For the last 4 years, my standard technique for total hip arthroplasty (THA) has been to utilize a mini-posterior single incision and this has been augmented with the use of the Stryker Hip Navigation system for the past 18 months. I think that these are complimentary techniques, each maximizing the potential of the other. In our office once a patient is scheduled for a THA, they follow a standardized pre-operative protocol. Along with medical clearance this includes a SF-12v2, a Harris Hip Score, an X-ray with a calibration marker, and leg length by X-ray and by block test. The navigation system does not require a pre-operative CT scan or any other imaging intra-operatively. All outcome data is entered into a web-based database for multi-center collection and evaluation.

Prior to starting the case, all the patient demographic and templating data are loaded into the computer. While we position the patient, the scrub nurse initializes all of the trackers and the circulator positions the optical camera. We have found that the optimum camera position for us is just above the arm board about 30 degrees off from parallel to the patient. We usually position the camera three times during the procedure: the initial position for registration and acetabular work, a second position for femoral broaching and stem insertion, and a final position for obtaining the kinematic range of motion data.

The patient is positioned in the lateral position with anterior and posterior bolsters. Initially the posterior bolster is not pushed in firmly against the sacrum, this allows the patient to role posterior into the “sloppy lateral” position which allows us access to the down anterior superior iliac spine (ASIS) and pubis. I use an 8–10 cm facial incision that is centered vertically over the tip of the greater trochanter and the length of the skin incision is determined by the thickness of the overlying fat. The leg is placed in the position for preparation of the femur and the skin incision is placed over the junction of the anterior two-thirds and posterior third of the greater trochanter (Fig. 7.52). The slightly posterior placement is to assist with access for the broach handle and for the neck on the stem.

With the incision drawn on the drape but not made, the pelvic tracker is placed, the pelvis is referenced, the femoral tracker is placed and the femur reference plane is established. For the placement of the trackers, two 4 mm pins from the external fixation set are placed through a clamp into the iliac crest. The tracker is placed far enough posteriorly so that when the patient is placed back into the true lateral position the tracker will be pointing at the camera. A bar-to-bar clamp then attaches the tracker pin to the clamp. Since the pointer is an active instrument, as are all of the trackers, we can...
use any of them to advance the system as we step through the different functions so as not to interfere with the flow of the case. This also alleviates the need for an additional person to work the computer.

The user can select a three- or four-point pelvic referencing system. We have used both and prefer the three-point technique as we have found it to be more accurate. The ASIS are marked through the drapes on both sides with the pointer. We have not had difficulty locating the ASIS even in our heaviest patients as on the down side there is a fold that can be followed and there is little subcutaneous fat over the bone at this location. We have found the best way to find symphysis pubis is to "follow the foley", this brings one to the inferior pubis below to the pubic fat pad. From this point, one must slide proximally pushing the fat pad out of the way until the anterior lip of the symphysis pubis is felt. By following this technique, and by using the computer which calculates in real time the distance to the mid line, we have found excellent intra- and inter-observer reliability.

The femoral tracker is then placed in the femur far enough distally so that it does not impair the procedure or the retractors. Once again two 4 mm pins are placed through a clamp and the tracker is attached to the clamp. This tracker is aimed posteriorly and proximally at about 45°. This is done so that the tracker is visible with the leg in extension and external rotation, and also in flexion and internal rotation. We place it in this fashion so that it will be optimal for the kinematic range of motion test and accept that we will have to move the camera during femoral broaching and stem insertion. Both trackers are now removed, leaving only the stable low profile clamp in place, thus minimizing the chances that a tracker will get bumped.

The skin incision is made with the hip flexed and a standard Kocher-Langenback approach to the hip is performed. The fascia is split distally far enough to palpate the lesser trochanter and great care is taken to split the glutaeus maximus along its fibers. The skin, the subcutaneous tissue and the muscle are all infiltrated during the approach with 20–30 cc of Lidocaine HCL 1% with 1:100 000 Epinephrine and Bupivacaine 0.5% with 1:200 000 Epinephrine as a 50/50 mix. With the hip in extension, the piriformis is tagged and reflected posteriorly. This exposes the glutaeus minimus which is elevated off of the superior capsule and reflected with a hip cobra retractor. The capsule is incised parallel to the neck at the junction of the inferior two thirds and the superior one third. The capsule and muscle are taken off the bone and tagged to enhance later repair. A superior capsulotomy is performed as is an inferior capsulotomy, the latter being done without injury to the transacetabular ligament. The femoral head is dislocated posteriorly and the distances from the lesser trochanter to the center of rotation and from the medial border of greater trochanter to the center of rotation are measured. The femoral tracker is placed back on the femur so the piriformis fossa, the popliteal fossa and the achillies tendon can be marked so as to be able to calculate the version of the femoral component.

During preparation of the acetabulum, I use special retractors that are now available from most implant manufactures and from several instrument companies. I place a sharp Hohmann at the inferior margin of the insertion of the indirect head of the rectus outside the labrum but inside the capsule. A two-pronged retractor straddles the ischium just outside of the labrum (this retractor is placed first and is done with the leg in extension). A third retractor is placed superiorly to control the superior capsule if needed. Using the HipNav pointer the Fovea is scribed to find its deepest point; the articular surface is scribed to determine the acetabular size and location; the acetabular rim is scribed to determine its orientation. I rarely try to medialize the acetabular component so I start with a reamer 2 mm smaller then the computer's calculated size so that I have to only pass two or three reamers through the soft tissues. Due to the accuracy of the computer, I no longer use an acetabular trial so I am able to place the real liner immediately after the shell.

As attention is now directed towards the femur, the camera is repositioned, the pelvic tracker is removed and the femoral tracker is applied. I use special retractors on the femoral side as well. I place a hip skid under the femoral neck that has two prongs to elevate the femur away from the retractor to allow access for the calcar reamer. A curved two-pronged retractor straddles the iliopsoas tendon under the inferior skin edge (this retractor is placed before the femur is maximally internally rotated). A third retractor is placed deep to the minimus along the anterior insertion of the medius to protect the muscles from the reamers and the broaches. Since the computer gives us real time data on the version and the change in leg length and offset as we broach, we can minimize internal femoral rotation and proceed quickly to the correct broach and depth (Fig. 7.53).
We confirm the final head position by comparing the computer calculations to the pre-operative and intra-operative measurements. We perform a trial reduction to check stability and compare the computer's calculated leg length and offset to that measured by the computer during the reduction. The real femoral component is then inserted and the hip is placed through a range of motion. The kinematic data includes range of motion and when subluxation occurs. Posterior capsular repair is followed by routine multilayer closure, a subcuticular skin closure and then full length half inch steri-strips.

I think that the patient's post-operative recovery rate during the first several weeks is more closely related with the patient's comorbid factors and personality then the specifics of the procedure performed. The surgical factors that have the greatest impact on initial outcomes are not the length of the skin incision or the surgical time, but are the stability of the implants, the amount of damage to the soft tissues and the avoidance of peri-operative complications. The advent of an imageless active tracker navigation system has allowed us to incorporate navigation with little change to our previous surgical technique. The navigation allows more consistent placement of the components irrespective of the exposure and allows us to minimize the surrounding soft-tissue damage by requiring fewer passes of instruments through the soft tissues, fewer trial reductions and fewer fiddles. The above technique has been very successful for us and our patients in maximizing their short-term recovery while optimizing the long-term success of their implants.