بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــســـم ﴾

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لم ترد بالأصـــل

ROLE OF MAGNETIC RESONANCE IMAGING (MRI) IN EVALUATION OF PAINFUL HIP IN ADULTS

Thesis

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The hip is a particularly well-designed joint with motion possible in all directions and great natural stability. It is subjected to tremendous loading forces due to gravity and to the strong muscles that cross the joint. The proper function of this joint requires congruity of the spherical surfaces of the femoral head and acetabulum, as well as balanced muscular forces [1].

Embryology:

The hip joint arises as a single block of tissue at about 4 to 5 weeks gestational age. At 2 months after fertilization (30 mm crown-rump length) the end of the embryonic and beginning of the fetal period, the hip joint has been completely formed in cartilage and its blood supply is established [2]. The acetabulum is formed by the fusion of the cartilaginous ilium and ischium, and these in turn by fusion with the pubis form the hip bone. The adult proportions of the hip bone are two-fifths ischium, two-fifths ilium, and one-fifth pubis [3].

By 20 weeks of gestation, the fetus is completely formed, and the femoral shaft and the acetabulum are ossifying. The femoral head and greater trochanter remain cartilaginous, and will stay in this form until on average, 3 to 6 months post-partum when the secondary ossification center of the femoral head appears radiologically [3].

The neck-shaft angle, angle of declination (ante version or retro version), acetabular orientation, and acetabular depth all change during fetal development, but normal values and relevance to congenital abnormalities are controversial [1].

Anatomy: Figure (1)

The hip joint is the most perfect example in the body of ball and socket joint. It exhibits a wide range of motion in all directions. It shows great strength and stability; this arises from the depth of the acetabulum, which is increased by the labrum acetabulare; also by the tough ligaments and the strong surrounding muscles [4].

The acetabular cup is directed anteriorly and lateral relative to the pelvis and the femoral neck is directed posteriorly, which contributes more to the overall stability of the joint [5].

The femoral head:

The femoral head is spherical and covered by hyaline cartilage that acts as shock absorber as well as a growth center of capital femoral epiphysis during the pre-natal and post-natal development. The femoral head is completely cartilaginous at birth and the greater trochanter is part of this same cartilaginous block, the femoral neck begins to form only after birth.

During the first six months of post natal life, the cartilaginous femoral head is invaded by osteogenic cells and a secondary center of ossification forms which in turn creates the epiphyseal plate that remains open until the age of 13 to 14 years [6].

The femoral head articulates with the cup-shaped acetbulum, its center lying a little below the middle third of the inguinal ligament. Evidences favor spheroid and slightly ovoid surfaces, becoming almost

