Surgical exposures to the hip may be classified as:

— anterior;
— anterolateral;
— lateral;
— posterior;
— medial;
— lateral subtrochanteric and proximal femoral shaft.

The anterior approach utilizes the interval between the sartorius and tensor fascia. The anterolateral approach utilizes the interval between the tensor fascia and the gluteus medius. The lateral approach is essentially dependent upon elevation of the insertion of the gluteus medius and minimus. The posterior approach utilizes the interval between the gluteus maximus and medius; in some instances the muscle fibres of the gluteus maximus are separated. The medial approach is between the gracilis and the adductor longus.

Surgical approaches are different from anatomical dissection in so much as the tissue planes are only dissected to a limited extent sufficient to identify specific structures and avoid nerve and vessel damage. There is usually no need to undermine the skin or dissect the superficial and deep fascia from the underlying structures. Extensions of the skin incision should not be declined simply to minimize the length of the suture line. "Keyhole" incisions are often dangerous; skin incisions heal from side to side and not from end to end.

Surgical exposures inevitably produce some degree of tissue damage. The orthopaedic surgeon must be mindful of the potential consequences of destroying blood supply, especially to bone. However, the advantages obtained by adequate, open reduction should outweigh the possible complications of the exposure.

If the femoral head is to be retained, the surgeon must be mindful that all surgical exposures of the hip are associated with the risk of devascularizing the femoral head.

Knowledge of the anatomical structures in the coronal and sagittal planes, as well as the cross-sectional relationships, is a prerequisite.

There are many eponyms related to hip joint exposures. With due respect to all who have contributed, no attempt was made to emphasize author recognition.

**ANTERIOR APPROACH**

The anterior iliofemoral approach utilizes the interval between the sartorius muscle and the tensor fascia lata muscle.

The entire ilium and hip joint can be reached through the iliac part of the incision. Nearly all hip surgery can be carried out through this approach and separate parts can be used for different purposes. However, it is now mainly used to expose the anterolateral aspect of the head and neck of the femur and acetabulum for biopsy or excision of bone in this area. It is difficult to gain direct access to the entire acetabulum, or to deliver the proximal femur out of the wound without extensive stripping of the abductors from the ilium or transecting the external rotator tendons.

The lower or distal part of the approach, requires no stripping of muscles, except possibly release of the
tendinous origin of the rectus femoris. The anatomy of the anterior approach to the hip is illustrated in figures 5-1, 5-2, 5-3 and 5-4.

**Anterior approach**

With the patient supine a pad is placed under the affected hip so that the posterior aspect of the ilium can be exposed, when necessary, and also to facilitate anterior dislocation of the hip. The leg is draped so the hip and leg can be manipulated during the approach.

The skin incision begins at the middle of the iliac crest, 2 centimetres below the crest of the ilium to avoid a painful postoperative scar adherent to bone. The incision is extended anteriorly below the anterior superior iliac spine and curved distally on the lateral aspect of the thigh (Fig. 5-5).

The superficial and deep fascia over the sartorius muscle are divided, medial to the tensor fascia lata muscle. The lateral femoral cutaneous nerve that penetrates the deep fascia just below the anterior superior iliac spine is identified and retracted medially along with the sartorius muscle. The interval between the tensor fascia lata and the sartorius is more easily identified distal to the anterior superior iliac spine (Figs. 5-1 and 5-6); so the dissection should therefore be started distally rather than close to the anterior superior iliac spine.

Part of the anterior aspect of the origin of the tensor fascia is subperiosteally stripped from the ilium. Retraction in this interval exposes the gluteus medius muscle and the rectus femoris muscle, which at this level is easily identified because of its fibrous nature, in contrast to the fleshy surrounding muscles.

The ascending branches of the lateral femoral cutaneous circumflex vessels are usually ligated at the lower end of the incision (Figs. 5-2 and 5-7).

The tendinous origin of the rectus femoris is separated from the underlying joint capsule, and the direct and reflected origins are released by a transverse cut. The iliopsoas is also separated from the capsule by blunt dissection and retracted medially. Most of the anterior aspect of the hip joint is then exposed (Figs. 5-3, 5-4 and 5-8).

The capsule may be incised in line with the axis of the femoral neck and transversely at the edge of the acetabulum, as well as distally (in the form of the letter H). If it is necessary to dislocate the hip anteriorly, as much of the capsule is incised or excised as necessary; part of the labrum may also be excised. The femoral head is dislocated by adducting, externally rotating and extending the hip. In young patients, it may be necessary to incise the ligamentum teres before the hip can be completely dislocated. The release of the psoas tendon from the lesser trochanter may also be required. The lesser trochanter is exposed by externally rotating the leg, retracting the psoas medially away from the capsule (Figs. 5-4 and 5-8).

To expose more of the ilium or the superior aspect of the acetabulum, the abductor muscle origin is stripped subperiosteally from the wing of the ilium and retracted posteriorly and laterally (Figs. 5-4 and 5-9). The space between the ilium and this muscle mass is then packed to control bleeding.

**Anterior approach**

**Fig. 5-1.** - The line of incision (dotted line) for the anterior iliofemoral approach.

1. Gluteus maximus;
2. Sartorius;
3. Iliopsoas;
4. Lateral femoral cutaneous nerve;
5. Tensor fascia lata;
6. Gluteus medius;
7. Anterior superior iliac spine;
8. Femoral nerve;
9. Rectus femoris.

