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Foundations of Strength Testing:
Techniques for Hip Extension, Adduction and Internal Rotation

Tuesday August 27th, 2024

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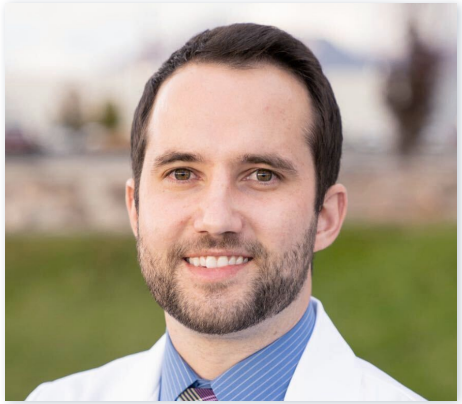
Introductions:



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Agenda

- Introduction to Hip Strength Testing: Hip Extension, Adduction and Internal Rotation
- Overview of how to test the Hip
    - Extension
    - Adduction
    - Internal Rotation
- Case Study- Analyzing the data
- Case Study- Possible rehab interventions

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Hip Extension

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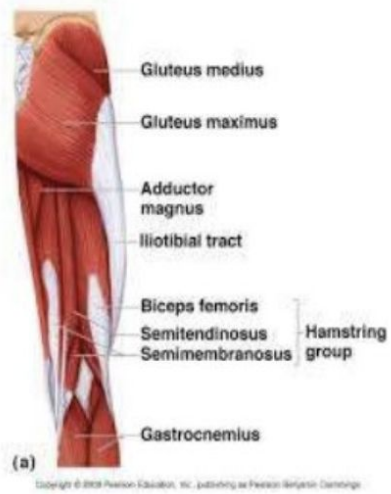
Hip Extension



Hip extensor muscles are located near the hip joint and help keep the body stable, flex the hip, and extend the leg away from the body. Strong hip extensors can help with posture, joint stability, and preventing back pain. They can also be beneficial for athletes by reducing the risk of injury and improving performance.

Here are some hip extensor muscles:

- **Gluteus maximus**
- **Adductor magnus**
- **Gluteus medius**
- **Semimembranosus**
- **Semitendinosus**
- **Biceps Femoris**

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Hip Extension

- Can test in **Prone, Standing, Side Lying**
- **Test at Ankle or Knee?**
- Testing at different angles: **Neutral, Mid range, End Range,** etc
- **Strap or No Strap**

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Hip Adduction

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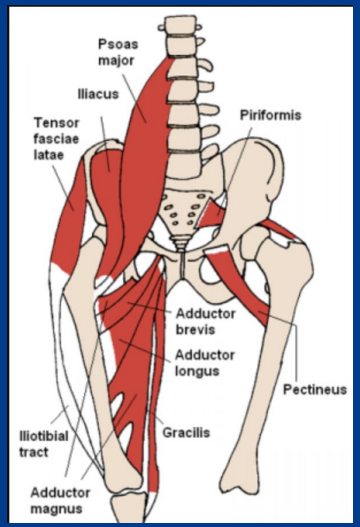
Hip Adduction



Hip adductor muscles move the upper leg toward the body's midline. Some hip adductor muscles include:

- **Adductor longus**
- **Adductor brevis**
- **Gracilis**
- **Adductor magnus**
- **Pectineus**
- **External obturator**
- **Piriformis**
- **Quadratus femoris**

Hip Adduction

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- Can test in **Standing, Supine, Prone, Sitting, Side Lying**
- **Test at Ankle or Knee?**
- Testing at different angles: **Neutral, Mid Range, End Range,** etc
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Hip Internal Rotation

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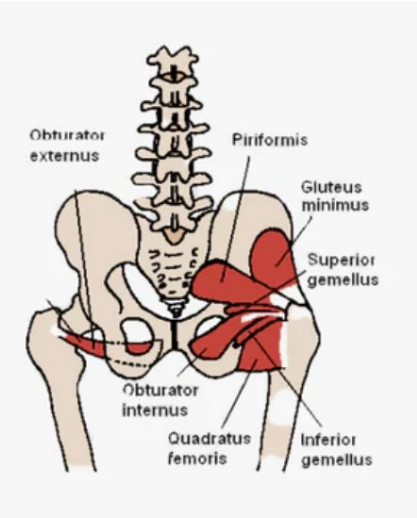
Hip Internal Rotation



