FRACTURE ACETABULUM

Thesis

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OF MASTER DEGREE IN

ORTHOPAEDIC SURGERY

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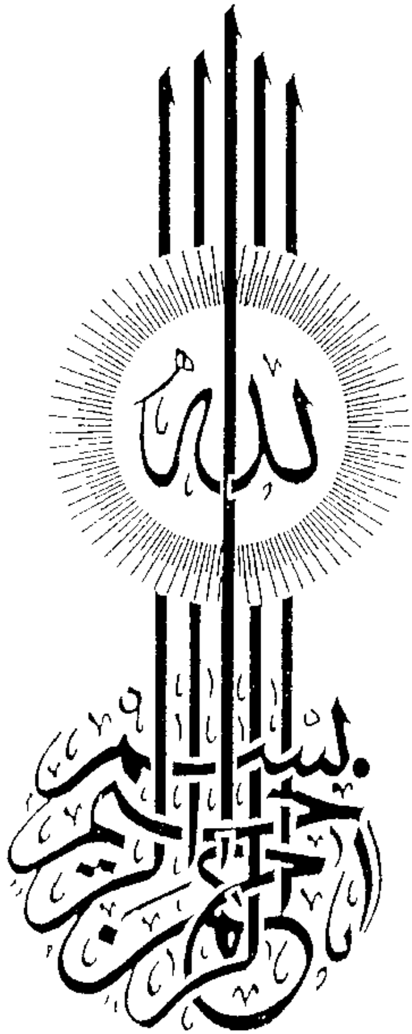
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INTRODUCTION

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Since the earlist description of acetabular fractures with intrapelvic penetration of the femoral head by **Callissen et al., in 1788,** there have been many reports dealing with these fractures **(Nerubay et al., 1973).**

Fractures of the acetabulum remain an enigma for the orthopedic surgeon **(Tile, 1980).**

They are relatively uncommon but it appears that there frequency is increasing with the number of automobiles on roads **(Judet et al., 1964), Nerubary et al., 1973** demonstrated the rarity of this lesion by the fact that during the past 20 years (1950-1969) only 107 of 33,659 admissions (0.31%) to the orthopedic service of their hospital.

When they occur they seem to pose management difficulties for the attending surgeon. These difficulties may be translated into high precentage of cases of per-mnanet disability. There are many reasons for this:

First, the anatomy of this region is complicated, making surgical approaches difficult.

Second, the patients often have major associated injury, making early operative treatment hazardous.

Third, the fractures are often severly comminuted leading, many surgeons, to believe that operative reduction is impossible.

Also, and unfortunately, the fractures are often missed.

Any patient who has been in motor vehicle accidents and sustained an injury to the region of the knee, or a fractured femur, must undergo X-ray examination of the hip to rule out this particular injury **(Tile, 1980).** Furthermore, individual variations between fractures occur, making it difficult to arrive at a simple classification or to outline the mangement of these patients.

This may explain the multiplicity of classification and great discrepancies between the reported results of conservative and surgical treatments **(Nerubay et al., 1973).**

As in most difficult situations, a return to basic principles may lead us to a more logical form of management for these unfortunate patients.

According to **Tile, 1980,** the ideal treatment would be the same as for any other displaced lower extremity joint fracture, to restore excellent function to a groosly displaced acetabular fracture, anatomical open reduction followed by stable internal fixation and early motion is necessary, "if technically possible". This princible has been proven experimentally and is a firm principle of the ASIF group.

The question "is it technically possible". The answer will depend on a precise knowledge of the patho-anatomy of the fracture and the principles of open reduction. Only in the past 20 years several large series have appeared that make it possible to evaluate the results of different forms of treatment.

ANATOMY OF ACETABULUM

ANATOMY

The acetabulum is a concavity located at the apex of an arch formed by two columns of bone, one posterior (ilioischial) and one anterior (iliopubic) (Fig.1) (**Shirkhoda et al., 1980**). It is formed by the fusion of the three component bones of the os innominatum Ilium, ischium and pubis meet at a Y shaped cartilage which forms their epiphyseal junction. The site of union, indicating the position of upper limbs of the Y shaped epiphyseal cartilage, can be seen on the os innominatum by a heaping up of bone at the iliopectineal eminence and at meeting place of ilium and ischium, and the stem of the Y is verticle and passes through the acetabular notch to the obturator foramen(**Last 1978**).

