Technical note

An anterolateral approach to the hip joint

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I describe an anterolateral approach to the hip joint. The intermuscular plane is between the gluteus medius and tensor fascia lata. The anterior one third of gluteus medius and the insertion of gluteus minimus are stripped from the anterior aspect of the greater trochanter to raise a flap in a way that facilitates reattachment. The vastus lateralis muscle is left undisturbed. This simple and relatively quick approach provides sufficient anatomic orientation and exposure to allow the surgeon to perform total hip arthroplasty, with minimal dissection and without excessive retraction. There is no danger of injury to the superior gluteal nerve or its branches. This has been used in 178 patients for primary total hip replacement. The strength of the hip abductor muscles was unimpaired and there were no complications attributable to the approach in 128 patients reviewed after at least 6 months.

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In 1874, Sayre described an approach for the resection of the upper end of the femur through the interval between the gluteus medius and the tensor fascia lata (Jergesen and Abbott 1955). This anterolateral approach was later improved by Watson-Jones (1935–36) and Burwell and Scott (1954) for management of femoral neck fractures and by McKee and Watson-Farrar (1966) and Müller (1970, 1974) for total hip replacement. Lowell and Aufranc (1968) suggested that this was the least traumatic and most direct approach to the hip.

Müller (1970) uses the same intermuscular plane in view of his preference to perform total hip arthroplasty without osteotomy of the greater trochanter. In this approach, a transverse incision is used to separate the anterior third of the distal attachment of the gluteus medius, and the tendon of the gluteus minimus is cut 1 cm from its attachment to the bone. Müller believes that abductor function is restored by varying the length of the neck of the femoral prosthesis. However, one of the complications of this approach has been found to be postoperative weakness of the hip abductors (Baker and Bitounis1989, Obrant et al. 1989). A certain portion of the abductor muscle mass is damaged during the subsequent procedure and continuous prolonged traction is necessary for exposure (Müller 1970). This usually results in failure to reestablish the attachment of the incised glutei to the greater trochanter. McFarland and Osborne (1954) based their approach to the hip on their anatomical observation that the gluteus medius and vastus lateralis are in direct functional continuity through the thick tendinous periosteum covering the greater trochanter.

This approach has been modified in the transgluteal approach by Bauer et al. (1979), the direct lateral approach by Hardinge (1982), the omega lateral approach to the hip by Learmonth and Allen (1996), the anterior partial trochanteric osteotomy by Dall (1986) and in the Stracathro approach by McLauchlan (1984) where two rectangular slices of greater trochanter are elevated. All these modifications split the vastus lateralis muscle. This causes significant bleeding due to injury to the transverse branch of the lateral circumflex artery. The vastus lateralis muscle is supplied by branches of the femoral nerve which enter the anteromedial border of the muscle on its deep surface. The nerves enter at the proximal and middle thirds in most specimens (Brash 1955) and a longitudinal split could denervate the posterolateral part of the muscle.

I report an approach originally described as a modified Müller's approach (Hanssen 1991). This has been further modified and used in 178 primary total hip replacements.

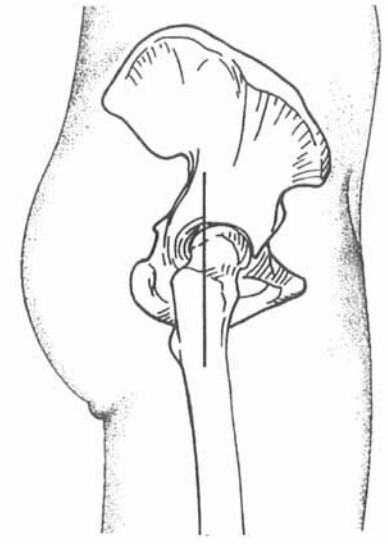

Figure 1. Straight midlateral skin incision.

