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MANUAL

MUSCLE TESTING

EXTENSOR HALLUCIS BREVIS

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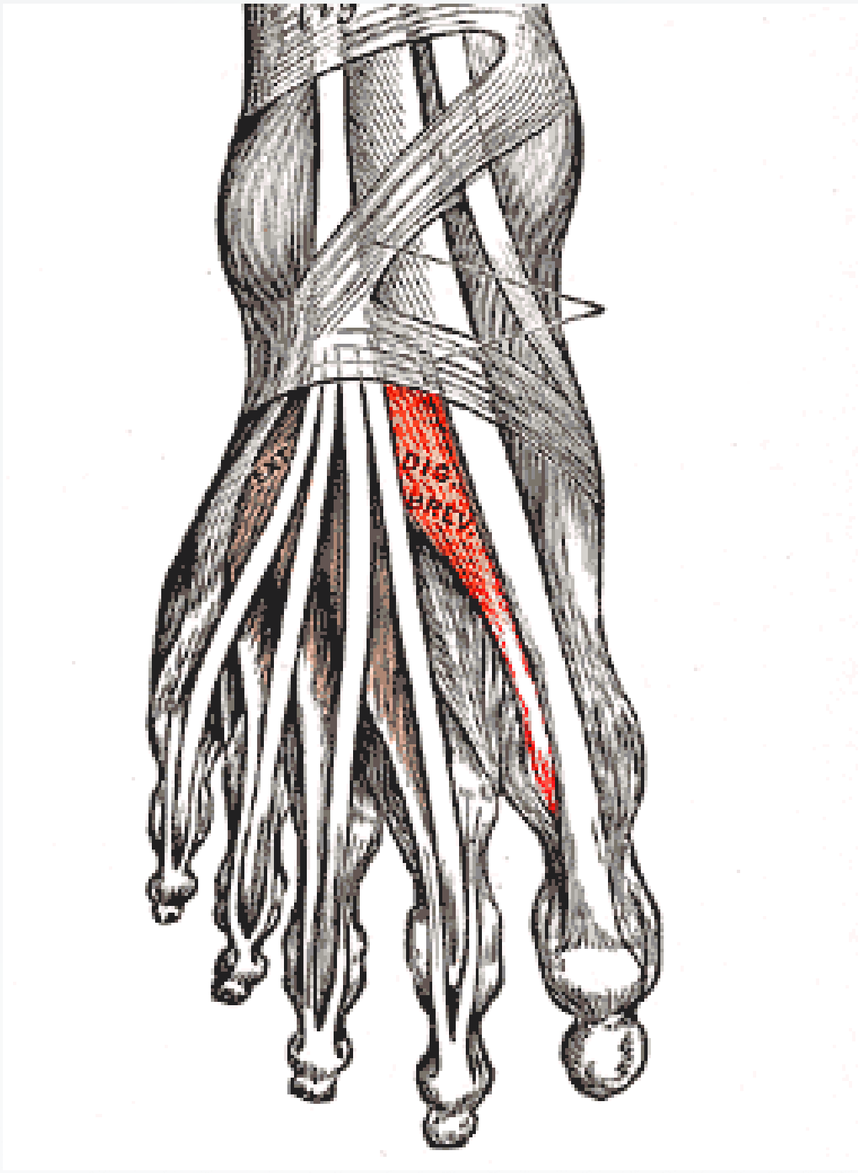
The extensor hallucis brevis is the medial slip of the extensor digitorum brevis.

Origin: anterior portion of the superolateral surface of the calcaneus, lateral talocalcaneal ligament, cruciate crural ligament.

Insertion: dorsal surface of the great toe proximal phalanx base.

Action: extends great toe proximal phalanx.

Nerve supply: deep peroneal, L4, **5**, SI.



EXTENSOR HALLUCIS BREVIS

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MMT

Patient position: supine or sitting.

Test: extension of metatarsophalangeal and interphalangeal joints of the big toe.

Pressure: against dorsal surface of proximal phalanges of the big toe in the direction of flexion

EXTENSOR HALLUCIS LONGUS

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Origin

From the middle two quarters of the anterior surface of **fibula** and the adjacent interosseous membrane.

Insertion

EHL passes deep to the extensor retinaculum before inserting at the base of the distal phalanx of the big toe.

Nerve Supply

Deep peroneal nerve L4 -**L5**.

Action

Extends the metatarsophalangeal and interphalangeal joints of the big toe and assist in the in the inversion of the foot and dorsiflexion of the ankle.

EXTENSOR HALLUCIS LONGUS

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MMT

Patient position:

supine or sitting.

Test:

extension of metatarsophalangeal and interphalangeal joints of the big toe.

Pressure:

against dorsal surface of distal phalanges of the big toe in the direction of flexion

TIBIALIS ANTERIOR

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Origin

It arises from

- Lateral condyle and upper half or two-thirds of the lateral surface of the body of the tibia
- Adjoining part of the interosseous membrane
- Deep surface of the fascia
- Intermuscular septum between it and the Extensor digitorum longus.

Insertion

Medial and under surface of the first cuneiform bone, and the base of the first metatarsal bone.

Nerve

Deep Pereonal Nerve (**L4**, L5, S1)

TIBIALIS ANTERIOR

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Function

- Tibialis anterior is the primary dorsiflexor of the ankle with synergistic action of extensor hallicus longus, extensor digitorium longus and peroneous tertius.
- Inversion of the foot.
- Adduction of the foot.
- Contributor of maintaining the medial arch of the foot.
- At anticipatory postural adjustment (APA) phase during gait initiation tibialis anterior favour knee flexion at the stance limb by causing forward displacement of tibia.
- Eccentric deceleration of foot plantarflexion, eversion and foot pronation.

