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# Lecture Title : Marking of Bones for Insertion and Origins of Skeletal Muscle - II Introduction

Hello and welcome to yet another module on physical education. Now in this very vivid and practical demonstration we will be telling you about the insertion of skeletal muscles to the bones, the various points where the skeletal muscles are attached to the bones and how they function, let's have a look.

The latissimus dorsi, meaning 'broadest [muscle] of the back' (Latin latus meaning 'broad', latissimus meaning 'broadest' and dorsum meaning the back), is the larger, flat, dorso-lateral muscle on the trunk, posterior to the arm, and partly covered by the trapezius on its median dorsal region. Latissimi dorsi are commonly known as "lats", especially among bodybuilders.

The latissimus dorsi is responsible for extension, adduction, transverse extension also known as horizontal abduction, flexion from an extended position, and (medial) internal rotation of the shoulder joint. It also has a synergistic role in extension and lateral flexion of the lumbar spine.

The number of dorsal vertebrae to which it is attached varies from four to eight; the number of costal attachments varies; muscle fibers may or may not reach the crest of the ilium.

A muscular slip, the axillary arch, varying from 7 to 10 cm in length, and from 5 to 15 mm in breadth, occasionally springs from the upper edge of the latissimus dorsi about the middle of the posterior fold of the axilla, and crosses the axilla in front of

the axillary vessels and nerves, to join the under surface of the tendon of the pectoralis major, the coracobrachialis, or the fascia over the biceps brachii. This axillary arch crosses the axillary artery, just above the spot usually selected for the application of a ligature, and may mislead a surgeon. It is present in about 7% of the population and may be easily recognized by the transverse direction of its fibers. Scientists extensively described this muscular variant using MRI data and positively correlated its presence with symptoms of neurological impingement.

A fibrous slip usually passes from the upper border of the tendon of the Latissimus dorsi, near its insertion, to the long head of the triceps brachii. This is occasionally muscular, and is the representative of the dorsoepitrochlearis brachii of apes. This muscular form is found in  $\sim$ 5% of humans and is sometimes termed the latiss imocondyloideus.

### **Muscles of Arm**

The triceps brachii muscle (Latin for "three-headed muscle of the arm") is the large muscle on the back of the upper limb of many vertebrates. It is the muscle principally responsible for extension of the elbow joint (straightening of the arm).

The long head arises from the infraglenoid tubercle of the scapula. It extends distally anterior to the teres minor and posterior to the teres major.

The medial head arises proximally from the groove of the radial nerve; from the dorsal (back) surface of the humerus; from the medial intermuscular septum; and its distal part also arises from the lateral intermuscular septum. The medial head is mostly covered by the lateral and long heads, and is only visible distally on the humerus.

The lateral head arises from the dorsal surface of the humerus, lateral and proximal to the groove of the radial nerve, from the greater tubercle down to the region of the lateral intermuscular septum.

Each of the three fascicles has its own motorneuron subnucleus in the motor column in the spinal cord. The medial head is formed predominantly by small type I fibers and motor units, the lateral head of large type IIb fibers and motor units and the long head of a mixture of fiber types and motor units. It has been suggested that each fascicle "may be considered an independent muscle with specific functional roles."

The fibers converge to a single tendon to insert onto the olecranon process of the ulna (though some research indicates that there may be more than one tendon) and to the posterior wall of the capsule of the elbow joint where bursae (cushion sacks) are often found. Parts of the common tendon radiates into the fascia of the forearm and can almost cover the anconeus muscle.

#### **Gluteal Muscles Origin**

The gluteal muscles are a group of three muscles which make up the buttocks: the gluteus maximus, gluteus medius and gluteus minimus. The three muscles originate from the ilium and sacrum and insert on the femur. The functions of the muscles include extension, abduction, external rotation and internal rotation of the hip joint.

