

Technique for Rapid Identification and Removal of Slipped Capital Femoral Epiphysis Screws

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Abstract

Cannulated screws within the femoral neck/head often need not be removed. Identifying and removing them can be a technical struggle, in some cases requiring hip dislocation or excessive operative time.

In this article, we describe a novel technique that orthopedic surgeons can use to more effectively identify and percutaneously remove cannulated screws. Over the past 6 years, we have percutaneously removed 10 screws (from 7 patients) in an average time of 21 minutes per screw.

Cannulated screws within the femoral neck/head are not commonly removed. Typically, these screws are asymptomatic and do not cause significant problems. The general consensus of surgeons who perform adult reconstructive surgery of the hip is that removal of screws from the femoral neck/head usually is not necessary¹ but may be necessary in the case of nonunion, hardware failure, or loss of fixation or penetration of the screw within the hip joint. Most orthopedic surgeons know the struggle and complications of removing these screws.^{2,3} In larger patients, such as those typically seen with a slipped capital femoral epiphysis (SCFE), locating the screw percutaneously may be even more technically demanding.

Over the past 6 years, we have removed 10 cannulated screws (7.3 mm) from the femoral necks of 7 patients. The most common reason for screw removal was avascular necrosis (AN) and flattening of the femoral head resulting in the screw tip penetrating the hip joint; 1 of these 4 patients required 2 surgeries secondary to continued flattening of the femoral head. Other reasons for screw removal were epiphyseal growth away from the screw (1 patient), screw penetration after initial SCFE pinning (1 patient), and a screw backing out after a femoral neck fracture treated with cannulated screws (1 patient). One patient had 3 surgeries for the

screw; the initial surgery was secondary to screw breakage, and the other 2 were for screw repositioning secondary to worsening of AN (Figure 1).

In this article, we report on a novel, simple, rapid percutaneous technique for removing cannulated screws from the femoral head/neck—a technique that avoids significant surgical dissection or hip dislocation.

Surgical Technique

The patient is placed on a fracture table without a peroneal post. The unaffected leg is well padded and moved out of the way to allow for adequate anteroposterior (AP) and lateral views using the image intensifier. AP and lateral views of the hip are obtained to ensure visualization of the entire length of the screw. Before we developed our screw-removal technique, we were finding it difficult to access the screw using the previous incision and to recreate the trajectory that had been used to place the screw. Potential reasons for being unable to match the trajectory are patient body habitus change and screw migration after the initial surgery. The same technique for pinning the SCFE is used to identify the screw, except that, instead of centering the wire over the center of the femoral head, the surgeon centers it directly

Figure 1. Radiograph demonstrates worsening of the patient's AN resulting in the necessity to remove the screw.



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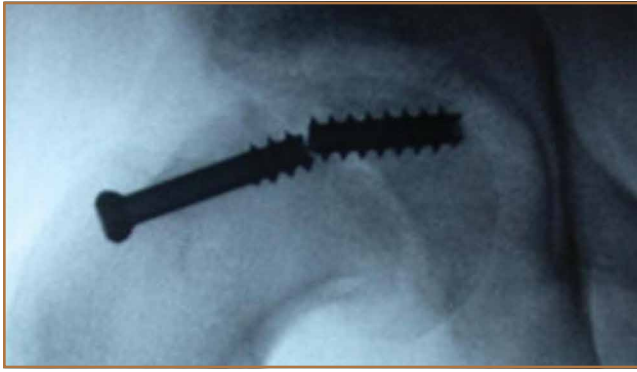


Figure 2. Intraoperative imaging of patient with broken slipped capital femoral epiphysis screw. We were able to remove both portions of screw percutaneously.

over the entire length of the screw. With use of an image intensifier, an AP view is obtained, a guide wire is placed on top of the leg directly over the length of the screw, and a line is drawn next to the wire. The same procedure is used on the lateral view. The result is that we are able to create the current trajectory of the screw. The guide wire is then placed through the skin where the lines intersect. It should be noted that the site of the guide wire insertion might be different from the site of the initial surgery. None of our incisions corresponded to the initial surgical incisions. We believe the change in incision site is related to what causes the change in screw trajectory. The image intensifier should be used while inserting the guide wire. The screw head is easily palpated with the guide wire, and the wire is inserted. A small stab incision is then made around the guide wire. Soft-tissue dissection is then performed to allow for easy passage of the screw during removal.

Using this technique, we removed 9 of the 10 screws in an average time of 21 minutes (range, 15 to 35 minutes). The other screw took 35 minutes to remove, as it was broken, its proximal portion was within the femoral head, and there was no screw head to palpate (Figure 2). A similar technique was used to locate the proximal fragment and remove it percutaneously.

Discussion

Hardware removal has its problems and complications. Screw stripping, screw breakage, screw retention, infection, and prolonged operative time all have been reported.⁴⁻⁷ For this reason, screws typically are not removed from the femoral head/neck of patients who are asymptomatic. Screw removal is necessary, however, in cases of unidentified screw penetration within the joint at initial surgery, AN resulting in femoral head collapse with subsequent screw penetration within the joint, epiphyseal growth

away from the screw, and need for revision surgery.

Hip dislocation has been performed when screws were penetrating the joint and total hip replacement was to be performed.⁷ This technique is not ideal in young patients because of their known risk for AN after hip dislocation. Other techniques have been used when the cannulated screw head was stripped or incarcerated.⁶ The technique described by Moehring and colleagues⁶ does not offer a fast and easy way to identify screws—only a way to extract stripped screws.

Crandall and colleagues² described a technique for removing cannulated SCFE screws. Their average operative time was slightly more than 60 minutes. Being able to easily identify screws has allowed us to reduce operative time significantly, to an average of 21 minutes.

Most recently, Bassi and colleagues⁸ described a technique for removing a broken cannulated drill bit. In this scenario, however, the path for the drill bit is already made and should be easy to identify. Our technique makes it possible to remove even a broken screw from bone, and without a screw head to palpate, as was done in 1 case in our study.

Although cannulated screws within the femoral neck/head often need not be removed, our technique for rapidly and easily removing them can help make this sometimes technically demanding surgery much less challenging, avoid hip dislocation, and decrease operative time.

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This paper will be judged for the Resident Writer's Award.