Greater Trochanteric Osteoplasty in Revision Hip Arthroplasty: Two Case Reports

David E. Attarian, MD, and Michael P. Bolognesi, MD

Abstract

Proximal migration of the greater trochanter can make revision hip arthroplasty challenging, particularly in regard to surgically exposing the joint, reestablishing leg length, avoiding postoperative impingement and instability, and achieving a functional hip with less pain and more motion. Often, the surgical solution to these problems includes greater trochanteric and/or subtrochanteric osteotomy.

In this report, we describe 2 cases treated with greater trochanteric osteoplasty (reshaping and partially resecting the greater trochanteric tip) through a modified direct lateral approach. This novel alternative surgical technique accomplishes the procedural goals without major osteotomy and its potential associated complications. The patients were very satisfied with their outcomes.

Revision hip arthroplasty with associated chronic proximal migration of the greater trochanter and lower extremity shortening is technically challenging. Surgically exposing the joint, reestablishing leg length, avoiding postoperative impingement and instability, and regaining a functional hip with less pain and more motion are difficult. Often, a major proximal femoral osteotomy is used in these cases, but at the cost of increased morbidity, higher risk for complications, and more frequent repeat surgery.[1-5] In this article, we describe a novel surgical technique: greater trochanteric osteoplasty (reshaping and partially resecting the greater trochanteric tip) through a modified direct lateral approach. We used this approach in 2 revision hip arthroplasties, which we report here, along with their good outcomes. The authors have obtained written informed consent from both patients for the print and electronic publication of their case reports and radiographic images.

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Case Reports

In each case, revision hip arthroplasty using greater trochanteric osteoplasty was undertaken through a modified direct lateral approach performed with the patient in the lateral decubitus position, as described in detail in the orthopedic literature.[6,7] The previous lateral hip scar was incised and extended as needed for exposure. Likewise, the fascia was opened immediately over the lateral proximal femur to facilitate full visualization. The proximal femur was exposed by incising the abductor mechanism and vastus lateralis (with cautery) in line with their respective muscle and tendon fibers. The proximal femur is essentially skeletonized anteriorly and posteriorly.

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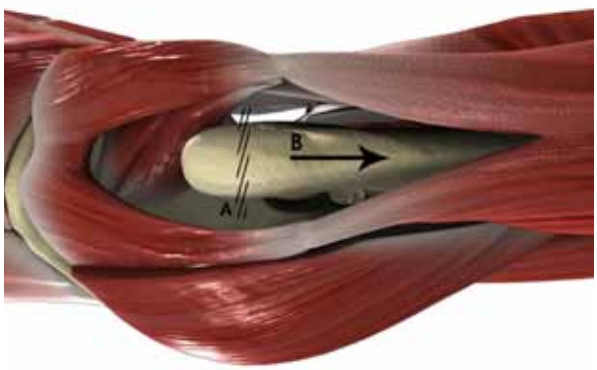


Figure 1. Lateral view of right hip with superficial layers removed. Skeletonized proximal femur with anterior and posterior soft-tissue sleeves as described in text. Hash marks A show approximate level of greater trochanteric osteoplasty; arrow B demonstrates distal translation of femur within soft-tissue sleeve. Figure provided by BioDigital Systems, New York, New York.

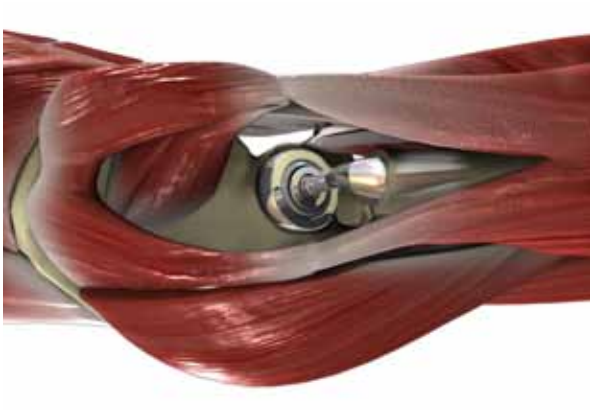


Figure 2. Lateral view of right hip after prosthetic implantation and greater trochanteric osteoplasty. Figure provided by BioDigital Systems, New York, New York.