TIBIALIS ANTERIOR

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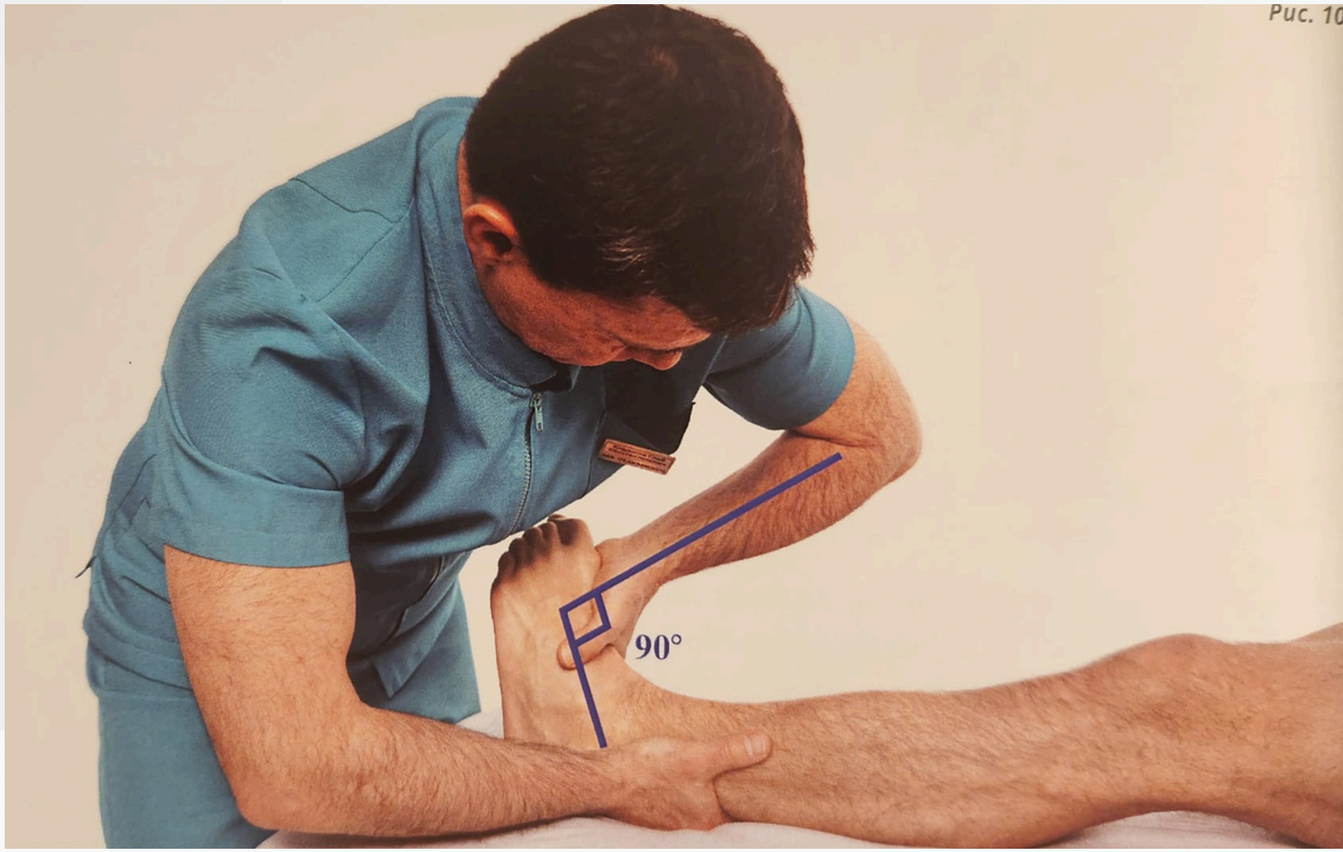
Test: The supine patient inverts and dorsiflexes the foot, with the toes kept in flexion.
The examiner applies pressure against the medial dorsal surface of the foot in the direction of plantar flexion and eversion.
The examiner should see effective contraction of tibialis anterior as indicated by the tendon elevation during the test.



המטופל השוכב למשכבים (supine) מפנה את כף הרגל פנימה ומרים אותה כלפי מעלה (דורסי פלקסיה), כאשר האצבעות נשארות מכופפות.
הבוחן מפעיל לחץ על החלק הגחי הפונה כלפי מעלה (דורסי) של כף הרגל, בכיוון של כיפוף כלפי תחתית כף הרגל (פלנטר פלקסיה) והפיכה החוצה (אברזיה).
הבוחן אמור לראות התכווצות יעילה של השריר הקדמי לשוקיים (טיביאליס אנטריור), כפי שמשתקף בהרמת השריר.

FLEXOR HALLUCIS BREVIS

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Origin:

The flexor hallucis brevis originates along the plantar aspect of the cuboid and cuneiforms.

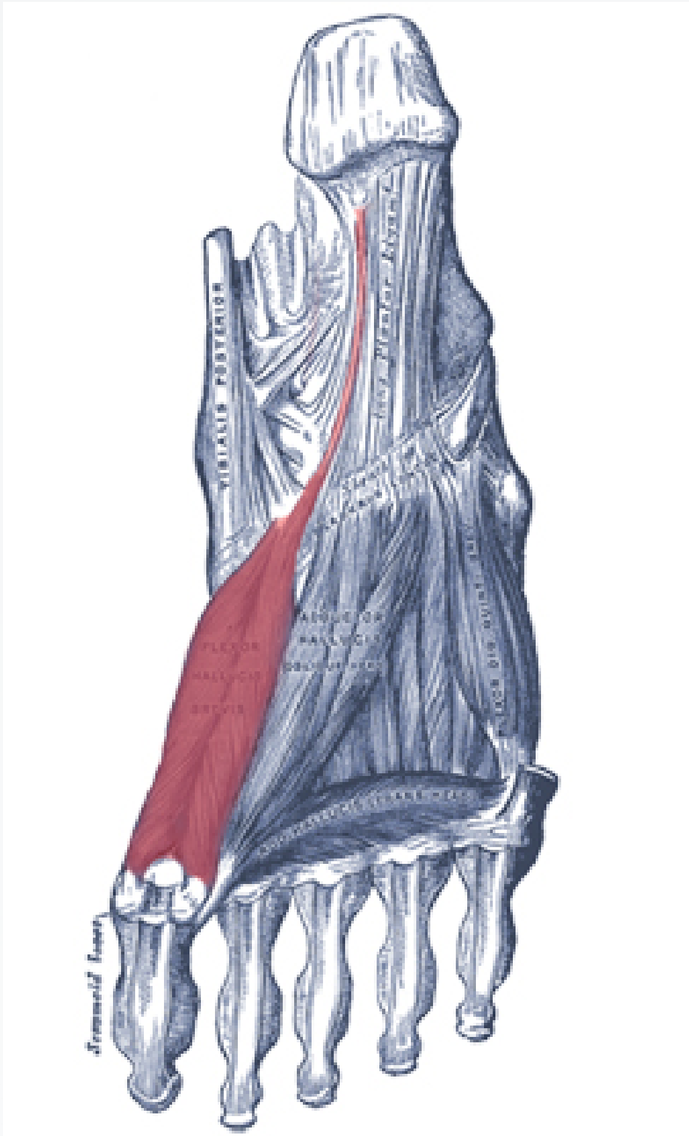
Insertion:

The medial head of the FHB is the larger head of the two. It inserts medially on the plantar plate. Also, it forms a common tendon with the abductor hallucis muscle before the insertion point at the base of the proximal phalanx. Within this tendon sits the tibial sesamoid bone.

