5%
Extension Force	0	0	53%	45%	0%
Abduction Force	274	233	84%	73%	14.7%
Adduction Force	245	213	81%	68%	13.2%
Ext Rotation Force	98	129	15%	34%	23.7%
Int Rotation Force	78	47	8%	2%	40.0%

Shoulder

Movement	Left	Right	Left %	Right %	Asymmetry %
Ext Rotation Force	2	2	73%	67%	8.3%
Int Rotation Force	1	1	27%	41%	34.1%
Flexion Force	2	3	41%	47%	13.0%

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 34.0 degrees, normal is considered 30-35. We saw a reduced curvature in your lumbar spine, you measured 14.0 degrees with normal being considered 30-35.

These readings indicate you have a flat back posture. 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 significantly 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 70.0 degrees to the left and 69.0 degrees to the right, and could laterally flex (side bend) 60.0 degrees to the left and 55.0 degrees to the right.

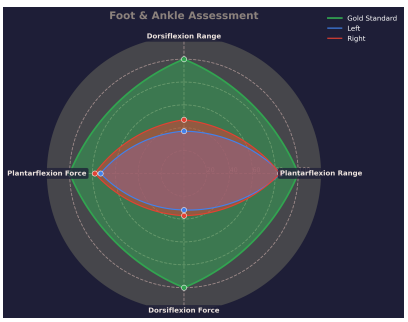
The angle of pelvic tilt in quiet standing describes the orientation of the pelvis in the sagittal plane. It is determined by the muscular and ligamentous forces that act between the pelvis and adjacent segments. You were 4.5 (left) and 4.8 (right), normal is 4-7 degrees for males.

Core Assessment

The core function assessments primarily evaluate TVA strength, coordination, and multifidus activation. Your significantly decreased lumbar curvature is likely contributing to the observed reduction in lower abdominal strength. This alteration in spinal alignment can lead to compensatory patterns, where other muscle groups, such as the quadratus lumborum (QL) and lower back musculature, may dominate during core stabilization tasks.

Given the findings, it is essential to focus on strengthening your deep core muscles, particularly the transverse abdominis, to enhance overall core stability and function. 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 neutral alignment, which is beneficial for stability. However, it is unable to pronate, indicating a restriction in the subtalar joint's movement capabilities. Dorsiflexion is limited in both range and strength, which may affect your overall mobility and functional performance. In contrast, plantarflexion demonstrates good range but lacks adequate strength, suggesting a need for targeted strengthening exercises, particularly through overcoming isometrics to enhance control and awareness.

The Right foot: The right foot also maintains a neutral position but exhibits the ability to pronate, indicating a more functional subtalar joint. While both feet share poor dorsiflexion range and strength, the right foot shows good strength and range in plantarflexion, highlighting a significant difference in the strength profile between the two feet. This discrepancy may contribute to asymmetrical loading and movement patterns during activities.

Foot and Ankle summary: The asymmetry between your feet is evident, particularly in the ability to pronate and the strength profiles in plantarflexion. While both feet exhibit poor

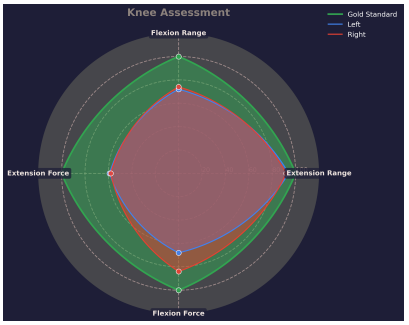
dorsiflexion capabilities, the right foot compensates with better plantarflexion strength. It is crucial to focus on building strength in the left foot, especially through isometric exercises, to improve overall function and control. Additionally, incorporating dynamic movements that promote awareness and control of the midfoot and fascia will aid in addressing the imbalances and enhancing overall foot and ankle performance.

Knee Assessment

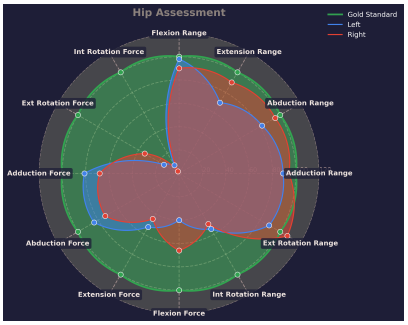
The Left knee achieved poor range in flexion, 28% below our gold standard, indicating significant limitations in the distal hamstring. Additionally, the left knee demonstrated poor strength in flexion, being 32% below the gold standard. Despite these deficits, the left knee showed sufficient range in extension, only 6% below the gold standard, but was still weak in extension, with strength 41% below the gold standard.

The Right knee also had poor range in flexion, 26% below the gold standard, but was slightly stronger than the left knee in both flexion and extension. The right knee's strength in flexion was classified as lack, being 16% below the gold standard, while its extension strength was poor, just 42% below the gold standard. The right knee's hamstring to quadriceps ratio was notably higher than the left, classified as high due to strong hamstrings.

