This article introduces a new blog—OR Notes—that will give readers a front row seat to complex surgeries. Open the folds to reveal surgical photographs highlighting key moments in a revision hip replacement. Then join us for a virtual grand rounds on the same topic on the free Figure 1 app at 8:00 pm on April 26.

Revision Hip Replacement

BY KIMBERLY MCGHEE
Preoperative radiograph (left) shows a cemented femoral stem and cementless acetabular component, with evidence of demarcation at the bone-cement interface of the stem and an incomplete radiolucent line with evidence of osteolysis in zones 1, 5, and 7. This radiographic appearance is consistent with aseptic loosening of the femoral stem as well as the patient’s symptoms.

Postoperative radiograph (right) shows that the cementless femoral stem fits tightly into the medullary canal with precision machining of the femur along the distal aspect of the stem.

Of the approximately 350,000 hip replacements performed each year in the U.S., about 10% will eventually require revision surgery—typically, 15-20 years after the original surgery—due to infection, wear, instability, or component loosening. Because revision hip replacements are more challenging and typically performed in an older population, they are best done at high-volume centers with robust critical care and advanced anesthesia services. At such centers, revision hip replacements are now commonly performed in patients older than 80 years of age, enhancing their mobility and enabling them to preserve an active lifestyle.

Vincent D. Pellegrini, M.D., Chair of the Department of Orthopaedics at MUSC Health, and the other surgeons on the joint replacement team—Harry A. Demos, M.D., Jacob M. Drew, M.D., and Richard J. Friedman, M.D.—perform more than 650 hip and knee replacements annually, more than a quarter of which are revisions. In 2014, the program was awarded Joint Commission specialty certification for total hip, knee, and shoulder joint replacement.

Report of a Case

An 80-year-old man, who had undergone primary cemented hip replacement 16 years previously, presented with “start-up” thigh pain. Each time he stood or initiated gait, he experienced thigh pain for the first few steps that resolved in a dozen steps. Radiographs revealed that the cement had loosened from the femur, resulting in the cycle of pain that repeated every time the patient stood up and the femoral stem sank to a stable position in the bone. The cement loosened due to bone loss, resulting from a foreign body reaction to microscopic particles that were generated as the plastic liner of the replacement wore.

Revision hip replacement was advised and involved removal of the femoral component, the associated cement, and the plastic liner, with implantation of a new plastic liner and a cementless femoral component. Bone from which cement has been extracted tends to be smooth and does not provide reliable fixation for new cement; for this reason, cementless femoral stems, which have a roughened surface texture to which bone can attach, are preferred for hip revision surgery.

Often in hip revision surgery, the greater trochanter and the attached muscles must be cut to allow access to the femoral canal for cement removal. In this case, an anterolateral approach provided good femoral access without the need for trochanteric osteotomy and the patient was able to begin exercise immediately after surgery. He will use a walker or cane for only three to four weeks, much less than would have been required after trochanteric osteotomy.

A pathologist was on hand to analyze tissue samples for infection. Had infection been detected, all components would have been removed, the patient would have received several weeks of intravenous antibiotics, and a second surgery would have been scheduled to implant the new components.

Want to learn more about this case? Ask Dr. Pellegrini questions in real time during his virtual grand rounds (a live event) on April 26 at 8:00 pm on the free Figure 1 app (iOS and Android).

To consult with an MUSC Health joint replacement surgeon or to refer a patient, contact nurse navigator Kathleen Case at casek@musc.edu.

Follow more surgical cases on the OR Notes blog (http://www.muschealth.org/or-notes) and on the MUSC Health profile (@MUSCHealth) on the free Figure 1 app (iOS and Android).

For more information, call MEDULINE at 1-800-922-5250 or 843-792-2200 or visit the digital edition at MUSChealth.org/pn
FIGURE 1. The patient is supine and the hip joint is accessed through a Watson-Jones approach, anterior to the gluteal abductor muscle mass, which contained repair sutures from the previous transgluteal exposure and a large bursal sac in the region of the repair.

FIGURE 2. After a radical anterior capsulectomy and complete circumferential posterior capsulotomy, the leg is placed in the figure 4 position to expose the femur. The femoral stem was grossly loose and rotationally unstable to light pressure with the suction tip.

FIGURE 3. Safe extraction of a cemented stem, even when grossly loose, requires initial removal of the cement mantle at the lateral shoulder of the implant so that the greater trochanter is not fractured when the stem is backed out of the canal. This cement fragment is sectioned and deliberately removed prior to extraction of the stem.

FIGURE 4. The stem is then easily and safely backed out of the canal.

FIGURE 5. This leaves the remaining “empty” cement mantle attached to the inner surface of the femur. Long pituitary rongeurs, assorted straight and offset chisels, reverse hooks and curettes, and sharp narrow drills are essential instruments to facilitate the process of cement removal from deep within the canal.

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FIGURE 6. Cement is circumferentially removed in 2-3 cm segments from the inner side walls of the femur until the distal cement plug is reached and clearly visualized (direct line of sight). Once visualized, the cement plug is carefully drilled and extracted with a threaded tap.

FIGURE 7. The plastic liner of the acetabulum is removed and demonstrates wear along the superior aspect, which leaves a gap along the inferior margin of the femoral head, where debris can enter the interface between metal and plastic. The plastic liner is replaced.

FIGURE 8. Alternating use of power reamers and hand broaches allows precise machining of the femoral canal to accept the new stem.

FIGURE 9. The final femoral stem has a roughened surface to encourage bone ingrowth for biologic fixation.

FIGURE 10. The stem is inserted into the canal with 75-100 short, firm blows. Rigid initial fixation is obtained because a stem size is selected that is 1 mm larger than the diameter of the last reamer.
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