The lateral head of the FHB inserts laterally on the plantar plate. It forms a common tendon with the adductor hallucis muscle before inserting on the lateral aspect of the base of the proximal phalanx. Within this tendon sits the fibular sesamoid bone.

Nerve:

The medial and lateral head of the flexor hallucis brevis is innervated by the medial plantar nerve. Both heads are represented by the spinal segments S1 and S2.



FLEXOR HALLUCIS BREVIS

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Test:

The ankle is in position of full dorsiflexion.

The examiner stabilizes the interphalangeal articulation of the great toe and places the metatarsophalangeal articulation in flexion for the starting test position. While maintaining hyperextension of the interphalangeal articu lation, the examiner directs pressure against the plantar surface of the proximal phalanx toward extension.

FLEXOR HALLUCIS LONGUS

Origin

Lower two-thirds of posterior fibula.

Insertion

Plantar surface at the base of the first distal phalanx.

Nerve

Branch of the tibial nerve (root S1 and **S2**).

Cutaneous supply from root S2.

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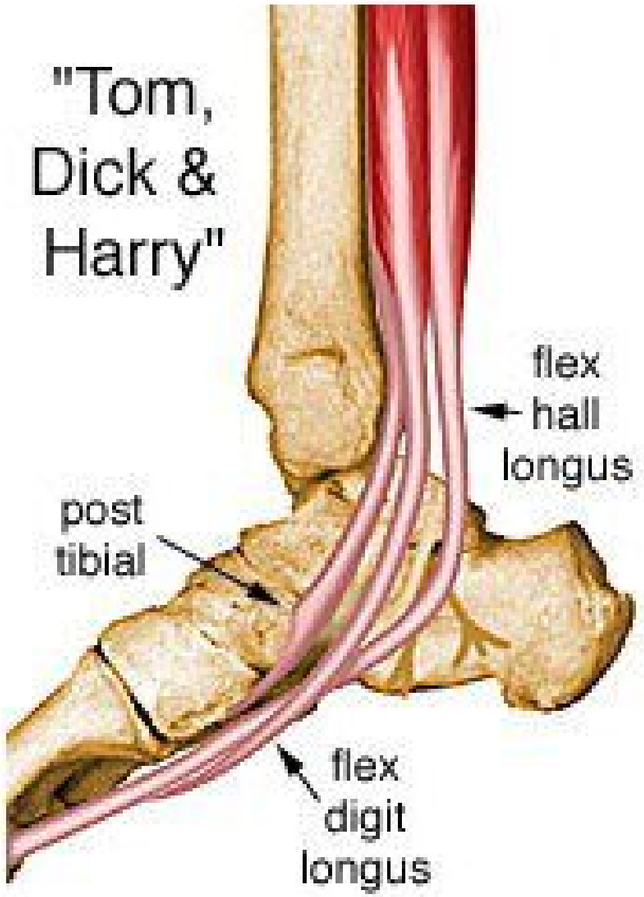

FLEXOR HALLUCIS LONGUS

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Test:

The ankle is in position of full dorsiflexion.

The examiner stabilizes the interphalangeal articulation of the great toe and places the metatarsophalangeal articulation in flexion for the starting test position. While maintaining hyperextension of the interphalangeal articu lation, the examiner directs pressure against the plantar surface of the distal phalanx toward extension.

QUADRICEPS MUSCLE

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Origin

The muscles that form the quadriceps femoris unite proximal to the knee and attach to the patella via the quadriceps tendon. In turn, the patella is attached to the tibia by the patella ligament.

Vastus Lateralis

- Proximal attachment: Originates from the greater trochanter and the lateral lip of linea Aspera.
- Actions: Extends the knee joint and stabilises the patella.

