TREATMENT OF TROCHANTERIC FRACTURE FEMUR BY CONDYLOCEPHALIC METHOD OF FIXATION USING ENDER PINS

THESIS

SUBMITTED FOR PARTIAL FULFILMENT OF THE

M.D. DEGREE IN ORTHOPAEDICS

By

DR. MOHAMED TALAAT EZZ EL DIN

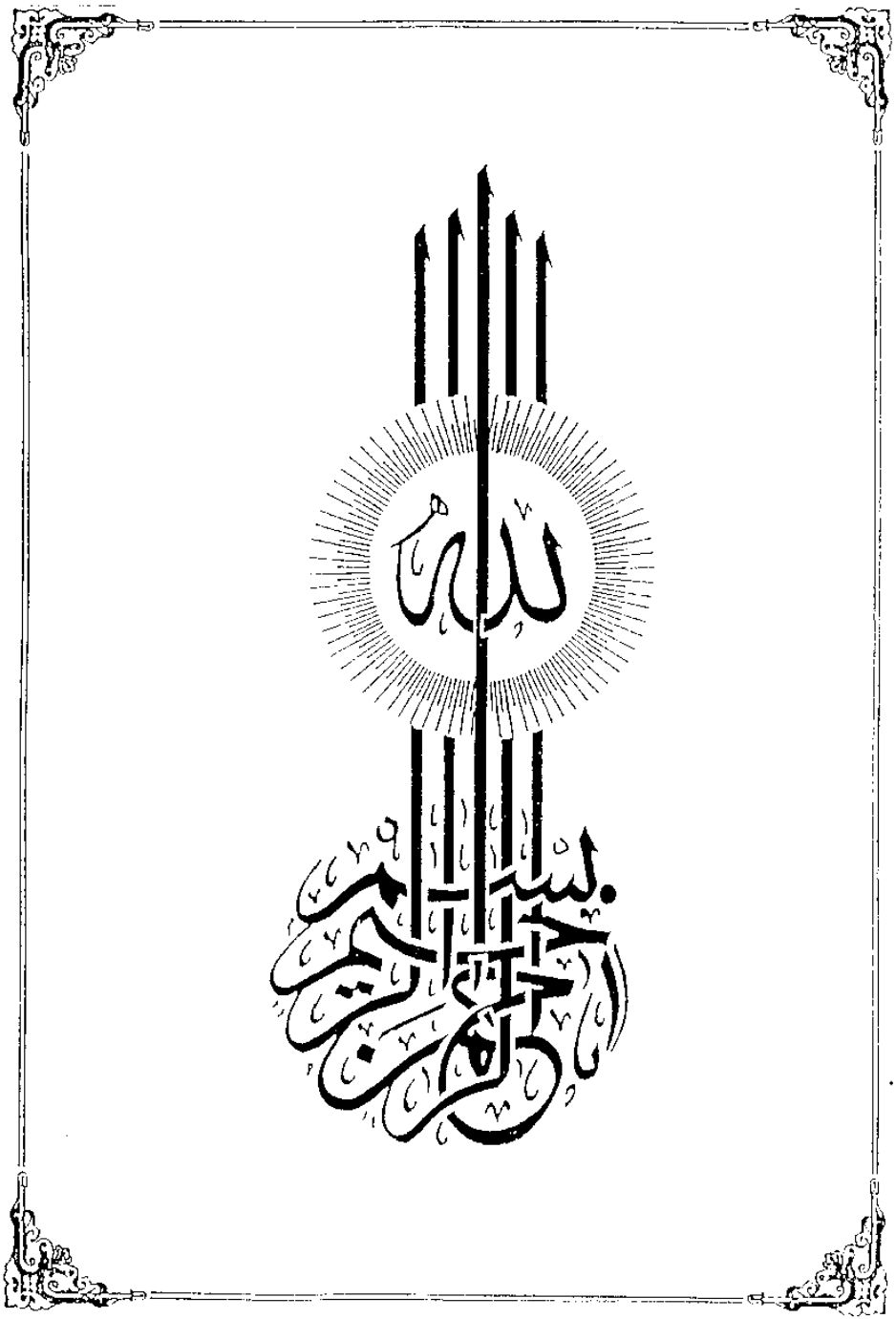
(M.B., B.CH., D. Surg., D. Orth., D.Traum)

Supervised By

- DR. EL SAYED MOHAMED WAHB
Professor of Orthopaedic Surgery
Ain-Shams University , Cairo .

