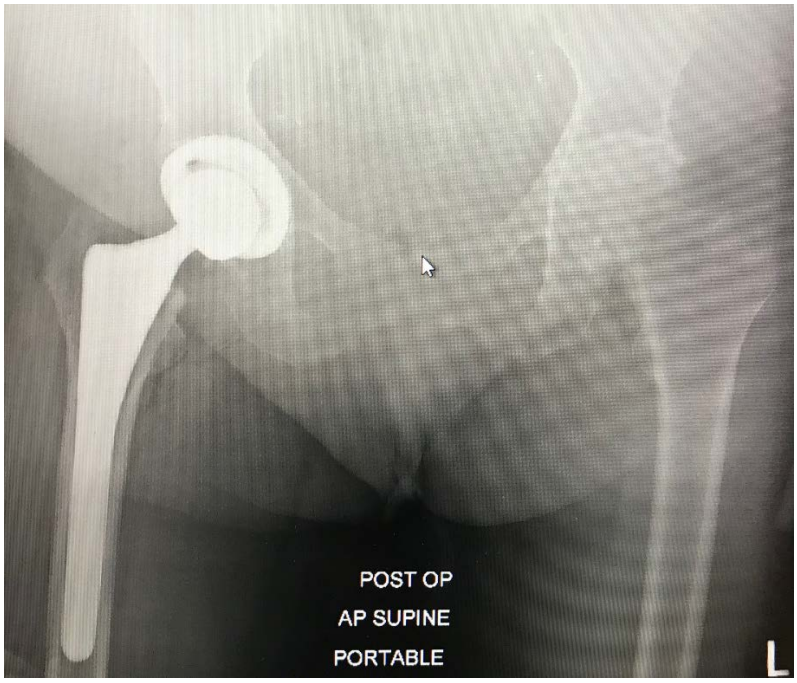
Patient Education Guide

SuperPATH

Hip Replacement



THE
KNEE • HIP • SHOULDER
CENTER

333 Borthwick Ave, Suite 301

Portsmouth, NH 03801

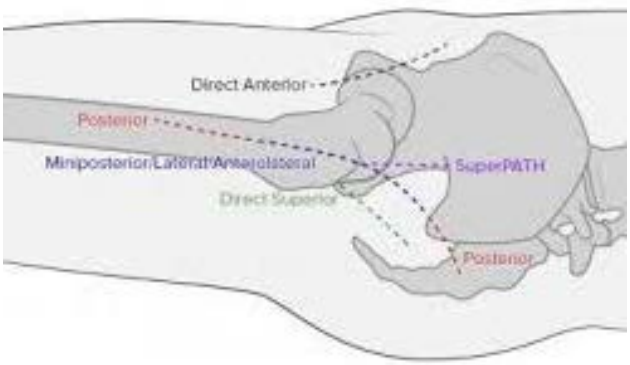
Tel: 603-431-5858

Fax: 603-431-5818

Email: avatar@kneehipsho.com

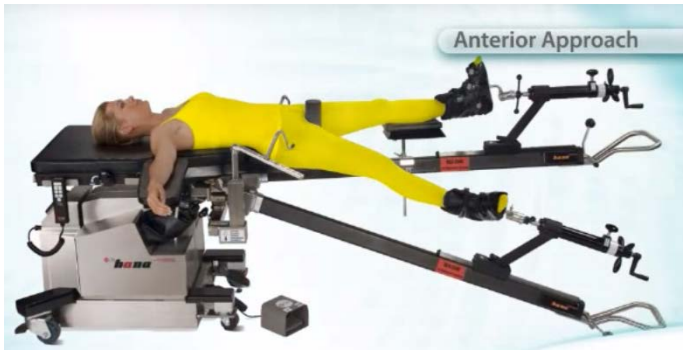
What is the SuperPATH Hip Replacement

SuperPATH stands for ***Super***ior ***P***ercutaneously ***A***ssisted ***T***otal ***H***ip. This technique uses a superior approach as opposed to the conventional posterior approach and the recently popular direct anterior approach. By approaching the hip superiorly, preparation of the femur can be done in line with the axis of the leg allowing the surgery to be done **without dislocating the hip joint**. In both other approaches, the hip joint has to be dislocated to gain access to the socket and to the canal of the femur bone for implantation of the prosthesis. Dislocating the joint is traumatic to the tissues surrounding the joint and places nerves and blood vessels on stretch. It also places the leg in a non-physiologic position for substantial portions of the case. The superior approach accesses the joint through an interval between two muscles and requires the least disruption of the muscle and joint capsule of any approach. By preserving the entire anterior and posterior capsule, the superior approach offers immediate stability that does not require hip precautions after surgery and lowers the risk of leg lengthening which can be necessary to improve hip stability once the joint has been dislocated.



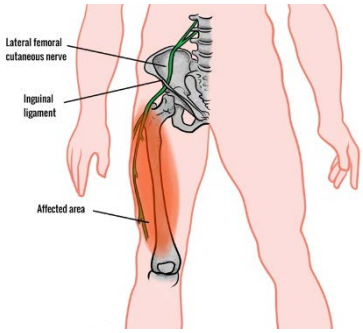
Theoretical Advantages over the Direct Anterior Approach

The direct anterior total hip is a technique that has been around for more than 40 years. It was one of the earliest approaches to hip replacement but was largely abandoned in favor of the posterior approach because of its technical difficulty. Roughly 10 years ago, this approach enjoyed renewed enthusiasm when special tables were developed to facilitate the surgery through easier positioning of the leg. While this technique is muscle sparing, it does require removal of the entire anterior hip capsule to access the joint. It also requires significant traction and rotation of the leg to allow access to the socket and canal of the femur bone. To access the femur, releases are required on the back of the hip that do involve division of some of the posterior capsule. This is necessary to get the femur out of the