Vastus Intermedius

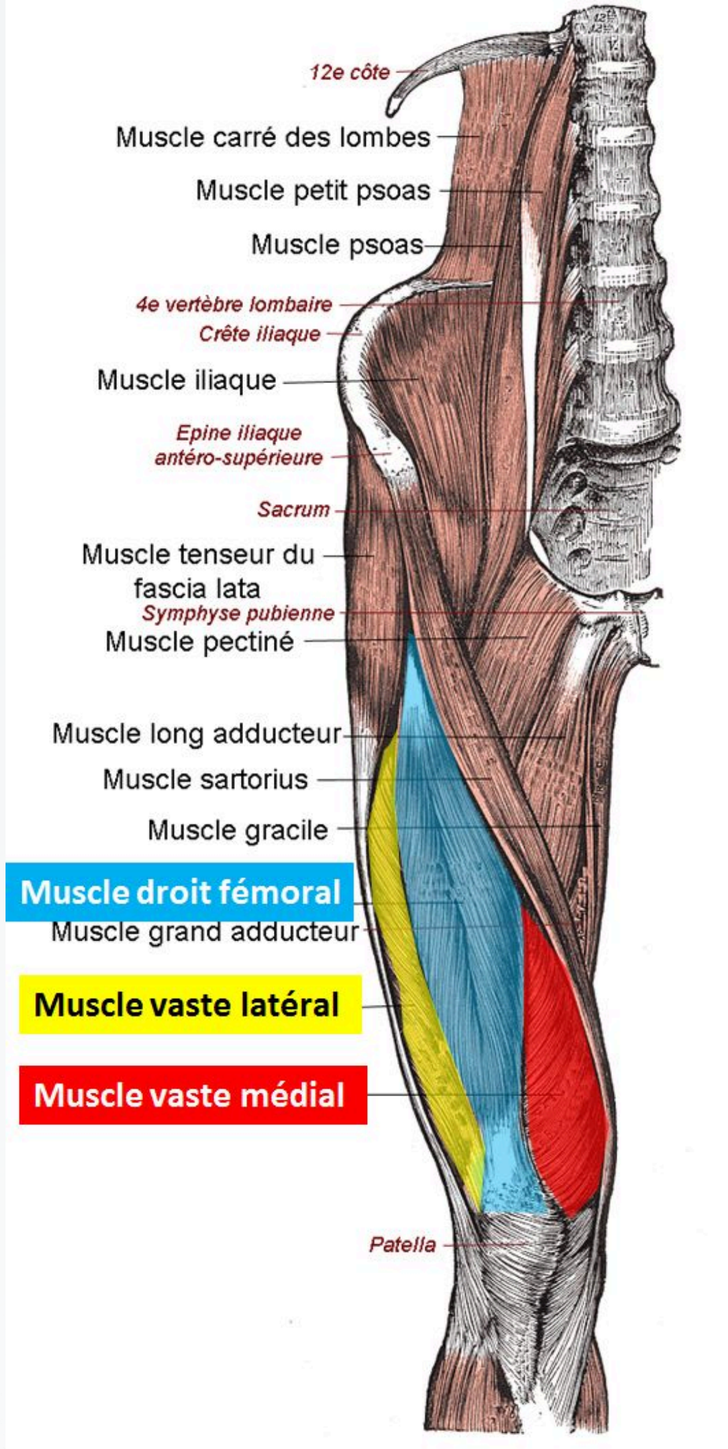
- Proximal attachment: Anterior and lateral surfaces of the femoral shaft.
- Actions: Extends the knee joint and stabilises the patella.

Vastus Medialis

- Proximal attachment: The intertrochanteric line and medial lip of the linea aspera.
- Actions: Extends the knee joint and stabilises the patella, particularly due to its horizontal fibres at the distal end.

Rectus Femoris

- Attachments: Originates from the ilium, just superior to the acetabulum. It runs straight down the leg (the Latin for straight is rectus), and attaches to the patella by the quadriceps femoris tendon.
- Actions: The only muscle of the quadriceps to cross both the hip and knee joints. It flexes the thigh at the hip joint, and extends at the knee joint.



QUADRICEPS MUSCLE

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Nerve

Innervation of these muscles is by the femoral nerve. (L2, **L3**, L4)

Function

The quadriceps all work to extend (straighten) the knee. The rectus femoris also flexes the hip, The vastus medialis adducts the thigh and also extends and externally rotates the thigh and stabilizes the kneecap

- The quadriceps are primarily active in kicking, jumping, cycling and running eg sports like basketball that requires jumps.
- In everyday life, they help you get up from a chair, walk, climb stairs and squat.
- They are used in walking and running at the onset of a stride and get used significantly when going downhill.

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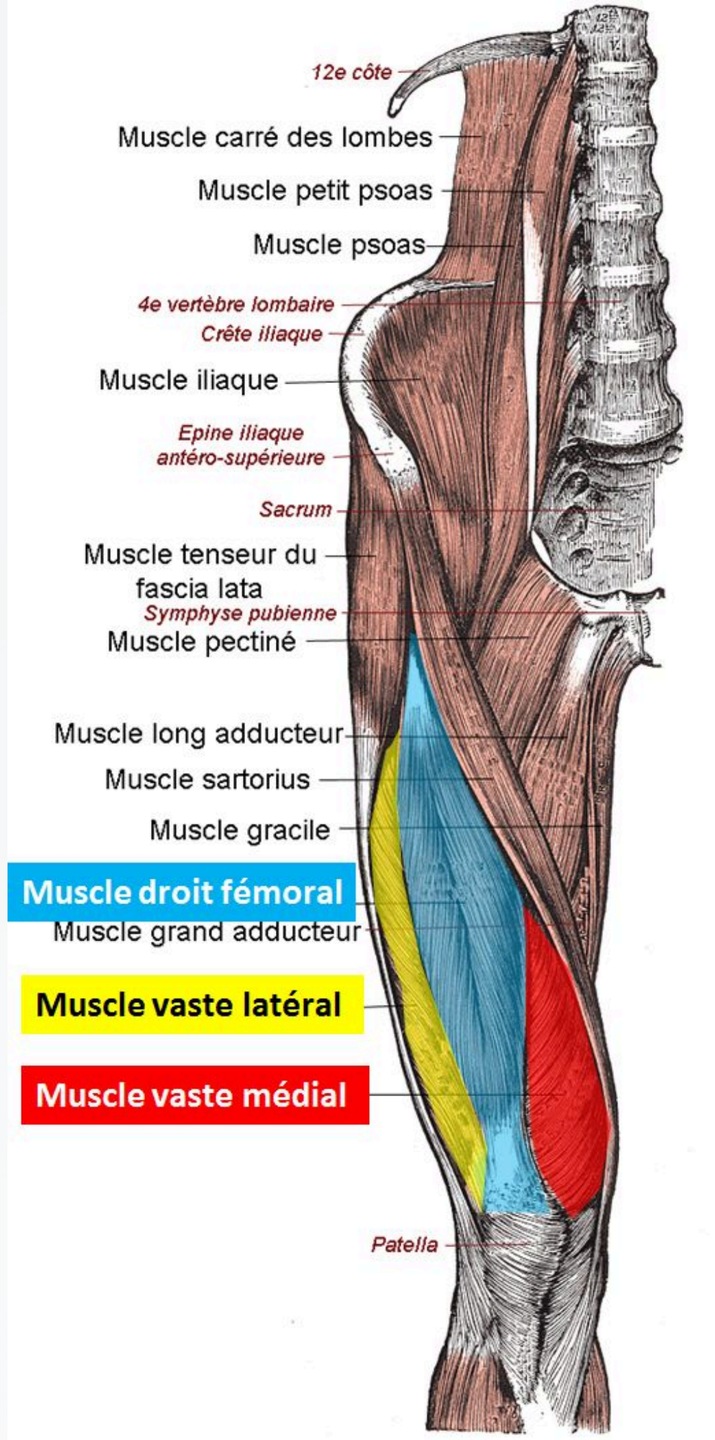

QUADRICEPS MUSCLE

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Knee Extension

1. Ask patient to sit up straight and support trunk with arms propped with no greater than 20 degree of trunk extension.
2. The therapist may put their hand or a rolled towel under the distal end of the thigh to cushion it.
3. Ask patient to extend the knee.
4. Place the knee in 45° of flexion from full extension to avoid mechanical locking of the joint.
5. Apply resistance just proximal to the ankle perpendicular to Tibia.