**Fig. 5-2.** - Part of the sartorius, tensor fascia lata muscle have been resected to expose the deeper layer that is encountered when the interval between the tensor fascia lata and sartorius is used.

1-9. See Fig. 5-1; 10. Anterior joint capsule of hip; 11. Fascia lata; 12. Ascending branch of lateral femoral circumflex artery; 13. Profunda femoris arter; 14. Femoral artery and vein.
Fig. 5-3. - Part of the gluteus medius, minimus and maximus muscles have been resected to visualize the underlying anatomy of the anterior approach.

1 to 14. See Fig. 5-1 and 5-2; 15. Greater trochanter; 16. Piriformis; 17. Reflected head of rectus femoris; 19. Gluteus minimus; 19. Inguinal ligament; 20. Direct head of rectus femoris.

Fig. 5-4. Part of the sartorius, tensor fascia lata, and gluteus muscles have been resected to reveal the deep plane of the anterior retracted medially, part of the anterior capsule has been excised exposing the hip and anterior aspect of the acetabulum. The origin of the rectus femoris has also been resected.

1 to 20. See Fig. 5-1, 5-2 and 5-3; 21. Joint capsule of hip; 22. Femoral head.

Fig. 5-5. The skin incision parallels the iliac crest, turns downwards below the anterior iliac spine and extends along the shaft of the femur (anterior iliofemoral approach) in the direction of the lateral border of the patella.

1. Iliac crest; 2. Anterior superior iliac spine.

Fig. 5-6. - The dissection between the tensor fascia lata and sartorius is started distally rather than at the anterior superior iliac spine. The lateral femoral cutaneous nerve is identified and retracted medially.


Fig. 5-7. - Retraction of the tensor fascia lata (9) and the sartorius (12) exposes the gluteus medius (11) and rectus femoris (8). The ascending branch of the lateral femoral circumflex artery (7) has been ligated. The anterior part of the tensor fascia lata muscle origin has been stripped from the ilium (10).
Fig. 5-8. - After detaching the rectus femoris (8) from its origin and retracting the iliopsoas (14) medially, much of the anterior aspect of the capsule is exposed (13).

Fig. 5-9. - After resection of the rectus femoris origin, subperiosteal stripping of the gluteus medius and minimus from the ilium exposes the anterior inferior iliac spine and anterior superior iliac spine. With additional subperiosteal elevation, the superior aspect of the acetabulum and much of the iliac wing can be exposed.

1. Femoral head and neck;
2. Anterior inferior iliac spine;
3. Anterior superior iliac spine.

ANTEROLATERAL APPROACHES

The Smith-Petersen anterolateral approach is an extension of the iliofemoral approach to permit exposure of the subtrochanteric region.

Illustrations of the anatomy of the anterolateral approach (Figs. 5-10, 5-11 and 5-12) are provided for correlation with the surgical approaches.

Anterolateral approaches

Fig. 5-10. - Skeletal anatomy for anterolateral approach.

**1° Smith-Petersen anterolateral approach**

Smith-Petersen described an anterolateral approach for open reduction and internal fixation under direct vision of recent fractures and nonunions of the femoral neck and slipped capital femoral epiphysis. The distal extension of the iliofemoral incision exposes the trochanteric region and the upper femur between the vastus lateralis and the rectus femoris.

It may be necessary to split muscle fibres to expose the anterior aspect of the femur (Fig. 5-13); however, muscle fibres should not be split too far distally to avoid damage to branches of the femoral nerve as they cross from medial to lateral. Posterior retraction of the fascia lata alone provides exposure of the lateral subtrochanteric region. The distal end of the skin incision is curved posteriorly to facilitate exposure of the subtrochanteric region.

**Smith-Petersen anterolateral approach**

Fig. 5-13. - The Smith-Petersen anterolateral approach is an extension of the iliofemoral approach.

2° Watson-Jones anterolateral approach

The patient is supine and the hip is slightly flexed to relax the anterior structures. The incision is begun a finger’s breadth distal and lateral to the anterior superior iliac spine and extended distally and posteriorly over the lateral aspect of the greater trochanter and lateral surface of the femoral shaft for approximately 5 centimetres (Fig. 5-14).

The interval between the gluteus medius and tensor fascia lata is identified more easily midway between the anterior superior spine and the greater trochanter, rather than at the level of the trochanter. The coarse grain of the fibres of the gluteus medius distinguish it from the finer structure of the tensor fascia lata muscle.

Retraction of the anterior edge of the gluteus medius posteriorly and the tensor fascia and rectus anteriorly exposes the joint capsule (Fig. 5-14 a). The capsule may be incised in a longitudinal or transverse fashion. The origin of the vastus lateralis may be reflected distally or split longitudinally to expose the trochanter and proximal aspect of the anterior femoral shaft.

Watson-Jones anterolateral approach

![Fig. 5-14. - a) The Watson-Jones approach provides an extension of the lateral subtrochanteric approach for open reduction of femoral neck fractures.](image)

1. Vastus lateralis; 12. Vastus ridge;
16. Tensor fascia lata.

b) 1. Vastus lateralis; 14. Capsule; 15. Trochanter

If additional exposure is required, the anterior fibres of the gluteus medius and minimus tendon may be incised or the anterior superior part of the greater trochanter may be osteotomized with the attached insertion of the gluteus medius muscle (Fig. 5-14 b).