- DR. AHMED ZAKI EL SOBKY
Ass. Professor of Orthopaedic Surgery
Ain-Shams University , Cairo.

Orthopaedic Surgery Department
Faculty Of Medicine
Ain-Shams University
1982



ACKNOWLEDGMENT

I thank Prof. Moh. Mehrez who offered me the chance to register the theme of this Thesis after I had lost my former Thesis on "Osteoarthritis of the knee" ,immediately before its submission for discussion. For that I owe him all respect and appreciation.

My great tribute also goes to my supervisors,namely Prof. El-Sayed Mohamed Wahb and Assistant Prof. Ahmed Zaky El-Sobky for their constructive assistance and continuous guidance well as for their sympathetic attitude towards me during my research.

I thank Dr. Ismail Sabry Khallaf who offered me a chance to experiment this new operation in Al-Monira Hospital and collaborated with me in getting the first findings of this operation in Egypt for the first time.

I express my thanks also to Dr. Galal Al-Barkouky who provided me with his personal experience in treating many cases by using methods other than that of Ender.

Tribute also goes to Prof. Jorg Böhler who allowed me to stay in Loranz Bohler Accidental Hospital from 1972 to 1973 in Vienna during which period I had a chance to acquaint myself with the new Ender operation, and its experimentation .

I also recall with deep recognition Prof. Ender who provided me with the necessary researches and Journals on Ender Operation and its development .

I Express my deep thanks for all Professors in all educational stages ,for their efforts which led me to

ny present status,praying God Almighty to help me exert similar efforts for their sons and to follow their path .n order to serve Science as well as the patients .

Finally I wish to thank also the new generation of hysicians,namely the assistants Dr. Khamis Al-Hamalawi , r. Ahmed El-Saleh and Dr. Ossama Ghali for their help n consolidating this work.

Special tribute goes to assistant Dr.Mahmoud Mohamed bdel Wadoud for his true and continuous assistance in yping this Thesis and drawing the appropriate designs. wish them all continuous success .

Here by I cannot forget my ex. supervisor Prof.Ahmed aid Khattab ,actually without his great support to me , ie agreament for beginning this thesis would not be ful- lled . So I ask God to place him.

M.T.Ezz El-Din

INTRODUCTION

In the treatment of trochanteric fractures,one is faced with the general medical problems of old age of the injured,as well as a statomechanical problem,namely to provide the most stable osteo synthesis possible.

There are many operative methods for treatment of the trochanteric fractures. Most of these methods are bloody,shocky and require operative intervention at the site of fracture, and the old patients cannot withstand these operations.

The condylocephalic methods of fixation were appeared at 1932 by Lezius and Herze in trial to avoid the difficulties of the other methods.

The condylocephalic pins were under continuous modification to improve their application and results. The most recent condylocephalic pin is the modified Ender pin made in 1974,by which very good results were gained in the treatment of trochanteric fractures.

Using Ender pins ,the majority of patients can be mobilised during the first post-operative week ,if the general condition of the patient allows ,and by early mobilization and walking of the old patient,We can avoid the complications of bed rest and improve the general medical condition.

The fixation of the trochanteric fractures with flexible Ender pins offer more favourable mechanical conditions than the usual nail-plate devices. This is due to the fact that it is exposed to considerably less bending forces due to the smaller distances from the resulting pressure.

By Ender pinning,We get three points of fixation; head, shaft and condyle of the femur. The tips of the pins are spread out like a fan in the dense cancellous part of the head, so the pins have a firm hold in the proximal fragments and a good rotational stability.