wound sufficiently to get the stem implant in the femur. During this part of the case, the leg is rotated 100 degrees externally which is far beyond normal range of motion. The picture to the right shows the excessive extension and rotation of the join necessary to access the joint. This rotation can cause sprain injuries to the knee and has been reported to result in occasional ankle fractures.

The anterior approach also requires use of specific stem designs called ML taper stems or flat wedge stems. While these designs have a good track record, they are not ideal in every case and there is a higher incidence of loosening in younger males with very dense bone.



The directly anterior approach also requires fairly aggressive retraction against the surrounding soft tissues and this can result in injury to the sensory nerve to the front part of the thigh. Many patients experience temporary and sometimes permanent numbness in the thigh. The anterior approach requires live intraoperative x-ray in order to confirm the placement of the socket implant. This is because visualization and access to the socket is difficult with this approach. Use of x-ray exposes the patients to radiation during the case, adds time to the operation and involves more equipment in the operative field which can increase the risk of infection. Finally, obese patients who have an overhanging belly are at a higher risk of infection because the incision can be buried in the skin fold.

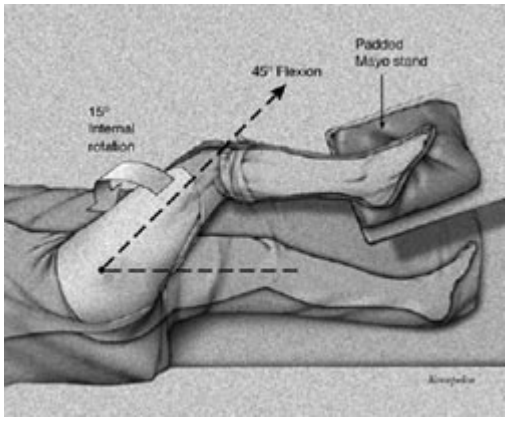
The SuperPATH offers the same advantages of the direct anterior approach without the risks. Like the anterior approach, the SuperPATH is muscle sparing and requires almost no aggressive retraction of soft tissues. There is near complete preservation of the hip capsule. Because the femur is accessed in line with its long axis, any stem design can be used allowing the surgeon to choose the best implant for each patient. Because the socket is prepared under direct visualization, x-ray is not required for implant placement. Furthermore, the leg can be kept in nearly the same position for the entire case with minimal rotation and no traction. This reduces stretch on surrounding tissues and stress to other joints in the lower extremity. There are no sensory nerves around the surgical approach, so the risk of nerve injury is less than for other approaches to the hip joint.