The gluteus maximus arises from the posterior gluteal line of the inner upper ilium, and the rough portion of bone including the crest, immediately above and behind it; from the posterior surface of the lower part of the sacrum and the side of the coccyx; from the aponeurosis of the erector spinae (lumbodorsal fascia), the sacrotuberous ligament, and the fascia covering the gluteus medius. The fibers are directed obliquely downward and lateralward; The muscle has two insertions: Those forming the upper and larger portion of the muscle, together with the superficial fibers of the lower portion, end in a thick tendinous lamina, which passes across the greater trochanter, and inserts into the iliotibial band of the fascia lata; and the deeper fibers of the lower portion of the muscle are inserted into the gluteal tuberosity between the vastus lateralis and adductor magnus. Its action is to extend and to laterally rotate the hip, and also to extend the trunk.

The gluteus medius muscle originates on the outer surface of the ilium between the iliac crest and the posterior gluteal line above, and the anterior gluteal line below; the gluteus medius also originates from the gluteal aponeurosis that covers its outer surface. The fibers of the muscle converge into a strong flattened tendon that inserts on the lateral surface of the greater trochanter. More specifically, the muscle's tendon inserts into an oblique ridge that runs downward and forward on the lateral surface of the greater trochanter.

The gluteus minimus is fan-shaped, arising from the outer surface of the ilium, between the anterior and inferior gluteal lines, and behind, from the margin of the greater sciatic notch. The fibers converge to the deep surface of a radiated aponeurosis, and this ends in a tendon which is inserted into an impression on the anterior border of the greater trochanter, and gives an expansion to the capsule of the hip joint.

## The Quadriceps

The quadriceps femoris (Latin for "four-headed muscle of the femur"), also called simply the quadriceps, quadriceps extensor, or quads, is a large muscle group that includes the four prevailing muscles on the front of the thigh.

It is the great extensor muscle of the knee, forming a large fleshy mass which covers the front and sides of the femur.

All four parts of the quadriceps muscle ultimately insert into the tuberosity of the tibia. This is via the patella, where the quadriceps tendon becomes the patellar ligament, which then attaches to the tibia.

In addition, recent cadaver studies have confirmed the presence of a sixth muscle, the tensor vastus intermedius. While the muscle has variable presentations, it consistently originates at the proximal femur, runs between the vastus lateralis and vastus intermedius muscles, and inserts distally at the medial aspect of the patellar base. Historically considered a part of the vastus lateralis, the tensor vastus intermedius muscle is innervated by an independent branch of the femoral nerve and its tendinous belly can be separated from the vasti lateralis and intermedius muscles in most cases.

Now there is a small description below of this group.

Muscle	Origin	Insertion	Nerve
<u>semitendinosus</u>	ischial tuberosity	medial surface of tibia	tibial part of sciatic
semimembranos us	ischial tuberosity	medial tibial condyle	tibial part of sciatic
biceps femoris - long head	ischial tuberosity	lateral side of the head of the fibula	tibial part of sciatic
biceps femoris - short head	linea aspera and lateral supracondylar line of femur	lateral side of the head of the fibula (common tendon with the long head)	common peroneal

In humans, the gastrocnemius muscle (referring to the bulging shape of the calf) is a very powerful superficial bipennate muscle that is in the back part of the lower leg. It runs from its two heads just above the knee to the heel, a two joint muscle.

The gastrocnemius is located with the soleus in the posterior (back) compartment of the leg. The lateral head originates from the lateral condyle of the femur, while the medial head originates from the medial condyle of the femur. Its other end forms a common tendon with the soleus muscle; this tendon is known as the calcaneal tendon or Achilles Tendon and inserts onto the posterior surface of the calcaneus, or heel bone.

#### Conclusion

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So in this episode you have seen in a very vivid and practical demonstration that how the various skeletal muscles are attached to the bones in a very specific manner according to their specific roles. So I hope that the information provided in this episode was of some use to all of you. Thank you so much for watching.