On weight bearing,the pins distribute the pressure evenly over the whole length of the outer cortex of the femur.

As the Ender pins are not fixed at their point of insertion, it is possible for the fragments to slide toward one another axially along the pins as a result of muscle action and weight bearing . The pins in this case slide few mms. out of the point of insertion without perforation the femoral head. Also the bending and flexibility of the pins facilitate to direct them to any selected point during operation.

On the other hand,when nail-plate devices are used, on early weight bearing,either the plate bends or breaks the nail goes to the head,where after healing of the fracture We get some resorption of the fracture ends.

Generally,Ender pinning operation does not inflict a great trauma on the patient and is therefore especially recommended for old patients,and frail health.

The mortality rate is reduced through this early operation and there is reduction of the risk of infection the incision of the operation is made far away from the fracture site.

Ender pinning operation is considered simple operative technique carried out with few instruments and is done in a short duration with improvement of the survival rate through early mobilization of the patient,and short time of

hospitalization.

The operation gives us extremely good clinical results as regard the gait,the hip and the knee mobility.

THE AIM OF THIS THESIS

The aim of this thesis is to expand our knowledge about Ender pinning for trochanteric fractures of the femur by:

1)Reviewing literature about Ender pinning.

2)Study the developmental history of condylocephalic fixation for trochanteric fractures.

3)Travelling to Austria to be in direct contact with the original sources,Prof.Bohler in Vienna and Prof.Ender in Styre as well as sharing them in operative treatment of some cases.

4)Follow up the results with Dr.Hanz Ender(The son of Primarius Ender),and discovering the complications and their avoidance.

5)Evaluating the operative technique by applying it to a group of our patients that allow us to study the advantages and the technical difficulties of the operation and how to avoid and study the operative and post-operative hazards that might be encountered and their management.

)Comparison of the results of our Ender pinning with the esults of other types of fixation by reviewing literature.

)I will try to introduce to Egypt Ender condylocephalic inning for trochanteric fractures using the semiflexible ins.

Showing my results of work if it is proved to be good and itable to my colleagues encouraging them to carry on this mple technique in all hospitals,for trochanteric fractures.

ANATOMY OF THE UPPER END OF THE FEMUR.

ANATOMICAL CONSIDERATION

The trochanteric region is that part that lies in the upper end of the femur between the neck and the shaft and includes the greater and the lesser trochanters.

SURFACE ANATOMY :

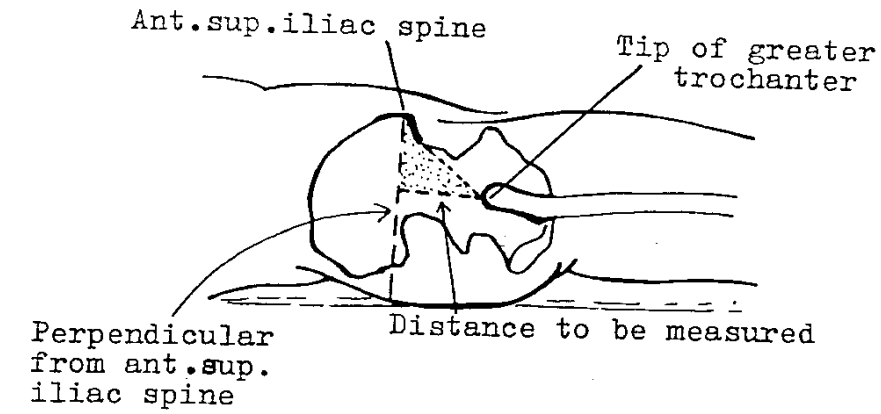
The upper border of the greater trochanter lies one hand breadth below the tubercle of the iliac crest(that tubercle lies 5 cm. behind the anterior superior iliac spine).

Also the upper border of the greater trochanter is on a level with the centre of the head of the femur and approximately the pubic crest.