The spherical head of the femur fits into the acetabulum where it articulates with the C shaped lunate surface or a smooth horse shoe-shaped articular surface (Fig.2) **(Joseph 1969)**. Its inferior margin is lacking and it is widest at the upper part of the articular surface where there is the weight bearing area lying like a cap over the femoral head. The acetabular notch is converted into a foramen by a strong bands of fibers,

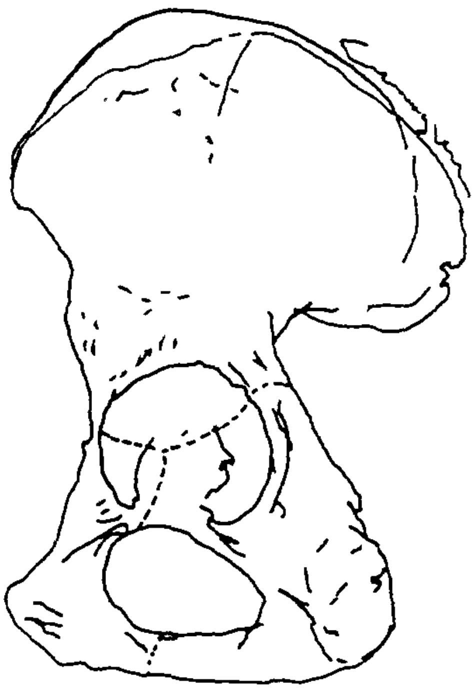

Fig. 1

Fig. 1: Diagram of the acetabulum viewed from the lateral side the dotted lines indicate the position of the anterior and posterior column. The posterior column extends up into the greater sciatic notch. The superior aspect of the acetabulum extending posteriorly from the anterior inferior spine through the posterior column is the very important dome segment. (Tile, M., 1980).

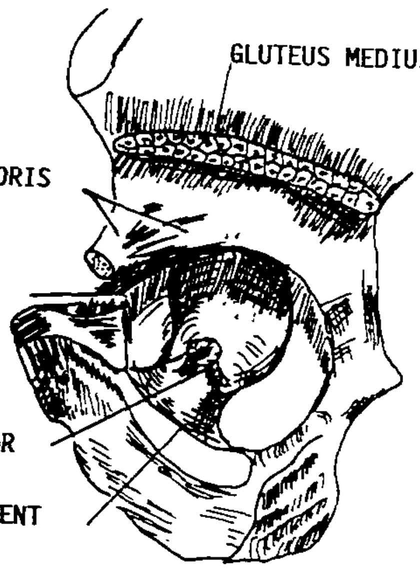

Fig. 2

Fig. 2: The left acetabulum and adjacent structures sketched from dissection. (Last, R.J., 1978).

the transverse ligament, through which vessels and nerves enter the acetabular fossa and the ligament of the head of the femur **(Romanes 1976)** (Fig. 3 and Fig.4).The non-articular bone in the acetabular fossa is paper thin and translucent, occupied by a pad of fat (haversion pad), this bone is prolonged down below the acetabular notch as a narrow rim skirting the obturator foramen **(Last, 1978).** Beyond the articular margin, the rim of the acetabulum gives the attachment to a dense fibro-cartilagenous ring which is also attached to the trans-verse ligament, the labrum acetabular. It deepens the cavity of the acetabulum and narrows its mouth to a slight extent by sloping inwards.

The labrum is tight fit on the head of the femur, and sealing it in the acetabulum, thus increasing the stability of the joint.

Both surfaces of the labrum are covered by syno-vial membrane, the free margin is relatively thin, the attached margin much thicker **(Romanes 1976).** The ligament of the head of the femur (legamentum teres) is attached to the transverse ligament and the adjacent margins of the acetabular notch and inplanted into the pit on the head of the femur. It is tensed when the thigh is flexed and slightly adducted.

