MAGNETIC RESONANCE OF THE ISCHAEMIC FEMORAL HEAD

ESSAY

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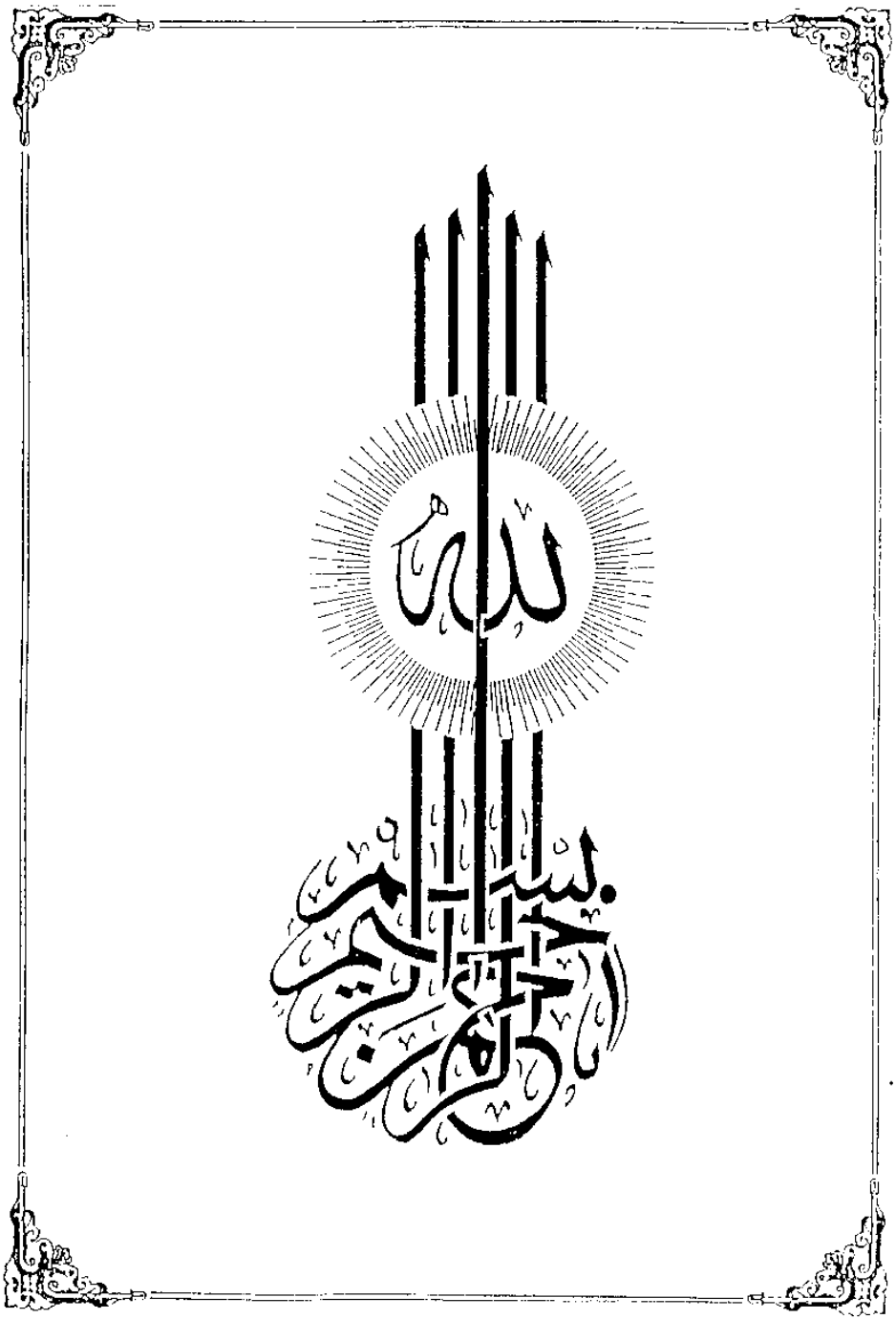
Amany Rashad.



A man cannot be measured by the colour of his skin,
or by his speech,
or by his clothes and jewels,
but only by his heart.

From, Sinuhe the Egyptian
by, Mika Waltari.

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INTRODUCTION AND AIM OF THE WORK

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Introduction and Aim of Work

Osteonecrosis of the femoral head causes considerable morbidity, including pain and subchondral bone collapse, culminating in secondary arthritis of the hip joint. As a result, it is of great importance to discover osteonecrosis in its initial stage before it is detectable on radiographs so that prompt therapeutic measures may be undertaken.