3° Callahan anterolateral approach

The skin incision starts just distal to the anterior superior iliac spine, extends distally to a point approximately three finger breadth distal to the lateral prominence of the trochanter and then curves posteriorly, producing a hockey stick shaped incision (Figs. 5-1 and 5-15).

Callahan anterolateral approach
The Callahan approach utilizes a hockey stick shaped incision; the interval between the sartorius and tensor fascia lata is used to expose the joint.


Insert: Line of incision.

The interval between the tensor fascia and the sartorius space is developed and the tensor fascia lata is divided transversely in the distal part of the incision. Proximally, the tensor fascia lata and gluteus muscles are elevated subperiosteally and retracted posteriorly. The rectus femoris is retracted medially.

The capsule is then exposed by medial retraction of the iliopsoas and rectus femoris.

When necessary, more exposure can be obtained by subperiosteal stripping of the tensor fascia lata and gluteus medius muscle from the wing of the ilium (Fig. 5-15).

4° Luck anterolateral approach

In this transverse anterior approach to the hip, the tensor fascia lata is divided transversely while the gluteus medius and minimus are not disturbed.

The skin incision starts over the femoral head, just lateral to the midpoint between the anterior superior iliac spine and the symphysis pubis, extends laterally parallel to, or in, the flexor crease of the hip and ends just lateral to the greater trochanter (Figs. 5-12 and 5-16 a).

The fascia lata is incised transversely just distal to the trochanter to permit identification of the tensor fascia lata muscle (Fig. 5-11). The muscle is divided at its most distal attachment to the fascia lata. The incised fascia lata and tensor are reflected proximally.

The sartorius and rectus femoris are retracted medially to expose the capsule (Figs. 5-12 and 5-16 b). The origin of the rectus femoris may be detached from the pelvis for added exposure of the joint.

Luck anterolateral approach

The lateral aspect of the incision may be curved superiorly if the trochanter is to be osteotomized or it may be curved distally if the subtrochanteric and lateral aspects of the femur are to be exposed for internal fixation or osteotomy (Figs. 5-11 and 5-16).

5° Fahey anterolateral approach

This oblique incision extends from the anterior superior iliac spine to a point distal to the prominence of the
greater trochanter and ends at the midpoint of the lateral aspect of the thigh (Fig. 5-17 insert).

The skin and superficial fascia are retracted and the plane between the tensor fascia lata and the sartorius is developed. The iliotibial band is divided transversely at the distal insertion of the tensor fascia lata muscle into the iliotibial band. The straight head of the rectus is divided and the psoas tendon is separated from the anterior capsule and retracted medially. The joint capsule is now opened longitudinally and cut transversely near the rim of the acetabulum.

The vastus lateralis muscle is separated from the femur and retracted anteriorly to expose the subtrochanteric and lateral aspects of the proximal femur (Fig. 5-17).

**6° Charnley anterolateral approach**

With the patient supine, the hip is placed near the edge of the table so that the skin and adipose tissues of the buttock will hang over the side. A sandbag under the buttock will elevate the trochanter and make draping easier. The sandbag may have to be removed when the implants are inserted in order to assess their position more accurately. For this reason, some prefer an air bag that can be deflated or they temporarily tilt the table. The leg is draped so that it can be manipulated during the procedure. The hip is flexed 30 degrees and adducted slightly to make the trochanter more prominent and to move the tensor fascia lata anteriorly.

The incision starts several centimetres distal to the iliac crest, extends to the tip of the trochanter, crosses the posterior aspect of the trochanter and runs down the shaft of the femur. The incision may also start more anteriorly, at the level of, and approximately 5 centimetres behind, the anterior superior spine (Fig. 5-18).

**Charnley anterolateral approach**

**Fig. 5-18.** - A straight (Fig. 5-19) or a cursed (Fig. 5-18) incision may be used for the anterolateral approach.


**Fig. 5-19.** - The tensor fascia is incised in line with the skin incision and behind the tensor fascia lata muscle.

3. Fascia over tensor fascia lata; 5. Vastus lateralis; 6. Iliotibial band.
Fig. 5-20. - The fat tissue is removed with blunt dissection revealing the underlying joint capsule and medially the tendon of the rectus femoris muscle. External rotation of leg makes capsule more taut.


The subcutaneous adipose tissue is incised in line with the skin incision down to the deep fascia. The fascia is incised starting over the greater trochanter and then distally for approximately 5 centimetres, exposing the underlying vastus lateralis. The fascial incision is extended proximally behind the posterior border of the tensor fascia lata muscle (Fig. 5-19). If the fascial incision is too posterior, the gluteus maximus fibres will be encountered; if it is too anterior, the tensor fascia lata muscle fibres will be sectioned.

Some authors prefer to go through the fascia covering the tensor muscle and detach this muscle inferiorly from the fascia lata (Roy-Camille).

Retraction of fascia lata muscle anteriorly and the gluteus maximus posteriorly, exposes the underlying gluteus medius and greater trochanter. Any fibres of the gluteus medius arising from the undersurface of the fascia lata are detached by blunt dissection.