The primary muscles that internally rotate the hip are the gluteus medius and the tensor fascia latae (TFL):

- **Gluteus medius**
- **Gluteus minimus**
- **TFL**

Other muscles that can help with hip internal rotation include:

- **Adductor brevis**
- **Piriformis**

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Hip Internal Rotation

- Can test in **Standing (0 or 90), Supine (90), Prone (0), Sitting (90), Side Lying (0 or 90)**
- Testing at different angles: **Neutral, 45 degrees, End Range,** etc

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Case Studies

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15 Year Old Elite Soccer Player

- Plays high level at school, club and professional club academy
- Right foot dominant attacking winger or striker
- Very fast – PB for 100m is under 12 seconds
- Developed right sided groin pain 6/12 previously
- Increasing time to “warm up”
- Pain primarily on sprinting and shooting

MRI finding of right sided Pubic Bone Marrow Odema

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Objective Findings - Initial

- Limited Hip Medial Rotation bilaterally – (< 10 degrees)
- Limited Hip Extension Right > Left (10 v 20 prone)
- Negative FADIR test
- Pain (4/10) Squeeze test at 45 degrees hip flexion
- Pain (8/10) Squeeze test at 0 degrees hip flexion
- Very painful on R Pubic Bone
- Very hypertonic Adductor Longus muscle

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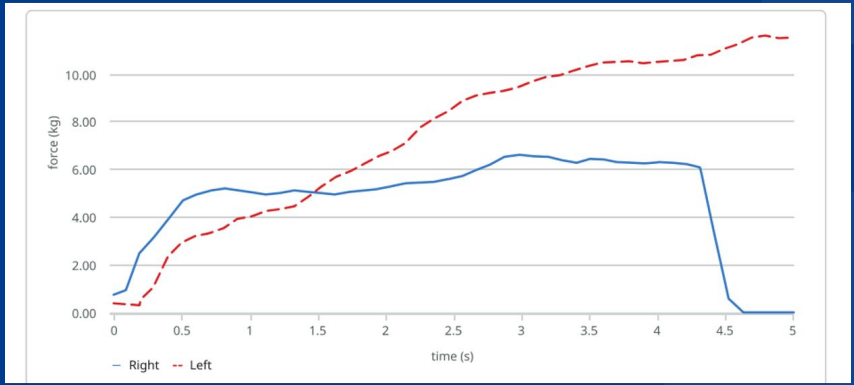
Initial - Supine Adduction @ 0



Peak Force (kg)	
Right	6.61 kg
Left	11.62 kg
Strength Difference	5.01 kg
Percentage Difference	54.94%

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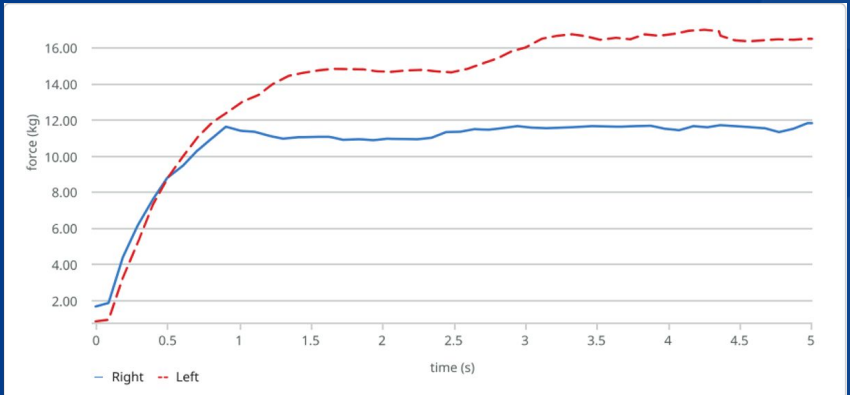
2/12 - Supine Adduction @ 0



