

# Open Reduction and Internal Fixation for Treating Pertrochanteric Femoral Fracture Below a Hip-Resurfacing Implant in a 65-Year-Old Man: A Case Report

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**Funding** The authors received no financial support for the research, authorship, and publication of this article.

**Conflict of Interest** The authors report no conflicts of interest.

**Informed Consent** The patient was informed that the data concerning his case would be submitted for publication, and he provided verbal consent.

## ABSTRACT

Periprosthetic proximal and pertrochanteric femur fractures around a well fixed hip resurfacing implant present a challenge to orthopaedic surgeons, as they do not allow the most biomechanically favorable fixation constructs in patients with otherwise high-demand levels of physical activity. A 65-year-old man hit a tree while skiing. He presented to our emergency department with a right-sided pertrochanteric fracture of the proximal femur beneath an implant used in prior hip resurfacing. The patient underwent open reduction and internal fixation with intraoperative fluoroscopy-assisted manipulation to ensure fixation of the hip resurfacing. At 6-week follow-up, a slight varus collapse at the fracture was noted. We continued to monitor our patient and the fracture healed with no further complications. Proximal femur fractures distal to a hip resurfacing may progress to mild varus collapse with promising outcomes after 5 months.

**Keywords:** Femur, Trochanteric Fractures, Hip Resurfacing, Skiing

## INTRODUCTION

Total hip arthroplasty is generally thought to have many disadvantages for treating younger, active patients with severe hip arthritis. Hip resurfacing has been proposed as an improved alternative procedure because it preserves the bone stock, has a large diameter head allowing for greater stability, improves biomechanics across the proximal femur with less stress shielding of bone, and allows patients to return to higher levels of physical activity.<sup>1</sup>

The most common proximal femoral fractures are extracapsular fractures. Most patients with this problem

undergo surgical treatment. In the United States, about 125,000 extracapsular proximal femur fractures occur annually.<sup>2</sup> These fractures are generally categorized as stable versus unstable, based on the Jensen and Michaelson classification.<sup>1</sup> Unstable fractures can include an affected lateral wall, reverse obliquity pattern, and instability of the posteromedial cortex.<sup>3</sup>

Owing to the increasing number of hip resurfacing procedures performed to treat these younger, more active patients, we would predict an increase in periprosthetic fractures seen around implants placed in the proximal femur. However, few studies have reported on the subject. We present a 65-year-old man who underwent ORIF for treating a pertrochanteric femoral fracture distal to the implant used in hip resurfacing.

## CASE REPORT

A 65-year-old man presented to our emergency department with a right-sided pertrochanteric femoral fracture. The patient struck a tree while skiing and was initially evaluated at an outside facility. Findings of radiographs revealed a pertrochanteric femoral fracture beneath the implant used in a prior hip resurfacing (Figure 1). He was transferred to our level 1 regional trauma center for definitive treatment. Before the ski-related injury, the patient's pain had improved since his index procedure. Normal findings of motor and sensory neurological functions were noted. He had returned to all activities, including skiing and riding his motorcycle. Regarding the patient's index hip resurfacing, no radiographs of his pre-, intra-, and postoperative treatment were available.

On physical examination, he held his right-sided hip in external rotation with a flexed knee, with a well-healed posterolateral incision. Motor and sensory



**Figure 1.** Anteroposterior radiograph of a right hip obtained at an outside facility, showing a displaced pertrochanteric femoral fracture distal to a well-fixed, hip-resurfacing implant.



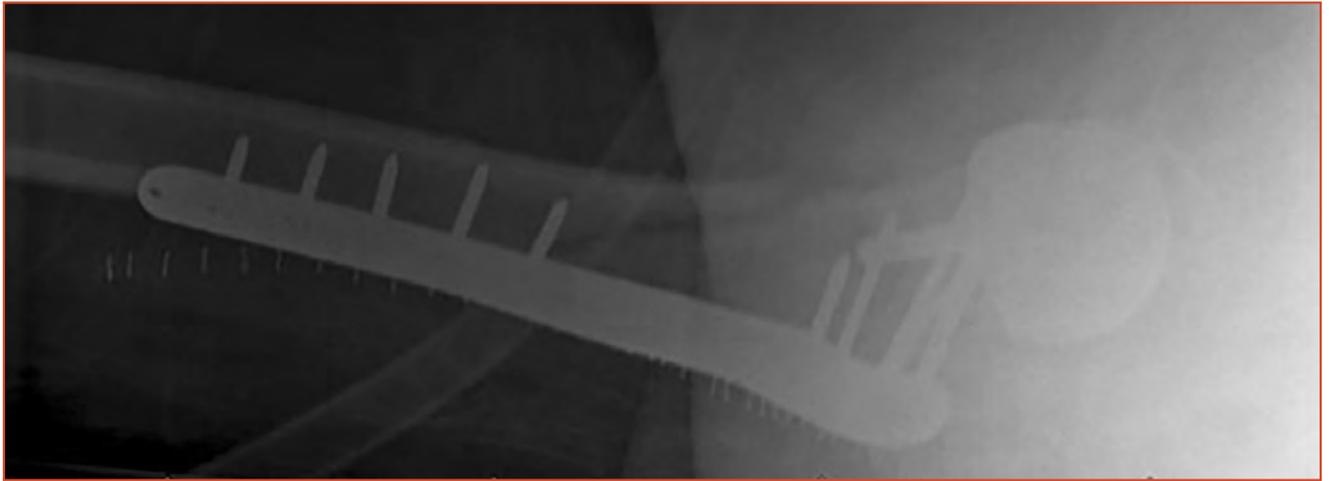
**Figure 2.** Immediate postoperative anteroposterior radiograph of the right femur, showing a well-reduced fracture with a lateral proximal femoral locking plate in place.