The interval between the anterior edge of the gluteus medius and the tensor fascia lata is identified; the gluteus medius and minimus are retracted laterally and posteriorly, while the tensor is retracted medially thereby exposing the fatty tissue overlying the joint capsule. The origin of the vastus lateralis is detached from the front of the greater trochanter. The hip is now externally rotated and slightly flexed to reduce the tension on the abductor muscles and make the anterior part of the capsule taut (Fig. 5-20).

If the procedure is to be done without osteotomizing the greater trochanter, an incision is made in the anterior insertion of the gluteus medius and minimus detaching them from the greater trochanter, but leaving a cuff of tendon for re-attachment (Fig. 5-21). The incision is then vertical and proximal, in the substance of the gluteus medius (Fig. 5-21, insert).

The capsule is cut and the head and neck are exposed (Fig. 5-22). With the leg adducted, the capsule is sufficiently resected so that with external rotation, the hip is dislocated anteriorly. Additional capsule is cut as necessary to retract the head and neck posteriorly for visualization of the acetabulum.

**Charnley anterolateral approach**

Fig. 5-21. - If the trochanter is not osteotomized, an incision is made in the anterior insertion of the gluteus medius detaching it from the trochanter but leaving a cuff of tendon for re-attachment. The incision in the gluteus medius is extended proximally from the tip of the trochanter (see insert).


Fig. 5-22. - With the leg adducted the capsule is resected and then with flexion and external rotation the hip is dislocated anteriorly.

Fig. 5-23. - A long heavy clamp is inserted either intracapsular as above, or extracapsular, to act as a guide for the osteotomy of the greater trochanter using a Gigli saw, an osteotome or an oscillating saw.

Fig. 5-24. - An osteotomy of the greater trochanter should exit on the trochanter just above the prominence of the abductor tubercle.

If the joint is exposed by osteotomizing the trochanter, an instrument is inserted as illustrated in figure 5-23 under and medial to the gluteus medius and minimus, either intracapsular or extracapsular, to serve as a guide for osteotomy of the greater trochanter. The vastus lateralis origin from the trochanter stripped and retracted distally. A wide osteotome, a Gigli saw or a reciprocating saw are used to osteotomize the greater trochanter as illustrated in figures 5-23 and 5-24. Care is taken not to damage the sciatic nerve posterior to the greater trochanter. Part of the abductor tubercle should be left attached to the shaft (Fig. 5-24).

The osteotomized greater trochanter is retracted superiorly and then, with slight flexion of the hip, it is possible to detach the origin of the rectus from the front of the hip joint (Fig. 5-25). The capsule is now incised in line with the neck of the femur and transversely at the acetabulum. With external rotation, the hip can usually be dislocated anteriorly, though it may be necessary to incise the attachment of the gluteus maximus to the posterior aspect of the femur (Fig. 5-26). It may also be necessary to incise the capsule inferiorly and to detach the psoas tendon from the lesser trochanter.

The neck of the femur is then osteotomized, either by using a Gigli saw or reciprocating saw. An osteotome should not be used for fear of fracturing the inferior cortex of the neck (Fig. 5-27).

After the head has been removed, a flat retractor can be inserted behind the lip of the acetabulum to lever the internally rotated femur posteriorly, thus providing direct access to the acetabulum (Fig. 5-28).

Self-retaining retractors are utilized to retract the osteotomized greater trochanter and the cut surface of the femur as well as the fascia lata and gluteus maximus (Fig. 5-29).

If at any time during the procedure exposure of the shaft is necessary, the skin incision is extended along the shaft of the femur and the vastus lateralis is either split, as illustrated in figure 5-30, or retracted.

**Charnley anterolateral approach**

Fig. 5-25. - The hip is flexed and the rectus femoris origin is detached from the edge of the acetabulum.

Fig. 5-26. - The capsule is incised as illustrated and with external rotation and adduction the hip is dislocated. If necessary, the fibres of the gluteus maximus attached to the femur are incised (insert).


Fig. 5-27. - The femoral head can be divided with a Gigli saw or, better still, with an end-cutting reciprocating saw.

Fig. 5-28. - After osteotomy of the femoral neck, the femur is retracted posteriorly by a retractor inserted behind the posterior edge of the acetabulum.


Fig. 5-29. - Self retaining retractors are inserted between the gluteus maximus posteriorly and the tensor fascia lata anteriorly; a second self-retaining retractor between the greater trochanter and osteotomized surface of the femur provides excellent exposure of the acetabulum. A Hohmann's retractor inserted over the anterior quadrant of the acetabulum is also helpful.
Fig. 5-30. - If necessary, at any time in the procedure, the vastus lateralis can be divided or the whole muscle retracted anteriorly to expose the shaft of the femur.


LATERAL APPROACHES

1° Ollier lateral approach

The U-shaped incision starts near the anterior superior iliac spine, continues downwards and distal to the trochanter, curves across the lower aspect of the trochanter, extends posterior superiorly, ending midway between the trochanter and posterior superior iliac spine. The gluteal fascia is incised in line with the skin incision (Fig. 5-31a).

