

PIRIFORMIS SPARING SUPERIOR APPROACH FOR HIP IMPLANT SURGERY

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There are three guiding principles of surgery: 1) careful control of bleeding, 2) protection from infection, and 3) gentleness of handling tissue. The purpose of any surgical exposure is to ensure not only the best and safest surgical result but also the best recovery. It was with this purpose in mind that I spent many hours with John M. Clark, MD, PhD (1948-2015) reviewing CT scans of the hip and pelvis, as well as performing surgery to find the ideal pathway to the hip. I am familiar with all the approaches because of being very involved with pelvic fracture and osteotomy procedures early in my career.

There are three approaches used commonly for hip implant surgery – anterior, lateral, and posterior. Dr. Clark, a gifted surgeon, also held a PhD in anatomy. As a result of our research, we discovered a fourth approach for hip implant surgery now known as the **piriformis sparing superior** approach. Initially, we used this approach for procedures involving only the femur, such as partial hip replacements for fractures and femoral-only hip resurfacings. By extending the incision distally, we found we could also access the acetabulum easily. It is now possible to use this superior approach for essentially all hip implant procedures.

After presenting this approach at meetings and conferences for a number of years, it was formally named and published as the “**superior**” approach in 2004. Its main advantage is a gentler approach. After placing the patient in a side-lying position (a common sleeping position) (Fig. 1), an incision is made in direct line with the femur in an area where there is little muscle (Fig. 2).

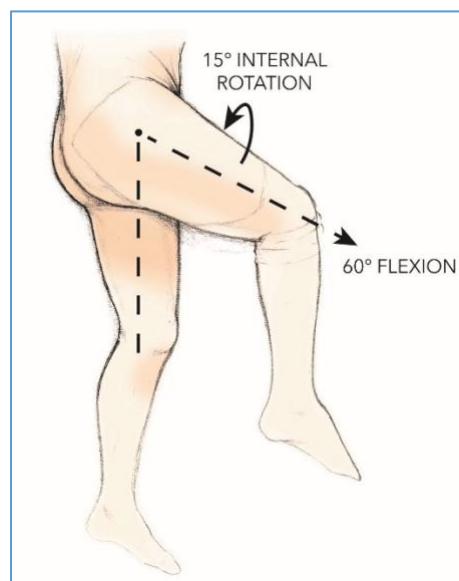


Figure 1



Figure 2

The gluteus muscle is separated parallel to its fibers. Muscles are protected and not **cut**.

The top of the hip capsule (Fig. 3) is opened and the only deep structures we need to release are the hip capsule and small external rotators.

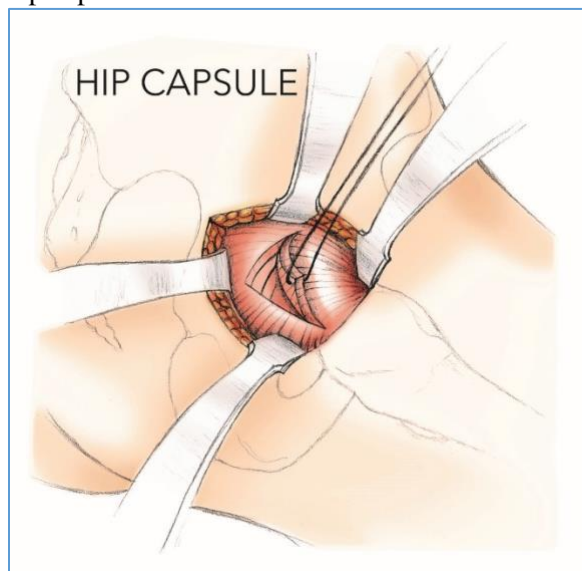


Figure 3

The incision is made long enough to place both components of a hip implant. The femur is prepared from the top down while the acetabulum is prepared from the bottom up. Although the implant components could be placed using two small incisions, we found overall better healing when only one incision was made.

Comparison to Other Approaches (Fig. 4).

The piriformis tendon is an important dynamic stabilizer. Preserving the piriformis improves both the functional outcome and stability. Piriformis release is part of most direct anterior approaches, particularly if a traction table is used to allow mobilization of the femur. With the anterior approach early recovery is very good but at very long term follow-up more muscular fibrosis is seen because tissues were stretched. Robotic approaches require additional small incisions which are sometimes on the other (good hip).