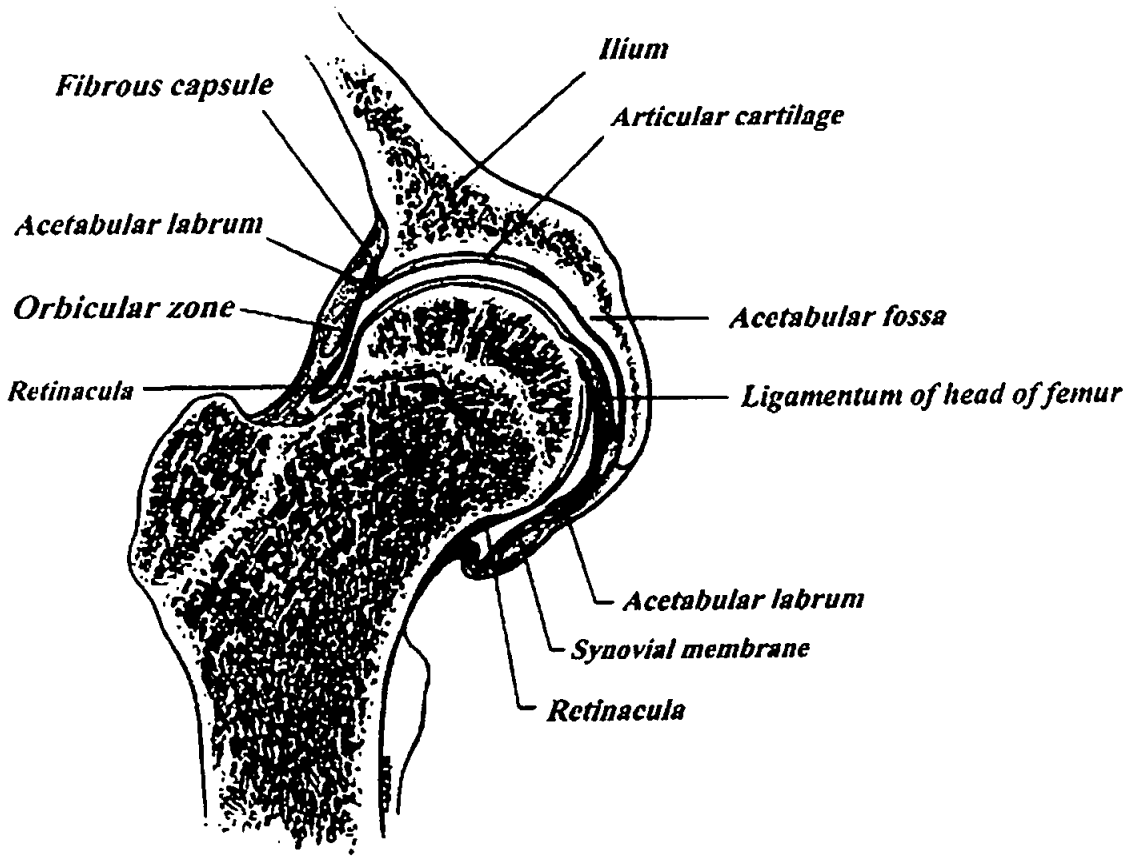

Figure 1. Coronal diagram of the hip joint [8]

spherical with advancing age. The femoral head is covered by hyaline cartilage except for a rough pit "fovea" for attachment of the ligament of the head "ligamentum teres"; in front the cartilage extends laterally over a small area on the adjoining neck; it is thickest centrally [7].

The acetabulum:

It is cup shaped, so the acetabular surfaces of the joint are reciprocally curved. The acetabular articular surface is an incomplete ring, the lunate surface, broadest above where pressure of the body weight falls in the erect position, the narrowest in the pubic region. It is deficient below opposite the acetabular notch and covered by articular cartilage, thickest where the surface is broadest [7].

The acetabular fossa within it is devoid of cartilage and occupied by the ligamentum teres and a large pad of fat called haversian gland or pulvinar. The articular cartilage of the acetbulum assumes a horseshoe shape resembling an inverted U. The tough ligament called transverse ligament bridges the 2 limbs of the U -shaped articular cartilage. The acetabulum is deepened superiorly by the fibro cartilaginous glenoid labrum, which is attached to the bony rim and transverse ligament. The free edge of the lip cups around the head of the femur, thus holding the ball firmly in the socket [7].

The limbus assists in deepening the concavity of the hip socket and thus giving more stability to the joint. The labrum lies inside the capsule that renders a potential source of obstruction to reduction of a dislocated joint [7].

The fibrous capsule:

Strong and tense, it is attached to acetabular margin 5-6 mm beyond its labrum, in front to the outer labral aspect and near the acetabular notch, to its transverse acetabular ligament and the adjacent rim of the obturator foramen. It surrounds the femoral neck and is attached in front to the trochanteric line; above to the base of the femoral neck; behind about 1 cm above the trochanteric crest; below to the femoral neck near the lesser trochanter [4].

The capsule is thickened antero-superiorly, where the maximal stress occurs, particularly on standing; postero-inferiorly it is thin and loosely attached [7].

The synovial membrane:

It lines the inner surface of the capsule. It is attached to and blends with the glenoid labrum and the transverse acetabular ligament. The ligamentum teres, the transverse acetabular ligament and the haversion gland are invested by the synovial membrane, and so these structures are extra-synovial [9].

Occasionally there is a communication between the hip joint cavity and bursa between the iliopsoas muscle and the joint capsule, in some instances through this synovial connection an effusion originating in the hip joint can present itself as inguinal simulating a hernia [9].