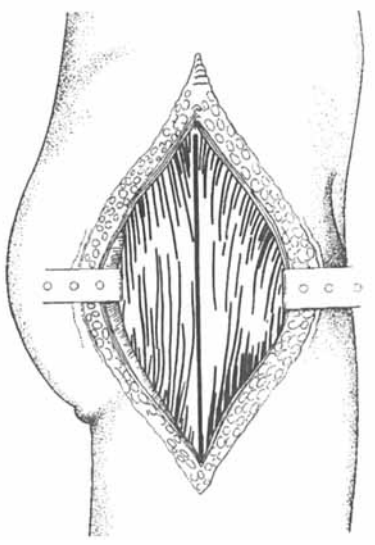

Figure 2. Incision of fascia lata in line with the skin incision between tensor fascia lata in front and gluteus maximum behind.

Operative technique

The patient is in supine position. A straight lateral incision (Figure 1) is placed equidistant between the anterior and posterior margins of the greater trochanter. It is extended equal distances above and below the tip of the greater trochanter (approximately 16–18 cm long, depending on the patient's size). The gluteal fascia and fascia lata are exposed and divided in a straight midlateral line along the length of the skin incision (Figure 2). A Charnley self-retaining initial incision retractor is inserted to provide wide exposure of the greater trochanter in the center of the wound, with the glutei superiorly and vastus lateralis inferiorly. The fat is dissected from the anterior margin of the gluteus medius and minimus by blunt dissection. The fibers of the gluteus medius that arise from the deep surface of the anterior part of the deep fascia are detached and the interval between the tensor fascia lata (which is lifted anteriorly by the self-retaining retractor) and the gluteus medius is developed by blunt dissection. The anterior border of the glutei is thus identified and retracted proximally and laterally away from the femoral neck. This exposes the anterior capsule and the overlying iliofemoral ligament.

Now an L-shaped incision is made using a diathermy needle (Figure 3). The transverse limb of the incision extends along the anterior border of the attachment of the glutei on the greater trochanter. The incision is made down to the bone through the fascia and periosteum, stripping partly the attachment of the iliofemoral ligament, the insertion of the gluteus minimus (over the anterior facet of the greater trochanter) and the overlying anterior tendinous expansion of gluteus medius. A 2–2.5 cm long longitudinal incision is made proximally from the lateral end of the first incision along the junction of anterior and middle thirds of the gluteus medius. The distance between the lower part of the attachment of the glutei over the anterior aspect of the greater trochanter and the upper

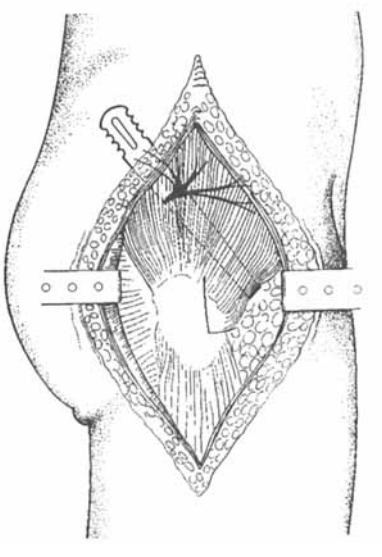

Figure 3. An L-shaped incision is made and the anterior one third of the gluteus medius and insertion of gluteus minimus is reflected from the anterior aspect of greater trochanter. Note the relation of the superior gluteal nerve and its branches to the incision.

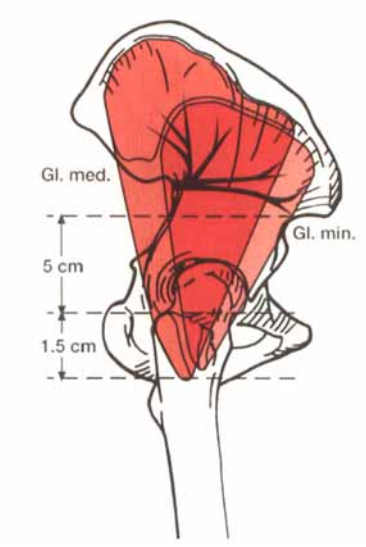

Figure 4. Anatomical sketch revealing the superior gluteal nerve and its branches and their relation to the greater trochanter.