Knee summary: Both knees exhibit significant deficits in flexion range and strength, necessitating a focused rehabilitation strategy to improve these areas. The right knee demonstrates a better hamstring to quadriceps ratio, suggesting a relative strength advantage in the hamstrings compared to the quadriceps. Overall, enhancing flexion peak force and addressing strength imbalances will be crucial for both knees.



Hip Assessment



The Left hip showed sufficient range in flexion but with a large deficit in extension, abduction, and internal rotation. Strength was significantly compromised across all movements, particularly in flexion, extension, abduction, adduction, and internal rotation, which negatively impacts movement patterns and hip joint integrity. The notable asymmetry with the right side indicates a substantial imbalance that could affect overall stability and function.

The Right hip demonstrated a sufficient range in flexion and extension but exhibited a large deficit in strength across all assessed movements. While it performed better in external rotation, the significant deficits in flexion, extension, abduction, and adduction suggest compromised propulsion capacity and force production. The asymmetry noted, particularly in internal rotation, further emphasizes the need for targeted interventions to address these weaknesses.

Hip summary: The large deficits in hip extension and internal rotation on the left side significantly affect pelvic alignment and overall hip joint integrity. The strength deficits across both hips, especially in flexion and internal rotation, hinder effective propulsion and can lead to inefficient movement patterns. The substantial asymmetries, particularly the 120.0% difference in internal rotation, highlight the need for corrective strategies to optimize femur

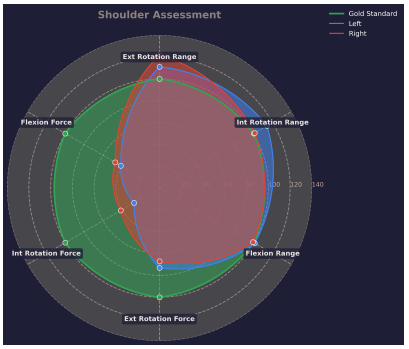
positioning and enhance energy transfer during both closed and open-chain movements. Addressing these deficits is crucial for improving functional performance and maintaining hip stability.

Shoulder Assessment

The Left Shoulder demonstrated excellent range in both external and internal rotation, with notable strength deficits in all tested areas. While the left shoulder's external rotation was above the gold standard, it showed a significant reduction in force, indicating a lack of strength despite good mobility. The internal rotation was also above the gold standard, but the force output was markedly reduced, suggesting a weakness in this area as well. Flexion was slightly above the gold standard, yet still exhibited a notable reduction in force, highlighting a need for strength improvement.

The Right Shoulder exhibited a greater range of external rotation compared to the left, but internal rotation was significantly weaker. The right shoulder's external rotation was much stronger than its internal rotation, indicating a clear asymmetry favoring external rotation. Although the right shoulder had a good range of flexion, it was still below the gold standard, and the force output was reduced, albeit less so than the left shoulder. Overall, the right shoulder showed a greater strength deficit in internal rotation compared to the left.

Shoulder Summary: There is a notable asymmetry between the shoulders, with the left shoulder exhibiting better internal rotation and the right shoulder showing superior external rotation. Both shoulders demonstrate significant strength deficits across all movements, particularly in internal rotation. To address these issues, it is recommended to focus on progressive overcoming isometrics for both internal and external rotation, incorporate heavy eccentric loading to enhance strength, and engage in scapula mobility and shoulder mobilisation drills. Additionally, unilateral movements should be included to correct the imbalances and improve overall shoulder function.



Conclusion

Our results indicate you have a flat back posture. This posture is characterized by a reduced lumbar curve, which can lead to a flattening of the thoracic spine and a potential depression of the rib cage. This positioning often results in the shoulders being held back and the pelvis being in a more neutral position, which can limit the natural movement patterns of the thorax and pelvis. The implications of this posture can affect your overall biomechanics, particularly during gait, as it may restrict the necessary spinal mobility and rib cage dynamics.

There are notable compensations occurring at the hip, particularly in your propulsion strategies. The limitations in hip extension and internal rotation suggest that your body is relying on alternative strategies to generate forward propulsion during gait and closed-chain movements. This can lead to overuse of the spine to compensate for the lack of hip function. Additionally, the discrepancies in strength and range of motion indicate that both hips are not functioning optimally, which may further exacerbate issues during movement and require attention to mid-foot awareness and pressurizing through the ground.

Our approach will focus on improving the range of motion at the hip while ensuring efficient tissue loading patterns to prevent overloading key areas. By enhancing joint articulation, we can improve muscle contraction quality and address the force discrepancies observed at the knee and hip. This will involve targeted exercises to increase flexibility and strength, particularly in the areas where deficits have been identified, allowing for a more integrated movement pattern throughout the lower extremities.

To enhance the efficiency of your shoulder girdle, we need to address the mechanics of your rib cage and scapula. A combination of heavy isometrics and eccentrics, following fascial release work, will be beneficial in promoting better movement patterns. Emphasizing the deltoids and rotator cuff complex will help to stabilize the shoulder joint and improve overall function. This targeted approach will not only address the deficits observed but also contribute to a more balanced and functional upper body.

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

Email: info@brickperformance.co.uk

Website: www.brickperformance.co.uk