Non - invasive techniques used in detecting osteonecrosis other than plain radiography include tomography, skeletal scintigraphy, single photon emission computed tomography (S.P.E.C.T.), and computed tomography (C.T.). Although several modalities are available, non have proved clearly superior for non - invasive diagnosis of osteonecrosis in its initial stage, but since its introduction, magnetic resonance has attracted the attention of investigators searching for a sensitive, non - invasive test for the early detection of osteonecrosis because of its ability to depict the cellular changes that occur before fracture, collapse or repair.

The aim of this work is to demonstrate the role of magnetic resonance in the diagnosis of osteonecrosis of the femoral head in its initial stage.

CHAPTER (2)

THE ANATOMICAL STRUCTURE AND MR ANATOMY OF THE HIP JOINT

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The Anatomical Structure and MR Anatomy of the Hip Joint.

The hip joint is a multi - axial joint and of the ball and socket type. It is formed by the articulation of the head of the femur, directed upwards, medially, and slightly forwards, with the cup - shaped fossa on the lateral aspect of the hip bone, directed laterally, downwards, and forwards, known as the acetabulum (Fig. 2.1).

A part of the floor of the acetabulum is roughened and non - articular, termed the acetabular fossa, while the rest of the floor of the acetabulum forms an incomplete ring, termed the lunate surface and is the articular surface of the acetabulum. This lunate surface is broadest at its upper part where the pressure of the body weight falls in the erect attitude, and narrowest where it covers the pubic constituent (Fig. 2.2) *(Gray, 1989)*.

The margin of the acetabulum gives attachment to a thin fibrocartilagenous rim which is triangular in cross - section, known as the acetabular labrum and which increases the depth of the acetabulum and narrows its margin becoming fit closely on the head of the femur. The base of this rim is attached to the edge of the acetabulum and the apex corresponding to the free margin of the labrum. So the labrum acts as a sucker which resists outward displacement of the head and adds more stability to the hip joint.

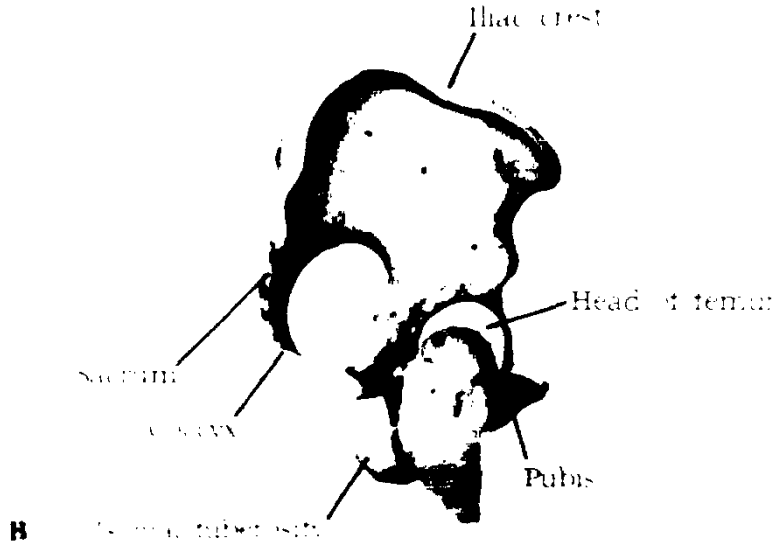

Fig 2.1

after Snell, 1978.

Fig 2.2

(after Snell. 1978)

The acetabulum is deficient below to form the acetabular notch that is bridged over by a ligament known as the transverse ligament, which in reality is a part of the acetabular labrum, converting the notch to the acetabular foramen through which the vessels and nerves enter the joint. The strong, flattened fibres of the transverse ligament cross the acetabular notch to complete the circle formed by the acetabular labrum which embraces the head of the femur closely to assist in holding it in its socket.

The articular surfaces of the head of the femur and the acetabulum are reciprocally curved and spheroid rather than spherical. The lunate surface of the acetabulum is covered with articular cartilage which is thickest where the surface is broadest, but the roughened part of the floor of the acetabular fossa within this surface is devoid of articular cartilage and lodges a fibroelastic pad of fat largely covered with synovial membrane (Fig. 2.3).