Peak Force (kg)	
Right	11.82 kg
Left	16.98 kg
Strength Difference	5.16 kg
Percentage Difference	35.86%

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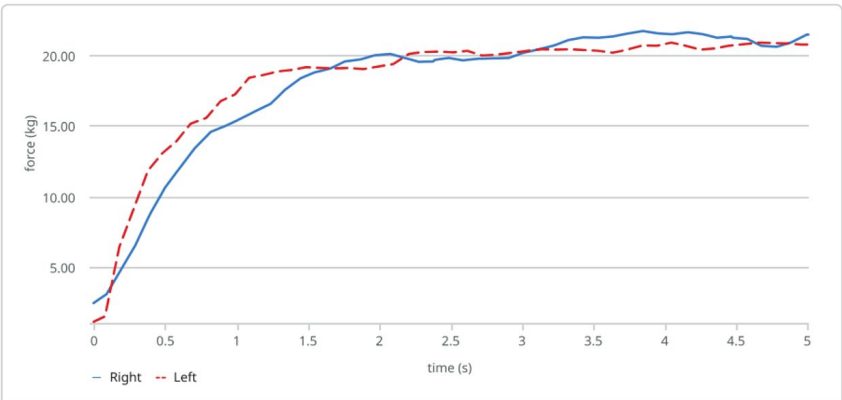
4/12 - Supine Adduction @ 0



Peak Force (kg)	
Right	21.77 kg
Left	20.95 kg
Strength Difference	0.82 kg
Percentage Difference	3.85%

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Clinical Utility for Isometric Strength Testing

Initially

1. Pain-free strength
2. To tolerable pain (~3/10)

Idea of level of inhibition

Idea of severity of pain

Guide to prognosis

Through Rehabilitation

Tracking progress

Monitor for any aggravation

Guide exercise progressions

Aids in communication

Support timescales for return to play

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Average Force Scores

- Interesting to look at
- Vital is consistent communication

Eg

- Push at 20% for 1 second and then build to maximum force
- Direct comparions then more valid

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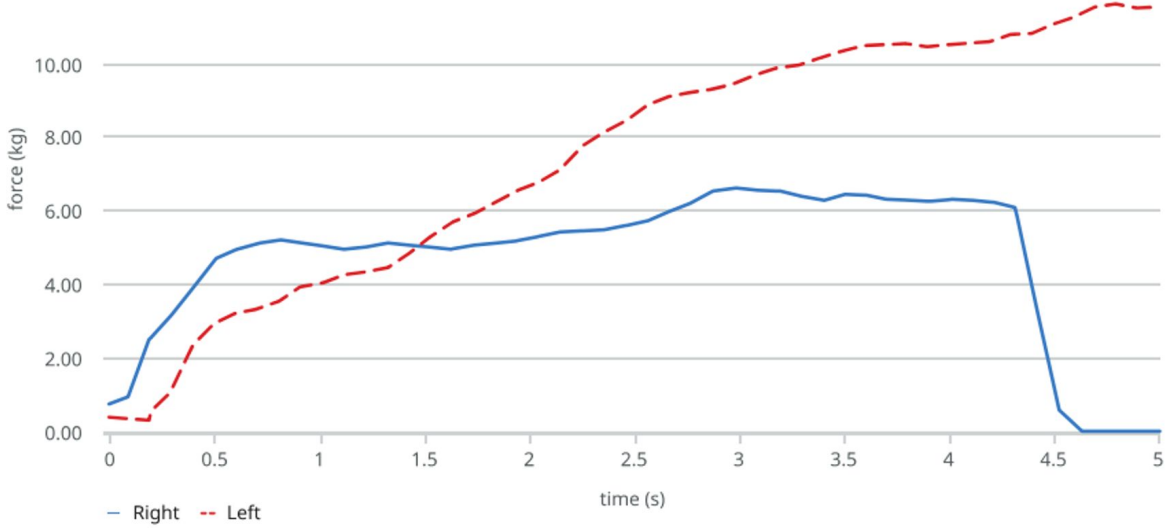

