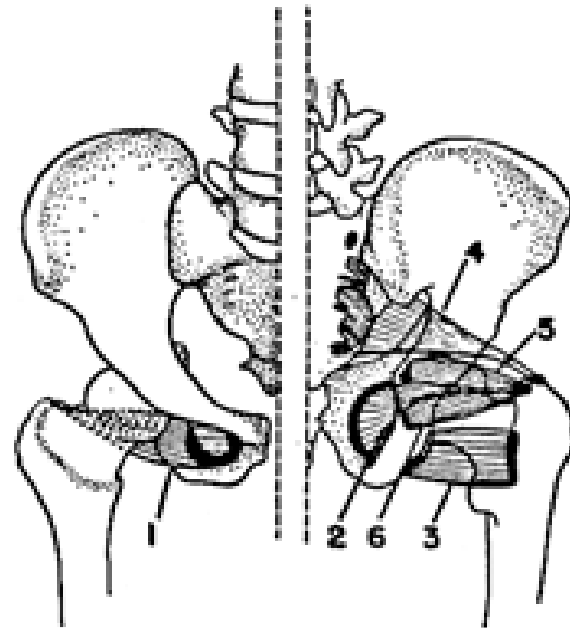
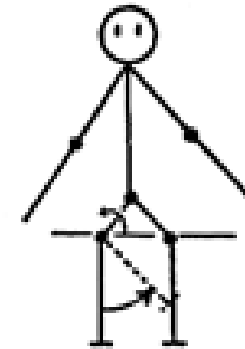


HIP EXTERNAL ROTATION



1. *Obturator externus*
2. *Obturator internus*
3. *Quadratus femoris*
4. *Piriformis*
5. *Gemellus superior*
6. *Gemellus inferior*

Range of Motion:



0° TO 45°
(less with hip extended)

Fixation:

1. Weight of trunk

- Muscle Tested:
- **a. Piriformis**
- 1) Origin:
 - - Pelvic surface of sacrum between, and lateral to 1, 2, 3,4 pelvic sacral.
 - - Margin of greater sciatic foramen and pelvic surface of sacrotuberous ligament.
- 2) Insertion: Superior border of greater trochanter of femur.
- 3) Nerve Supply: Sacral Plexus: L5, S1, S2,
-

- **b. Quadratus Femoris**
- 1) Origin:
 - Proximal part of lateral border of tuberosity of ischium.
- 2) Insertion:
 - Proximal part of quadrate line extending distally from intertrochanteric crest.
- 3) Nerve Supply: Sacral Plexus: L4, L5, S1, (2)

- **Obturator Internus:**
- 1) Origin:
 - - Internal or pelvic surface of obturator membrane and margin of obturator foramen.
 - - Pelvic surface of ischium posterior and proximal to obturator foramen, and to a slight extent, from the obturator fascia.
- 2) Insertion:
 - Medial surface of greater trochanter of femur proximal to trochanteric fossa.
- 3) Nerve Supply:
 - Sacral Plexus: L5, S1, S2, (3)
 -

- **d. Obturator Externus:**
- 1) Origin:
- Rami of pubis and ischium, and external surface of obturator membrane.
- 2) Insertion:
- Trochanteric fossa of femur.
- 3) Nerve Supply:
- Obturator Nerve: L3, L4
-
-

- **e. Gemellus Superior:**
- 1) Origin:
 - External surface of spine of ischium.
- 2) Insertion:
 - With tendon of obturator internus into medial surface of greater trochanter of femur.
- 3) Nerve Supply: Sacral Plexus: L5, S1, S2, (3)

- Muscle Actions:
- - All the above muscles laterally rotate the hip joint.
- - In addition the Quadratus femoris and Obturator externus may assist in adduction of the hip joint.
- - The Piriformis, Obturator internus and Gemelli may also assist in abduction when the hip is flexed.
-

- Range of Motion:
- - With the knee in flexion the hip lateral rotation is of 45° of motion.
- - With the knee in extension the range of motion will have tendency to be of less amplitude. the range of motion may be limited by:
 - a. Tension of lateral band of ilio-femoral ligament.
 - b. Tension in the hip medial rotator muscles.