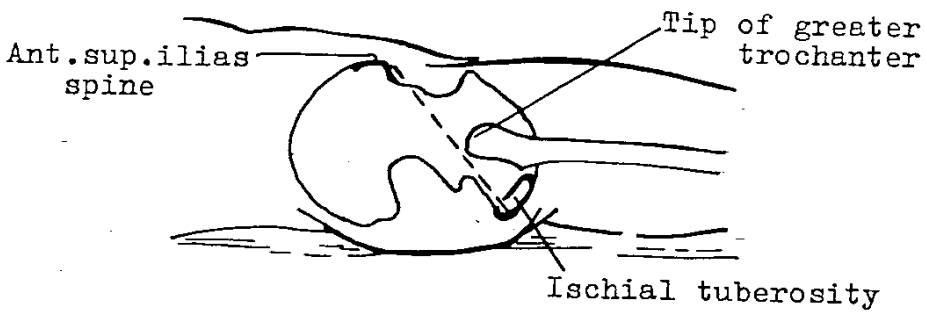
Elevation of the greater trochanter is one of the more common manifestation of the hip joint abnormality. The elevation is confirmed by the use of Nelaton's line , Shoemaker's line and Bryant's triangle.

Nelaton's line joins the anterior superior iliac spine to the ischial tuberosity and should pass proximal to the tip of the greater trochanter(The patient should lie on the sound side during the examination).

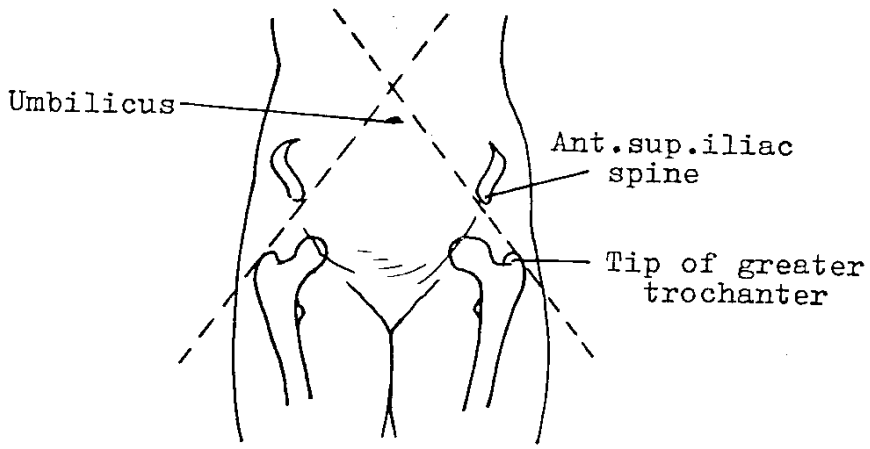
Bryant's triangle :the patient lies on his back,now three lines are drawn on both sides,one from the anterior superior iliac spine vertically down to the bed,another horizontal one from the tip of the greater trochanter to join the first line at a right angle;diminution of the length of that horizontal line (as compared with the other side) denotes upward elevation of the greater trochanter,i.e.supratrochanteric shortening(the third line is not important and it joins the anterior superior iliac spine to the tip of the greater trochanter.



BRYANT'S TRIANGLE



NELATON'S LINE



SCHOEMAKER's LINE

Shoemaker's line :when the line from the tip of the greater trochanter to the anterior superior iliac spine is prolonged over the anterior abdominal wall,it should crosses the midline at or above the umbilicus . Elevation of the greater trochanter is also noticed by slackness at the proximal end of the iliotibial tract(Place the thumb on the anterior superior iliac spine and palpate the tract and the trochanter by the remaining fingers).This method is experienced especially in children.

NORMAL RADIOLOGICAL FINDINGS :

1)The lesser trochanter is attached postero-medially to the femoral shaft ,therefore a prominent lesser trochanter indicates an externally rotated hip joint confirmed by a shortened neck,and the overlap of the trochanteric and capital shadows.

