



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



# Laboratory

RHS 221

Manual Muscle Testing

**Ali Aldali, MS, PT**

**Tel# 4693601**

Department of Physical Therapy  
King Saud University

# Many factors can influence the result from MMT:

Including:

- Age
- Type of contraction (isometric, concentric, or eccentric)
- Speed of contraction
- Pain
- Fatigue
- Training effect
- Joint position
- Nutrition status
- Level of motivation
- Body type
- Limb dominance

# Testing the Muscles of the Lower Extremity

1. **Hip Abduction from flexed position**
2. **Hip Adduction**
3. **Hip External (lateral) Rotation**
4. **Hip Internal (medial) Rotation**

## Hip Abduction from flexed position

### 1. Prim mover /agonist:

	Origin	Insertion
Tensor Fascia Latae	Iliac Crest (outer lip) lateral to ASIS	Iliotibial tract or band.

### 2. Synergist / Accessory Muscles:

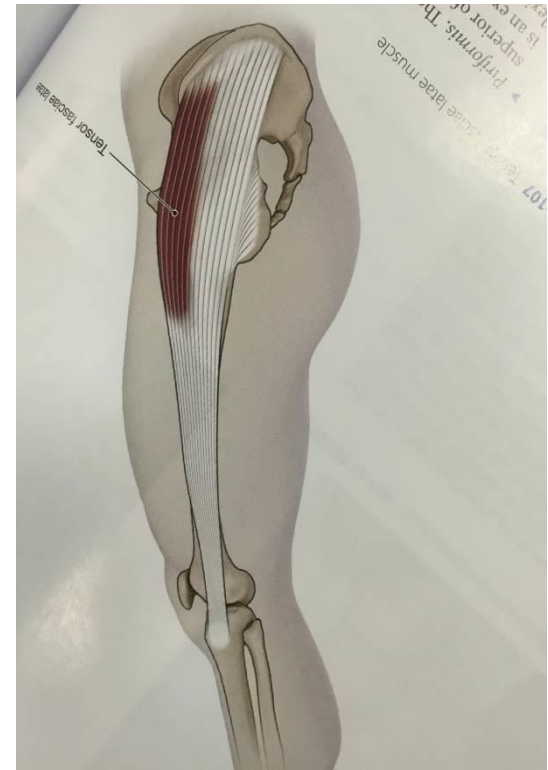
Gluteus medius, and Gluteus minimus

### 3. Nerve supply:

Superior gluteal n.

### 4. Range of motion:

No specific Rom, because of two-joint muscle.



# Hip Abduction from flexed position

## 5. Fixation:

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

## 6. **Effect** of **weakness** and contracture:- **Video?**

effect of weak : pt walks with **BOW- Leg** with tendency to rotate hip laterally

effect of shortness: Bilaterally– results in anterior pelvic tilt and sometimes bilateral **knock-knees**,  
Unilateral– results in lateral pelvic tilt.

effect of contracture: hip flexion, and knock knees.

## 7. Factor Limiting of motion:

- Non, ROM incomplete

## 8. Substitution:

by Hip lateral rotator muscles.



# Hip Abduction from flexed position

## 9. Procedures:

**a- patient position (pt):**

**b- Therapist Position:**

inner hand:

Outer hand:

Direction of Resistance :

Instruction to patient:

**c- grading system:**

Normal(5), Good(4), Fair(3), Poor(2), Trace(1), Zero(0)

make sure patient tolerates maximal resistance pluse hold 3 sec.

**e. Palpation site:**

# Hip Adduction

## 1. Prim mover /agonist:

	Origin	Insertion
1- Adductors magnus	Ischial tuberosity (inf-lat)	Femur (linea aspera)
2- Adductors Brevis	Pubis	Femur (linea aspera)
3- Adductors Longus	Pubis	Femur (linea aspera)
4- Pectineus	Pubis	Femur (linea aspera)
5- Gracilis	Pubis	Femur (linea aspera)

## 2. Synergist / Accessory Muscles:

*Obturator externus and Gluteus maximus.*

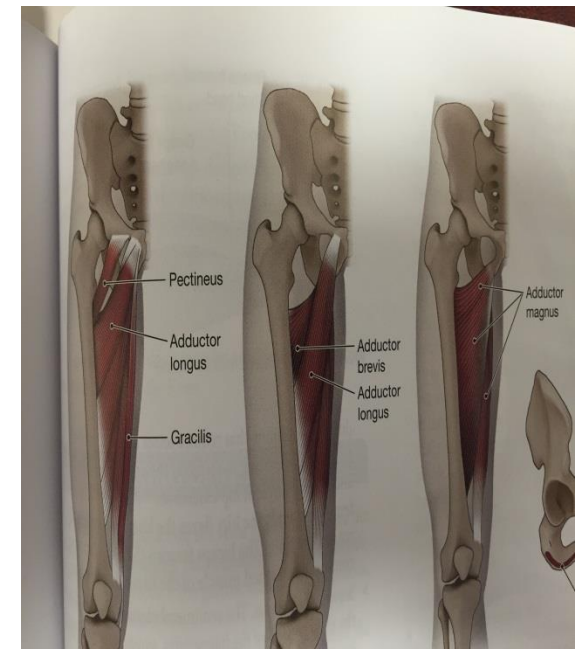
## 3. Nerve supply:

pectineus  
Femoral n.(L2-L3)