neurological functions were intact, and findings of vascular examination were normal. Radiographs revealed an unstable intertrochanteric femoral fracture, involving the lateral cortex and the lesser tuberosity, with the degree of comminution somewhat appreciated. The hip resurfacing implant was well aligned, with a slight level of valgus noted.

The patient was taken to the operating room and underwent ORIF in the lateral position. Fluoroscopy-assisted manipulation of the hip was used to ensure no loosening or instability of the hip-resurfacing implant. The hip was extended by pulling manually on the leg. The hip-resurfacing implant did not reveal any subluxation, dislocation, or play within the proximal femur. A standard lateral approach to the femur was used to ensure the hip capsule was not violated. Near-anatomical fixation was achieved by using a proximal femoral locking plate.

Because the hip-resurfacing implant was not loose and the patient was happy with his prior level of function, extramedullary fixation was performed to treat the fracture. Owing to the presence of the hip-resurfacing implant, intramedullary and cephalomedullary nailing or other fixation techniques placing large diameter fixed angle implants into the femoral neck were not possible. Total hip arthroplasty was not recommended because the patient functioned well after his prior fracture and the implant did not appear loose. The most proximal screws were drilled and placed free-handedly with nonlocking screws to avoid the hip-resurfacing implant (Figures 2 and 3). Postoperatively, the patient was discharged with posterior hip precautions and no weight bearing on his right leg.

At 2-week follow-up, he reported that he was doing well and radiographic findings were promising. His weight bearing progressed to touch down. At his 6-week follow-up, he reported he was still doing well, with no falls or complications at home. Findings of radiographs revealed mild varus collapse of his fracture without evidence of the hip-resurfacing implant loosening or dislocating (Figure 4). The patient maintained touch-down weight bearing until his 3-month follow-up, at which time the radiograph findings revealed a stabilized fracture. He also reported that he had been putting full weight on his leg. As such, he was progressed to full weight bearing. At 5-month follow-up, the patient had returned to all activities, including riding his motorcycle, and had no concerns. Radiograph findings showed stabilization of his varus collapse, no implant complications, and healing of his fracture (Figure 5).



**Figure 3.** Immediate postoperative lateral radiograph of the right femur, showing a well-reduced fracture with a lateral proximal femoral locking plate in place.



**Figure 4.** At 6 weeks postoperatively, anteroposterior radiograph of the right femur shows mild varus collapse of the fracture without implant complications.



**Figure 5.** At 5 months postoperatively, anteroposterior radiograph shows a healing fracture, stabilization of varus collapse, and no implant complications.

## DISCUSSION

Femoral neck fractures are known complications after hip resurfacing.<sup>4</sup> However, few cases of pertrochanteric femur fractures distal to a hip-resurfacing implant have been reported.<sup>5-7</sup> In one study, the fracture was in the diaphysis and treated using an intramedullary device.<sup>4</sup> Another case reported that the proximal fracture resulted in loosening of the prosthesis, which was treated using cerclage wiring and conversion to a revision total hip arthroplasty.<sup>7</sup>

In only two available reports, the implant was retained and the fracture was treated using a lateral femoral locking plate.<sup>5,6</sup> Interestingly, both of these cases included early and mild varus collapse, although still within acceptable alignment, without lateral cortex gapping and keeping the neck-shaft angle between 125° and 135°. Neither case reported failure of either fracture fixation or hip-resurfacing implant. The patients successfully healed with no complications and returned to their levels of activity before the injury.

It is unclear why these periprosthetic fractures seem to settle into varus deformity and then heal. Our current case and the other two cases<sup>5,6</sup> all involved relatively unstable femoral fractures. Ideally, patients with fracture types are treated with intramedullary devices.<sup>2,3</sup> However, in patients with periprosthetic fractures around a well-fixed, hip-resurfacing implant, using an intramedullary device may not be a reasonable option to maintain the hip resurfacing. In the one fracture that resulted in a loose implant, conversion to revision total hip arthroplasty was performed to stabilize the fixation.<sup>7</sup> Using nonlocking screws proximally to avoid the hip-resurfacing implant changes the lateral proximal femoral locking plate from a pure-fixed angle device to somewhat of a hybrid-type construct, which may result in a varus collapse.

In our case and the other two,<sup>5,6</sup> these fractures settled early into an acceptable amount of varus deformity, healed, and all patients returned to previous levels of activity. However, more studies are needed on ORIF with lateral femoral locking plates for treating pertrochanteric fractures distal to a well-fixed hip-resurfacing implant. Further findings can help assess the biomechanical stability and long-term outcomes of the procedure. We believe the results of the current case can help guide research on appropriate treatment of these rare fractures.

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