

Osteoarthritis Of Hip In Young Adults

Essay

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بسم الله الرحمن الرحيم

وما أوتيتم من العلم إلا قليلا

صدق الله العظيم

الاسراء آية ٨٥



Dedication

To my *Father* and *Mother*

To my *Wife* and *Children* **Marwa** and **Abdullah**

To my *Brothers* and all *Family*

Who support me well

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ANATOMY OF THE HIP JOINT

ANATOMY OF THE HIP JOINT

The hip is a synovial joint of a ball and socket variety. Its stability is largely the result of the adaptation of the articulating surfaces of the acetabulum and femoral head to each other, and its greater mobility results from the femur having a neck that is much narrower than the equatorial diameter of the head.

The **acetabulum** is formed by fusion of the three components of the os innominatum: ilium, ischium, and pubis that meet at the Y shaped cartilage. The acetabular articular surface is C-shaped, covered with hyaline cartilage. Its peripheral edge is deepened by a rim of fibrous tissue called the **Labrum acetabulare**, which is continued across the acetabular notch to produce the transverse ligament which gives attachment to the ligament of the head of the femur. The opening of the acetabulum faces downwards and forwards, about 30 degrees in each direction. The central non-articular part of the acetabulum is occupied by a pad of fat known as the Haversian pad.

The spherical head of femur is adapted to the concavity of the articular surface of the acetabulum. The neck of the femur is narrower than the equatorial diameter of the head. Normally the neck shaft angle is around 160 degrees

in a child, decreasing to around 125 degrees in adult life. This angle is mechanically important because the further away the abductor muscles from the hip, the greater is their leverage and their efficiency.

The **capsule** is attached proximally circumferentially around the labrum acetabulare and transverse ligament, then it passes laterally, like a sleeve, to be attached to the neck of the femur. Anteriorly, it is attached to the intertrochanteric line, but posteriorly attached halfway along the femoral neck. From these attachment the fibres of the capsule are reflected back along the neck of femur to the articular margin of the head.

The **synovial membrane** lines the inner surface of the capsule and covers the ligamentum teres and the labrum glenoidale. It is reflected distally upon the neck of the femur and covers the latter as far proximally as the margin of the articular cartilage. At the distal synovial reflection, some of the fibres of the capsular ligament are likewise reflected and run upward on the femoral neck, raising the synovium as ridges called retinaculae. The retinacular folds are prominent over the posterior aspect of the neck where they enclose cervical arteries that constitute the main vascular supply to the femoral head.

LIGAMENTS OF THE HIP:

1.) Three major ligaments are represented by capsular thickenings:

- a. Iliofemoral ligament , shaped like an inverted Y is the thickest and strongest part of the capsule. It is located anteriorly and as it passes distally toward the trochanteric line, it divides into two separate bands. The lowermost band passes obliquely downward and is tightened when the hip is fully extended. The Y ligament is the chief stabilizer of the hip in the erect standing position. It is 1/4 inch thick and is rarely disrupted by trauma. Its preservation prevents excessive displacement and provides a fulcrum about which manipulative reduction of dislocation and fracture can be affected.
- b. The pubofemoral ligament is a capsular thickening at the inferior aspect of the capsule, it passes from the iliopubic eminence and obturator crest to the capsule in the inferior part of the neck of the femur. Abduction combined with extension of the hip pulls it tight.
- c. The ischiofemoral ligament is a weak band within the posterior capsule. It arises from the postero-inferior margin of the acetabulum, and its fibres,

passing laterally to the capsule, spiral upwards and are continued into a band of fibres, that run in the capsule transversely around the neck of the femur.

2.) The transverse ligament of the acetabulum is a strong band of fibers that bridges and is attached to the margins of the acetabular notch. It completes the rim of the acetabulum. The vessels and nerves (branches from obturator artery and nerve) enter the joint through the foramen beneath the ligament.

3.) The ligamentum teres, the ligament of the head of the femur, is flat and fan shaped. Its narrow end is inserted into a pit in the femoral head, its flattened end is bifurcated and attached to the transverse ligament. A small artery runs along the ligamentum teres to the head of the femur.

