Small Incision Total Hip Replacement by the Lateral Approach Using Standard Instruments

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Primary total hip replacement (THR) is performed by different approaches. The traditional transtrochanteric approach described by Charnley1 is not commonly used today in primary surgery and has been substituted for less invasive approaches.2

The posterior approach is popular in THR. Favored by many surgeons, it provides anatomic dissection and less traumatic access to the hip. Higher dislocation rates have been reported with this approach, mainly due to inexperienced surgeons or treatment of the posterior capsule and external rotators.3,4

Posterior approach techniques by short skin incisions ranging from 8-10 cm have been described for primary THR.5,6 Less blood loss and reduced need for blood transfusions has been reported.7

Small incisions in total hip replacement should be easily extensible to provide further exposure when needed without compromising the safety of the surgical approach or the skin.
fusion have been important features of the procedure\(^7\) along with reduced hospital stay and cost.\(^8\)

The direct lateral approach is a frequently used procedure. Low dislocation rates and the ability to place adequately oriented prosthetic components with an acceptable level and severity of limp and heterotopic bone formation have been reported.\(^9\)-\(^11\) Clinical results are similar when the posterior approach and the direct lateral approaches are compared; this has encouraged the use of the latter.\(^12\)

The article presents a short skin incision technique using a modified direct lateral approach with standard instruments for THR.

**SURGICAL TECHNIQUE**

With the patient positioned in lateral decubitus on the unaffected side, prepping is done in the standard fashion. The greater trochanter is the main skin landmark, and a longitudinal incision is made parallel to the long axis of the femur centered at the mid portion of the greater trochanter starting 2 cm above the tip of the greater trochanter and extended distally 5-8 cm below (Figure 1). The subcutaneous fatty tissue is sectioned as the skin incision. The iliobibial band is incised 1-2 cm longer than the skin incision proximally and distally. Adequate dissection of fatty tissue from the iliobibial band is recommended to increase skin mobility (Figure 2). A Charnley retractor is placed on the anterior and posterior edges of the iliobibial band incision and moderate tension is applied so that longitudinal exposure is not affected (Figure 3).

The trochanteric bursa is resected until the gluteus medius and vastus lateralis fibers are easily identifiable. A “hockey stick” incision is made at the union of the anterior and mid fibers of the gluteus medius starting approximately 2 cm proximally and anteriorly of the tip of the greater trochanter (Figure 4). The superior gluteal nerve lies at least 3 cm above the tip of the greater trochanter (Figure 5). Anterior displacement of the muscle flap (MF), the middle and posterior thirds of the gluteus medius (GM) attached to the greater trochanter (GT), insertion of the gluteus minimus (GMI), and the hip capsule (HC) are exposed.

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**Figure 3:** With the iliobibial fascia incised, the Charnley retractor holds the anterior and posterior edges of the cut in the fascia. The bursa has been partially resected and the gluteus medius and vastus lateralis are exposed along with their insertion on the greater trochanter. **Figure 4:** “Hockey-stick” incision through the anterior third of the gluteus medius and the vastus lateralis. **Figure 5:** Anterior displacement of the muscle flap (MF), the middle and posterior thirds of the gluteus medius (GM) attached to the greater trochanter (GT), insertion of the gluteus minimus (GMI), and the hip capsule (HC) are exposed.
the greater trochanter. The incision of the gluteus medius is directed posteriorly and inferiorly toward its distal insertion in the greater trochanter and then directed distally over the prominence of the greater trochanter and in between the vastus lateralis fibers at 3 cm.

Electrocautery is used initially, but blunt dissection is performed through the deep fibers of the gluteus medius to avoid damage to the superior gluteal nerve. The anterior muscle flap, including the gluteus medius and vastus lateralis, is displaced anteriorly (Figure 5). Rectus femoralis and gluteus minimus fibers are detached and displaced off the hip capsule and greater trochanter. After the joint capsule is exposed, a Hohmann retractor is placed under the posterior flap of the gluteus medius (still attached to the greater trochanter) and the tendon of gluteus minimus. Both are elevated to expose the superior aspect of the hip capsule. The anterior hip capsule is resected, exposing the neck, femoral head, and acetabular rim.