All Adductors are supply by  
Obturator n.(L2-L4)

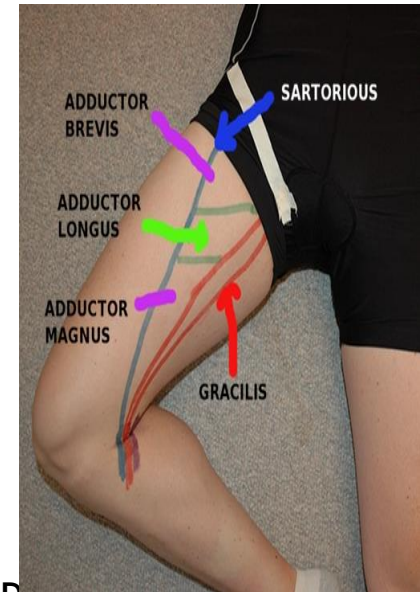
## 4. Range of motion:

**from 0 to 15- 20°**



# Hip Adduction

5. *Fixation:*  
by Weight of trunk.
6. *Effect of weakness and contracture:*  
effect of weak : pt unable to adduct the leg during walking.  
effect of shortness: pt walks with adducted legs.  
effect of contracture: unable to abduct leg during gate cycle.
7. *Factor Limiting of motion:*
  1. Contact with opposite limb.
  2. When hip is flexed, tension of ischiofemoral ligament
  3. Tension of hip abductor muscle.
8. *Substitution:*  
by 1. hip flexor muscles (the pt may attempts to substitute the hip flexors for the adductors by internally rotating the hip using a posterior pelvic tilt) pt trying to turn supine from side-lying.  
2. Hamstring muscle (the pt may attempts to substitute the hamstring for the adductors by externally rotating the hip using an anterior pelvic tilt) pt trying to turn prone from side-lying.



# Hip Adduction

## 9. *Procedures:*

**a- patient position (pt):**

**b- Therapist Position:**

inner hand:

Outer hand:

Direction of Resistance :

Instruction to patient:

**c- grading system:**

Normal(5), Good(4), Fair(3), Poor(2), Trace(1), Zero(0)

make sure patient tolerates maximal resistance plus hold 3 sec.

**e. Palpation site:**

# Hip External (lateral) Rotation

## 1. **Prim mover /agonist:**

	<i>Origin</i>	<i>Insertion</i>
1-Obturator internus	Ischium and Pubis	Femur (trochanteric fossa )
2-Obturator externus	Ischium and Pubis	Femur (greater trochanter)
3-Gemellae Superior	Ischium	Femur (greater trochanter)
4-Gemellae Inferior	Ischial tuberosity	Femur (greater trochanter)
5-Piriformis	Sacrum	Femur (greater trochanter)
6-Quadratus Femoris	Ischial tuberosity	Femur
7-Gluteus Maximus	Ilium , sacrum	Femur (gluteal tuberosity)

## 2. **Synergist / Accessory Muscles:**

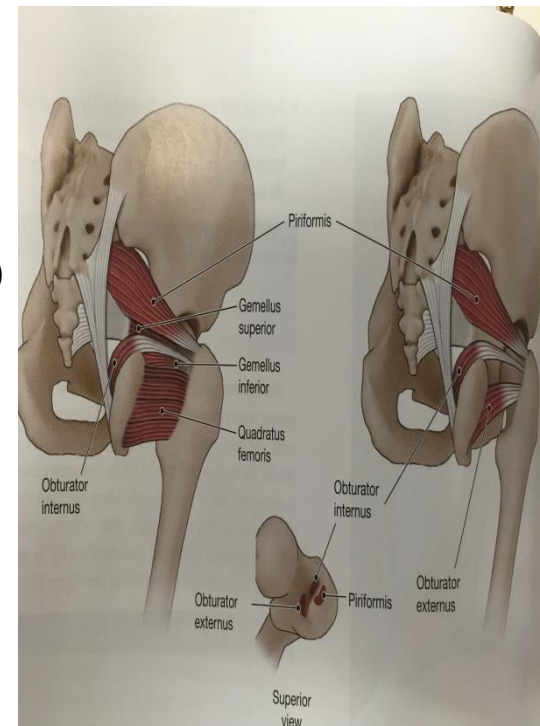
*Sartorius, Biceps femoris, Adductors magnus and longus.*