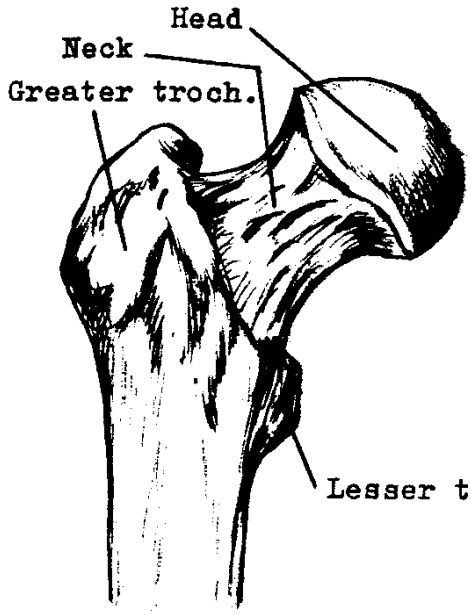
2)The thin cortical bone of the greater trochanter casts a faint shadow compared to the adjacent bony structure,both in children and aged.

GROSS ANATOMY :

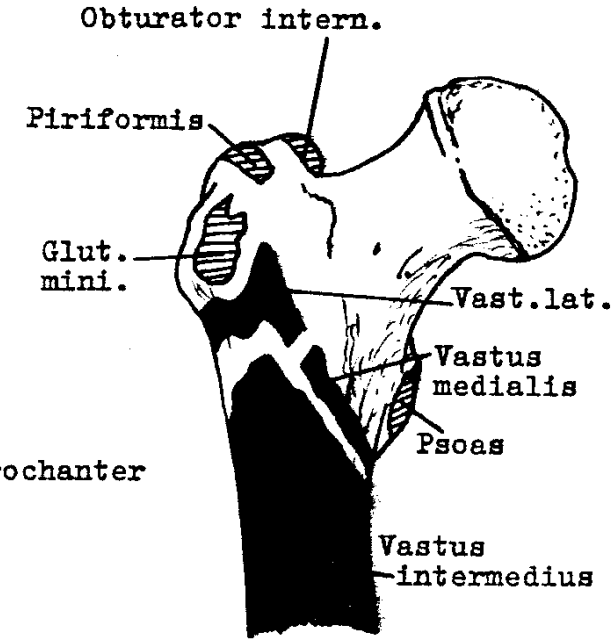
The greater trochanter is a typical traction epiphysis that ossifies separately from the shaft,it is for the insertion of the abductors and it overhangs the expanded junction of the neck and the shaft. Its upper border projects posteriorly. This carries the upper part of the insertion of gluteus medius.

Piriformis is inserted here and spreads forward along the upper border. deep to the gluteus medius.

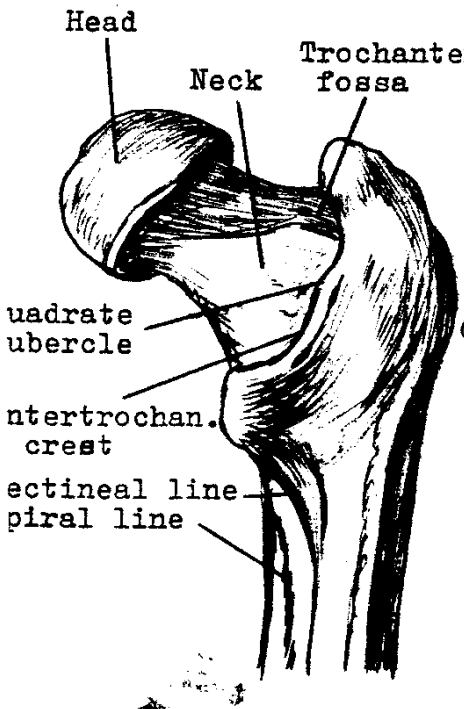
More anteriorly,the medial surface of the upper border shows smooth facets for the tricipital tendon of the obturator internus and also the gemelli. The apex overlies a deep pit.



