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 addressing these issues. 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 neutrally, with the center of mass appropriately aligned over the 2nd metatarsal. However, it is noteworthy that your left foot cannot pronate, indicating a restriction in its ability to adapt to dynamic movements. In terms of dorsiflexion, both range and strength are poor, which may limit your functional mobility. Conversely, plantarflexion demonstrates good range but lacks strength, suggesting a need for targeted strengthening exercises, particularly through overcoming isometrics to enhance stability and control.

The Right foot: In contrast, your right foot also maintains a neutral position with the center of mass over the 2nd metatarsal, but it can pronate effectively, allowing for greater adaptability during movement. While dorsiflexion range and strength are similarly poor as on the left, the right foot exhibits good strength and range in plantarflexion, highlighting a significant asymmetry between the two feet.

Foot and Ankle summary: The asymmetry between your feet is evident, particularly in the pronation capabilities and plantarflexion strength. While both feet are positioned neutrally, the left foot's inability to pronate and poor dorsiflexion strength necessitate focused

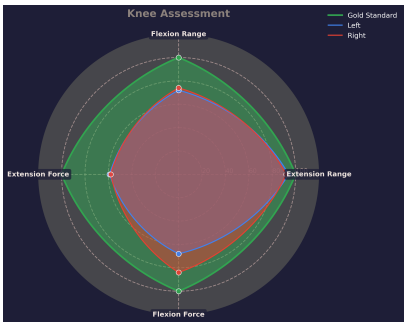
rehabilitation efforts. It is essential to incorporate exercises that build strength and control in the left foot, especially through isometric training. Additionally, enhancing your awareness of foot mechanics during daily activities will support better fascial control and midfoot articulation, ultimately improving overall foot function.

Knee Assessment

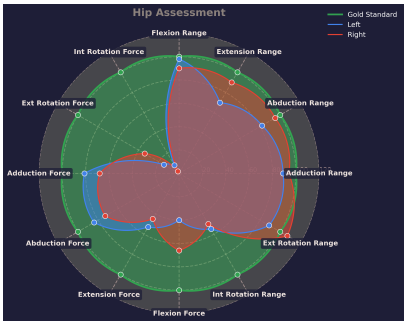
The Left knee achieved poor range in flexion, 28% below our gold standard, and was also weak in this movement, showing a 32% deficit in strength (distal hamstring). Despite these deficits, the left knee demonstrated sufficient range in extension, only 6% below the gold standard, although it was still weak in extension with a 41% deficit in strength. The hamstring to quadriceps ratio on the left side was classified as good at 0.699, indicating a relatively balanced strength between the hamstrings and quadriceps.

The Right knee also exhibited poor range in flexion, 26% below the gold standard, but was stronger than the left knee in both range and strength, with a 2.8% stronger flexion and a 16% deficit in strength (distal hamstring). In extension, the right knee had sufficient range, 8% below the gold standard, and was slightly weaker than the left knee, with a 42% deficit in strength. The right knee's hamstring to quadriceps ratio was classified as high at 0.874, indicating strong hamstrings relative to the quadriceps.

Knee summary: Both knees show significant deficits in flexion range and strength, necessitating a focus on improving these areas. The left knee has a good hamstring to quadriceps ratio, while the right knee exhibits a high ratio due to stronger hamstrings. Overall, enhancing flexion strength and range will be crucial for both knees to reduce asymmetry and improve overall knee function.



Hip Assessment



The Left hip showed sufficient range in flexion but with a large deficit in extension, abduction, and internal rotation. Strength deficits were significant 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 function.

The Right hip demonstrated sufficient range in flexion and extension but had a large deficit in abduction and internal rotation. While it performed better in external rotation, strength deficits were still present across all movements, particularly in flexion, extension, abduction, adduction, and internal rotation. The asymmetry noted with the left side further compromises propulsion and stability during dynamic activities.

Hip summary: The large deficits in hip extension and internal rotation on the left side significantly affect pelvic alignment and hip joint integrity. The strength deficits across both hips, particularly in flexion and internal rotation, hinder effective propulsion and energy transfer during movement. The substantial asymmetries, especially in internal rotation, highlight the need for targeted interventions to improve range and strength, which are crucial

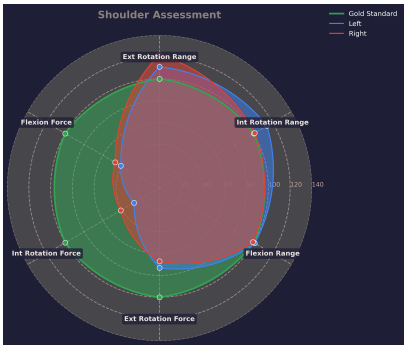
for maintaining hip stability and optimizing movement patterns. Addressing these deficits will enhance overall functional capacity and reduce the risk of injury.

Shoulder Assessment

The Left Shoulder exhibits a strong range of motion in both external and internal rotation, with notable strength deficits in external rotation force and internal rotation force. The left shoulder shows a slight bias towards internal rotation compared to external rotation, indicating a potential imbalance in muscle activation and strength.

The Right Shoulder demonstrates a greater capacity for external rotation compared to the left, but it is significantly weaker in internal rotation. While the right shoulder has a good range of motion in flexion, it falls slightly below the gold standard. The right shoulder's strength in external rotation is also notably reduced, but it maintains a stronger internal rotation force relative to the left shoulder.

Shoulder Summary: There is a clear asymmetry between the shoulders, with the left shoulder being stronger in internal rotation and the right shoulder excelling in external rotation. Both shoulders exhibit notable reductions in strength across all tested movements. To address these imbalances, it is recommended to incorporate progressive overcoming isometrics and heavy eccentric loading for both internal and external rotation. Additionally, focusing on scapula mobility and shoulder mobilisation drills will help improve overall shoulder function and strength. Unilateral movements should also be included to target the weaker side effectively.



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%)*

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

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