NERVE SUPPLY : The famous Hilton's Law states that the nerve supply of a muscle tends to give a branch of supply to the joint which the muscle moves and another branch to the skin over the joint. Accordingly, the hip joint is supplied by the three nerves of the pelvic girdle and lower limb : the femoral nerve via the nerve to rectus

femoris, the sciatic nerve via the nerve to quadratus femoris and the obturator nerve directly from its anterior division (Last, 1984).

VASCULAR ANATOMY OF UPPER END OF FEMUR

Knowing the normal arterial supply to the proximal end of the femur in the human during fetal life and childhood plays an important role in understanding of Legg-Calve-Perthes disease , avascular necrosis , slipped capital femoral epiphysis, osteomyelitis, fracture of femoral neck and other disease processes which affect the femoral head.

The most appropriate description of the arteries of the proximal end of the femur done by Crock (1980) where he describes them in three groups:

1. An extracapsular arterial ring located at the base of the femoral neck.
2. Ascending cervical branches of the extracapsular arterial ring on the surface of the femoral neck.
3. The arteries of the ligamentum teres.

The extracapsular arterial ring is formed posteriorly a by large branch of the medial femoral circumflex artery and anteriorly by branches of the lateral femoral circumflex artery (Fig. 1). The superior and inferior gluteal arteries also have minor contributions to this ring.

The ascending cervical branches arise from the extracapsular ring. Anteriorly they penetrate the capsule of the hip joint at the intertrochanteric line , and

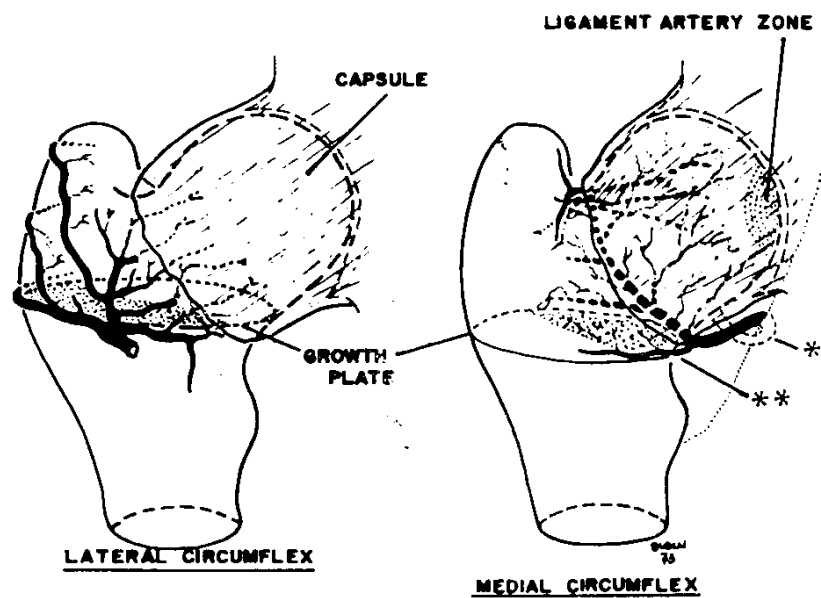


Figure (1) : The medial and lateral circumflex femoral arteries are the main blood supply to the developing proximal end of femur. The artery of the ligamentum teres supplies a small medial area of the femoral head.

posteriorly, they pass beneath the orbicular fibers of the capsule.

The ascending cervical branches pass upward under synovial reflections and fibrous prolongation of the capsule towards the articular cartilage that demarcates the femoral head from its neck. These arteries are known as retinacular arteries, described initially by Weitbrecht (Rockwood, 1984). As the ascending cervical arteries traverse the superficial surface of the neck of the femur, they send many small branches into the metaphysis of the femoral neck.

The ascending cervical arteries can be divided into four groups anterior, medial, posterior and lateral based on their relationship to the femoral neck. Of these four the lateral provides most of the blood supply to the femoral head and neck (Crock, 1980). At the margin of the articular cartilage on the surface of the neck of the femur these vessels form a second ring termed the sub-synovial intra-articular ring (Chung, 1976). This ring was initially termed the circulus articuli vasculosis by William hunter in 1743.

The artery of the ligamentum teres is a branch of the obturator or the medial femoral circumflex artery (Howe, 1950). Although the vessels of the ligamentum teres did