QUADRICEPS MUSCLE

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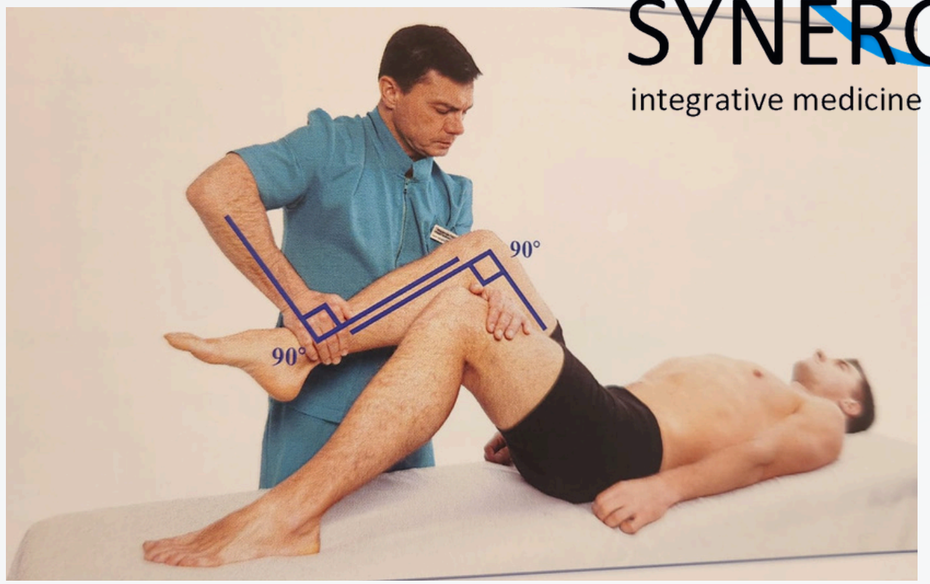
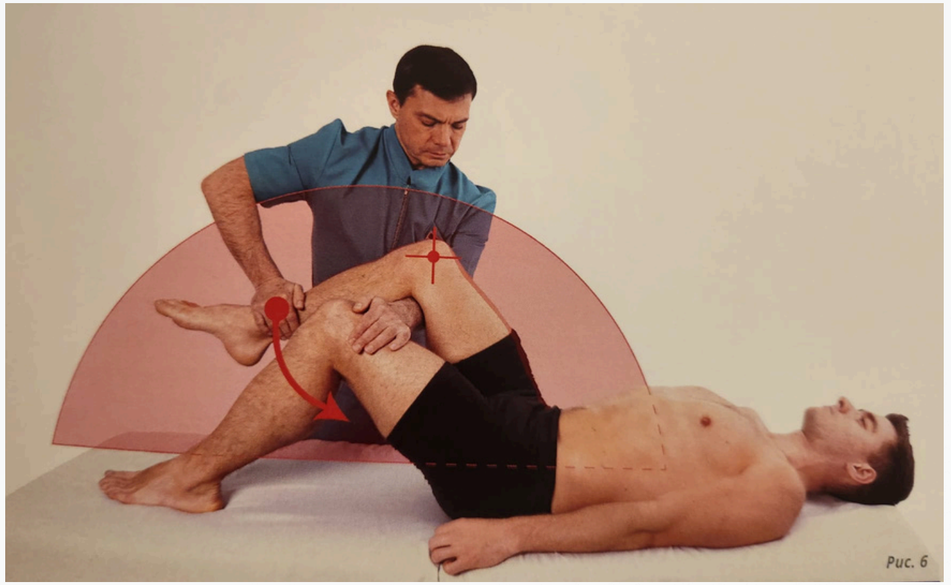


Knee Extension

בדיקה בשכיבה על הגב



GASTROCNEMIUS

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Origin:

Medial head: medial condyle and adjacent part of femur; capsule of knee joint.

Lateral head: lateral condyle and posterior surface of knee joint.

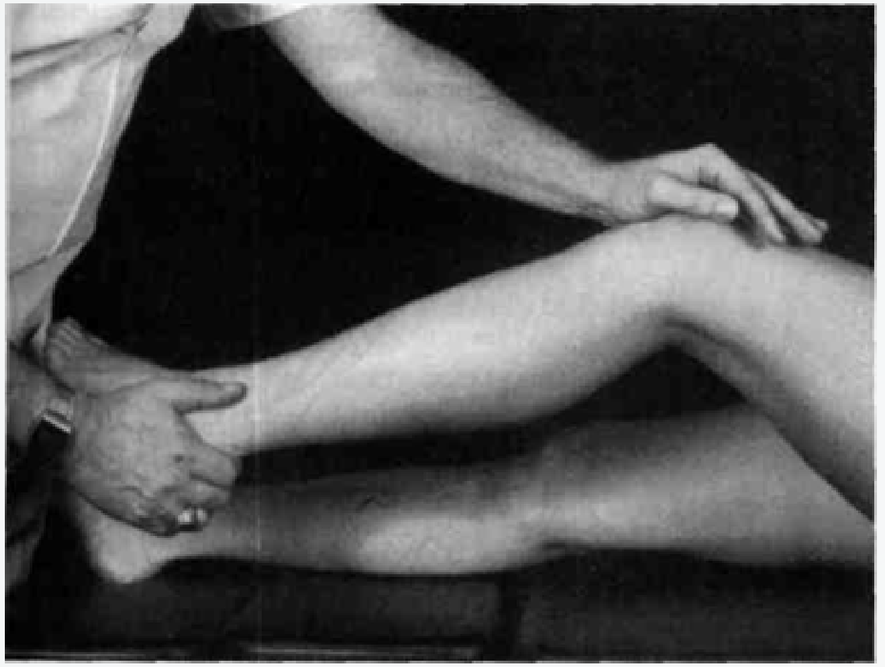
Insertion: into calcaneus by Achilles tendon.

