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.

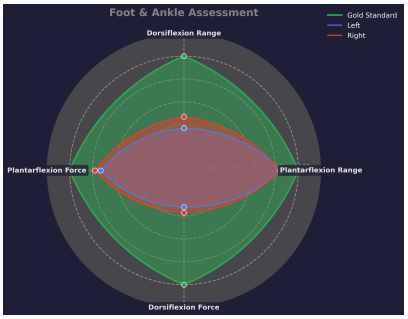
The angle of pelvic tilt in quiet standing describes the orientation of the pelvis in the sagittal plane. It is determined by the muscular and ligamentous forces that act between the pelvis and adjacent segments. You were 4.5 (left) and 4.8 (right), normal is 4-7 degrees for males.

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 the lower back musculature may dominate during core stabilization tasks, potentially affecting overall core function.

Given the findings, it is essential to focus on strengthening your deep core muscles, particularly the lower abdominals, to improve both strength and coordination. We would like to teach you to use your deep lying core muscles, build their strength and work on their co-ordination with a larger emphasis on your lower abdominals.

Ankle Assessment



The Left foot: Your left foot is positioned in a neutral alignment, but it is unable to pronate effectively, indicating a potential restriction in midfoot articulation. While you can achieve supination, both the range and strength of dorsiflexion are poor, which may limit your overall functional mobility. In contrast, plantarflexion demonstrates good range but lacks sufficient strength, suggesting a need for targeted strengthening interventions. Prioritizing isometric exercises will be essential to enhance the stability and control of your left foot.

The Right foot: The right foot also maintains a neutral position, but it exhibits the ability to pronate, which allows for greater adaptability during dynamic movements. Similar to the left foot, dorsiflexion range and strength are poor, yet the plantarflexion capabilities are strong, indicating a disparity in the functional performance of both feet. This difference in pronation ability may contribute to the observed asymmetry between the two sides.

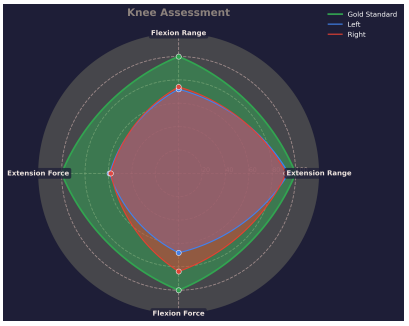
Foot and Ankle summary: The asymmetry between your feet is evident, with the left foot lacking pronation and exhibiting poor dorsiflexion strength, while the right foot demonstrates better adaptability through pronation. It is crucial to focus on building strength in the left foot, particularly through isometric exercises, to enhance control and awareness. Additionally, incorporating dynamic movements that promote midfoot articulation and fascial control will be beneficial. We recommend integrating exercises that emphasize proprioception and stability, such as single-leg balance activities, to address the discrepancies and improve overall foot function.

Knee Assessment

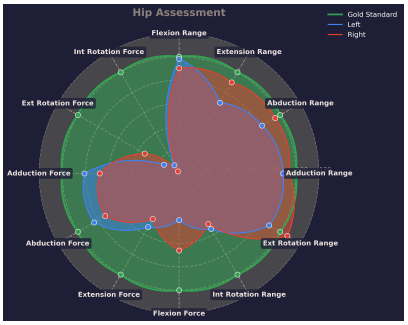
The Left knee achieved poor range in flexion, 28% below our gold standard, indicating significant limitations in the distal hamstring. Additionally, the left knee demonstrated poor strength in flexion, being 32% below the gold standard. Despite these deficits, the hamstring to quadriceps ratio was classified as good, suggesting that while the left knee struggles with range and strength, the relative strength of the hamstrings compared to the quadriceps is favorable. However, it is important to note that the left knee extension strength was 41% below the gold standard, making it weaker than the right.

The Right knee also exhibited poor range in flexion, 26% below the gold standard, but was slightly stronger than the left knee in both range and strength comparisons. The right knee's flexion strength was classified as lacking, being 16% below the gold standard, yet it maintained a high hamstring to quadriceps ratio of 0.874 due to stronger hamstrings. In extension, the right knee showed sufficient range but had poor strength, only marginally weaker than the left knee.

Knee summary: Both knees exhibit significant deficits in flexion range and strength, necessitating focused rehabilitation efforts to improve these areas. The left knee's good hamstring to quadriceps ratio is a positive aspect, but overall strength in both flexion and extension needs to be addressed. The right knee, while stronger, still requires attention to enhance its flexion capabilities and maintain its advantageous hamstring strength.



