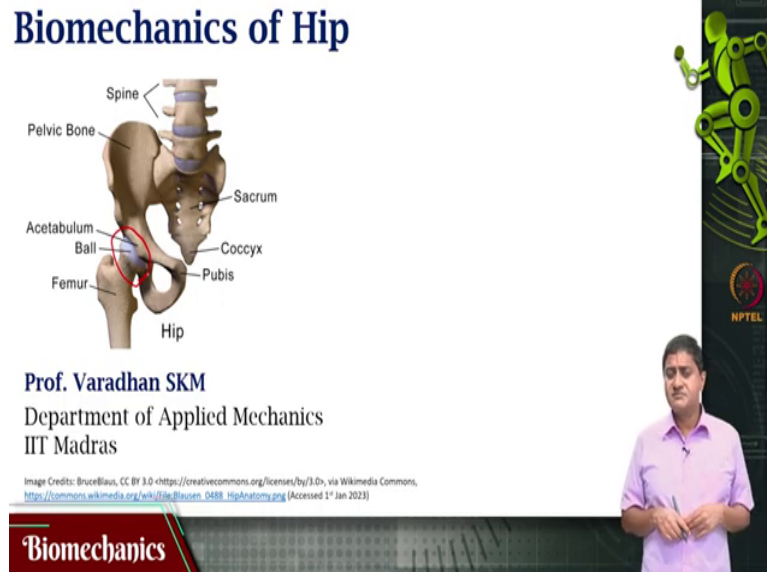


Biomechanics
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Lecture – 35
Hip Muscles

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(FL) Welcome to this video on biomechanics. We were discussing my mechanics of hip, specifically, we discussed the anatomy of the hip joint and the movements that are possible in the hip joint to remind you that what is the hip joint? The articulation involving the hip bone or the rather the acetabulum of the hip bone or the socket of the hip bone with the long bone of the thigh that is essentially only one bone in the thigh. That is, the femur which is a long bone.

The head of the femur or the ball of the femur articulation that is called as a hip joint. Responsible a very crucial function is weight bearing. And weight bearing during dynamic activity such as walking running, jumping and so on and so, forth all those things made bearing. Movements forward, backward movements they said flexion extension, medial, lateral movements or sideways moments, abduction, adduction and rotation, internal and external rotation. This is what we saw in the previous class.

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In this class...

- Muscles of the hip ✓



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In this video we will be looking at muscles of the hip. So, what are the muscles that are responsible for these moments that we just now discussed?

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Muscles of the Hip - Iliopsoas group

Muscle	Movement	Origin	Insertion
<u>Psoas major</u>	<u>Flexion and lateral rotation</u>	<u>Lumbar vertebrae (L1-L5); Thoracic vertebrae (T12)</u>	<u>Lesser trochanter of femur</u>
<u>Iliacus</u>	<u>Flexion and lateral rotation</u>	<u>Iliac fossa; Iliac crest; lateral sacrum</u>	<u>Lesser trochanter of femur</u>

Superficial pelvic and thigh muscles of right leg (anterior view)

© Harvard Thigh Muscles: <https://openstax.org/books/anatomy-and-physiology-2e/pages/11-6-appendicular-muscles-of-the-pelvic-girdle-and-lower-limbs> (Accessed on 4th Jan 2022)

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What are these moments? Flexion extension, abduction adduction and rotation. Most of the muscles insert on the femur that makes sense. Because that is the movable more movable part, it is not like the hip is going to move by itself and the hip is the more proximal part. So, the insertion of most of the muscles is on the femur or the thigh bone and they move the thigh bone. And they rotate it and the so, the origin of these muscles mostly is on the pelvic girdle very so, there are very large muscle.

Some of these muscles are relatively big, huge muscles. So, the origins of most of these muscles is on the pelvic girdle. The insertion of most of these muscles is under thigh bone or

the femur. The psoas major and iliacus together form what is called as the iliopsoas group. The iliopsoas group comprises of these two muscles. One is the psoas major and the other is iliacus. The psoas major is responsible for flexion and lateral rotation. What is the origin?

Look, the origin is the lumbar vertebra, relatively more superior structure. So, somewhere in the spine, not somewhere in the spine. It is not that far if you go back to the hip, this is the sacrum and this is the tailbone that is the coccyx and this is the lumbar spine. This is where the muscles originate and this is where they attach. So, through the back anterior view. So, as major and iliacus and they are present.

This is the attachment and this is a attachment. And the insertion is on the lesser trochanter of the femur. The iliacus also is responsible for flexion and lateral rotation. This originates and the iliac fossa and the iliac crest and the lateral sacrum. So, going back somewhere here on the back side and this somewhere here. And the attachment is on again, the insertion is on the lesser trochanter of the femur. There is only one of the many groups of muscle this is the iliopsoas group.