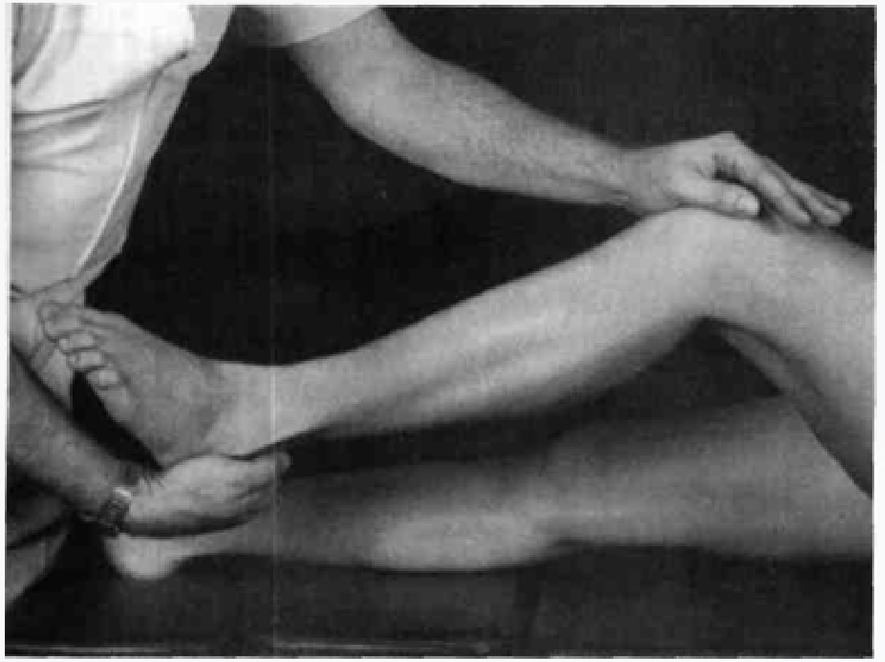
Nerve supply: tibial, L4, 5, **S1**, 2.

Action: plantar flexes foot.

GASTROCNEMIUS

Test: The medial and lateral heads of the gastrocnemius can be tested as described by Beardall.
The test must be correlated with hamstring strength because they are significantly synergistic in the test. For both medial and lateral heads of the gastrocnemius, the supine patient flexes the knee to approximately 110° and maximally plantar flexes the foot. For the medial head, the leg is internally rotated; for the lateral test, it is externally rotated. The examiner stabilizes the knee while extending it by pulling on the calcaneus contact.





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GASTROCNEMIUS

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בדיקה נוספת בשיבה על הגב

ILIOPSOAS

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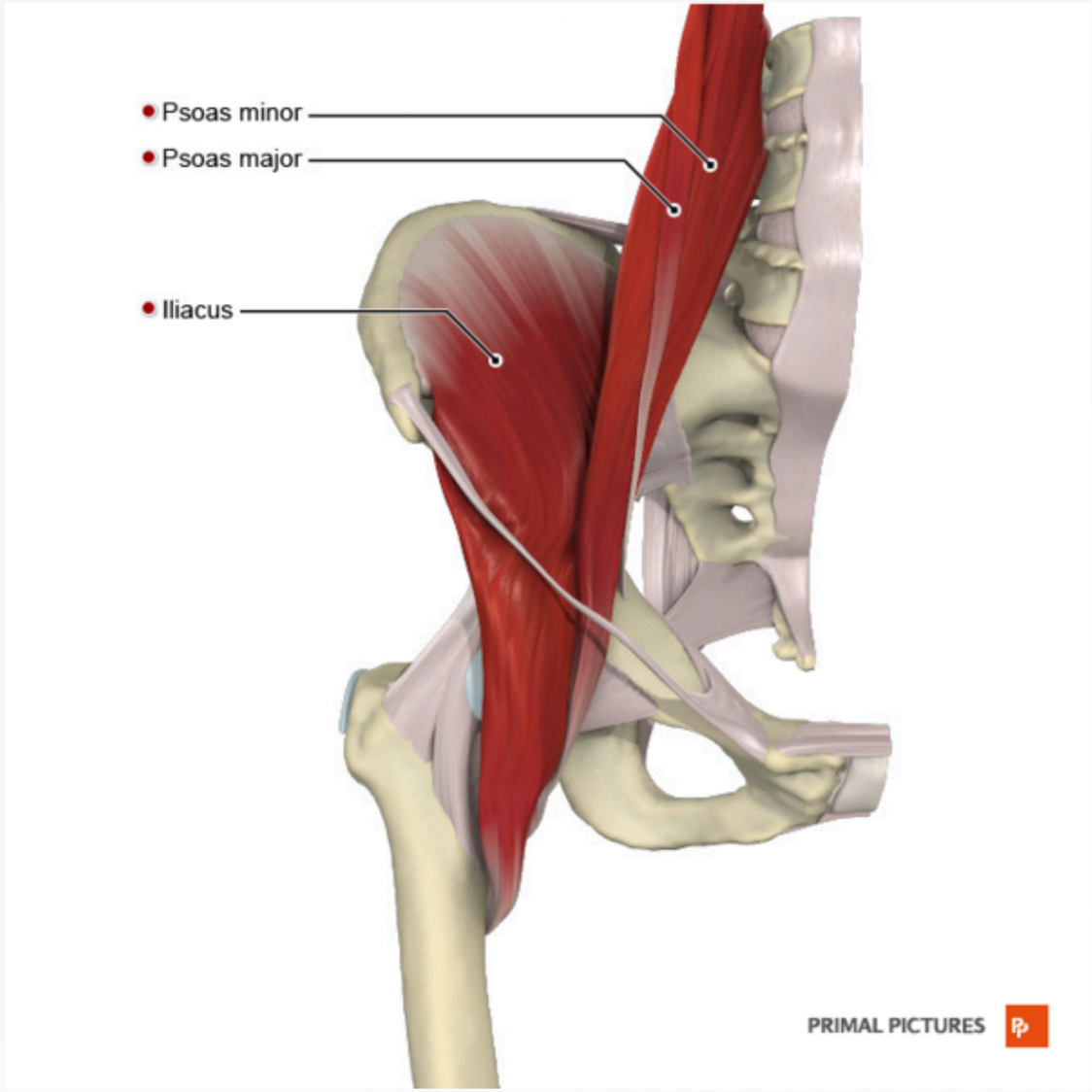
בדיקה נוספת בשיבה על הגב



