

Approaches in Primary Total Hip Arthroplasty

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Learning Objectives

- Learn the basic strategy and concepts required for successful execution of a primary total hip arthroplasty with use of commonly employed minimally invasive approaches
- Learn the evidence supporting and questioning the minimally invasive philosophy
- Learn the indications for using the minimally invasive total hip arthroplasty techniques

The Direct Anterior Approach for Total Hip Arthroplasty

By E. Marc Mariani, MD, and Michael H. Bourne, MD

Background

The direct anterior approach to total hip arthroplasty offers several advantages, including utilization of the supine position, use of anatomical intervals for soft-tissue preservation, and use of intraoperative fluoroscopy for verification of acetabular and femoral prosthetic position¹. Correct femoral offset and length are also facilitated.

Methods

Over the past two and one-half years, we have actively pursued the anterior technique and have followed all patients prospectively. Hip scores, operative times, and complications have been collected, allowing for comparison with other techniques.

Results

Three hundred and seventy patients underwent total hip arthroplasty with use of either a direct anterior approach (185 patients) or a non-direct anterior approach (185 patients) technique. Six weeks postoperatively, the direct anterior approach group had less pain, better function, and a superior average Harris hip score ($p < 0.0001$ for each). The direct anterior approach group had superior ratings for walking, need for support devices, stair-climbing, and ability to don socks and shoes. Complications in the direct anterior approach group included one dislocation, which required reoperation; one deep infection, which responded well to simple irrigation and débridement; and one trochanteric fracture, which required no surgical intervention. Four cortical perforations resolved without fixation. Three of these occurred in the first thirty operations, in which a sharp-tipped rasp was utilized. A blunt-tipped rasp is now currently used.

Conclusions

We are very enthused about the direct anterior approach for total hip arthroplasty. Our data support the notion that recovery is faster and less painful when this technique is used. In addition, proper placement of the components is facilitated with use of intraoperative fluoroscopy with the patient in the supine position. Replication of the original femoral offset and length is also greatly facilitated. The approach preserves the short external rotators and capsule, thus decreasing the potential for the posterior dislocation that is more commonly seen with the posterior approach. Preservation of the hip abductors eliminates the early postoperative Trendelenburg gait that is commonly seen in patients for whom the anterolateral approach was used.

Clinical Relevance

As a result of our early experience (two and one-half years) with the direct anterior approach to total hip arthroplasty, we now prefer it to all others and use it in virtually all of our primary total hip arthroplasty procedures.

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Minimally Invasive Watson-Jones Approach to Total Hip Arthroplasty

By Richard A. Berger, MD

Minimally invasive approaches to total hip arthroplasty have the potential to improve postoperative recovery by reducing tissue trauma and preserving musculotendinous

units. Historically, the anterolateral (Hardinge) approach¹ has been preferred by some surgeons because of a reduced dislocation risk in comparison with that associated with the posterior approach. Unfortunately, violation of the anterior attachment of the abductors leads to weakness and a limp in some patients. In this paper, we describe a minimally invasive Watson-Jones approach to the hip, which is aimed at preserving the abductors to avoid postoperative weakness and limping. A combination of new instrumentation and positioning is described that facilitates the ability to perform this variation of the classic Watson-Jones approach². In comparison with the posterior approach, this minimally invasive Watson-Jones approach provides most patients with a rapid recovery and rehabilitation while limiting the risk of dislocation.

The patient is placed in the lateral decubitus position on a table that allows for extension, adduction, and external rotation of the hip. The interval between the tensor fasciae latae and gluteus medius is utilized for deep exposure to the hip. The femoral head is resected in situ. Specialized lit retractors allow for excellent visualization of the acetabulum as it is prepared and as the acetabular component is placed. The leg is then extended, adducted, and externally rotated, which exposes the femur. Again, specialized lit retractors allow for excellent visualization of the proximal aspect of the femur as it is prepared and as the stem is inserted. After final reduction, only the superficial fascia and skin require closure.