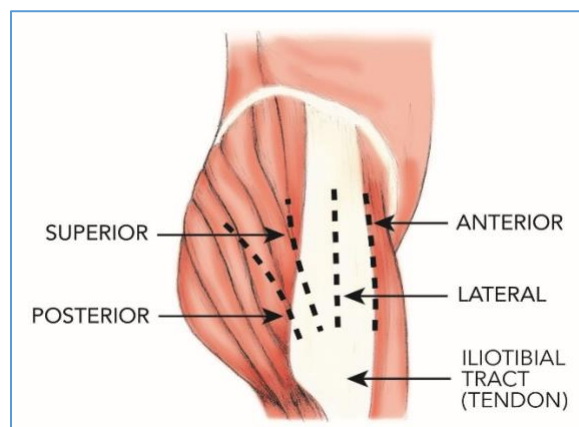


Figure 4

The **anterior** approach results in a very stable hip and is an excellent approach. I have used this more than any other approach during my career performing total hip replacements. In the past we used very small femoral heads (22 - 32 mm) for hip replacement procedures and the anterior approach for these cases helped prevent postoperative dislocations. Now we rarely use an implant with a femoral head size smaller than 36 mm and some designs allow for natural size femoral heads (44 - 50 mm). However, there is more blood loss with the anterior approach and the incision, while smaller, is cosmetically less acceptable. There can also be numbness on the front and side of the thigh following the anterior approach, because the lateral femoral cutaneous nerve is in the path of that approach. Most surgeons use a Hana® table for these procedures and put the leg in strong traction to assist pulling the hip out of joint. Most surgeons prefer the anterior approach as it is more efficient for the surgeon. The staff operate the traction table. A gentler surgical approach would eliminate the need for a traction table.

The **posterior** approach allows for excellent exposure during surgery but requires postoperative restrictions for 6 weeks following surgery to allow for adequate soft-tissue healing. The posterior approach has been the most popular, because it requires no special equipment during surgery and the incision is less visible, making it more cosmetically appealing.

However, the posterior approach does occasionally permit postoperative dislocation.

The **lateral** approach results in a stable hip and there are no issues with thigh numbness. A traction table is not necessary and the surgeon can sit during surgery. There is usually a temporary limp following surgery and this approach is not popular in the United States because of this concern.

Originally, the superior approach was called the “burglar” approach (suggesting the surgeon found his way into your hip unnoticed). The **superior** approach requires careful and complete knowledge to find the subtle and delicate muscular seam (Fig. 4). It took Dr. Clark and me years to work out the nuances and clues necessary to find this path consistently, despite the variation in patients’ muscular anatomy. Now, with care, I can always find this gentler, less traumatic route. The superior approach now is the Northwest Passage into the hip.

A Mayo Clinic study published in 2016 introduced a new concept for assessing surgical approaches using tissue sensors. They documented that surgical trauma must also include stretch and traction as well as the direct trauma of the surgical incision. A small incision with traction and stretch was found to be more traumatic than careful extensile exposure. It is important to recognize that what you stretch and pull is as damaging or more so than what you cut and retract.

Postoperative restrictions enhance capsular healing. This allows the joint to seal and contain the synovial joint fluid (and avoid a seroma). Blood loss is minimal, eliminating the need for transfusion. In addition, postoperative dislocations are very rare. The **piriformis sparing superior** approach is not for the occasional hip surgeon. It requires precision and extensive experience. A trained assistant and special retractors are also needed for the procedure. However, manipulating the hip during surgery is gentle and precise, and eliminates the need for a traction table.

We looked at the healing of our current approach using MRI scans and found the approach healed well and looked like just a fine seam (Fig. 5).

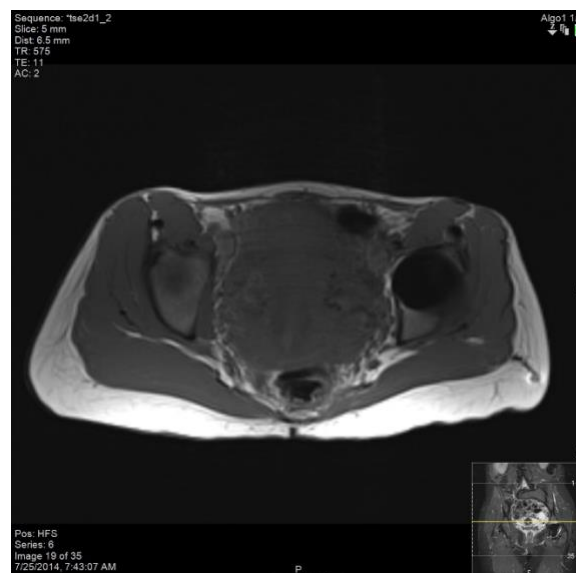


Fig 5

By comparison to the anterior approach the **piriformis sparing superior** approach had a faster Time Up and Go (TUG) test, less blood loss and no incidence of lateral femoral cutaneous nerve injury. Our patients performed the best compared to other surgeons in early recovery at both our hospital and surgery center.

All hip approaches are reasonable options and no modern approach results in any significant muscle cutting. Each patient is special and unique but all approaches today allow for immediate weight bearing and early return of function. Hip implant surgery has moved from the hospital to the ambulatory setting. This is a major advance in limiting hospital acquired infection and blood clots.

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