Who is a Candidate for the SuperPATH?

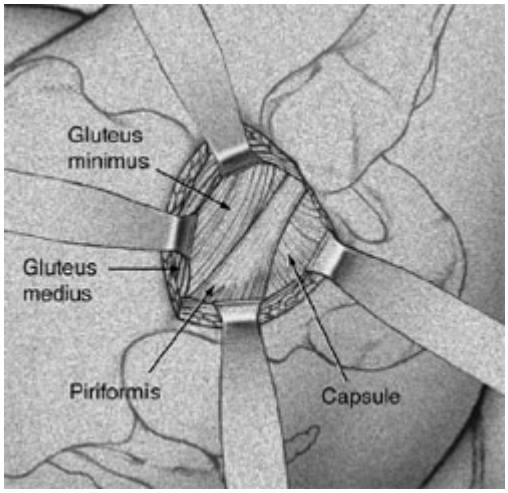
This technique can be performed in the majority of patients. People who have had prior surgery with existing rods, pins or screws may not be a candidate as these devices may have to be removed through the incisions they were originally placed. Patients with substantial deformity either from developmental hip problems or severely erosive arthritis may also require a more extensile approach that allows wider access to the joint for placement of special implants with augments and screws. These are usually performed through a conventional posterior approach. Patients who are obese can still have this approach but may require biggers incisions to access the joint.

Technical Steps

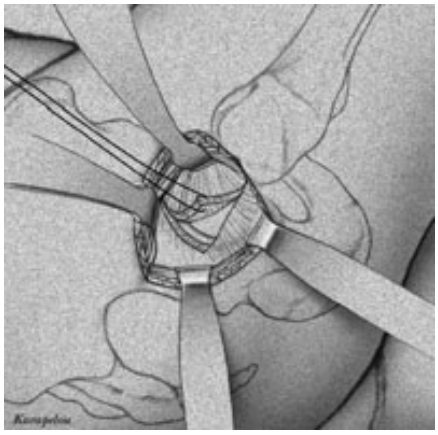
The procedure is most commonly done under a spinal anesthetic with sedation, so the patient is effectively asleep for the procedure without the need for general anesthesia which often has side effects. Once asleep, patients are turned on their side with operative side up and secured with a positioning device that secures the pelvis. The down side is well padded. The entire operative leg is then prepped with antiseptic solution, draped and then covered with a special antiseptic wrap to cover the exposed skin.



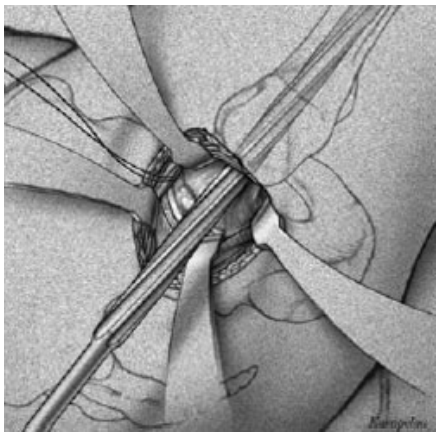
A 3-4 inch incision is them made in line with the top of the femur bone. The muscles fibers of the tensor fascia muscle are then divided without detaching them. Beneath that the hip joint is covered by the gluteus medius, gluteus minimus and piriformis muscles. The interval between this is developed and they are gently retracted front and back with special retractors.