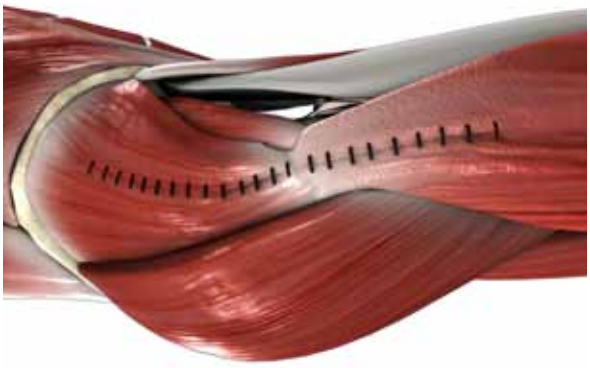
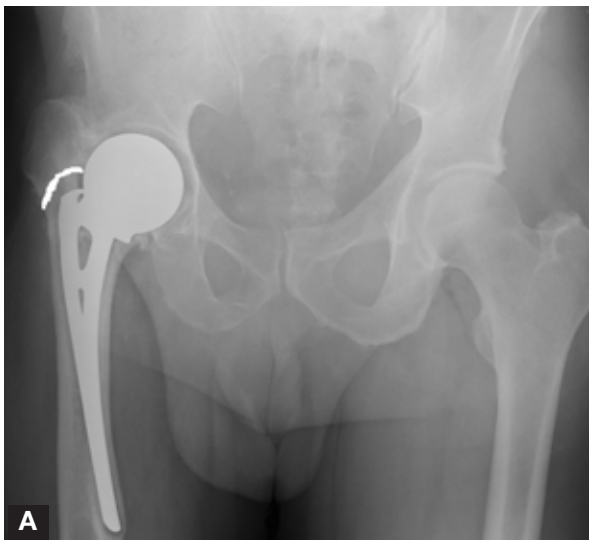


Figure 3. Lateral view of right hip shows closure and reattachment of anterior and posterior sleeves to remaining proximal femur. Figure provided by BioDigital Systems, New York, New York.

Any previous surgery rendered these layers much thicker than usual and easier to peel off the proximal femur as a single connected layer. As shown in Figure 1 (right hip), the anterior conjoined sleeve of soft tissue consists of the anterior half of the gluteus medius, the gluteus minimus, the vastus lateralis, and the anterior hip pseudocapsule from 3 to 5 cm above the greater trochanteric tip down to or just below the lesser trochanter (the iliopsoas tendon did not need to be released in these specific cases). A fleck of bone of the lateral greater trochanter at the junction of the gluteus medius and the vastus lateralis may be used, at the surgeon's discretion. The posterior sleeve consists of the posterior half of the gluteus medius, the piriformis, the short external rotators, and the posterior pseudocapsule. The gluteus maximus tendon was left intact. The existing implant was removed, and total hip implant trials were placed to translate the proximal femur distally within the created soft-tissue sleeve (Figure 1, arrow B) until the desired leg lengthening (assessed by intra-



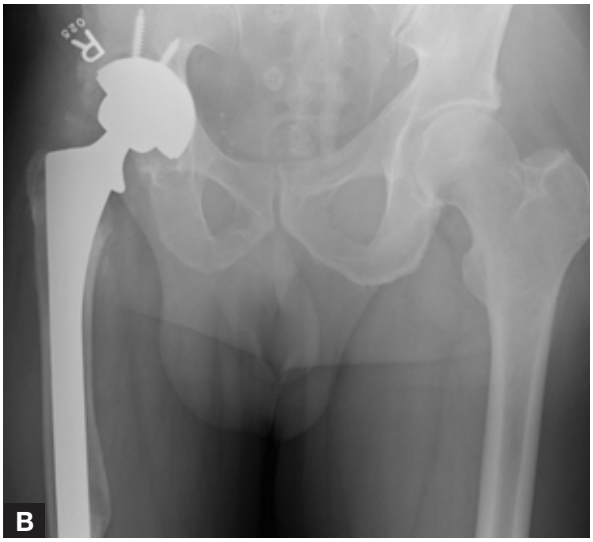


Figure 4. (A) Preoperative anteroposterior radiograph of case 1 right hip with white line marking approximate level of greater trochanteric osteoplasty. (B) Postoperative anteroposterior radiograph of case 1.