The hip can be dislocated, or a high neck cut close to the femoral head can be done in situ (Figure 6). After the femoral head is resected, the Charnley retractor can be removed if mobilization of the leg is obstructed. A proximal femur elevator is placed under the greater trochanter and directed posteriorly. External rotation along with medial capsular release exposes the medial aspect of the femoral neck (the leg is flexed and externally rotated). The space created by the absence of the femoral head allows for palpation of the lesser trochanter. This is used as a landmark for the final neck resection according to the preoperative plan (Figure 7). Medial capsular release is important to obtain adequate external rotation, which is mandatory for femoral preparation. The hip is further flexed and externally rotated so that the proximal end of the femur is “pushed out” of the incision by the proximal femur elevator. Two Hohmann retractors are used. The first is placed above the lesser trochanter and the anterior edge of the incision is displaced forward, and the second is placed under the posterior neck, which pushes the superior edge of the incision down and helps elevate the proximal femur. Proper neck resection can be performed. Straight access to the femoral canal is possible at this step, and femoral preparation is per-

Figure 6: Anterior dislocation of the femoral head through a complete anterior capsulectomy. Figure 7: A proximal femur elevator is placed posteriorly under the greater trochanter, the proximal femur is “pushed out” of the joint by flexion and external rotation, a proximal Hohmann retractor helps elevate the proximal femur and an anterior Hohmann retractor exposes the medial aspect of the femur. Intraoperative photograph shows a high neck osteotomy and a second cut to adjust the osteotomy level, according to the location of the lesser trochanter and preoperative plan. Figure 8: Flexion and external rotation of the extremity are important to allow for straight access to the medullar canal.
formed in the standard fashion (Figure 8).

Acetabular exposure begins by removing the previously described retractors. The leg is placed in the original position and the anterior muscle flap is identified and displaced anteriorly with a Richardson retractor. This helps locate the posterior gluteus medius flap, which is retracted posteriorly and superiorly with another Richardson retractor. The remaining anterior capsular attachments to the acetabular rim and the acetabular labrum are now resected; the lateral rim is clearly identified along with 1 cm of the adjacent iliac bone. Two anterior and posterior pin retractors are placed on the iliac bone proximal to the acetabular rim and perpendicular to the pelvis. The posterior Richardson retractor is removed. The anterior rim of the acetabulum is located and a blunt Hohmann retractor is placed over the anterior rim. The anterior Richardson retractor is removed. The proximal femur is pulled back with a bone hook (Figure 9).

Exposure of the inferior acetabulum is performed, and a blunt curved acetabular retractor can be placed under the acetabular notch. Full acetabular exposure should be obtained at this point, and acetabular preparation is performed. After bone preparation is complete, the components are implanted in a standard fashion (Figures 10 and 11). Careful soft-tissue repair is performed with reattachment of the gluteus minimus to the insertion of the gluteus medius and full repair of the anterior muscle flap (Figure 12). A subcutaneous skin suture is used (Figure 13).

**RESULTS**

From January 2002 to March 2003, 40 patients (31 women and 9 men) were operated on at our institution using the small incision lateral approach for THR. Average age of the women was 60 years (range: 34–79 years). Average age of the men was 58 years (range: 33-75 years). Average body mass index was 28.19 (range: 25.39-34.15). Patient diagnoses included: osteoarthritis (n=29), developmental dysplasia of the hip (Crowe 1) (n=3), femoral neck fracture (n=2), ankylosing spondylitis (n=2), rheumatoid arthritis (n=3), and avascular necrosis of the hip (n=1).
The skin incision measurement averaged 8.2±1.04 cm (range: 7-10 cm). Average bleeding was 584±244.4 mL (range: 250-1000 mL). Sixteen (42%) patients did not require a blood transfusion. Transfusion criteria at our institution includes a hemoglobin value <10. The preoperative hemoglobin value of the series averaged 13.2±1 (range: 10.9-14.7).

Twenty-six uncemented, 9 hybrid (uncemented cup), and 5 total cemented hip implants were used. Third generation cementing techniques were used for cemented stem implantation (11 stems). Average acetabular inclination was 42° (range: 36°-50°). Average length of hospital stay was 2-31 days. Five patients were discharged the next day, 16 the second day, and 17 the third day postoperatively. Two patients were discharged >10 days postoperatively; one due to a pulmonary embolism (with a cemented stem) and the other with rheumatoid arthritis who stayed because of a physical therapy program. These two patients were not considered in the average hospital stay of the series.

One pulmonary embolism occurred and 19 patients had small skin abrasions that healed with no complications (Figure 14). No dislocations or infections occurred. Three cases began as small incision procedures and were converted to a standard procedure (>10-cm incision length). They are not included in the series.

**DISCUSSION**

Minimally invasive THR is an attractive alternative for surgeons and patients. The technique described was used for a small incision THR by the lateral approach. In our series, the procedure was highly reproducible. Implants were oriented correctly and the approach proved to be easily extensible when more exposure was needed.

No dislocations or infections were reported. Pulmonary embolism occurred, but it was not related to the surgical exposure and may have been related to the pressurized cementation of the femoral canal. All patients in the series followed the same prophylaxis protocol for deep venous thrombosis, which included low molecular weight heparin, 30 mg starting 12 hours postoperatively and taken every 12 hours for 21 days. Long compressive stockings and early mobilization were also used.

Skin abrasions were observed at the distal margin of the incision and occurred during preparation or implantation of the cup because of impingement of straight instruments against the distal portion of the incision. Modified curved reamers and cup impactors may be necessary to avoid these skin lesions.

**REFERENCES**