Average Values

Right	4.75 kg
Left	7.56 kg

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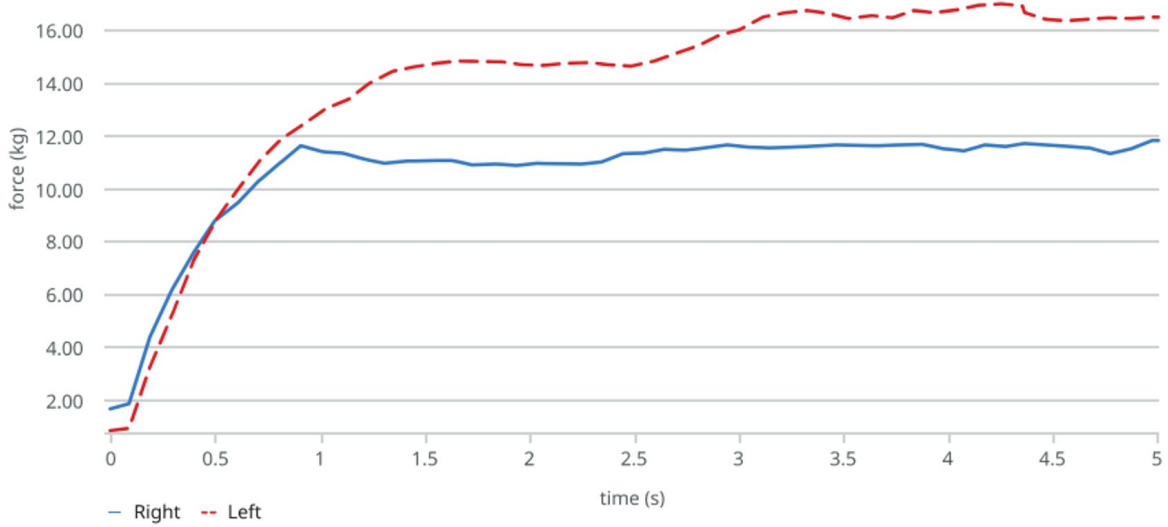

Average Values

Right	10.77 kg
Left	14.22 kg

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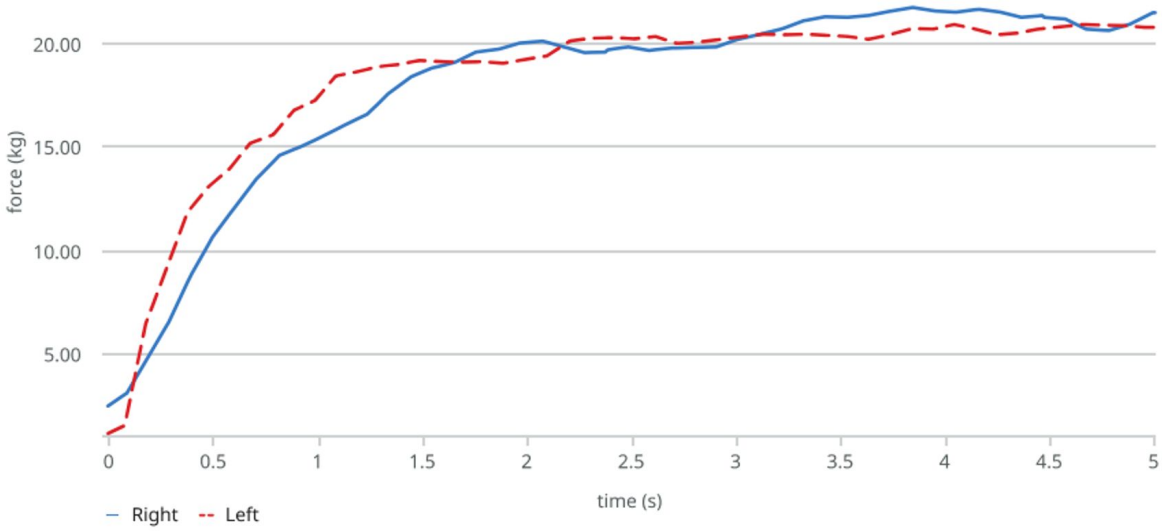

Average Values

Right	18.29 kg
Left	18.58 kg