Test Procedures:

- ***Effects of weakness of hip lateral rotators:***
- Usually, weakness of the lateral rotators of the hip will produce a medial rotation of the femur accompanied by pronation of the foot and a tendency toward knock-knee position.

Ext. rot. hip

Grade " 3 "
Fair Strength →



Grade " 4 , 5 "
Good and Normal Strength →



Grade " 2 "
Poor Strength →

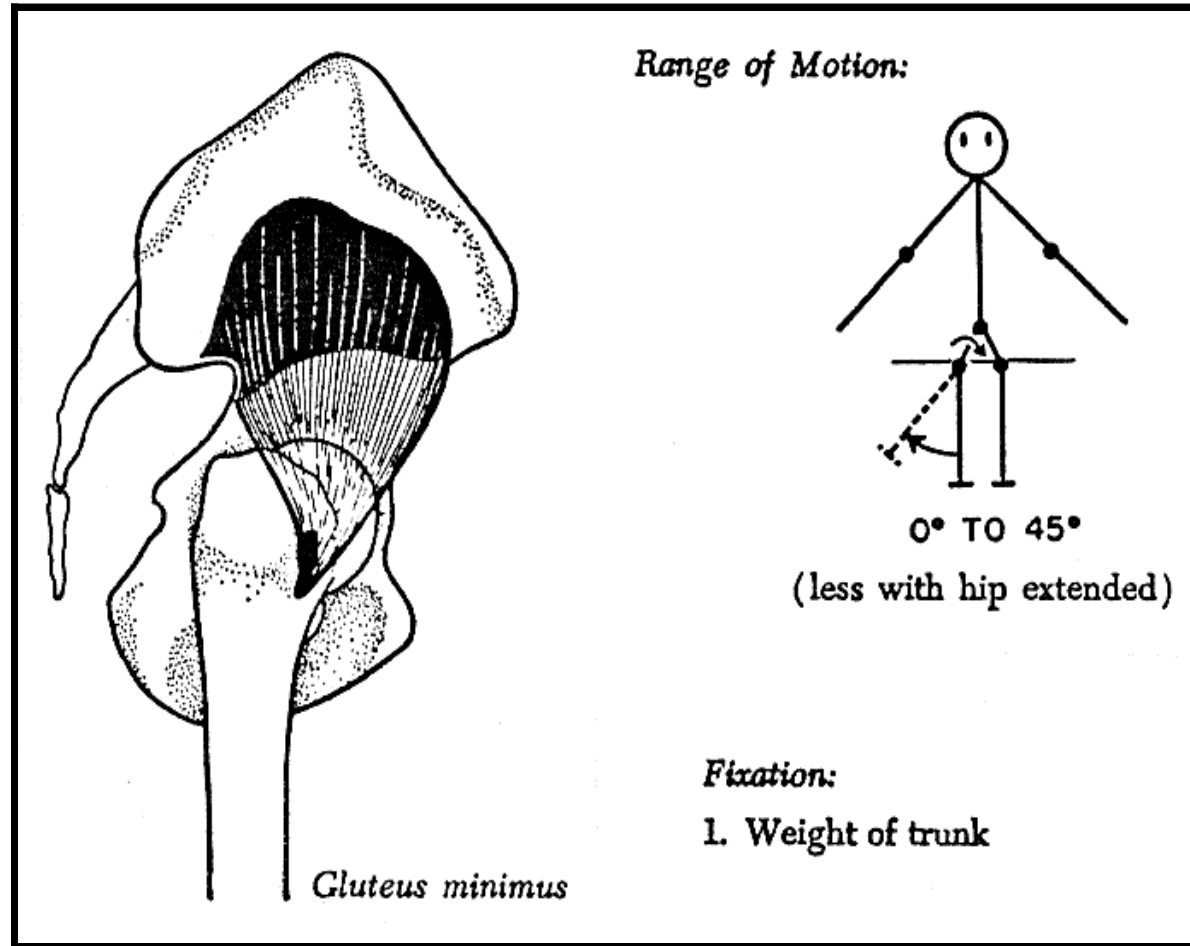


Grade " 1 , 0 "
Trace and Zero Strength →



- ***Effects of contracture in the lateral rotators of the hip:***
- - The contracture of the lateral rotators of the hip is usually occurring in an abducted position of the hip.
- - The range of motion of medial rotation will, then, be limited and in the standing position the toes are outwardly directed.