HIP FLEXION

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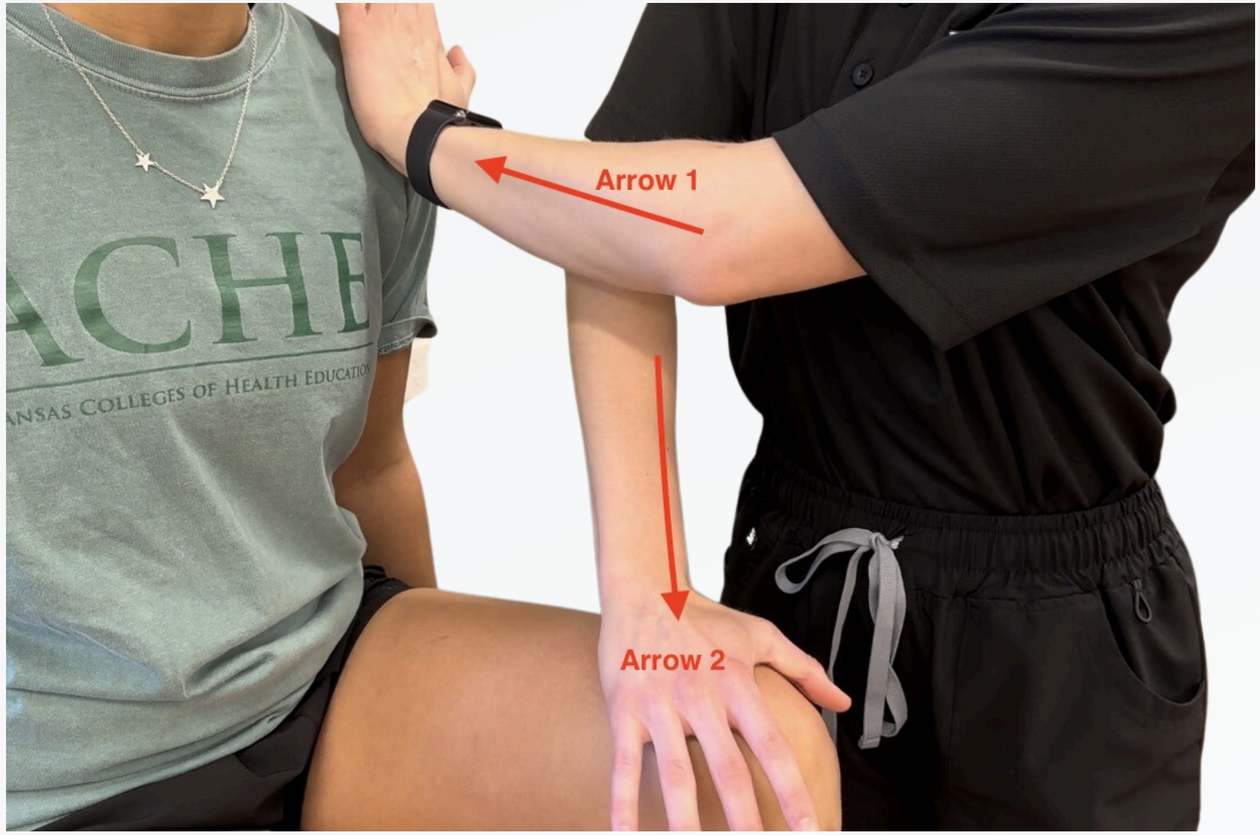
Patient Positioning

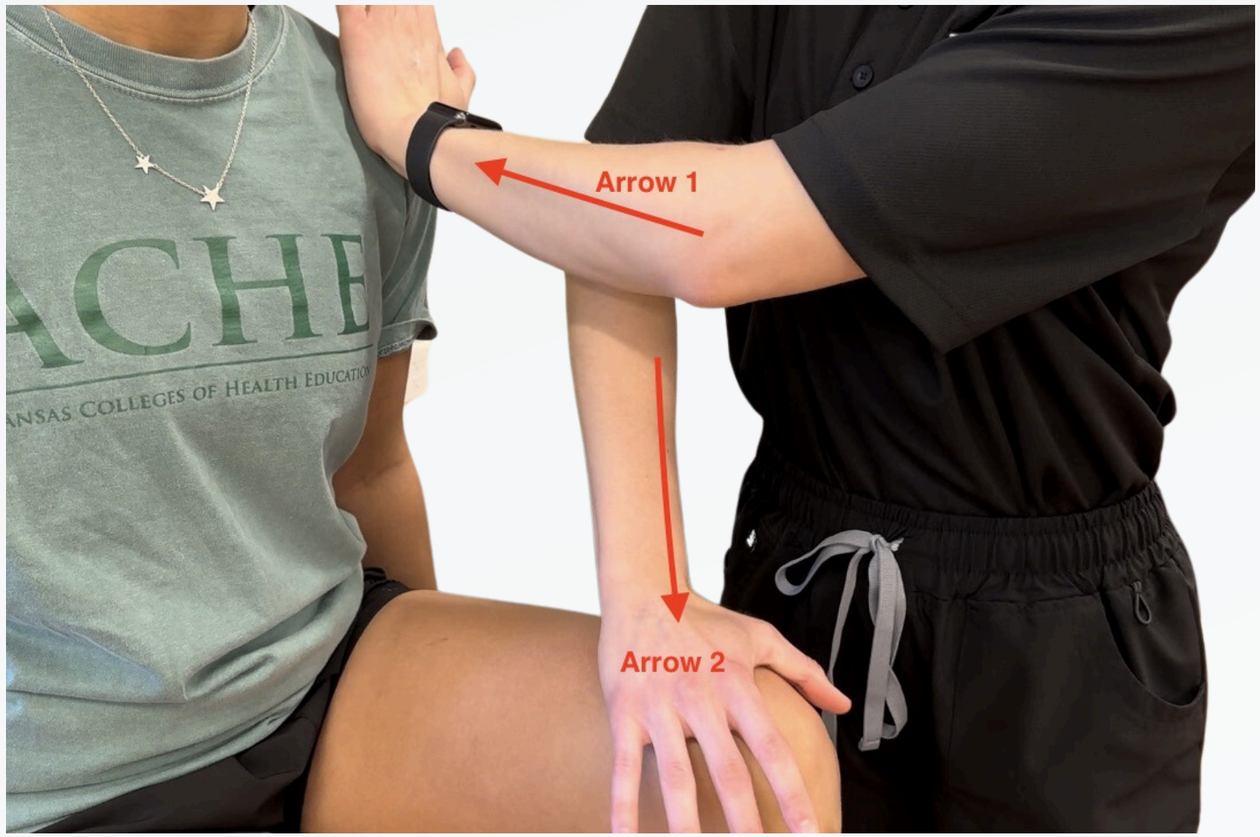
- Patient will be in a seated position for a gravity resistance test and if they are able to actively flex the hip. This will automatically put the test grade between 3- to 5.
- If patient is unable to to actively flex the hip in the seated position, the test will continue in a side-lying position for a gravity eliminated test. This will automatically put the test grade between 0 to 2+.