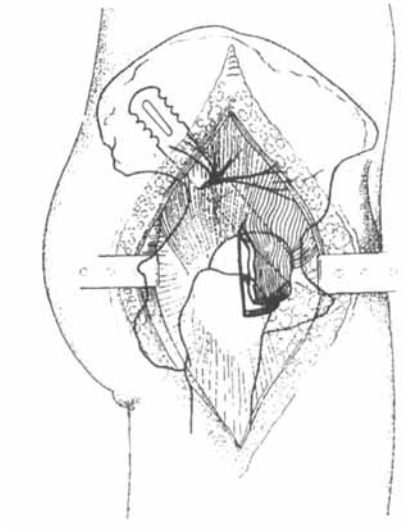

Figure 5. The L-shaped incision has been completed. Note the relationship with underlying bony landmarks,

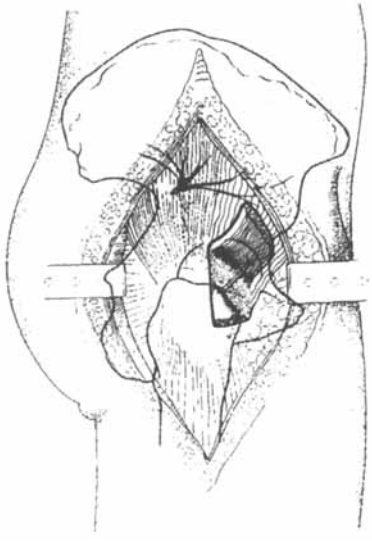

Figure 6. The musculotendinous flap is retracted superiorly and the anterior capsule is incised.

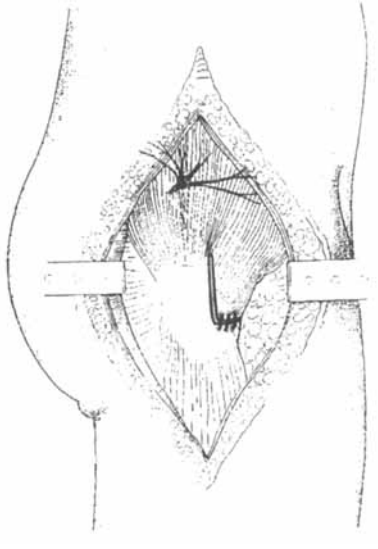

Figure 7. The myofascial unit is sewn with multiple interrupted sutures.

most tip of the greater trochanter is, on an average, 1.5 cm (Figure 4). The longitudinal incision usually does not extend more than 0.5–1 cm above the tip of the greater trochanter. (An area of 5 cm adjacent to the greater trochanter is considered a safe area of the gluteus medius (Figure 4) (Jacobs and Buxton 1989)).

It should be noted that the main attachment of the gluteus medius over the posterosuperior angle of the greater trochanter is left undisturbed, together with the posterior two-thirds of its attachment over the oblique ridge on the lateral side of the greater trochanter (Figure 5). No attempt is made to develop a plane between the gluteus medius and minimus and they are raised in one flap. Division of the piriformis is not routinely necessary, except in cases of difficulty and in overweight patients.

The capsule is incised after the hip is externally rotated to put the capsule on a stretch (Figure 6). The leg is adducted and further radial cuts along the circumference of the anterior capsule are made over the fem-

oral head. The anterior capsule is excised, if necessary. An incision released in a transverse manner is made in the posterior fascia lata slightly distal to the greater trochanter. The hip is dislocated anteriorly by full adduction and external rotation of the thigh. This is facilitated by lateral traction on the femoral neck with a bone hook. After removal of the femoral head, the leg is adjusted to give a good view of the acetabulum.

In most cases, adduction of the thigh and external rotation give the best view. The self-retaining retractor is positioned against the posterolateral aspect of the proximal femur inferiorly and the flap of the glutei superiorly. The key to full exposure of the acetabulum and proximal femur lies in correctly placing the retractors. This approach gives very good exposure of the acetabulum and femoral neck for routine total hip replacement.