The interval between the tensor fascia and the gluteus medius is identified midway between the anterior superior iliac spine and the trochanter. The anterior border of the gluteus medius is dissected down to the trochanter. Posteriorly, the interval between the anterior border of the gluteus maximus and the posterior border of the gluteus medius muscle is identified. The anterior edge of the gluteus maximus is reflected posteriorly by extending the fascial incision distally.

The trochanter is now osteotomized obliquely at its base, taking care to preserve the insertion of the gluteus medius and minimus, as well as the piriforms, obturator and gemelli muscles. The trochanter with its tendinous insertions is then reflected upwards and backwards to expose the joint (Fig. 5-31b).

Additional exposure may be obtained by adding a distal extension from the base of the trochanter parallel to the femur for a distance of approximately 10 centimetres, transforming the original U-shaped skin incision into a Y configuration.

Ollier lateral approach

Fig. 5-31. - a and b) Ollier lateral approach.


2° Hardinge lateral approach

The patient is in the lateral position to facilitate a direct lateral approach following an anterior dislocation of the hip.

The bulk of the gluteus medius is preserved intact and the trochanter is not osteotomized. It does not provide as wide an exposure as the anterolateral approaches with osteotomy of the trochanter or the posterior approaches.

The tensor fascia lata is retracted anteriorly and the gluteus maximus posteriorly (Fig. 5-32a). The incision follows the superior and anterior borders of the greater trochanter, incising the attachment of the gluteus medius but with a cuff of tendon still attached to the greater trochanter (Fig. 5-32b).
The incision starts at the apex of the trochanter and extends proximally in line with the fibres of the gluteus medius. Distally, the incision extends into the anterior surface of the femur, detaching part of the vastus lateralis. The part of the gluteus medius that is detached from the trochanter is essentially the internal rotator segment; that which is left attached is the main part of the abductor mass of the gluteus medius.

The leg is adducted and the portion of the vastus lateralis that arises from the intertrochanteric line, the insertion of the gluteus medius and ligament of Bigelow are detached and retracted. Further detachment and elevation of these muscles and ligaments allow anterior dislocation of the hip following adduction and external rotation of the leg (Fig. 5-32 c). At the time of closure, the incision in the gluteus medius and vastus lateralis is closed (as illustrated in figure 5-32 d).

**Fig. 5-32.** - a, b, c and d) Hardinge direct lateral approach with anterior dislocation of the hip. 1. Abductor portion of gluteus medius; 2. Internal rotator portion of gluteus medius.

### McFarland and Osborne lateral approach

The McFarland and Osborn approach is similar to the Hardinge approach except that the hip is dislocated posteriorly with the patient in the lateral position. It is based on the observation that the gluteus medius and the vastus lateralis are in direct functional continuity through the thick tendon and periosteum covering the greater trochanter. The integrity of the gluteus medius muscle is protected during the posterior dislocation of the hip. The two muscles meet at a right angle anteriorly, so with detachment of the periosteum and tendon it is possible to displace the two muscles forward like a bucket handle (Fig. 5-33 b). If the periosteum is difficult to strip, a small amount of bone is osteotomized with the tendinous attachment to allow anterior retraction.

**McFarland and Osborne lateral approach**
McFarland and Osborne approach with detachment of gluteus medius and vastus lateralis in continuity. Posterior dislocation after detaching gluteus minimus.


The posterior border of the gluteus medius is clearly defined and separated from the piriformis by blunt dissection (Fig. 5-33 a). The gluteus minimus is divided so that it can be retracted upwards to expose the capsule of the joint (Figs. 5-33 c and d). The hip is dislocated posteriorly by internal rotation and adduction of the hip.

At closure, the gluteus minimus and capsule are reattached as one. The gluteus medius and vastus lateralis are returned to their original position and sutured to the undisturbed portion of the vastus lateralis while the insertion of the gluteus maximus to the femur is repaired if it has been sectioned.

4. Jergensen and Abbott lateral approach

An oblique incision is made from the anterior superior iliac spine to 5 centimetres below the gluteal fold with the patient in the direct lateral position (Fig. 5-34 a).

The interval between the tensor and the gluteus medius is developed and the fascia is incised distally in line with the posterior aspect of the femoral shaft (Fig. 5-34 b). Anteriorly the dissection extends between the tensor and gluteus medius to the capsule (Fig. 5-34 c). The origin of the rectus is retracted medially.

Curved instruments are placed between the capsule and the gluteus minimus and medius muscles so that the trochanter can be osteotomized extracapsularly (Fig. 5-34 d). The anterior and anterolateral capsule is then incised; the attachment of the psoas tendon to the lesser trochanter may be transected. The hip is then dislocated anteriorly.
The Jergesen and Abbott approach permits extensive exposure of the hip and allows anterior and posterior dislocation after osteotomizing the greater trochanter.


If further exposure is required, or if the hip is to be dislocated posteriorly, the tendinous attachment of the gluteus maximus to the femoral shaft is incised near the trochanter. The external rotator muscles are also detached from the back of the femur. The osteotomized trochanter is retracted superiorly and the capsule can now be incised or excised both anteriorly and posteriorly. The entire circumference of the acetabulum is now exposed.

5° Harris lateral approach

This approach permits both anterior and posterior dislocations of the hip. The patient is in the lateral position.