HIP FLEXION

Physical Therapist Position

- The Physical Therapist stands next to test side closest to the hip that is being tested.
-
- Image 2: Cross-Over Method for Therapist Position. Arrow 1: Therapist's arm is used to stabilize the patient's shoulder. Arrow 2: Therapist's arm is used for direct of force to put the hip into extension.
- The Physical Therapist should adjust the height of the table or seat to avoid any future injures to therapist. The therapist body is important too, especially for the physical therapist who plans on doing this for years to come. Protect your body by learning what you can control. The ability to examine, treat and help others is limited by the physical therapists who can't protect their own body.
- The Physical Therapist will cross their arms to perform the test by placing one hand on the patient's shoulder to stabilize the trunk and by placing the other hand on the distal femur to apply force directly against the hip flexor. The cross-over method with help protect the therapist's shoulders and posture.



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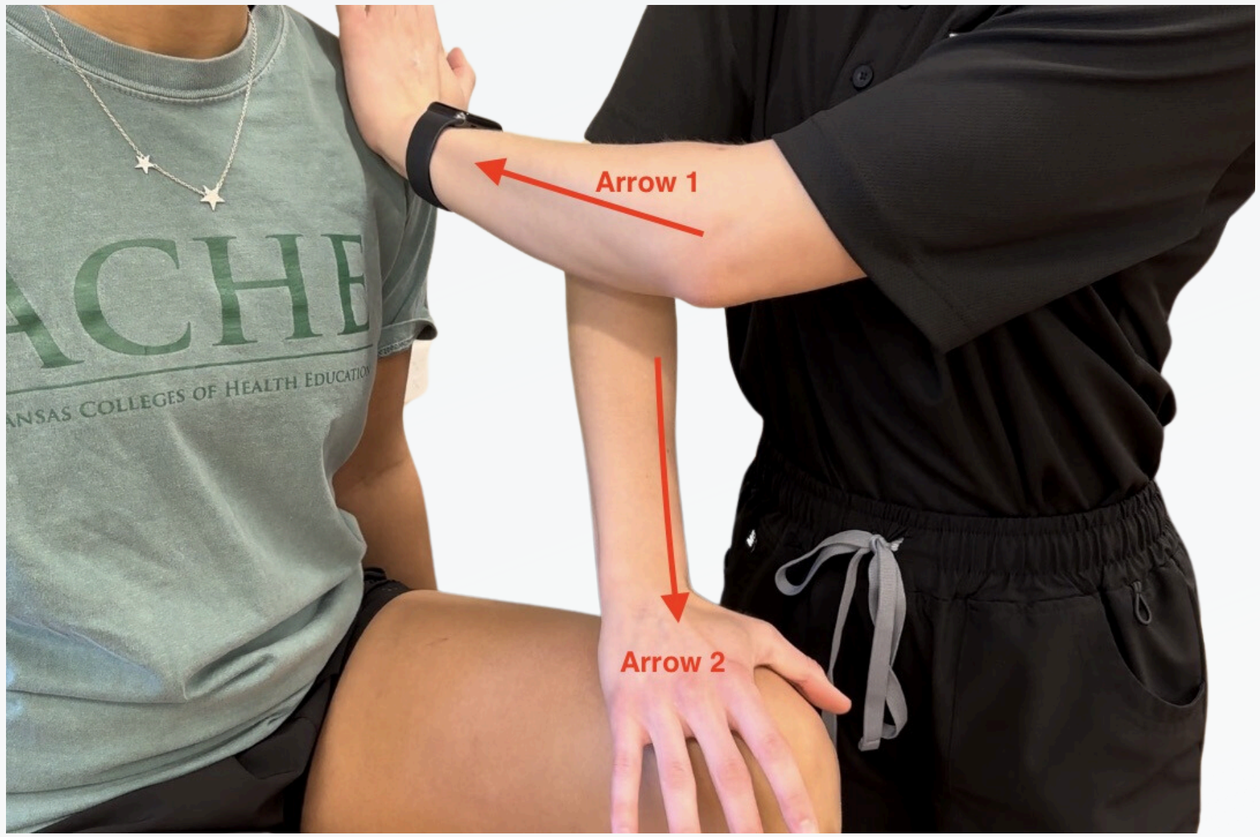
HIP FLEXION

To Test

- Start with the patient in a seated position on a treatment table or chair that doesn't have arm rests.
- Have the patient put hands on the table. Do not allow the patient to grip the table, which could allow the patient to compensate and alter the test results. Have the patient's feet not touching the floor to avoid any possible compensations as well.
- To test the hip flexors as a whole, therapist will bring the patient's tested leg into hip flexion at mid range and ask the patient to perform that motion without assistance.
- Apply resistance over the distal femur in a direction opposite to flexion. The Physical Therapist will cross their arms, one hand on the patient's shoulder (same side as the tested hip) that will stabilize the patient and the other hand at the distal femur that will be used to apply the force against the hip flexors.



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