On the other hand, the head of the femur is completely covered with articular cartilage except over the small, roughened pit called the fovea to which the ligamentum teres of the head of the femur is attached (Fig. 2.4). This ligament is a triangular, somewhat flattened band implanted by its apex onto the fovea of the femoral head; its base is attached by two bands, one into each side of the acetabular notch, and between these bony attachments, it blends with the transverse ligament. As it lies within the joint, it is unsheathed by synovial membrane, so the ligament is intracapsular, extrasynovial. In front, the cartilage extends laterally to cover a small area on the adjoining part of the neck of the femur; it is thickest at the centre of the head, and thinner towards the periphery (*Gray, 1989*).

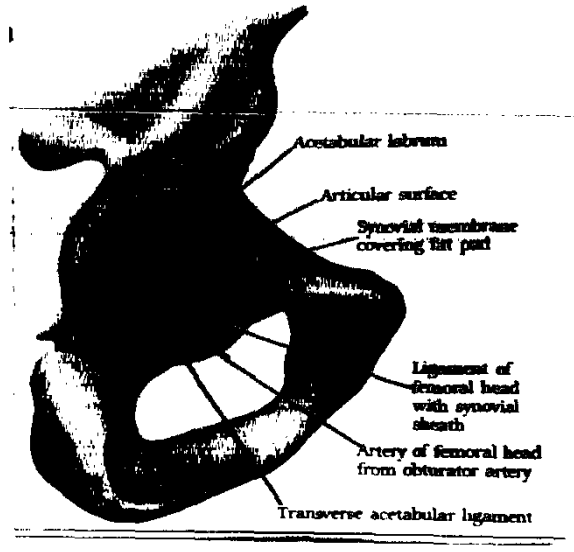

Fig. 2.3

after Sneil. 1978

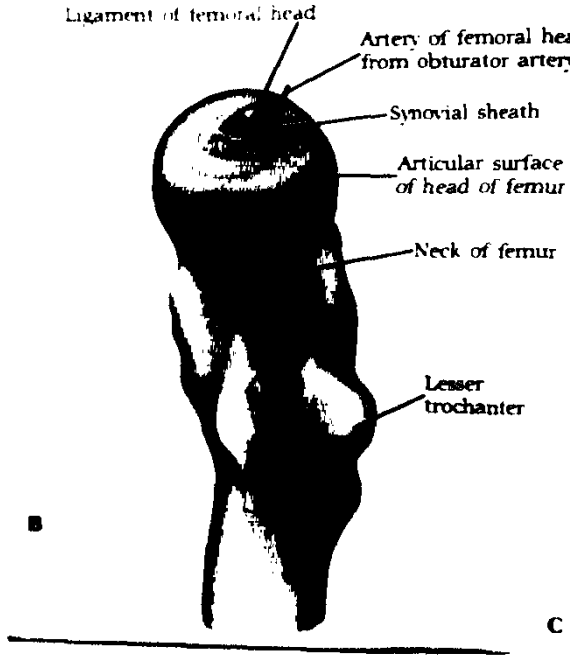

Fig. 2.4

after Sneil. 1978

The Capsule of the Hip Joint :

The hip joint capsule is a closely fitting fibrous ligament that attaches proximally around the brim of the acetabular labrum, and transverse acetabular ligament, and encircles the femoral head (Fig. 2.5 A and B).

The capsule attaches anteriorly along the intertrochanteric line and posteriorly along the junction of the middle and distal thirds of the femoral neck. The capsule is constricted along the narrowest part of the femoral neck by the zone orbicularis, a deep sling of collagenous fibres.

An inferior recess is formed by an impression made by the transverse ligament , which is situated at the inferior portion of the acetabulum. The iliopsoas muscle is anterior to the joint capsule, separated by the iliopsoas bursa with which the joint frequently communicates. The joint capsule encloses the femoral head, which is attached to the acetabulum by the ligamentum teres (*Mitchell, et al., 1986*) .

The Synovial Membrane of the Hip Joint :

Lining the inner surface of the capsule, the synovial membrane of the hip joint commences at the margin of the articular cartilage of the head of the femur. It covers the portion of the neck which is contained within the joint capsule, covers both surfaces of the acetabular labrum, unsheathes the ligament of the head of the femur, and covers the mass of fat contained in the acetabular fossa except the articular surface (*Gray, 1989*).