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.

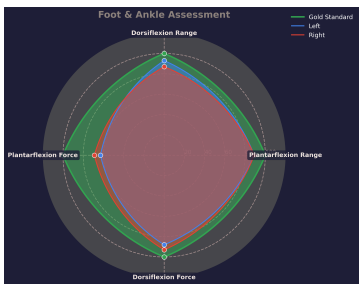
Core Assessment

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 observed reduction in lower abdominal strength.

The Lower Abdominal Coordination Test resulted in a fail, indicating challenges in coordinating the lower abdominal muscles effectively. While your upper core demonstrated sufficient bracing capabilities, your lower core was unable to brace efficiently. This suggests a potential compensation pattern where other muscle groups may be taking over, possibly leading to reliance on the lumbar extensors or other surrounding musculature.

To address 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 in a slightly everted state, 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 lacks strength, necessitating a focus on overcoming isometric exercises to enhance stability and control. Additionally, there is a need to improve proprioceptive awareness to optimize movement patterns.

The Right foot: The right foot mirrors the left in terms of positioning, also slightly everted with the center of mass at the 0th metatarsal. Similar to the left, it exhibits the ability to pronate and supinate effectively, with both dorsiflexion and plantarflexion showing good range but poor strength. However, the presence of asymmetry suggests that while the movement capabilities are comparable, there may be underlying discrepancies in strength and control that need to be addressed.

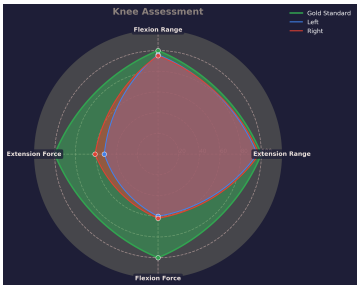
Foot and Ankle summary: The asymmetry between your feet is notable, despite both exhibiting similar everted positioning. Key findings indicate that while both feet possess good range in dorsiflexion and plantarflexion, the lack of strength in plantarflexion is a common issue that requires targeted intervention. To address this, we recommend incorporating isometric strengthening exercises, particularly for the plantar flexors, alongside activities that enhance midfoot articulation and fascial control. Additionally, integrating dynamic movements that promote subconscious awareness and control during gait will be beneficial in improving overall foot function.

Knee Assessment

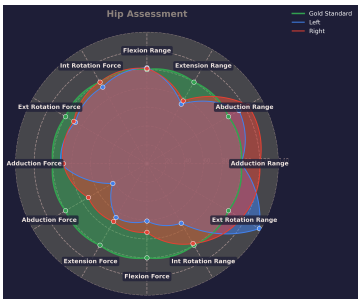
The Left knee achieved sufficient range in both flexion and extension, being 4% below the gold standard in each. However, the left knee demonstrated poor strength in both flexion and extension, with strength deficits of 40% and 48% below the gold standard, respectively. Notably, the left knee's hamstring to quadriceps ratio is classified as good, indicating a relatively balanced strength between the distal hamstring and distal quadriceps despite the overall weakness.

The Right knee also showed sufficient range in flexion and extension, with a slightly better performance than the left, being 5% and 2% below the gold standard, respectively. The right knee's strength was similarly poor, with deficits of 38% in flexion and 39% in extension. The right knee's hamstring to quadriceps ratio is also classified as good, but it is 7.1% lower than that of the left knee, indicating a slight asymmetry in strength distribution.

Knee summary: Both knees exhibit sufficient range but significant strength deficits in flexion and extension. While the hamstring to quadriceps ratios are good for both knees, the left knee has a slight advantage. Focus should be placed on improving overall strength, particularly in flexion and extension, to enhance joint stability and performance.



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, with above gold standard measurements in flexion, abduction, and external rotation. However, it also exhibited deficits in hip extension and internal rotation, alongside notable strength deficits in flexion, extension, and abduction. The asymmetry observed, particularly in abduction, suggests a potential imbalance affecting propulsion and stability.

Hip summary: The large deficits in hip extension range on both sides compromise pelvic alignment and stability, which are crucial for effective propulsion and movement efficiency. The strength deficits in flexion, extension, and abduction further exacerbate these issues, leading to inefficient movement patterns. The significant asymmetries, especially in hip abduction and internal rotation, highlight the need for targeted interventions to improve hip joint integrity. Optimizing strength and range in these areas will enhance energy transfer during both closed and open-chain movements, ultimately improving overall functional performance.

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Conclusion

Our results indicate you have a sway back posture. This is characterized by an anterior pelvic tilt and a posterior shift of the thorax, leading to an exaggerated lumbar curve and potential rib cage depression. The shoulders may appear rounded and positioned forward, which can create an externally rotated position. This posture can affect the alignment of the pelvis, often resulting in limitations in internal rotation and contributing to compensatory patterns during movement. Addressing this posture through targeted correctives will be essential for improving overall alignment and function.

There are significant compensations occurring at the hip, particularly with propulsion strategies during gait and running. The limitations in hip extension and internal rotation suggest that the body is relying on alternative movement patterns to generate forward propulsion. This can lead to overuse of the spine as it compensates for the lack of hip function. Additionally, the strength deficits in both flexion and abduction indicate a need for focused interventions to enhance hip stability and control, while also promoting awareness of mid-foot dynamics during movement.

To improve integration at the hip, we will focus on enhancing range of motion and optimizing tissue loading patterns. This will involve targeted exercises to improve joint articulation and muscle contraction quality, addressing the force discrepancies observed at the knee and hip. By increasing range of motion, we can ensure that the hip functions more efficiently, reducing the risk of overloading surrounding structures and improving overall movement mechanics.

In addressing your shoulder girdle, we need to focus on the mechanics of the ribcage 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 to stabilize the shoulder girdle and improve overall function. This comprehensive approach will enhance your upper body mechanics and contribute to better posture and movement efficiency.

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

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