The skin incision is U-shaped with the bottom of the U at the posterior border of the greater trochanter. It starts 5 centimetres posterior and slightly proximal to the anterior superior iliac spine, curves distally and posteriorly to the posterior superior corner of the greater trochanter and then longitudinally for approximately 8 centimetres, curving gradually anteriorly and distally so that both limbs of the U are almost symmetrical (Fig. 5-35). The iliotibial band is incised to the distal aspect of the skin incision.

The femoral insertion of the gluteus maximus on the gluteal tuberosity is identified and the incision in the fascia lata is extended approximately one finger's breadth anterior to that insertion. The incision in the iliotibial band is carried proximally along the skin incision releasing the fascia over the gluteus medius.

The exposure to the posterior aspect of the joint capsule is limited by the posterior aspect of the fascia lata and the gluteus maximus fibres that insert into it. For wider posterior exposure, for posterior dislocation of the head, a short oblique incision can be made into the deep surface of the posteriorly reflected fascia lata and into part of the substance of the gluteus maximus. This transverse incision is at the level of the greater trochanter (Fig. 5-35).

Harris lateral approach

A relaxing incision is made in the posterior part of the fascia lata and extended into part of the gluteus maximus to expose the short external rotators and the posterior portion of the capsule.


The line of the osteotomy of the trochanter is defined. The osteotomy may be performed with a wide osteotome or reciprocating saw.
To develop the anterior exposure of the joint, the iliotibial band and fascia lata muscle are reflected anteriorly. Before osteotomizing the greater trochanter and the attached abductor muscles, the origin of the vastus lateralis is reflected distally, exposing the abductor tubercle at the inferior level of the trochanter.

An instrument is now passed transversely between the capsule and the abductor muscles (Fig. 5-36). The greater trochanter is osteotomized with either a wide osteotome or a reciprocating saw, starting below the abductor tubercle and in line with the femoral neck. The piriformis, obturator externus and internus are incised where they attach to the trochanter (Fig. 5-37). The anterior and posterior aspects of the capsule are now incised or excised exposing the neck and head, as well as the lateral aspect of the acetabulum. Special care must be taken to avoid damage to the sciatic nerve posteriorly.

To expose the joint anteriorly, a blunt instrument such as a Bennett retractor is placed deep to the rectus femoris on the anterior inferior iliac spine, and soft tissues are thus retracted medially. By reflecting the greater trochanter superiorly, the acetabulum is exposed. A thin retractor can be placed between the capsule and iliopsoas to expose the anterior and inferior aspects of the capsule. As much of the capsule as desired is excised anteriorly and posteriorly.

The femoral head can now be dislocated posteriorly. To expose the full circumference of the head, the osteotomized part of the trochanter with the attached muscle pedicle is placed in the acetabulum and the femur is externally rotated (Fig. 5-38). To expose the entire acetabulum, the greater trochanter is retracted superiorly and the femoral head is dislocated posteriorly by adducting, flexing and internally rotating the hip (Fig. 5-39). Flexion of the knee reduces tension on the sciatic nerve while the head is dislocated posteriorly.

At the time of closure, the hip is placed in approximately 20 degrees of abduction and slight external rotation. The trochanter is fixed to the side of the femoral shaft with several wire loops or two screws.
It is rarely necessary to dislocate the hip both anteriorly and posteriorly to visualize both the anterior and posterior parts of the capsule. However, if the patient has a flexion contracture, the anterior exposure allows release of the capsule, as well as of the rectus and psoas. The arthroplasty may be performed following either anterior or posterior dislocation.

**POSTERIOR APPROACH**

A number of approaches are classified as posterior. They vary from the extensive Henry approach that releases the gluteus maximus from the iliac crest, the iliotibial band and the femoral shaft to essentially expose all of the posterior structures (Figs. 5-41 and 5-42) to the limited muscle splitting approach of Ober for drainage of the hip joint.

They all have in common the posterior retraction of the gluteus maximus to enter the posterior aspect of the hip and the release of the short external rotator muscles to enter the hip joint.

They vary mainly as to whether the deep posterior compartment is entered by incising the iliotibial band and the gluteus maximus muscle in line with the axis of the shaft, or separating the muscle fibres of the gluteus maximus proximally. They also vary depending on whether the abductors are released from the trochanter and, if released, whether the tendinous attachment is transected or the trochanter is osteotomized.

Almost all of the approaches have the option to release the abductors, depending on the need for added exposure.

The posterior approach that Moore popularized, and which is often referred to as the "Southern approach", is a variation of the original Henry approach and of the modifications subsequently made by Kocher, Osborne and
Gibson. The Moore approach will be discussed here because it is the most commonly used approach for endoprostheses, total hip arthroplasty, open reduction of hip dislocation, removal of loose fragments in the joint, repair of acetabular fractures, drainage of the hip and vascular muscle pedicle graft procedures.

Three anatomical illustrations are included in this section for reference (Figs. 5-40, 5-41 and 5-42).

**Moore posterior approach**

The patient is securely fixed in the lateral position with the involved side uppermost. The leg is draped so that it can be manipulated during the procedure. It is well to drape in such a manner that the anterior superior spine can be palpated as a reference point.

The incision starts 10 centimetres from the posterior superior iliac spine, is directed laterally and distally to the back of the trochanter and extends for 10 or more centimetres, parallel to the shaft of the femur (Fig. 5-43).