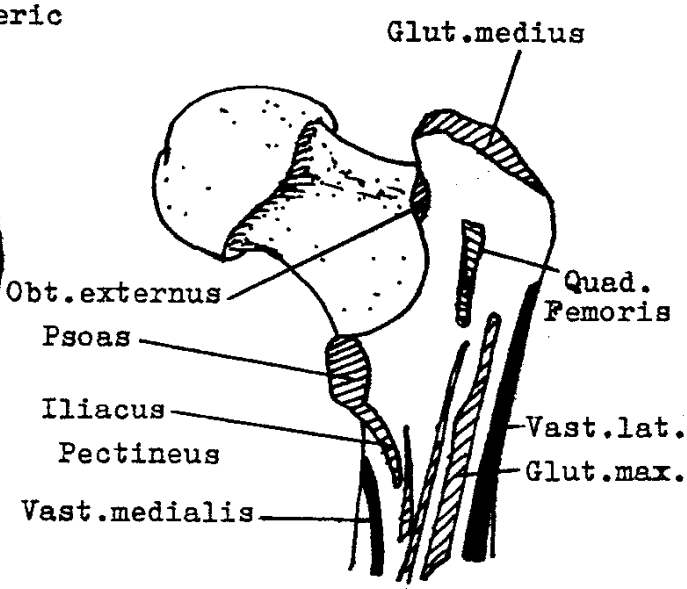
Anterior aspect of upper end of right femur.



Anterior aspect of upper end of right femur to show muscle attachments.



Posterior aspect of upper end of right femur.



Posterior aspect of upper end of right femur to show muscle attachment.

the trochanteric fossa,the bottom of which is smooth for the insertion of obturator externus tendon.

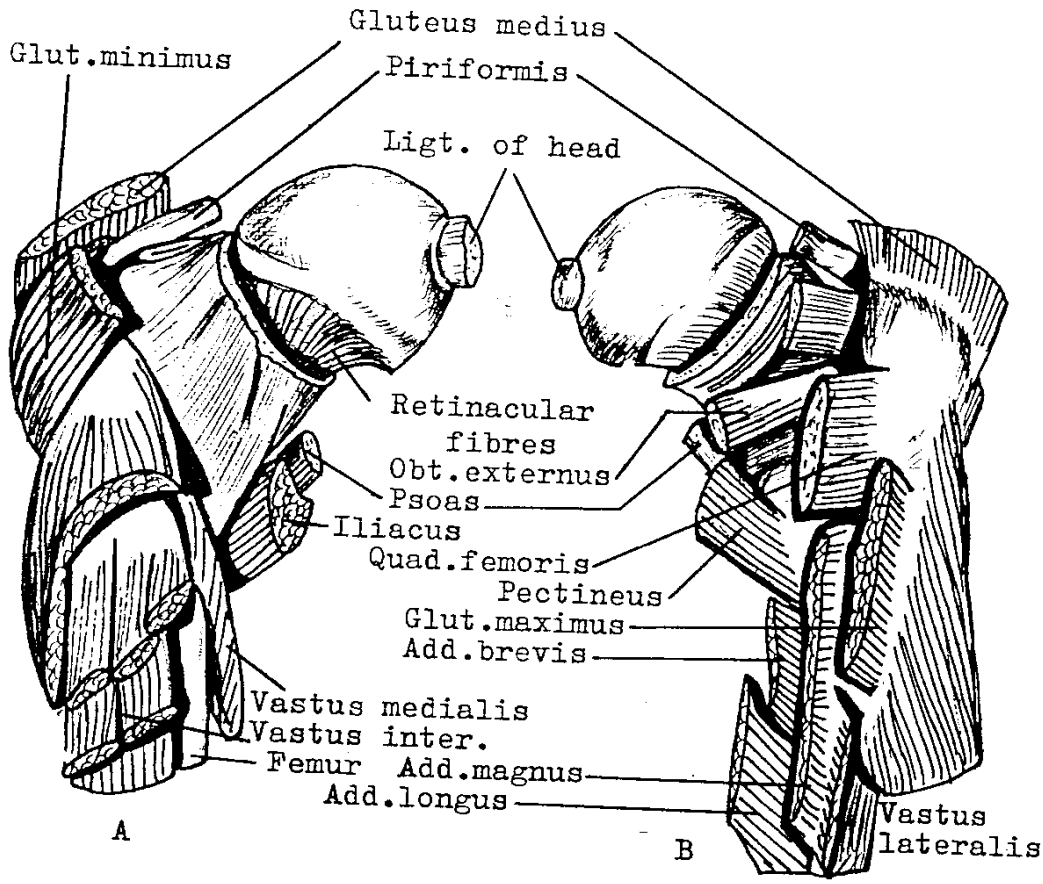
The anterior surface of the greater trochanter shows a J-shaped ridge for gluteus minimus tendon. The lateral surface shows smooth oblique strip,1 cm. wide,sloping down from the apex to the middle of the J-shaped ridge, for the insertion of the tendon of the gluteus medius.