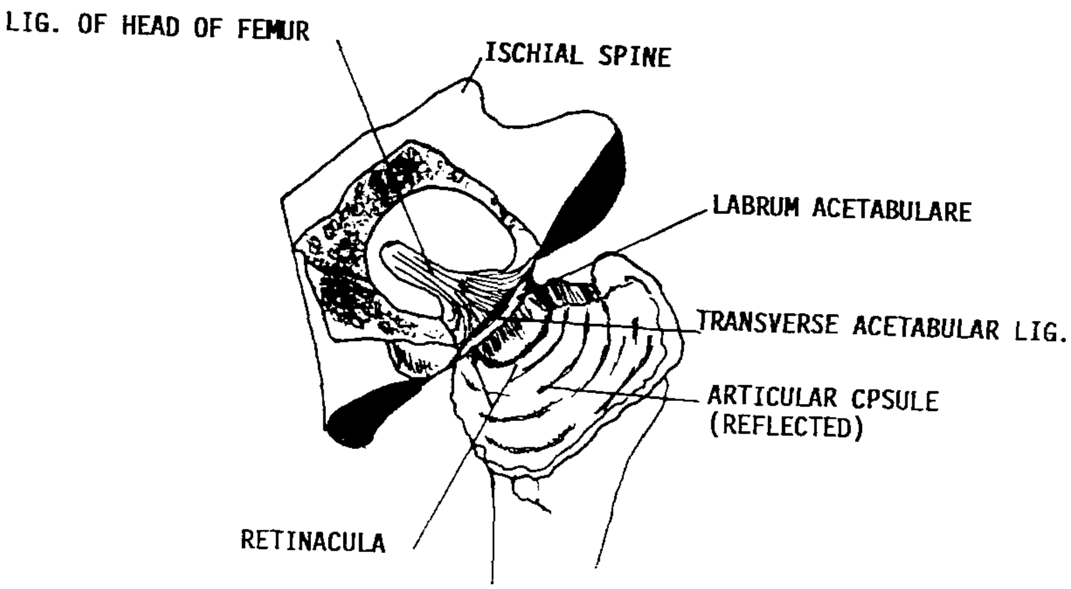

Fig. 3

Fig. 3: Dissection of right hip joint from pelvic side. The floor of the acetabulum has been removed, and the articular capsule of the joint thrown laterally towards the trochanters. (Romans, G.J.,1976).

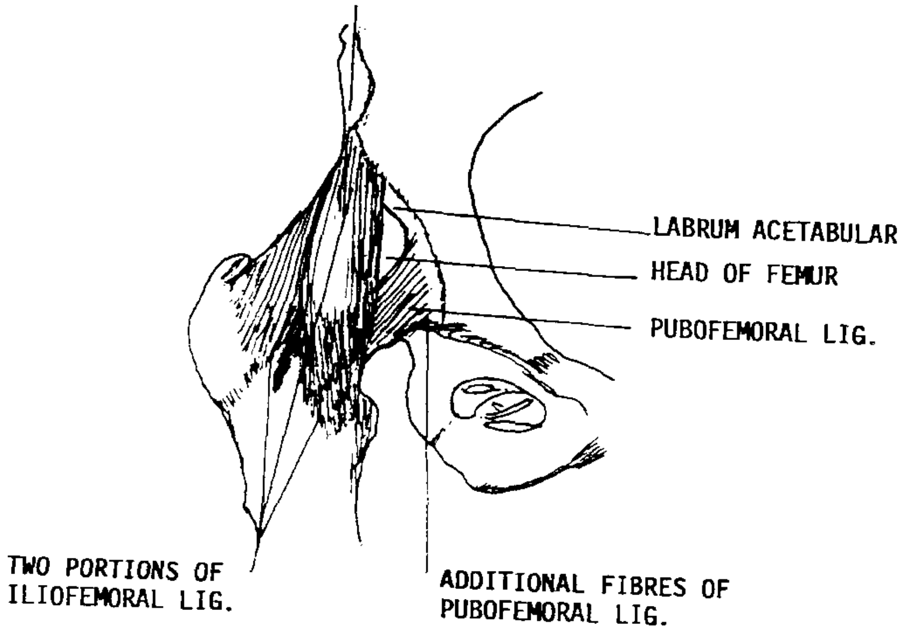

Fig. 4

Fig. 4: Dissection of hip joint from the front.(Romans, G.J., 1976).

The capsule of the hip joint is attached to the acetabular labrum and to the surrounding bone, inferiorly it is attached to the transverse ligament.

The synovial membrane is attached to the concave inner margin of the articular surface, whence it covers the Haversian fat pad in the acetabular fossa and is continued along the ligamentum teres to the fovea on the femoral head and it is also attached around the convexity of the articular margin and to the outer margin of the transverse ligament, whence it lines the hip joint capsule down to the femur.

The axis of the acetabulum is not strictly horizontal but it is directed also downwards and slightly backwards along the axis of the femoral neck **(Last,1978).**

The acetabulum is a complex structure. It is made up of series of traingles in two planes **(Tile,1980).**

The surgeon's concept of the acetabulum must not be limited to the socket but should take into consideration the bony masses that limit and support the acetabulum. It is to these masses that the internal fixation devices must be attached to restore and maintain the shape of the socket. It is useful to regard the acetabulum as