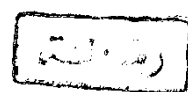


TOTAL HIP REPLACEMENT

An Essay

Submitted For Partial Fulfilment of
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*Dedication
To*

my Mother

my Father

my Wife and Children

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INTRODUCTION

INTRODUCTION

ARTHROPLASTY is an operation to restore a motion to a joint and function to the muscles, ligaments, and other soft tissue structures that control the joint.²⁹

THE HIP JOINT is subjected to many diseases and injuries which result in pain, restricted motion and loss of stability and ultimately leads to deformity. Arthroplasty is the surgical treatment for these disorders, and when performed under proper circumstances, the operation can provide a significant relief of pain, an increase in motion, great stability and less deformity.¹⁸

ANATOMY OF THE HIP JOINT

ANATOMY OF THE HIP JOINT

OSTEOLOGY

The Femur :

The proximal femur includes the head, neck, lesser and greater trochanters, and proximal femoral diaphysis (fig 1). The head of femur is spheroid rather than spherical with an average diameter 46 mm (range, 35 to 58 mm)⁵⁷ Although extremely variable, the adult neck-shaft angle average 125 degrees (range, 106 to 155 degrees) ⁵⁷

Femoral ante- version is determined by the angle between the plane of femoral condyles and the axis of the femoral neck (fig 1)²⁷ .During childhood, this angle progressively decrease to the average adult ante-version angle of 10 to 15 degrees ⁶⁰ .

The greater trochanter overhangs the neck-shaft junction it provides insertion for most of the muscles of the gluteal region and it forms an important landmark for all surgical approaches to the hip.

The lesser trochanter is a conical bony prominence at the postero-medial aspect of the neck-shaft junction, it is strengthened by the "Calcar femoral" a fringe of compact bone projecting like a spur into the cancellous bone of the neck ³⁸.

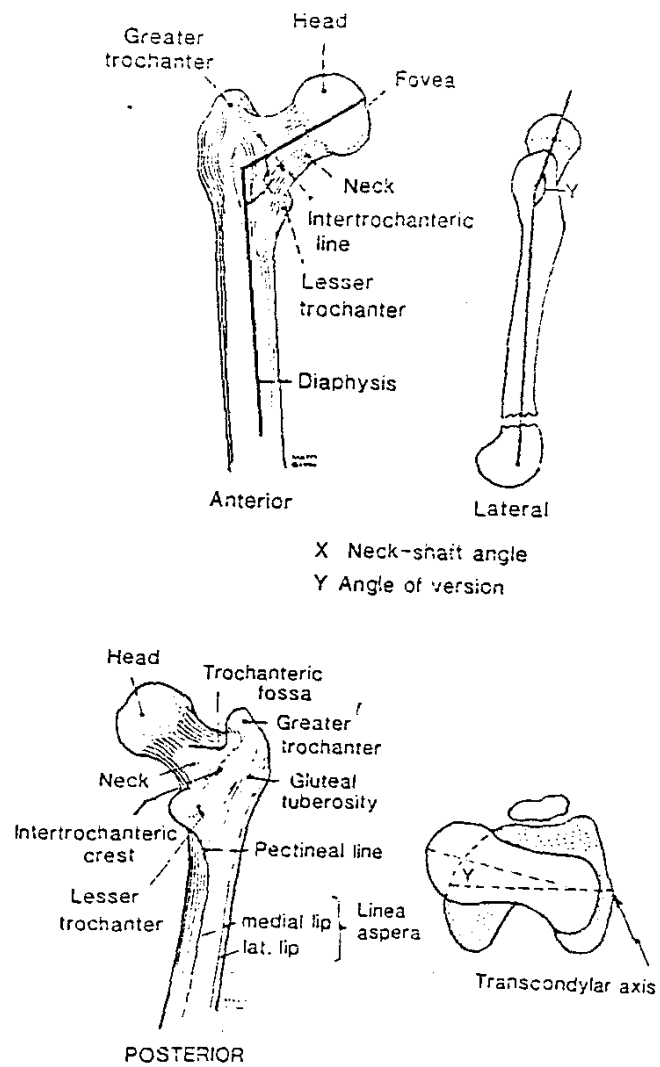


Fig. 1: Anterior (A) and posterior (B) views of the external geometry of the proximal femur. X, neck-shaft angle. Y, angle of version.