The prominent convexity of the greater trochanter below the gluteus medius is the widest part of the greater trochanter,it is covered by the beginning of the iliotibial tract where the gluteus maximus is received in the tract. That part of the tract plays freely over a bursa on the bare bone.

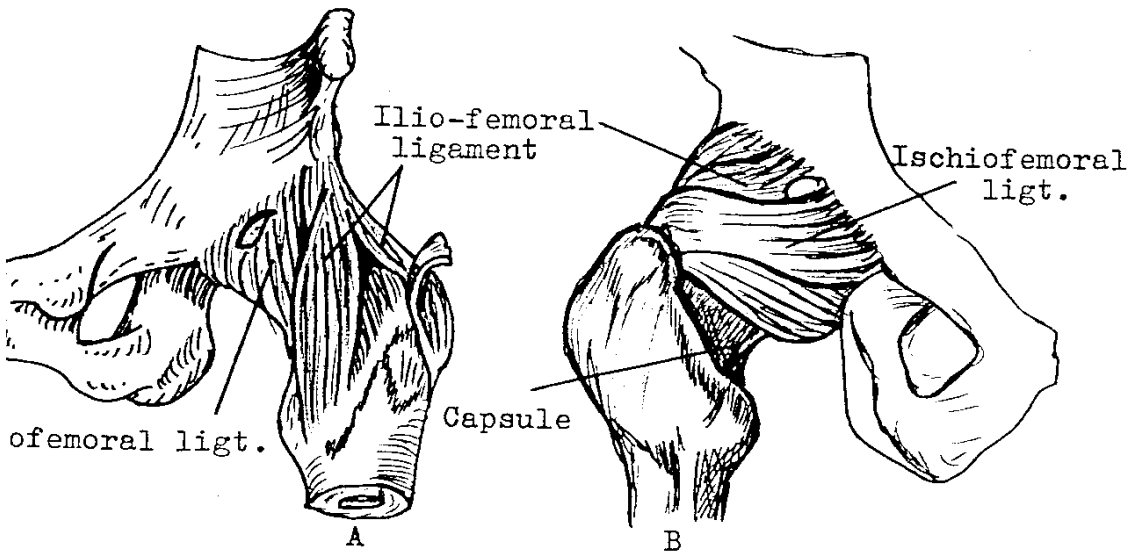
Posteriorly,the apex of the trochanter is continued down as the prominent trochanteric crest to the lesser trochater. Nearly,half way down the crest,is an oval eminence called the quadrate tubercle to which the quadratus femoris is inserted. Also,the insertion extends vertically below the tubercle down to a level that bisects the lesser trochanter.

The lesser trochanter projects from the postero-medial aspect of the proximal shaft. Its rounded surface,facing medially,is smooth for the reception of the psoas major tendon. This tendon receives nearly the whole fibers of the iliacus muscle on its lateral side. Some of the iliacus fibres are attached to the shaft of the femur for 2.5 cm. below and infront of the lesser trochanter.

The upper fibres of the adductor magnus play over the posterior surface of the lesser trochanter and a bursa is sometimes interposed between them. The neck joins the greater trochanter infront along a rough line called the trochanteric



Attachments at the upper end of the right femur (anterior in A,and posterior in B).



Ligaments of the left hip joint(anterior in A,and posterior in B).