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Sliding Hip Screw for Fixation of Fracture Through a Previously Arthrodesed Hip

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Abstract

Hip arthrodesis is a treatment option for painful chronic hip conditions. Hip fractures through a previously arthrodesed hip are relatively uncommon as indications for hip arthrodesis are rare. The following case reports on the use of a sliding hip screw and a pelvic reconstruction plate to address arthrodesed hip fracture in an 81-year-old man. The use of a dynamic hip screw in this setting gave us a stable fixed-angle construct with compression across the fracture site, and the addition of a trochanteric side plate added to the stability. The dynamic compression plate with limited bone contact was used to neutralize the construct. This case describes the successful treatment of such an injury in a way not previously described in the literature with the intent of giving the orthopaedic traumatologist another method to approach this rare injury.

With the increased aging of our cohort, the incidence of hip fractures worldwide continues to climb from 1.26 million in 1990 to a projected 4.5 million by 2050.¹ In the United States, the reported incidence rates for hip fractures in 2005 were 793.5 per 100,000 in women and 369 per 100,000 in men.²

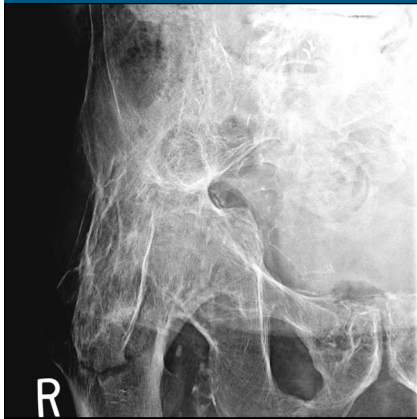
Hip arthrodesis is a treatment option for painful chronic hip conditions. In the developed world with the popularization of total hip replacements, hip arthrodesis is done less frequently.³ While previous patients are usually functional in the long term,⁴ complications such as long lever arm fractures and adjacent joint disease after fusion that require follow-up care are occasionally encountered.

Although a fractured arthrodesed hip is rare, it is often found in adults

younger than 40 years with non-inflammatory monoarticular end-stage hip arthrosis; in patients with joint destruction, bone deficiencies, or neurologic abnormalities to the hip musculature; and also in patients with fracture, osteonecrosis, or joint sepsis. The damage should be limited to one joint.^{5,6} Additional indications include high-activity individuals with no preexisting lumbar disease or ipsilateral knee or contralateral hip arthritis and those in whom a total hip arthroplasty would be contraindicated or would carry a high complication rate.^{5,7}

Hip fractures through a previously arthrodesed hip are relatively uncommon because only few indications for hip arthrodesis are found. We found six reported cases each using a unique surgical treatment. These cases

Figure 1



Injury radiograph.

Figure 2



Immediate post-operative radiograph.

included the use of combined plating and cannulated screws,⁸ short segment retrograde nailing through the subtrochanteric region,⁹ cephalomedullary nail fixation,¹⁰ and using virtual planning to implant multiple long locking screws.¹¹

Manzotti et al¹² described the fixation of an intertrochanteric fracture of an arthrodesed hip using a 4.5-mm dynamic compression plate with limited bone contact (LC-DCP) (DePuy Synthes Trauma). A 10-hole plate and a 9-hole plate were

Figure 3



3 month follow-up radiograph.

used, with the 10-hole plate on the anterior aspect and the 9-hole plate on the lateral aspect. The reasoning for using this instrument was that these plates allowed for the fixation to extend proximal to the arthrodesis and into the pelvis. These plates also allowed for earlier mobilization and weight-bearing. Font-Vizcarra et al described the fixation of an undisplaced intertrochanteric fracture with four 7.0-mm cannulated screws, and satisfactory results were seen both clinically and radiographically. The cannulated screws were used because the patient had to be non-weight-bearing for several weeks due to concomitant injuries.¹³ Other reports of fracture fixation of a previously arthrodesed hip used a cephalomedullary device¹⁴ and a supracondylar nail.⁹

The following case reports on the use of a sliding hip screw and a pelvic reconstruction plate to address arthrodesed hip fracture.