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Muscles of the Hip - Gluteal group

Muscle	Movement	Origin	Insertion
Gluteus maximus	Extension	Dorsal ilium; sacrum; coccyx	Gluteal tuberosity of femur; iliotibial tract
Gluteus medius	Abduction	Lateral surface of ilium	Greater trochanter of femur
Gluteus minimus	Abduction	External surface of ilium	Greater trochanter of femur
Tensor fascia latae	Flexion; abduction	Anterior aspect of iliac crest; anterior superior iliac spine	Iliotibial tract

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Then you have the big muscles that form the muscles of the butt some of the largest muscles. These are called as gluteus maximus, gluteus medius and gluteus minimus. These are among the largest muscles and they are also among the most powerful of the muscles within the human body. This is called as the gluteal group or the muscles of the gluteus or the glutes to be short. So, the most superficial, the largest and the most superficial, is the gluteus maximus muscle, more deep is the gluteus medius.

And even more deep is the gluteus minimus muscle. The size also reduces, as it goes deeper something to keep in mind. There is one more muscle which is the tensor fascia latae. This is the muscle that is more, square like that is found on the side of the thigh on the lateral thigh on the side of the thigh. It is a synergist to the glutes and the iliopsoas its purpose is in flexion and in abduction of the thigh.

So, gluteus maximus, its purpose is extension of the thigh. Its origin is in the dorsal ilium and in the sacrum and the coccyx, a relatively big muscle. Its insertion is on the gluteal tuberosity of the femur iliotibial tract so, again, a relatively large muscle. Gluteus medius its function, is abduction, its origin is on the side of the ilium lateral surface of the ilium insertion is greater trochanter of the femur.

Gluteus minimus is a more deep muscle relatively smaller its function is abduction. It is on the outside or the external surface of the ilium, the iliac bone and its insertion, is on the greater trochanter of the femur. And the other muscle is tensor fascia latae. Its function is friction and abduction. It is found on the anterior aspect of the iliac crest and anterior superior side of the iliac spine and the insertion is on the iliotibial tract.

So, what you are seeing is function that is performed by these muscles are abduction, extension, flexion, abduction.

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Muscles of the Hip - Adductors

Muscle	Movement	Origin	Insertion
<u>Adductor longus</u>	Adduction; flexion	Pubis near pubic symphysis	Linea aspera
<u>Adductor brevis</u>	Adduction; flexion	Body of pubis; inferior ramus of pubis	Linea aspera above adductor longus
<u>Adductor magnus</u>	Adduction; flexion; extension	Ischial rami; pubic rami; ischial tuberosity	Linea aspera; adductor tubercle femur

Note: Other important muscles of the hip joint are discussed later along with the muscles of the knee joint.

*Hip and Thigh Muscles: <https://openstax.org/books/anatomy-and-physiology-2e/pages/11-6-appendicular-muscles-of-the-pelvic-girdle-and-lower-limbs> (Accessed on 4th Jan 2024)

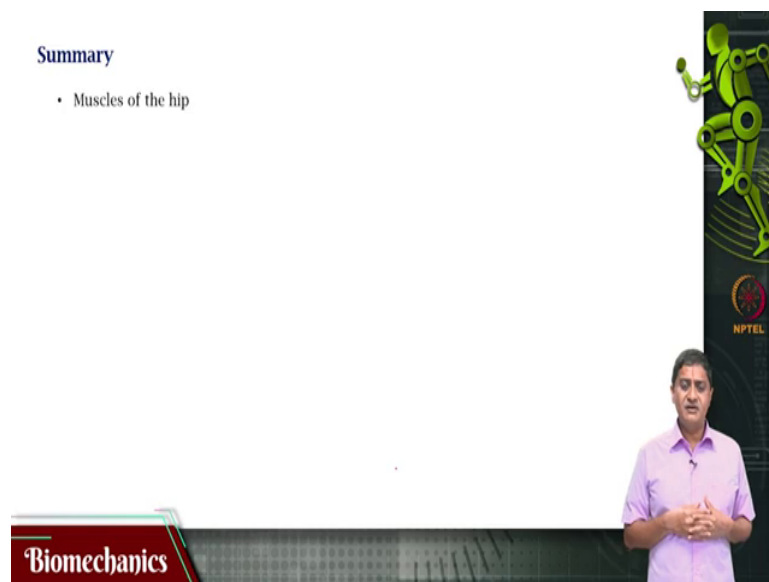
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We are not done yet because we have only seen abduction so far. There will be some adductors of the muscle. Adductors of this muscle these are adductor longus, adductor brevis and adductor magnus. These are the muscles that are responsible for adduction movement towards the medial side. The other role is also to rotate the muscle on the side or rather lateral rotation depending on the placement of the foot.

It can also do lateral rotation, the adductor longus flexes the hip or flexes the thigh rather flexes the thigh, whereas the adductor magnus extends it. Some other muscles they are not discussing because these are discussed along with the muscles of the knee joint because it turns out that there is an amount of sharing that happens between these muscles and their functions.

This leads to a relatively complicated relationship in biomechanics or biomechanical relationship between hip joint and the knee joint how the movement of the one can affect the movement in the other joint. Something that is better discussed as part of the discussion on knee joint.

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So, with this we come to the end of this video in this video, we discussed the muscles of the hip. What are these muscles? The muscles of the iliopsoas group, the glutes and the adductor muscles with this we come to the end of this lecture. Thank you very much for your attention.