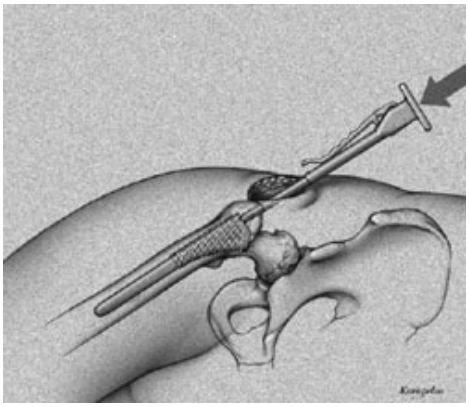
This exposes the hip capsule which can then be divided over the ball of the femur. The piriformis tendon is usually released to exposure the neck of the femur but it is repaired at the end of the case. The entire anterior and posterior hip capsule is preserved. Retractors are placed beneath the capsule to fully expose the ball.



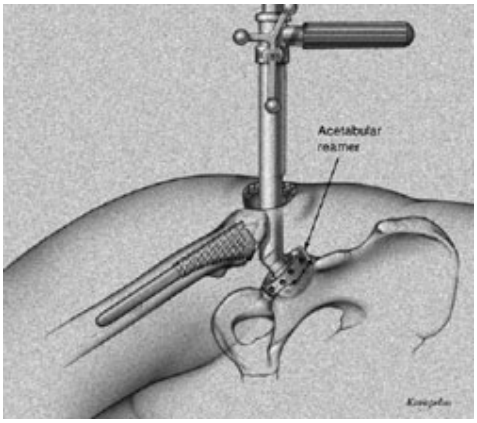
The canal of the femur is then opened with a reamer and progressively larger reamers are introduced until the diameter fills the canal of the bone. The width of this canal varies between patients.



Some bone from the head of the femur is then removed and broaches are impacted into the femur. These are shaped like the hip implant and help shape the canal to receive the final implant. Once the appropriate size broach is seated which achieves a secure fill of the canal, the ball is resected using the broach as a guide to determine the level and angle of the resection.



Without repositioning the leg, the socket can easily be exposed after the ball is removed. As stated, because the neck is cut while the ball is still in the socket, the joint never has to be dislocated to access the bone. Soft tissue around the socket is then removed to define the margins of the bone. Retractors can then be placed around the socket to provide excellent direct visualization.



A small keyhole incision is then made several inches below the main incision and a targeting guide is used to introduce a cannula into the hip socket in direct line with its orientation. A cannula is a tube like a rigid straw through which instruments can pass from outside to inside through keyhole incisions. Circular reamers are then placed into the socket through the main incisions and a drive shaft can be placed through the cannula to allow reaming and shaping of the socket under direct visualization without having to place the leg in traction or any degree of rotation.

Once the socket bone is adequately prepared, the appropriate sized socket prosthesis is then impacted in the appropriate orientation. Any bone spurs around the margin of the implant can then be removed and the liner can then be placed.

At this point a trial neck and ball of the appropriate angle and length can be inserted and the joint reduced to put the trial ball in the new socket. The leg can then be taken through a normal range of motion to test the stability of the reconstruction and make sure it does not dislocate. Leg lengths can also be compared. Adjustments can be made to the femoral implant at this point to achieve the desired fit, length and position. The trial is then removed, and the final femoral implant and ball are then impacted and the joint reduced.

Next, we inject long-acting local anesthetic all around the capsule, muscles and skin. The joint is then copiously irrigated with antiseptic wash and antibiotic powder is placed into the field. The capsule is then closed side to side repairing the piriformis tendon. The fascia lata muscle is then closed side to side and skin closed with absorbable stitches and skin glue. A waterproof dressing is then applied and the patient is awoken from sedation and taken to the recovery room. An x-ray is taken in recovery to ensure no complications with the implant placement.

Postoperative Plan

Patients normally spend 60-90 minutes in the recovery room and then will be transferred either back to the Same Day Surgery Unit if they are planning to go home or to the Surgical Care Ward of the hospital if they are planning to spend the night. In either case, physical therapy will have patients up and walking within a few hours of surgery with the assistance of crutches or a walker. Patients can begin to eat and drink normal food as tolerated. Our multimodal pain medication regimen will also begin to ensure patients are comfortable. With our rapid recovery program, about 60% of patients are able to return home the day of surgery with visiting nursing and physical therapy set up in advance. Of the 40% of patients who stay in the hospital, 90% will be able to leave the next day. Patients who plan to transfer to an inpatient rehabilitation center may have to stay longer due to Medicare rules.

