

RUSH GRAND ROUNDS PUBLICATION EXCLUSIVE

A 15-year-old female patient with hip pain

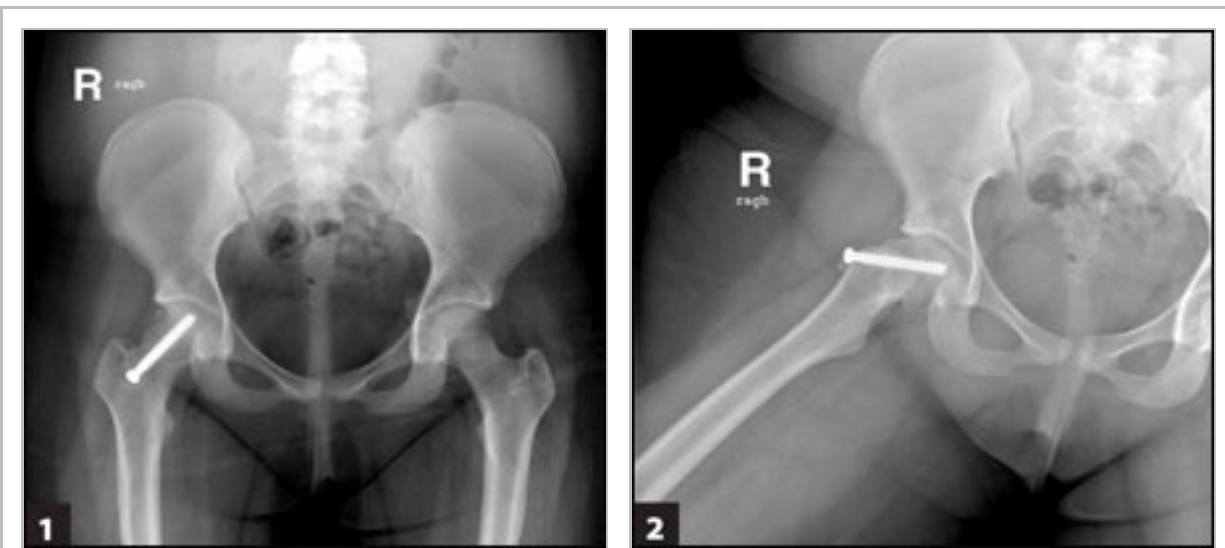
Orthopedics Today, October 2015

Sandeep Mannava, MD, PhD; Elizabeth A. Howse, MD; Austin V. Stone, MD, PhD; Allston J. Stubbs, MD, MBA

A 15-year-old female patient presented to the pediatric orthopedic surgery clinic 3 years status post in situ screw fixation of a stable, moderate right slipped capital femoral epiphysis with progressive right groin pain for 3 months. This resulted in her inability to participate in physical education at her school. The index slipped capital femoral epiphysis in situ screw fixation procedure was uncomplicated, and the patient was able to return to full activity following her operation.

During the course of 3 months, the patient reported progressive anterolateral hip pain with difficulty ambulating, rising from a chair and climbing stairs. Furthermore, the patient described pain at night. The patient had a past medical history significant for seasonal allergies, depression, obesity and type 2 diabetes mellitus.

On focused exam of her right hip, the patient had a positive “C-sign,” greater trochanteric pain and terminal hip flexion of 60°. Internal hip rotation at 90° was -25° and flexion, abduction and external rotation (FABER) measured 0 cm from the exam table, consistent with Drehmann’s sign. When the patient is lying supine, the examiner bends the patient’s leg up cranially. If the leg automatically rotates into external rotation and abduction to avoid impingement, this is a positive Drehmann’s sign. Flexion, adduction and internal rotation of her right hip resulted in groin pain. Her contralateral, uninjured hip exam demonstrated no pain and terminal hip flexion to 105°. Internal rotation at 90° was 10°, and FABER measured less than 4 cm from the exam table. For a review of a focused physical exam of the pre-arthritic hip, please refer to the video by Stubbs and colleagues.



1 AP radiograph of a skeletally immature pelvis demonstrating prominent SCFE screw with signs of hip dysplasia.

2 Frog lateral view of a skeletally immature right hip demonstrating prominent SCFE screw with signs of femoral-acetabular

Standard radiographs of the hip and pelvis demonstrated a Tönnis grade of 1 and Risser stage 4. Her right hip acetabular metrics are Wiberg lateral center edge (LCE) angle 26°, Sharp angle 37° and anterior center edge (ACE) 40°. The patient’s hip did not demonstrate acetabular retroversion, coxa profunda, coxa protrusion, and no additional radiographic abnormalities were

impingement.

noted, aside from anterior acetabular osteophytes.

Radiographic evaluation of her right femur revealed anterior CAM, an

alpha angle of -77° . She also had a prominent slipped capital femoral epiphysis (SCFE) screw head (Figures 1 and 2). Preoperative MRI demonstrated mild edema about the acetabulum and proximal femur, although the evaluation was limited by metal artifact. She did not have any constitutional symptoms and clinical suspicion for infection was low.