operative measurements and radiograph) was achieved. Motion and potential impingement of the proximal femur on the pelvis were assessed; a proximal portion of the greater trochanter was marked (Figure 1, hash marks A, about the level of the hip center of rotation) and removed with saw and/or osteotome, and then reshaped with rongeur to prevent any impingement on the pelvis through a physiologic range of motion. The final total hip prosthesis was implanted (Figure 2). Then the anterior and posterior soft tissues were closed in situ, front to back over the proximal femur in its new distally translated position, with nonabsorbable suture, as shown in Figure 3 (in case 2, a cable was used to reattach the sliver of bone with anterior soft-tissue sleeve; several drill holes at the level of the remaining proximal femur/greater trochanter facilitated reattachment

Figure 5. (A) Preoperative anteroposterior radiograph of case 2 right hip with white line marking approximate level of greater trochanteric osteoplasty. (B) Postoperative anteroposterior radiograph of case 2.

of the anterior and posterior flaps). The remaining layers were closed routinely. The patient underwent standard postoperative rehabilitation, though active abduction of the hip was limited the first month after surgery.

Case 1

A 66-year-old man with "low-grade chondrosarcoma" of the right femoral neck, which had been diagnosed by open biopsy and subsequently treated with staged radiation and hip hemiarthroplasty 35 years earlier, presented with chronic, progressive pain and hip stiffness. On examination, he demonstrated a right antalgic/Trendelenburg gait with a cane and right shoe-lift. The right leg was approximately 2.25 inches shorter than the left leg. Right hip motion was painful and quite limited, with near full extension, hip flexion of 45°, and essentially no rotation, adduction, or abduction. The patient had significant right thigh atrophy and old right hip anterolateral surgical scars. The right knee appeared normal and the right leg was neurovascularly intact.

Figure 4A shows the right hip radiograph (white line marks approximate the greater trochanteric osteoplasty). More than a year out from surgery, the patient was pain free. On examination, he was ambulating with only a right 3/4-inch shoe lift and no cane. He had a mild, improved Trendelenburg gait. Right hip active motion had increased to 80° of flexion, 30° of abduction, 20° of adduction, 30° of external rotation, and 0° of internal rotation. Figure 4B shows the postoperative radiograph. The patient was pleased with his outcome. His preoperative Harris hip score was 33, and his postoperative score was 87.

Case 2

A 76-year-old man presented with right hip pain and inability to ambulate. The year before presentation, he had undergone a minimally invasive 2-incision right total hip arthroplasty complicated by intraoperative proximal femur fracture. The same day as the index procedure, he was taken back for open reduction and internal fixation. The postoperative course was quite stormy: surgical site infection with methicillin-resistant *Staphylococcus aureus,* stroke, and an infected prosthetic heart valve. The patient was transferred from the community hospital to a tertiary level hospital. The hip was treated with incision, drainage, prosthetic resection, and placement of an antibiotic cement prosthetic spacer, which later dislocated. On initial presentation more than a year after the described surgeries, the patient was frail and confined to a stretcher/bed. All right hip motion was very painful and limited, and the hip was fixed in an extended, adducted, mildly externally rotated position with functional shortening of more than 2 inches. The patient was unable to sit up because of the pain. He had no evidence of residual infection or neurologic deficit. Figure 5A shows the right hip radiograph (white mark approximates the greater trochanteric osteoplasty). After lengthy multispecialty preoperative consultations, he underwent conversion of the dislocated hip spacer to total hip (Figure 5B). More than a year after the final surgical procedure, the patient was pain free. He was able to ambulate and transfer independently with and without a cane and had a minimal right Trendelenburg gait. Leg lengths were nearly equal. Right hip active flexion was 80° with full extension to neutral, abduction of 30°, adduction of 10°, external rotation of 30°, and no internal rotation. Right hip flexion and abduction strength were graded 4/5. The patient was very happy with his outcome. His preoperative Harris hip score was 0, and his postoperative score was 75.

Discussion

Chronic proximal migration of the greater trochanter can make revision hip arthroplasty technically difficult. The goals of surgical exposure, prosthetic implantation, and reestablishment of a painless hip joint with improved motion and leg lengths need to be addressed safely and reproducibly. Another successful surgery in similar circumstances is proximal femoral osteotomy

(greater trochanteric or subtrochanteric),[2,4,5] but this option posed a significant risk for complications and repeat surgery.[1,3]

Our 2 patients underwent a novel surgical alternative approach that avoided major proximal femoral osteotomy but still accomplished each of the surgical goals described. Immediate and short-term outcomes were complication free, and the patients were very satisfied with their clinical outcomes. Greater trochanteric osteoplasty through a modified direct lateral approach appears to be a reasonable alternative surgical option in these difficult revision hip arthroplasties.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

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