Essentials of Sports Injury Prevention & Rehabilitation

Lt Col (Dr.) Atul Sharma

Deptt. Of Physical Medicine and Rehabilitation

Command Hospital (SC), Pune

Lecture – 11

Anatomy of Lower Limb

Good morning everyone, myself Dr. Atul Sharma, your guide of essential of sports injury prevention and rehabilitation. In this lecture, we are going to study about relevant anatomy of lower limb. In this, we first study about the thigh bone, tibia and fibula that is our calf bone, tarsal bones that is our ankle bones, and foot bone that is metatarsal and phalangeal bones. In this we are going to read about the muscles of our lower limb. So, first we start the anatomy of lower limb femur muscle, femur is the largest bone of our body, and with pelvic girdle it makes the hip joint and with tibia and fibula it makes knee joint.

This is the largest bone and of our body part. It has head, neck, shaft and condyles, that is medial and lateral condyles. Common problem is fracture of the shaft of femur bone but fracture of femur is very serious. A fracture of femur accounts for 1 to 1.5 litre or more than that blood loss. Then comes our next bone, that is tibia and fibula. It is our calf bones, tibia is our medial bone and slightly thicker, fibula is thinner bone and lateral bone. The head of inner bone is tibia, that is medial bone; and the lateral bone is fibula. The lower end makes the medial malleolus by tibia and lateral malleolus by the fibula, and it makes knee joint on the upper side and ankle joint on the lower side.

Tarsal bones: it made up of talus that is it lying between the calcaneus and the talofibular joint. Calcaneus, then navicular, cuneiforms; these are 3 bones (medial cuneiform, intermediate cuneiform, lateral cuneiform), and cuboid and metatarsals and phalanges, same like the hand the lower limb has metatarsals and phalanges. Same for the great toe: only two phalanges are there, and rest of the fingers have three phalanges. The main function of our foot is weight bearing. Weight bearing occurs on three-point system: heel, great toe and little toe. These transfer our entire body weight.

So, little toe has crucial role in the weight transfer of our body. Now comes muscles of the lower limb, quadriceps muscles these are the main extensors of the thigh; quadriceps muscles, hamstring muscles, flexors of knee, main extensor of thigh or knee joint, gluteal muscles, main extensor and abductors of hip joint. Gluteal muscles are three in number: gluteus maximus, gluteus medius and gluteus minimus. Then iliopsoas and rectus femoris, these are the main flexor of hip joint. Adductor magnus and adductor intermedius are main adductors of the hip joint. Then comes the muscles of our calf: Tibialis Anterior which does dorsiflexion and

inversion of our foot. Tibialis Posterior which does plantar flexion and inversion. Peroneus longus and peroneus brevis which causes eversion and plantar flexion.

Then the gastrosoleus which are also known as heart of lower limb, or second heart of our body, plantar flexion of ankle and knee flexion. Now again, I am going to repeat or revise you about the anatomy of lower limb. Femur bone which is the largest bone has a head, neck, shaft, medial and lateral condyle. Tibia and fibula: in the upper it makes knee joint in the lower it makes the ankle joint. Tarsal bones, talus, calcaneus, navicular, cuneiform and cuboid.

Cuneiforms are three bones medial, intermediate and lateral. Metatarsal and phalanges 5 in numbers. Great toe has 2 phalanges, other toes have 3 phalanges; and in the weight bearing heel great toe and little toe makes the weight bearing part of our foot. Muscles: quadriceps muscle which is the main extensor of our knee; hamstring main flexor of our knee. Gluteal muscles are the main extensor and abductors of hip joint, iliopsoas and rectus femoris which is the main flexor of our hip joint, and adductor muscles are main adductors of hip joint.

Tibialis Anterior and Tibialis Posterior: dorsiflexion and plantar flexion of our feet and inversion of our feet. Peroneus longus and brevis do plantar flexion and eversion. Gastrosoleus do plantar flexion of ankle and little bit of knee flexion. Movements which occur on the lower limbs are: at hip joint: flexion, extension that is when you extend your hip joint, abduction, adduction, internal rotation and external rotation. At knee joint: mainly flexion and extension when you flex little bit of your knee joint then slightly medial and lateral rotation is also possible. At ankle there is only dorsiflexion, plantar flexion, inversion and eversion. So, in this lecture we have read about relevant anatomy of lower limb, the bones, muscles, joint movements.

Now in the next lecture we will study about the injuries of upper limb, common injuries of upper limb, common injuries of lower limb and their causes, their biomechanics. So, now I finish this lecture. Thank you so much.