The Acetabulum:

A cup-shaped depression on the lateral aspect of the hip bone, directed laterally, caudally and anteriorly. Over two fifths of it is contributed by the pubis 22

The articular surface of the acetabulum is horse-shoe shaped, and is known as the "lunate surface" . The acetabular fossa is the non-articular central part of the acetabulum, is occupied by fibrofatty tissue.

The lunate surface is broadest superiorly, where the pressure of the body weight falls, and is deficient inferiorly to form the acetabular notch which is bridged over by the transverse ligament.

The margins of the acetabulum gives attachment to a fibro-cartilaginous rim "labrum acetabular" which deepens the concavity of the acetabulum and enhances the stability of the joint as it embraces the head slightly beyond it's equator.

The capsule and ligaments:

The capsule of the hip is a dense fibrous cylindrical sleeve ,running from the margin of the acetabulum to the upper end of the femur, it is made up of four distinct sets of fibers, longitudinal, oblique, arcuate and circular fibers "zona orbicularis".

The capsule is reinforced by powerful ligaments, anteriorly the thick iliofemoral ligament of Bigelow's, posteriorly the thinner ischiofemoral ligament, and inferiorly, the pubofemoral condensation.

The muscles:

There are 21 muscles crossing the hip joint, the primary and secondary functions as well as innervations of each of these muscles are detailed in table 1. During hip arthroplasty, certain muscles have major surgical significance ²⁷.

The tensor fascia lata and gluteus maximus have been described as the doorway to the hip joint. One of these muscles or the iliotibial band must be split in order to gain access to the deeper muscles. Beneath this outer layer, the gluteus medius muscle and its insertion into the greater trochanter lies. All the surgical approaches to the hip joint are designed to either avoid detachment of gluteus medius or displace the abductors by mechanisms that facilitate reattachment. The gluteus medius and the thick periosteal covering of the greater trochanter are in continuity with the fascia of the vastus lateralis and form a functional myofascial unit.⁴⁹

Table 1. Muscles of the Hip Joint (after Hanssen, 1991)

Primary Function	Muscle	Nerve	Segmental Innervation	Secondary Function
Extension	Gluteus maximus	Inferior gluteal	L5-S1	External rotation, adduction
	Semimembranosus	Tibial	L5-S1	Internal rotation
	Semitendinosus	Tibial	L5-S1	Internal rotation
	Biceps femoris (long.)	Tibial	L5-S1	
	Adductor magnus (post.)	Tibial	L4-S1	Internal rotation
Flexion	Iliopsoas	Nn. to iliopsoas	L2-L4	Adduction, external rotation
	Pectineus	Femoral or obturator	L2-L3	Adduction
	Rectus femoris	Femoral	L2-L3	External rotation
	Sartorius	Femoral	L2-L3	External flexion, external rotation (post.)
Abduction	Gluteus medius	Superior gluteal	L4-S1	Internal rotation (ant.)
	Gluteus minimus	Superior gluteal	L4-S1	Flexion, internal rotation
	Tensor fascia lata	Superior gluteal	L4-L5	Flexion, internal rotation
Adduction	Adductor brevis	Obturator	L3-L4	
	Adductor longus	Obturator	L2-L3	Flexion
	Adductor magnus (ant.)	Obturator	L3-L5	Flexion
	Gracilis	Obturator	L3-L4	Flexion
	Obturator externus	Obturator	L3-L4	External rotation
External rotation	Piriformis	Nn. to piriformis	S1-S2	
	Obturator internus	Nn. to obturator internus	L5-S2	
	Superior gemellus			
	Inferior gemellus	Nn. to quadratus femoris	L5-S1	
	Quadratus femoris			

The short external rotators are generally only encountered during posterior or transtrochanteric approaches to the hip joint and can provide additional protection for sciatic nerve during posterior exposures of the hip.

The iliopsoas tendon inserts into the lesser trochanter posteromedially and occasionally release of the insertion is needed to overcome severe flexion deformity or increase exposure during difficult revision surgery, when doing so, release of the tendinous part while sparing the fleshy muscular part will correct the deformity sparing part of the flexor function ²

Release of the adductors may also be required with severe adduction contractors such as patients with parkinson's disease ²⁷

Blood supply of the hip joint:

Arteries from the lateral and medial circumflex femoral arteries enter the capsule distally and posteriorly and pass proximally beneath the synovial membrane, along the retinaculae. These branches form the main source of blood supply to the femoral head .