

The Hip Joint: Part One

By Tracy Anderson

The hip joint is the uppermost joint of the lower extremity. Like the shoulder joint, the hip joint is a triaxial joint, allowing movement in all three planes. This joint is very important during weight bearing and walking activities. Unlike the shoulder joint, the hip is a more stable joint, but it does sacrifice some range of motion, for this stability. This joint is susceptible to injury during falls, especially in the elderly, who may have more brittle bones.

The hip joint is a ball and socket joint, with the rounded convex femoral head articulating with the acetabulum of the hip bone. The joint consists of the femur, os coxae (hip bone), joint capsule and its corresponding ligaments, tendons and muscles. This article will serve to provide a general overview of the joint, leaving out some of the smaller muscles and other structures.

Since this joint is a triaxial joint, it allows motion in all three planes, the sagittal, frontal, and transverse. Flexion, extension and hyperextension are all performed in the sagittal plane, with about 120 degrees of flexion, and 15 degrees of hyperextension. Extension of the hip occurs when the joint returns to anatomical position after being flexed. Anatomical position for the legs is basically a standing position. Adduction and abduction occur in the frontal plane with about 45 degrees of abduction and about 25 degrees of adduction past the anatomical stance. Internal and external rotation occur in the transverse plane and about 45 degrees of both motions are possible.

While stretching legs during your workouts, observe these ranges of motion, you then would be able to tell if your joint capsule and muscles are limber enough to continue without injury. If you are recovering from an injury, these ranges can provide a goal to work toward. The hip joint is very important in every day life activities, and as with any joint, this joint should be taken care of to ensure continued pursuit of your fitness goals.

Like all synovial joints the hip joint has a fibrous joint capsule, and three ligaments that reinforce it. The three ligaments are the iliofemoral, pubofemoral and ischiofemoral. These three ligaments help keep the head of the femur joined with the hip bone. They also limit motion in a given direction, with each ligament having its own assignment. There are many other ligaments associated with the hip joint, but for the purpose of this article, we will forgo further discussion of them.

Like the shoulder joint, the hip joint has many muscles that act as either stabilizers, assisting, neutralizers or prime movers. Again to stay within the scope of this article, I will only discuss some of the larger muscles. The muscles to be discussed are the iliopsoas, rectus femoris, sartorius, pectineus, the three adductor muscles, gracilis, gluteus maximus, deep rotator muscles (collectively), the three hamstring muscles, gluteus medius and minimus and the tensor fascia latae muscle. This , part one, article will focus on the anterior portion of the hip joint, and next month will continue with the posterior portion. Each article will contain some injury and recovery information, and applications of exercise.

The iliopsoas muscle begins from the iliac fossa and portion of the lower back. Then it inserts onto the lesser trochanter of the femur. Its function is to flex the hip. Remember that flexion means to decrease the angle of the joint. Flexion of the hip is

done during movements such as the squat, leg press, lunges, running and most any other activity that requires your knee to be in front of you. This muscle also contributes to trunk flexion when the femur (upper leg) is stabilized.

The rectus femoris muscle originates (starts) from the front portion of the inferior side of the hip bone, and then cross the knee to insert onto the tibial tuberosity. This muscle is one of the quadricep muscles, and it also is a prime mover during knee extension. The rectus femoris also is a prime mover during hip flexion, and since this article is about the hip joint, I will save the knee discussion for a coming article.

The sartorius muscle originates from the front portion of the superior side of the hip bone, and inserts onto the upper inside of the tibia. This muscle is the longest muscle of the body, and is not a prime mover during motion in the three planes. Its function allows a combination of hip flexion, abduction and external rotation. This muscle is most efficient during movement of all three, such as crossing your legs. This muscle is very important to football and soccer players, who may twist their leg and apply power for movement at the same time.

The pectineus muscle is a small muscle and allows hip flexion and adduction. It originates from the top of the pubis and inserts onto the top portion of the inside femur. Sometimes this muscle is easily strained and a sharp pain can be felt just outside the groin area.

The three adductor muscles originate from different parts of the pubis bone and insert on different parts of the femur. The adductor longus, brevis and magnus all function during hip adduction. The adductor magnus is the largest of the three, and makes up most of the inner thigh, and is the strongest hip adductor muscle.

The gracilis muscle is the only hip adductor muscle that spans two joints. This muscle originates from the pubis and inserts onto the inside-top portion of the tibia.

Exercises that will help strengthen the hip joint are most any compound exercise involving the leg and adduction and abduction. Adduction is simply moving the leg toward the middle of the body, and abduction is moving the leg away from the body. These muscles should be paid special attention to in athletes that use their legs often and in elderly. If the hip joint is strengthened and the range of motion maintained, then when an elderly person does fall he, or she, will be more likely to avert injury, or atleast recover at a faster rate.

Athletes that injure a groin muscle, usually actually injure one of the adductor muscles. By knowing the function and placement of these muscles, you should be better able to massage the area, and place ice or heat on the injured muscle. Some of the muscle in the hip are small, and have more to do with stabilization, than with movement of the joint. These smaller muscles can be subject to an overuse syndrome, often seen in high school athletes, who will participate in sports continuously. Their developing bodies must be given the opportunity to rest and recovery from the strenuous activity that is sometimes required during these sports.

Next moth I will continue with the hip joint and wrap up the joint with common injuries and rehabilitation strategies. If you feel you have injured your hip, or have a chronic pain in this area, seek a qualified physician or therapist, so they may correctly identify the problem and help you start the healing process.

This is my fourth article in this magazine, and I thank you for your feedback. If you have any questions or comments, you can reach me through my web site at www.LFNonline.com or through Parrillo.com. I welcome your thoughts and suggestions.