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 and extension, which affects overall movement patterns and hip joint integrity. The notable asymmetry with the right side indicates a substantial imbalance that could lead to compensatory strategies during functional activities.

The Right hip demonstrated a sufficient range in flexion and extension, yet it still exhibited deficits in abduction and internal rotation. While it performed better in external rotation, strength deficits were present bilaterally, particularly in flexion, extension, and adduction. The asymmetry noted in internal rotation is particularly concerning, as it suggests a significant discrepancy in hip mechanics that could impact propulsion and stability during movement.

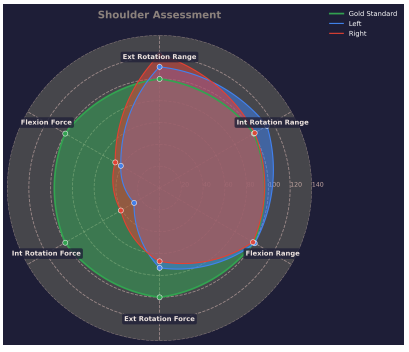
Hip summary: The large deficits in hip extension and internal rotation on the left side compromise pelvic alignment and overall hip joint integrity. The strength deficits across both hips, especially in flexion and extension, hinder effective propulsion and can lead to inefficient movement patterns. The significant asymmetries, particularly in internal rotation, highlight the need for targeted interventions to improve range and strength. Addressing these deficits is crucial for optimizing energy transfer during both closed and open-chain movements, ensuring better functional performance and reducing the risk of injury.

Shoulder Assessment

The Left Shoulder demonstrates excellent range in both external and internal rotation, with a notable bias towards internal rotation. The left shoulder's external rotation is above the gold standard, yet it shows a significant reduction in force, indicating a weakness in this area. Internal rotation is also above the gold standard, but the force output is considerably reduced, suggesting a substantial deficit in strength.

The Right Shoulder exhibits a greater capacity for external rotation compared to the left, with a notable advantage in force output. However, internal rotation is significantly weaker, falling just above the gold standard. The right shoulder's flexion is slightly below the gold standard, indicating a need for improvement in this range. The force output for both external and internal rotation is reduced, but the right shoulder shows a lesser reduction in internal rotation force compared to the left.

Shoulder Summary: There is a clear asymmetry between the shoulders, with the left shoulder being stronger in internal rotation while the right shoulder excels in external rotation. Both shoulders exhibit notable reductions in force across all movements, indicating a need for targeted strengthening. A focus on progressive overcoming isometrics and heavy eccentric loading for both internal and external rotation, along with shoulder mobilisation drills, will be essential. Additionally, improving scapula mobility and addressing the flexion deficits will enhance overall shoulder function and stability.



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 neutral or slightly posteriorly rotated position. The lack of lumbar lordosis can also affect the overall alignment of the spine, leading to compensatory patterns in the upper body and lower extremities. Addressing this posture will be essential for improving your overall biomechanics and function.

There are notable compensations occurring at the hip, particularly with limitations in hip extension and internal rotation on the left side. These restrictions can affect your propulsion strategies during gait and running, as well as during closed-chain movements. The inability to achieve proper hip extension may lead to overuse of the spine to generate downward force, which can contribute to discomfort and inefficiency. Additionally, the lack of mid-foot awareness may hinder your ability to effectively transfer force through the lower extremities, necessitating targeted interventions to enhance these patterns.

Our approach will focus on improving the range of motion at the hip while ensuring proper integration with the knee and ankle. By enhancing tissue loading efficiency and joint articulation, we can improve muscle contraction quality and address the force discrepancies observed. This will involve targeted exercises to increase hip internal and external rotation, as well as strengthening the surrounding musculature to support better functional movement patterns. Addressing these areas will help alleviate the strain on your knee and ankle joints, promoting a more balanced and efficient gait.

To optimize your shoulder girdle function, we need to focus on the mechanics of the rib cage and scapula. Implementing a resistance training approach that includes heavy isometrics and eccentrics will be beneficial, particularly after performing fascial release work. Emphasizing the deltoids and rotator cuff complex will help improve stability and mobility in the shoulder joint. This targeted strategy will enhance your overall shoulder function and contribute to better upper body mechanics during various activities.

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

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