## 3. **Nerve supply:**

Obturator internus:	Nerve to Obturator internus (L5-S1)
Obturator externus:	Nerve to Obturator externus (L3-L4)
Gemellae Superior:	Nerve to Gemellae Superior (L5-S1)
Gemellae Inferior:	Nerve to Gemellae Inferior (L5-S1)
Piriformis:	Nerve to Piriformis (S1-S2)
Quadratus Femoris:	Nerve to Quadratus Femoris (L5-S1)
Gluteus Maximus:	Inferior gluteal n.(L5-S2)

## 4. **Range of motion:**

**from 0 to 45°**



# Hip External (lateral) Rotation

5. *Fixation:*

by Weight of trunk

6. **Effect** of **weakness** and contracture:- **Video?**

effect of weak : result in medial rot. accompanied by foot pronation with **knock-knees**.

effect of contracture: result in abduction position with limited medial rot. of the hip accompanied by **outward** position of the **toes** in standing position.

7. *Factor Limiting of motion:*

1. Tension of lateral band of iliofemoral ligament.
2. Tension of hip medial rotator muscles.

8. *Substitution:*

by Sartorius (flex, abd, and ext rot.)



# Hip External (lateral) Rotation

## 9. *Procedures:*

**a- patient position (pt):**

**b- Therapist Position:**

inner hand:

Outer hand:

Direction of Resistance :

Instruction to patient:

**c- grading system:**

Normal(5), Good(4), Fair(3), Poor(2), Trace(1), Zero(0)

make sure patient tolerates maximal resistance plus hold 3 sec.

**e. Palpation site:**

# Hip Internal (medial) Rotation

## 1. Prim mover /agonist:

	Origin	Insertion
<i>Gluteus Minimus</i>	<i>Ilium (outer surface)</i>	<i>Femur (greater trochanter)</i>

## 2. Synergist / Accessory Muscles:

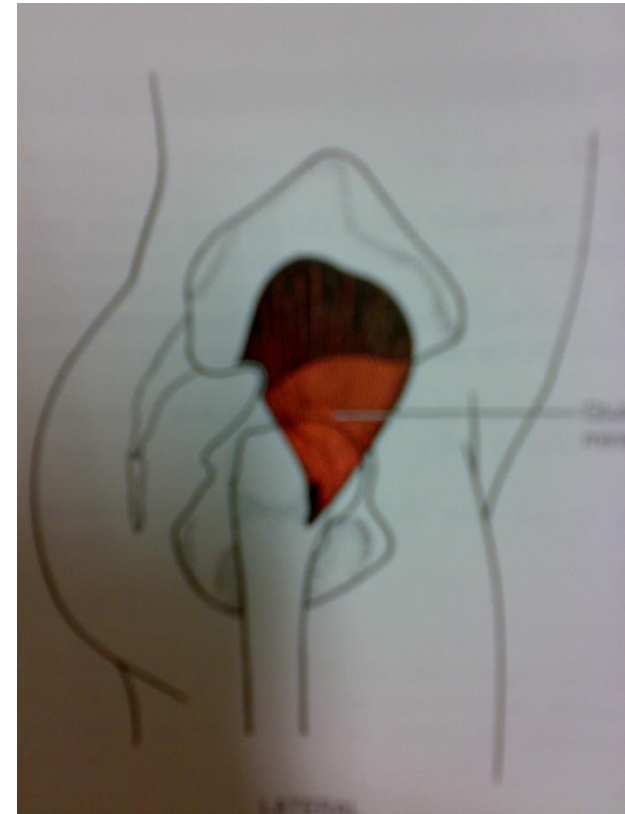
*TFL, & Glut. Medius,*

## 3. Nerve supply:

*Gluteus Minimus: Superior gluteal n.(L4-S1)*

## 4. Range of motion:

*from 0 to 45<sup>0</sup>*



# Hip Internal (medial) Rotation

## 5. *Fixation:*

by Weight of trunk

## 6. *Effect of weakness and contracture:*

walking with lat. Rot.

effect of contracture: result in adduction position with limited lateral rot. of the hip.

## 7. *Factor Limiting of motion:*

1. when hip is **extended**, tension of **iliofemoral** Ligament.

2. when hip is **flexed**, tension of **ischio capsular** ligament.

3. tension of hip lateral rotator muscles.

## 8. *Substitution:*

by lifting the pelvis on the tested side.

# Hip Internal (medial) Rotation

## 9. *Procedures:*

**a- patient position (pt):**

**b- Therapist Position:**

inner hand:

Outer hand:

Instruction to patient:

Direction of Resistance :

**c- grading system:**

Normal(5), Good(4), Fair(3), Poor(2), Trace(1), Zero(0)

make sure patient tolerates maximal resistance plus hold 3 sec.

**e. Palpation site:**



Thank You