The deep fascia is exposed and the iliotibial band is incised from the trochanter to the distal end of the incision (Fig. 5-44). The fascial incision is now carried into the gluteus maximus muscles separating the oblique, coarse fibres in the direction of the skin incision.

Retraction of the gluteus maximus muscle reveals (Fig. 5-45) the back of the trochanter and the adipose tissue overlying the short external rotator muscles. Special care is taken to place the inferior retractor in the gluteus maximus muscle and not place the tip injudiciously for fear of injury to the sciatic nerve. In most instances, the sciatic nerve does not have to be identified and protected; however, in patients with protrusio acetabuli or in congenital dislocation of the hip, the nerve may be near the back edge of the acetabulum and it is wise to identify it and to protect it.

Blunt dissection will usually remove the adipose tissue from the short external rotators; internal rotation of the hip makes them more prominent and displaces their insertion away from the sciatic nerve (Fig. 5-46). The external rotator muscles are transected near their attachment to the trochanter. Prior to sectioning of the tendons, they may be tagged with a nonabsorbable suture so that they may be re-attached at the end of the procedure.

The capsule may or may not be sectioned along with the short external rotators (Fig. 5-47). The capsule is now opened in line with the axis of the neck and a transverse incision is made at the edge of the acetabulum.
**Fig. 5-46.** - Internal rotation and detachment of the short external rotator muscles along the back of the trochanter (dotted line).
1. Sciatic nerve.

**Fig. 5-47.** - The short external rotators have been sectioned and reflected posteriorly to protect the sciatic nerve. The quadratus femoris has been released from the trochanter; the iliopsoas tendon is now seen and may be sectioned to allow dislocation of the hip. Also the gluteus maximus tendon attached to the femur has been released prior to dislocation.

**Fig. 5-48.** - The head is dislocated by adduction, internal rotation and flexion of the hip with the foot above. The transverse axis of the knee joint is parallel to the floor which provides a point of reference for anteversion of the neck of the femur.

**Fig. 5-49.** - Ludloff medial approach. Skeletal anatomy of the medial approach of the hip.

The hip is now gently adducted, internally rotated and flexed. Dislocation should not be forceful especially if there is any degree of osteopenia or weakening of the shaft for any reason. More capsule may have to be incised, especially inferiorly and medially; it may also be necessary to incise the quadratus femoris muscle to dislocate the hip. In addition, it is at times necessary to detach the psoas tendon from the lesser trochanter. The lesser
trochanter can be identified after release of the quadratus. Removal of part of the labrum and posterior osteophytes on the acetabulum, in order to dislocate the hip with ease, is sometimes necessary. Sectioning the neck with an end-cutting reciprocating saw may be necessary if the hip is fused, if there are intra-articular adhesions, or if the head is grossly distorted and cannot be easily dislocated.

The hip may now be dislocated as illustrated in figure 5-48. This places the axis of the knee joint parallel to the floor so that the anteversion of the neck and the position of the femoral prosthesis can be properly evaluated.

In procedures in which the femoral head is not sacrificed, such as drainage of the hip, reduction of a posterior dislocation, removal of fragments from the joint, repair of acetabular fractures, or resurfacing procedures, special care must be taken to avoid injury to the medial circumflex and retinacular vessels. The short external rotator muscles are sectioned close to the edge of the acetabulum, rather than at the insertion in the trochanter, and the capsular incisions are made near the acetabular edge rather than near the attachment of the capsule to the neck. The medial circumflex vessels are at risk during the dissection near the attachment of the psoas tendon to the lesser trochanter (Fig. 5-49).

**MEDIAL APPROACH**

Ludloff described a medial approach for open reduction of congenital dislocation of the hip, but it is now most used for obturator neurectomy, psoas tendon release and selective adductor tenotomy. To a lesser extent, it is used for biopsy and removal of tumors near the lesser trochanter, the medial aspect of the neck and the proximal shaft of the femur. It is difficult to extend the incision proximally. Furthermore, the medial circumflex vessel, the main blood supply to the femoral head, may be jeopardized.

For this reason, and because of a lack of familiarity with this exposure, most surgeons prefer to expose the lesser trochanter through a Huetner-Schede approach (lower limit of the Smith-Petersen iliofemoral incision) or through the posterior approach.

**Ludloff medial approach.**

With the patient supine and a pad under the buttock, the affected hip is flexed, abducted and externally rotated (Fig. 5-49). Very careful preparation and draping of the operative field is necessary because of the proximity of the perineum.

A longitudinal incision is made over the adductor longus; with the leg in the above position it is the most prominent of the adductor muscles (Fig. 5-50). The incision begins approximately 3 centimetres below the pubic tubercle and extends distally for at least 8 centimetres.

The gracilis muscle lies posterior to the adductor longus. These two muscles are innervated by the anterior branch of the obturator nerve at the proximal end of the incision (Fig. 5-51). Separation of the two muscles (Fig. 5-52) and retraction of the adductor longus superiorly and the gracilis inferiorly exposes the underlying adductor brevis muscle (Fig. 5-53); the adductor magnus is posterior to the brevis. The anterior branch of the obturator nerve overlies the adductor brevis (Figs. 5-51 and 5-53). Retraction of the adductor longus and brevis superiorly exposes the posterior branch of the obturator nerve overlying the adductor magnus (Figs. 5-51 and 5-54). It is the adductor brevis, therefore, that separates the anterior and posterior branches of the obturator nerve (Fig. 5-51). The adductor brevis is innervated by the anterior branch and the adductor magnus is innervated by the sciatic nerve.