What is your diagnosis?

See answer on next page.

1

2

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Trochanteric bursitis, hip synovitis and dysplasia with combined CAM and pincer impingement, and a hip labral tear and chondromalacia

The patient had painful/prominent orthopedic hardware resulting in trochanteric bursitis. She also had hip synovitis (central and peripheral compartments), hip dysplasia with combined CAM and pincer impingement, and a hip labral tear and chondromalacia (femur and acetabulum).

The diagnosis of contributing factors to a young patient with pre-arthritis hip pain can be challenging. Despite the patient having painful orthopedic hardware, hip arthroscopy revealed further pathology that likely contributed to the patient's difficulty with activity that may not have been diagnosed or treated with traditional open hardware removal. We advocate a systematic approach to pre-arthritis hip pain with a standardized patient history, physical exam, radiographic evaluation and finally surgical intervention, when indicated.



Dynamic intraoperative fluoroscopic evaluation under anesthesia demonstrating signs of femoral-acetabular impingement.



AP radiograph shows a skeletally immature pelvis after SCFE screw removal with improved skeletal architecture after femoral and acetabular osteoplasty.

Some of the advantages of arthroscopic removal of SCFE screws include the ability to diagnose and address concomitant pathology, direct visualization of the screw, minimizing intraoperative fluoroscopy, and the ability to dynamically assess the hip under direct visualization.

Disadvantages of arthroscopic removal of SCFE screws include the neurovascular risks of hip distraction, the potential for screw breakage and incomplete hardware

removal. Furthermore, there is a steep learning curve associated with performing hip arthroscopy.

In some instances, the SCFE screw has been reported to impinge upon the acetabulum resulting in labral tearing. However, femoroacetabular impingement (FAI) can also be due to the residual deformity that exists at the proximal femur after SCFE screw fixation. There are reports of the associated FAI being addressed at the time of SCFE screw placement arthroscopically with some success, but the authors of this study note the technically demanding aspects of hip arthroscopy potentially limiting the wide-spread adaptation of their reported technique. Long-term efficacy regarding patient return to function and the development of arthritis following arthroscopic treatment of SCFE screw impingement and FAI is not known, but we have found short-term success with this strategy.



Frog lateral view of a skeletally immature right hip status post SCFE screw removal and femoral and acetabular osteoplasty, demonstrating improved skeletal architecture. Note some dysplasia persists despite arthroscopic intervention secondary to the original SCFE pathology.

Treatment of our patient

The patient was indicated for hip arthroscopy, which allowed for both the removal of her prominent and painful hardware, and also for the diagnosis and treatment of her concomitant hip pathology. In addition to the painful and prominent orthopedic hardware that contributed to the patient's clinical presentation of right hip trochanteric pain and bursitis (Figure 2), the patient also had significant central and peripheral compartment hip pathology that compounded her dysfunction. On dynamic fluoroscopic hip range of motion evaluation, the patient was found to have FAI CAM and pincer impingement (Figure 3).

Despite having preserved joint space on X-ray evaluation and MRI suggesting only mild loss of joint space, hip arthroscopy revealed early pre-arthritic changes to the patient's hip joint. The labral tear was repaired and the patient's acquired deformity was addressed with

femoral and acetabular osteoplasty to help treat her current impingement symptoms, and prevent future sequelae from impingement (Figures 4 and 5). The synovitis of the hip joint was also addressed arthroscopically and a loose body (5 mm x 10 mm) was excised. A video demonstration of the arthroscopic SCFE screw removal technique has been previously published by Howse and colleagues and is available for viewing online at *Arthroscopy Techniques*.

The patient was admitted to the hospital for extended stay recovery. On the morning of postoperative day 1, she was discharged home with outpatient physical therapy. She was maintained at flat-foot restricted weight-bearing, given deep vein thrombosis prophylaxis, heterotopic ossification prophylaxis (naproxen 500 mg twice daily for 21 days, Pepcid 20 mg twice daily with naproxen for gastrointestinal prophylaxis and doxycycline used as a cartilage MMP inhibitor) and continuous passive motion was initiated for the immediate postoperative period. At 6 weeks postoperatively, she was progressed to weight-bearing as tolerated. Her right hip terminal flexion was 100°, internal rotation at 90° was 0° and her FABER test was 4 cm from the exam table. She reported some pain, but improvement from prior to surgery. At 4 months following surgery, she reported 100% improvement in her pain. Her right hip demonstrated terminal flexion to 100° without pain. Her internal rotation

at 90° was -5° and her FABER test measured 0 cm from the table. She did not have right hip trochanteric pain. She was released to full activity and has continued to do well in her early postoperative period. She has been able to participate in physical education coursework following surgery.

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Disclosures: Mannava reports he receives support from Wake Forest Innovations Spark Award for development of rotator cuff repair device and has been awarded utility patent tissue tensioning devices and related methods. Stubbs reports he receives support from Smith & Nephew Endoscopy, Bauerfeind, and holds shares in Johnson & Johnson. Howse and Stone report no relevant financial disclosures.