While this procedure was found to be safe and practical for most patients who are candidates for traditional total hip arthroplasty, there are conditions that are not amenable to this procedure at this time. With morbidly obese patients, this procedure is very challenging. Additionally, patients with very marked abnormal anatomy of the hip joint, extensive prior surgical scarring, or complete hip dislocation may be better candidates for an alternative total hip arthroplasty approach. At the time of this writing, with these few exceptions, there is no significant difference in patients receiving the minimally invasive Watson-Jones approach compared with a more standard approach.

In conclusion, the minimally invasive Watson-Jones approach to the hip has the advantages of an anterior approach, which limits the risk of dislocation and does not violate the abductor unit. We have not observed the occurrence of significant abductor weakness, which is often experienced after a classic Watson-Jones approach or a Hardinge approach. With the proper instrumentation and operating table, this technique is reproducible. The acetabular exposure is more than adequate regardless of patient type, except for the very obese patient. The femoral exposure and preparation is usually adequate but proves difficult in muscular men. As with other minimally invasive approaches, proper preparations and training are necessary to successfully complete the technique.

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What Are the Evidence-Based Data for Minimally Invasive Surgical Approaches?

By R. Michael Meneghini, MD

The reported advantages of minimally invasive total hip arthroplasty include shorter hospital stays and a more rapid rehabilitation and recovery due to the lack of muscle and tendon damage with use of the minimally invasive surgical technique. However, it is difficult to draw conclusions from the existing peer-reviewed literature on the benefits of minimally invasive surgical approaches because of the multiple confounding variables, such as terminology, concomitantly introduced perioperative teaching, patient expectations, anesthetic techniques, and rehabilitation protocols. An evidence-based analysis was performed by means of a review of the available literature, with particular attention given to scientific cadaveric and biomechanical gait analysis reports as well as prospective, randomized clinical outcome studies.

Recent cadaveric studies have demonstrated that muscle damage may actually be greater with minimally invasive surgical techniques, yet the functional implications of this damage are unknown. Gait analysis has been shown to be an objective way to assess patient recovery and muscle function before and after total hip arthroplasty. Yet, despite the appreciable interest in minimally invasive surgical techniques, there have been few studies that have utilized gait analysis to evaluate total hip arthroplasty performed with minimally invasive surgical approaches. The few gait studies that exist fail to demonstrate a benefit in postoperative recovery with minimally invasive surgical techniques. In a prospective, randomized study of patients undergoing a two-incision approach, a mini-posterior approach, or a mini-anterolateral approach, there was no observable difference in short-term recovery with regard to kinetic and kinematic gait-analysis parameters at follow-up times of six weeks or one year¹.

There have been numerous studies reporting outcomes and recovery with minimally invasive approaches in total hip arthroplasty. However, only six prospective, randomized clinical studies exist in the English peer-reviewed literature¹⁻⁶, despite the fact that minimally invasive surgical approaches have been utilized for almost a decade. The results of these prospective, randomized studies are somewhat conflicting, with some authors reporting improved early pain relief and earlier hospital discharge and functional recovery with minimally invasive surgical techniques and other authors reporting no improvement over standard approaches. In one prospective, randomized clinical study of the two-incision approach compared with the mini-posterior approach, slower recovery was observed in the two-incision group with respect to recovery of functional milestones⁵. Furthermore, there is evidence to support the hypothesis that preoperative patient condition-

ing and education is more important than surgical approach in facilitating a rapid recovery after total hip arthroplasty⁶.

There continues to be insufficient evidence to conclusively support the hypothesis that a specific surgical approach or minimally invasive technique provides faster recovery and return to function after total hip arthroplasty. Furthermore, long-term data do not exist to confirm that implant longevity and survivorship with minimally invasive surgical techniques will not be inferior to the established clinical outcomes that have been reported with regard to total hip arthroplasty performed through traditional surgical approaches.

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