Retraction of the adductor brevis anteriorly and the adductor magnus inferiorly exposes the lesser trochanter, the medial aspect of the neck and the proximal aspect of the femur (Fig. 5-54). Careful blunt dissection is advised. The medial femoral circumflex artery passes around the medial side of the psoas tendon and is, therefore, subject to damage, especially in children (see Fig. 5-42).

**Ludloff medial approach**

![Fig. 5-50. - Ludloff medial approach.](image)

Superficial anatomy of the medial approach. The incision and dissection are made between the adductor longus and gracilis muscles as indicated by the dotted line.


![Fig. 5-51. - Part of the sartorius, gracilis and adductor longus muscles have been resected to uncover the deeper anatomy. The relationship of the obturator nerve branches to the adductor brevis muscles and the proximity of medial circumflex vessels should be noted.](image)

The anterior branch of the obturator nerve innervates the adductor brevis as well as the gracilis. This anterior branch also supplies a cutaneous nerve that extends to the medial aspect of the knee, accounting for pain in this region in many patients with hip joint pathology, especially slipped femoral epiphysis. The posterior branch supplies the obturator externus in the pelvis and at the level of this incision it supplies the adductor magnus.

If a selective adductor tenotomy is to be performed with an obturator neurectomy, a transverse rather than a longitudinal incision may be used. This provides better exposure of the origin of the adductors so they can be sectioned close to their origin from the pelvis. To correct an adductor deformity, the adductor longus is sectioned at its pelvic origin and turned downwards and laterally. There may be some bleeding from the branches of the external pudendal artery and vein. The origins of the adductors brevis and gracilis are also sectioned close to the pelvis. The adductor magnus may be stripped from the lateral surface of the inferior ramus of the pelvis and ischium.

**LATERAL APPROACH**

**TO THE SUBTROCHANTERIC REGION**

**AND LATERAL ASPECT**

**OF THE PROXIMAL FEMORAL SHAFT**

This approach is utilized for internal fixation of femoral neck, as well as for open reduction and fixation of intertrochanteric fractures and core decompression procedures of the femoral neck and head.
With the patient in a supine position, on a fracture or a standard operating table, a linear incision is made over the posterolateral aspect of the trochanter and extended distally on the lateral aspect of the thigh, parallel to the shaft, 10 centimetres or more. The underlying fascia lata is divided in line with the skin incision and is split posterior to the tensor fascia lata muscle.

Retraction then exposes the fascia of the underlying vastus lateralis muscle (Fig. 5-55). With retraction, the lateral aspect of the shaft is exposed. The proximal tendinous origin of the muscle may be divided transversely and elevated to expose the lateral aspect of the femur distal to the abductor tubercle (Fig. 5-56).

The muscle is now divided along the posterior lateral border of the femoral shaft. If the muscle is separated from the shaft close to the linea aspera, the perforating vessels that are divided will be difficult to cauterize because they will retract into the posterior aspect of the thigh. To avoid this, it is advisable to longitudinally split the muscle 1 or 2 centimetres from the linea aspera and thereby more easily identify and cauterize these vessels (Fig. 5-57).

The body of the vastus lateralis is retracted superiorly and the lateral aspect of the femur is exposed by blunt dissection with a periosteal elevator. Proximally, subperiosteal elevation of the vastus lateralis and intermedius will expose the intertrochanteric line (Fig. 5-57). The soft tissue attachment to the posterior inferior aspect of the femur may have to be released for open reduction of an intertrochanteric or subtrochanteric fracture.

Since the skin and vastus lateralis muscle have been incised posterolaterally, the bone is exposed by superomedial retraction; little or no inferior retraction is usually necessary (Figs. 5-55 and 5-56).

**Lateral approach of the subtrochanteric region**

**Fig. 5-55.** - Lateral approach to the subtrochanteric region and lateral aspect of the proximal femoral shaft.

- a) The skin and fascial incision are made posterolateral so that the tensor fascia lata muscle (1) will be retracted superiorly and medially along with the fascia (2).
- b) The detachment of the vastus lateralis (3) from the shaft exposes the gluteus maximus insertion (4) and provides excellent exposure of the shaft.

The exposure may be extended distally to the supracondylar area of the femur if necessary. To expose the femoral neck and head anteriorly, the skin incision is extended superomedially and the dissection is carried proximally in the interval between the tensor fascia lata muscle and the gluteus medius (Watson-Jones approach, see Fig. 5-14). Transverse section of the tensor fascia lata muscle at its attachment to the fascia lata and flexion of the hip joint will facilitate additional exposure of the anterior aspect of the joint capsule. If still further exposure is necessary for open reduction of a femoral neck fracture or slipped capital femoral epiphysis, the greater trochanter may be osteotomized.

At the time of closure, the vastus lateralis muscle falls over the lateral aspect of the shaft of the femur. Separate absorbable sutures are used to approximate the edges of the fascia of the vastus lateralis and the fascia lata. If a transverse incision has been made in the fascia lata, the cut edges should be approximated.

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