HIP INTERNAL ROTATION



- Muscle Tested:
- a. **Gluteus Minimus:**
- Please refer to the abductor muscles of the hip for description.
-

- **b. Tensor Fasciae Latae:**
- 1) Origin:
 - - Anterior part of external lip of iliac crest.
 - - Outer surface of anterior superior iliac spine.
- 2) Insertion..
 - Into iliotibial tract of fasciae latae at the junction of proximal and middle third of thigh.
- 3) Nerve Supply:
 - Superior gluteal nerve: L4, L5, S1
- 4) Action:
 - Medially rotates, abducts and flexes the hip joint. It may assist in knee extension by tensing the iliotibial tract.
 -
 -

- **Accessory Muscles**
- - Gluteus Medius
- - Semitendinosus
- - Semimembranosus

- **Range of Motion**

- The medial rotation of the hip with the knee flexed is of 45° . It will be of a somewhat less amplitude when performed with the knee extended. The range of motion may be limited by:

- - Tension in the iliofemoral ligament when the hip is extended.
- - Tension in the ischio-capsular ligament when the hip is flexed.
- - Tension of hip lateral rotator muscles.
-

- ***Effect of weakness of hip medial rotators:***
- Weakness of the hip medial rotators results in lateral rotation of the lower extremity in standing and walking.
-
-

- ***Special consideration related to the patient position while testing the hip medial rotator muscles:***
- If the test is performed in the supine position, the pelvis will tend to tilt anteriorly if much resistance is applied, but this is not a substitution movement. Due to its anatomical attachments, the tensor fasciae, when contracting to maximum, pulls forward on the pelvis as it medially rotates the leg.

-

Int.Rot. Hip

Grade " 3 "
Fair Strength →



Grade " 4 , 5 "
Good and Normal Strength →



Grade " 2 "
Poor Strength →



Grade " 1 , 0 "
Trace and Zero Strength →



Sartorius

- HIP FLEXION, ABDUCTION AND EXTERNAL ROTATION WITH KNEE FLEXION



Sartorius

Range of Motion:

Combined joint action; ranges of motion incomplete

Fixation:

1. Contraction of abdominal muscles to fix pelvis
2. Weight of trunk

- Muscle Tested:
- **Sartorius:**
- 1) Origin:
 - Anterior superior iliac spine and superior half of notch just distal to spine.
- 2) Insertion:
 - Proximal part of medial surface of tibia near anterior border.
- 3) Nerve Supply: Femoral, L2, L3.
- 4) Action: Flexes, laterally rotates, and abducts the hip joint. Flexes and assists in medial rotation of the knee joint.

- **Accessory Muscles:**
- - Hip and knee flexors
- - External rotator of hip.
- - Hip abductors.

- Range of motion:
- Combined joint action, ranges of motion (hip flexion, abduction and external rotation) are incomplete.
-

- ***Substitution:***
- Substitution of iliopsoas or rectus femoris in this movement is evidenced by straight hip flexion without abduction and lateral rotation.
-

- ***Effect of Weakness:***
- Decreases strength of hip flexion, abduction, and lateral rotation. Contributes to anteromedial instability of the knee joint.
-

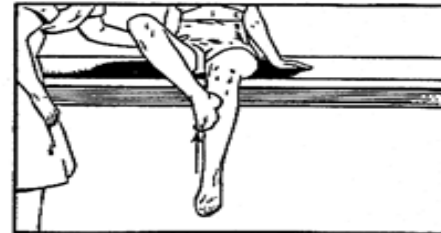
- ***Effect of contracture:***
- - Flexion, abduction, and lateral rotation deformity of the hip, with flexion of the knee.
- - The position of the leg, as illustrated, resembles the sartorius test position in its flexion, abduction, and lateral rotation. However, the ability to hold this position is essentially a function of the hip adductors and requires little assistance from the sartorius.