During closure, the flap of gluteus minimus and medius falls back into its normal position on slight abduction and internal rotation of the hip and is secured by sutures inserted in the periosteum and soft tissues covering the trochanter (Figure 7). The longitudinal split in the gluteus medius usually does not require suturing. The releasing transverse incision in the posterior fascial leaf is then repaired. The iliotibial band and the gluteal fascia are closed carefully in routine fashion. The superficial layers are closed over drains.

Discussion

In the anterolateral approach to the hip joint without osteotomy of the greater trochanter, the anterior musculotendinous expansion of the gluteus medius and the insertion of the gluteus minimus onto the greater trochanter are the main obstacles to access to the hip joint. The approach described in this paper is based on the principle of raising a flap containing these obstacles in a way that facilitates reattachment. The intermuscular plane of cleavage is basically that of Watson-Jones (1935-1936), Burwell and Scott (1954) and Müller (1974), but the skin incision is a straight lateral one which facilitates access to the femoral canal.

The Hardinge (1982) approach threatens denervation of a large mass of gluteal abductor musculature, if the split in the gluteus medius is extend too far proximally so as to damage the superior gluteal nerve (Baker and Bitounis 1989). Ramesh et al. (1996) also reported persistent damage to this nerve in one tenth of patients with this approach.

Injury to the inferior branch of the superior gluteal nerve remains a potential risk with our approach, but dissection sufficiently proximal to damage the nerve is rarely necessary in primary total hip arthroplasty, in the absence of acetabular dysplasia. In any event, the superior branch innervating the gluteus medius, which accounts for more than half of the hip abductor muscle mass (Inman 1947), is unlikely to be affected.

The incidence of heterotopic bone formation is rather high using the Hardinge approach, about one tenth having grades IV to V heterotopic bone formation with compromised hip function (Foster and Hunter 1987).

The incidences of dislocation, heterotopic bone formation and trochanteric bursitis are low after an anterolateral approach (Thompson and Culver 1975), and have been found to be much higher with posterior and transtrochanteric approaches (Vicar and Coleman 1984).

The Dall (1986) and McLauchlan (1984) approaches, require special care to reattach the trochanteric fragment after the operation and union of this fragment, bursitis and heterotopic bone formation must remain a concern.

With the omega lateral approach (Learmonth and Allen 1996), care must be taken to retain an untouched continuous strip of gluteus medius and anterior border of vastus lateralis between the curve of the omega shape. Moreover, an approach to the hip joint behind this continuous strip of tissue anteriorly does not provide easy access, and retraction may make it tenuous. Therefore a secure repair may not be possible.

Müller's (1970, 1974) approach usually does not provide sufficient anatomic orientation and exposure to allow the surgeon to perform total hip arthroplasty properly. Working on the femoral side is particularly difficult and damaging to the gluteal muscles. More recently, Nazarian, Tisserand, Brunet and Müller (1987) have described addition of the division of vastus lateralis, as first described by McFarland and Osborne (1954).

In the modification of Müller's approach (Hanssen 1991), the longitudinal split in the gluteus medius along its fibers occurs not at the junction of the anterior and middle thirds but much more posteriorly, and it extends 3 cm proximal to the superior acetabular rim. The gluteus medius and minimus are raised in two separate flaps from the greater trochanter, and retraction of both these tendons superiorly usually requires the use of Charnley acetabular pin retractors driven into the pelvis above the superior acetabular margin. This can lead to injury to the superior gluteal artery, with consequent retroperitoneal hemorrhage, particularly if the pin is driven more than 4 cm into the ileum (Lozeman and Robbins 1983).

Hanssen (1991) places the patient in the lateral decubitus position, which may lead to difficulties in the orientation of the implants and in the correction of discrepancies in the leg lengths, particularly for surgeons who are accustomed to operating on patients in the supine position. I have never attempted an operation with the patient in this position.

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