Figure 4



Final follow-up radiograph at 17 months.

Case Report

The patient is an 81-year-old man with a history of hypertension, hyperlipidemia, gout, and open abdominal aortic aneurysm repair, who has smoked about 10 cigarettes a day for the past 60 years. During the Korean War, he was involved in a motor vehicle accident in which he sustained a fracture to his right hip. He was treated with a hip fusion, after which he was able to ambulate without difficulty for approximately 50 years at which time he sustained his present injury after a fall from a standing height (Figure 1).

Given his relatively high level of function, open reduction and internal fixation was recommended to mobilize him early and avoid the many problems associated with prolonged recumbency, as well as provide him his best chance of a positive outcome. Non-surgical management may have been successful in a less-independent patient who was already relatively immobile but was not considered for this active community ambulator (Figure 2).

A spinal block was done because of his smoking history, to decrease the

morbidity associated with general anesthesia. He was placed in the left lateral recumbent position, and a direct lateral approach was done, with the incision in line with the femur and over the greater trochanter. The dissection was carried down through the iliotibial band to the hip abductors. The hip abductors were atrophied and were elevated off the fusion mass, and the fracture lines were identified, and the incision extended proximally to the iliac crest. The fracture sites were then reduced by abducting and externally rotating the hip and then holding it in place with a series of point-to-point reduction clamps (Figure 3).

A guidewire for a 140-mm Locking Compression Plate dynamic hip screw (Synthes) was then passed along the posterior fusion mass fracture line from the shaft of the femur just distal to the greater trochanter but directed a little more posterior than usual. After reaming, a 125-mm lag screw was passed. A six-hole trochanter stabilization plate (Synthes) was then attached using 4.5-mm cortical screws. A 130-mm 6.5 cannulated screw was placed obliquely through the trochanteric plate up into the neck of the femur, along with 4.5 cancellous screws (Figure 4).

Live fluoroscopy was used to confirm continued reduction with proper placement of screws. An LC-DCP 4.5 plate (Synthes) was then contoured to fit the anterolateral aspect of the fusion mass and extended down to the shaft of the femur. The plate was secured from proximal to distal using 4.5-mm screws. Live fluoroscopy was used to confirm the placement of the screws and stability of the fixation. The wound was then closed in layers, with an incisional wound vacuum dressing. The patient was placed in a hip abduction brace, and he was instructed to be on toe-touch weight-bearing for 3 months.

At the 3-month follow-up, the patient had no tenderness around

the surgical site and was ambulating with the assistance of a walker without any pain. Radiographs obtained at that time showed the instrument remained in place with no apparent shift in position, and the fracture lines were well healed. At the 10-month follow-up, the patient's only report was a subjective limb-length discrepancy with the right feeling shorter. Radiographs at that time showed a healed fracture with the instrument in place. Sixteen months after fixation, he was released from the clinic with as needed follow-up with minimal complaints of hip pain.

Discussion

Open reduction and internal fixation of a fracture through a previously arthrodesed hip is a procedure not commonly done in the United States. A fracture through an arthrodesed hip is even rarer, accounting for the paucity of literature on the subject.

This case describes the successful treatment of such an injury in a way not previously described in the literature with the intent of giving the orthopaedic traumatologist another method to approach this rare injury. The use of a dynamic hip screw in this setting gave us a stable fixed-angle construct with compression across the fracture site, and the addition of a trochanteric side plate added to the stability. The LC-DCP plate was used to neutralize the construct in a manner similar to the other description of dual plating we found. We did not use cannulated screws because they have a relatively high failure rate in femoral neck fractures and are not typically used at all in intertrochanteric fractures. Since this fracture looked more like a reverse obliquity intertrochanteric fracture, we thought the likelihood of failure would be

high with that particular construct. The similarity to a reverse obliquity fracture is why we added the side plate to the dynamic hip screw. The dynamic hip screw allowed us to dial in our compression nicely after the instrument was placed. We did not consider a cephalomedullary device practical, given the abnormal anatomy proximally, as he has a large fusion mass without preservation of a relatively normal-appearing greater trochanter.

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