Once home, patients will participate in daily exercises. Physical therapy is supervised by a home visiting therapist typically for the first 1-2 weeks. At this point, patients can transition to outpatient PT. This usually lasts for 6-10 weeks depending on how quickly patients recover. Patients who are very weak and stiff prior to surgery due to long standing arthritis may require therapy for longer.

Activity can progress as tolerated after surgery. Patients recover at different rates depending on a multitude of factors. The therapist can help guide return to activites and weaning from walker to cane to nothing. Many patients can transition to a cane by 5-10 days after surgery and transition off the cane by 2-4 weeks. We generally allow patients to drive between 10 days to 3 weeks after surgery if they are doing well and not taking any narcotic pain medications.

Return to activities like aerobic exercise is generally as tolerated. Swimming can be commenced once the incision is fully healed (generally 3 weeks). Activities that require stretching the body in complicated poses like yoga, or those that require significant pivoting activities like golf should wait 4-6 weeks to prevent dislocation.

Long term we place almost no restrictions on patients. We do advise that activities like distance running can cause repetitive impact on the joint which may accelerate the wear of the plastic liner. For patients that are life long runner, we generally advise switching to biking to avoid the impact loading on the implant.

Hip Precautions
Precautions refer to avoiding certain positions in the first few months after surgery to prevent the hip replacement from dislocating. When hip replacements are done through the posterior approach which involves detaching and reattaching the capsule and muscles on the back of the joint, patients must avoid too much hip flexion and internal rotation. When hips are done through the anterior approach, patients should avoid hip extension and external rotation.

While dislocations are rare after hip replacement (1-2%) of cases, they can damage surrounding tissues and lead to recurrent instability which may necessitate revision surgery. Because the superior approach preserves the entire anterior and posterior capsule, the joints are immediately very stable. Thus, specific precautions are not required after surgery, allowing patients normal hip flexion and simple things like sitting with the legs crossed immediately.

Postoperative Pain
We cannot make surgery pain free although with our comprehensive multimodal approach and minimally invasive technique, we can make surgery quite tolerable. A key approach to pain management is staying ahead of the curve. Scheduled doses of medications can keep on top of the pain, never allowing it to escalate to unmanageable levels. As days go by, patients can begin to taper medications and use only as needed.

As activity level increases, it is normal to experience increasing discomfort and swelling. Most of this is soft tissue discomfort as the capsule and ligaments around the joint heal and as the muscles begin to reawaken. It is normal for patients to require continued use of Tylenol and anti-inflammatory medications for several weeks after surgery.

Patients who take narcotic pain medications for chronic pain from other conditions may have a harder time achieving comfort after surgery due to the fact that their body already has a tolerance to pain medication. If at all possible, we advise patients to work with their pain management specialist to wean off narcotics prior to surgery as this has proven more successful than trying to manage pain with larger and larger doses of narcotics.

Summary
I believe that the SuperPATH technique has compelling advantages over both the direct anterior and the posterior approach. While patients can have an excellent outcome no matter which technique is used, the concepts of avoiding dislocation and joint, avoiding traction and excessive rotation of the leg during surgery, and maximal preservation of the capsule and ligaments around the joint, all provide both theoretical and real advantages that are hard to overlook. The SuperPATH combines the best advantages of both other approaches without the disadvantages of each, allowing patients a less traumatic surgery with a rapid recovery. When combined with our AVATAR enhanced recovery pathway, this method of hip replacement can provide for excellent outcomes, same day surgery and rapid return to life. Dr. Parsons is currently the only hip surgeon in New Hampshire performing the SuperPATH technique and was fortunate to learn this method from the surgeon who pioneered it.