sartorius

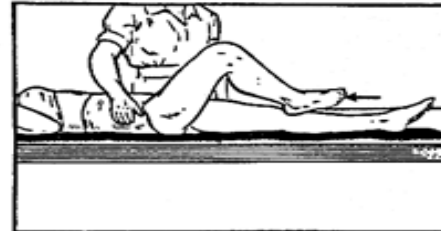
Grade 5 and 4 →



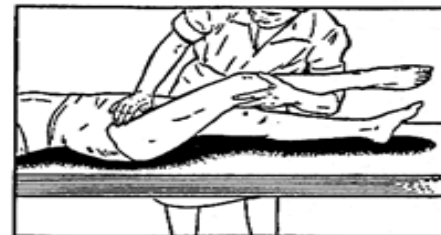
Grade 3 →



Grade 2 →

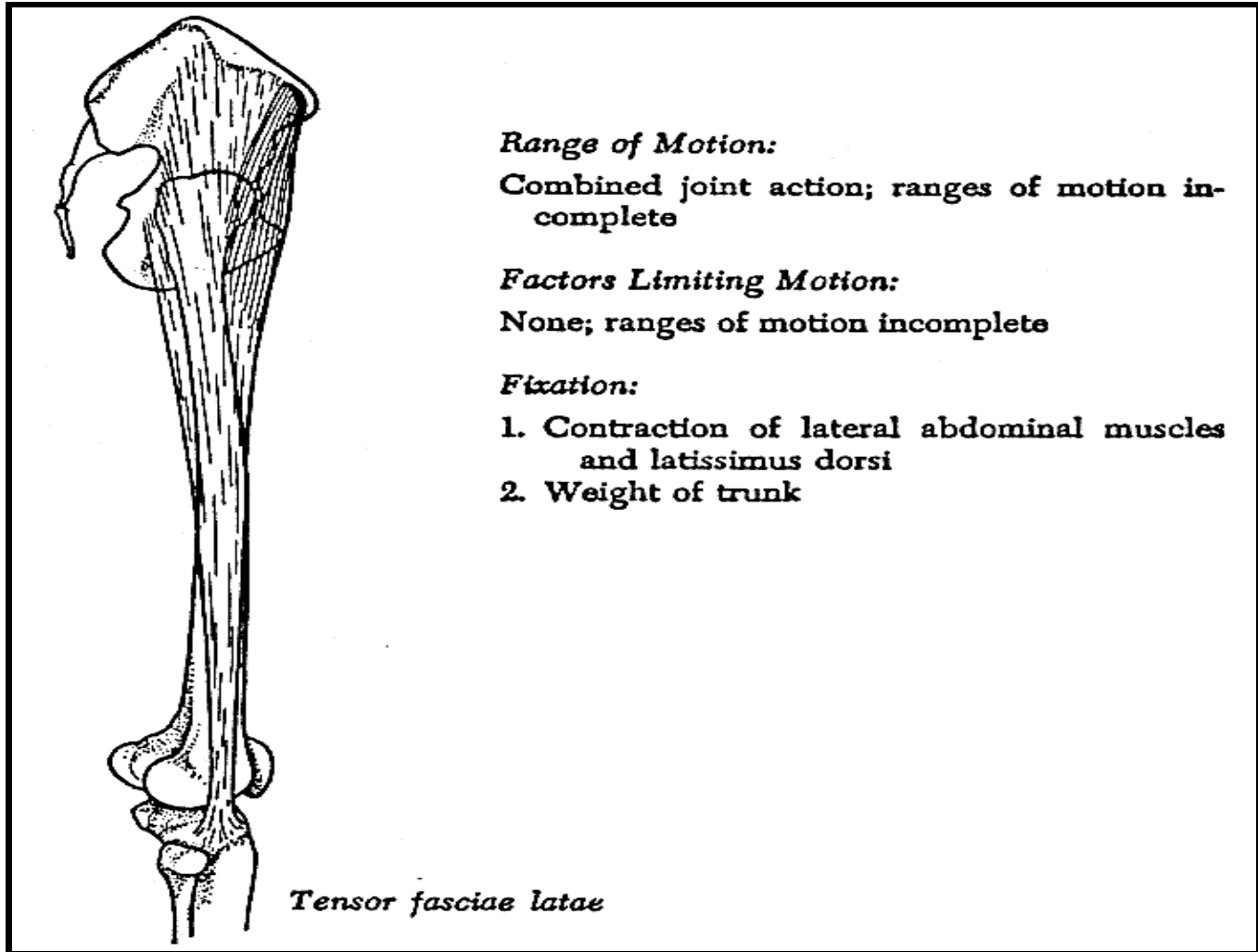


Substitution



Grade 1 and 0

HIP ABDUCTION FROM FLEXED POSITION: Tensor Fasciae Latae



Range of Motion:

Combined joint action; ranges of motion incomplete

Factors Limiting Motion:

None; ranges of motion incomplete

Fixation:

1. Contraction of lateral abdominal muscles and latissimus dorsi
2. Weight of trunk

- Muscle Tested:
- **Tensor Fasciae Latae**
- 1) Origin:
 - Anterior part of external lip of iliac crest, outer surface of anterior superior iliac spine and deep surface of fasciae latae.
- 2) Insertion:
 - Into iliotibial tract of fascia lata at junction of proximal and middle thirds of thigh.
- 3) Nerve Supply: Superior gluteal, L4, L5, S1.
- 4) Action:
 - Flexes, medially rotates and abducts the hip joint, tenses the fasciae latae, and may assist in knee extension.

- **Accessory Muscles:**
- Gluteus medius and gluteus minimus.
-
- Range of motion:
- Combined joint action (hip flexion, abduction and internal rotation). Ranges of motion are not complete.
- **Note:** On asking patient to abduct hip, range of motion is approximately 30°.
-

- Range of motion:
- Combined joint action (hip flexion, abduction and internal rotation). Ranges of motion are not complete.
- **Note:** On asking patient to abduct hip, range of motion is approximately 30°.
-

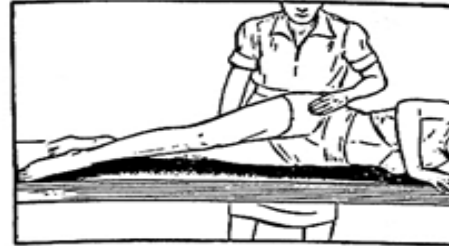
- ***Effect of Weakness:***
- In standing, there is a thrust in the direction of a bow-leg position, and the extremity tends to rotate laterally from the hip.
-
-
-

- Effect of Shortness:
- The effect of a shortness of the tensor fasciae latae in standing depends upon whether the tightness is bilateral or unilateral. If bilateral, there is an anterior pelvic tilt, and sometimes bilateral knock-knee. If unilateral, the abductors and fasciae latae are tight along with the tensor fasciae latae and there is an associated lateral pelvic tilt, low on the side of tightness.
- The knee on that side will tend toward a knock-knee position. If the tensor fasciae latae muscle is tight as a hip flexor, there is an anterior pelvic tilt and a medial rotation of the femur, as indicated by the position of the patella.
-

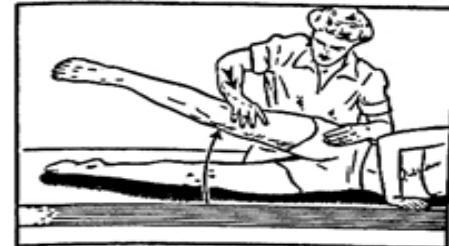
- ***Effect of contracture:***
- Hip flexion and knock-knee position.

TENSOR FASCIAE LATAE

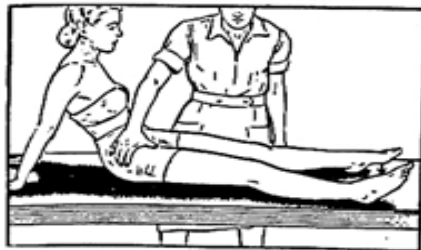
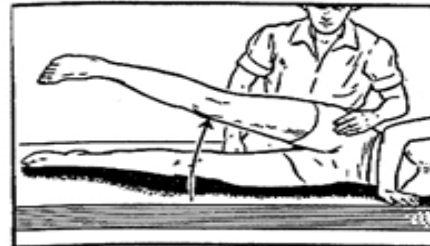
Starting Position →



Grade 5 and 4 →



Grade 3 →



Grade 2



Grade 1 and 0

- **Thank you**