

## Anterior o Postero-Lateral Surgical Approach: Can we Identify Parameters for the Choice in Noncemented Hip Arthroplasty?

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### Editorial Note

Total hip arthroplasty (THA) has been one of the most successful orthopaedic procedures over the past 30 years [1,2]. Noncemented THA (N-THA) has gained popularity particularly among younger patients, because of the simplicity of surgery, preservation of bone stock and longevity of the implants [3]. N-THA was developed in response to evidence on cement debris playing an important role in promoting bone lysis and loosening. Prosthetic devices that achieve fixation without cement either by “press-fit” or by biologic ingrowth have successively been developed. With the press-fit technique, stabilization is achieved by ensuring an optimal interference fit of the implant into the femur and the acetabulum. With biologic ingrowth, fixation occurs by bone ingrowth into a porous surface. Currently, several surgical approaches for hip arthroplasty have been defined; these include the anterior and the posterolateral approaches. The basic premise of these approaches is the use of a smaller skin incision (defined as less than 10 cm) to create a mobile window that allows an intermittent complete visualization of the surgical anatomy. The same respective surgical approach and bone resection are performed beneath the skin incision. Overall, there is conflicting data available regarding the efficacy of these approaches in terms of need for blood transfusions, pain control, length of hospital stay, and duration of the recovery period [4,5]. However, most studies have reported improved cosmesis and patient satisfaction with such approaches involving smaller incisions [6]. Howell and colleagues lent significant importance to the psychological impact of improved cosmesis on patient attitude, satisfaction and motivation for recovery, and cautioned that this appeal should not be underestimated [7]. The question regarding which surgical approach is best has been extensively debated. Despite this, no consensus has been reached regarding which approach is ideal for primary THA. The advantages and disadvantages of each approach have been well documented and the choice of which approach to use has largely depended on surgeon preference, which in turn is a reflection of the surgeon’s training and experience. This thesis assesses the effect of three common surgical approaches on functional outcomes, dislocation rate, and revision rate, as objective measures of success after primary THA.

Most previous studies have not assessed long-term results, with only one study that evaluated the five-year clinical outcome of patients [8]. The follow-up period was short, but covered the critical period during which the benefits of the minimally invasive approach to THA are supposed to be maximal. Flören et al. found that the THA technique did not compromise the long-term clinical and radiographic findings when compared with conventional techniques [9]. Studies in the literature about the clinical benefits of minimally invasive surgical techniques, report insufficient or non-uniform case studies in the selection of patients and results reported. For a hip replacement procedure to be truly “minimally invasive”, it is not indispensable to perform the operation through the smallest possible skin incision, but it is essential that the procedure be performed with minimal soft-tissue trauma, sparing all muscle attachments. Of course, the skin incision performed for the anterior surgical approach is normally smaller (about 2 cm less) than that used during the direct posterolateral approaches. The minimal invasiveness of the surgical incision offers a reduction of muscle tissue

damage, and, consequently, a reduction in bleeding. The theoretical advantages of the anterior mini-incision include a good view of the acetabulum, while preserving all muscles; additionally, fluoroscopy is not required, and one does not have to use a specific implant for this approach. Practical advantages include fast postoperative recovery, no limp (because the buttock muscles and the greater trochanter are not affected) and almost no risk of dislocation [10]. The posterolateral approach has the benefits of preserving abductor function [11] and providing good exposure of the proximal femur and acetabulum. The main disadvantage seems to be the reportedly higher dislocation rate compared with other approaches [12]. The operating table used for the posterolateral approach is commonly found in surgical departments. The table used for the anterior approach is specific and complex, characterized by tractions and tensioners. A disadvantage of this approach is, in fact, the need for a special operating table and specific tools. Potential complications include intraoperative femur and ankle fractures, and damage to the lateral femoral cutaneous nerve. These can be avoided by using caution during the external rotation of the hip and the lowering of the foot of the lower limb, which must be performed without traction.

There is, however, some controversy in the literature concerning the accuracy of the estimated blood loss in relation to the real calculated loss, with significantly higher quantities reported in older studies compared with those in more recent studies on minimally invasive approaches [13,14]. The methodology used for measuring intraoperative blood loss is highly variable, ranging from the use of mathematic formulae to blood parameter measurements. In agreement with the results of this thesis, Wentz et al. [15], Goldstein et al. [16] and Chimento et al. [17] reported a statistically significant reduction of blood loss in patients treated with the anterior surgical approach. Most authors have reported lower bleeding levels when using anterior techniques. The estimated blood loss quantities were significantly lower (ranging from 152 ml to 598 ml) than in the present sample, for which the estimated mean total blood loss in the anterior mini-incision group was 1083.5 ml [15,18]. Therefore, the type of surgical approach influences the extent of blood loss, regardless of the size of the skin incision and surgery duration. Less blood loss results in a reduced need for blood transfusions, and this is a particular advantage in some patients; these include patients suffering from anemia, hemophilia and cachexia, as well as patients with religious restrictions, such as Jehovah’s Witnesses. Greater trochanter fracture is a typical complication of the

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minimally invasive anterior approach, related to an insufficient release of the capsule [19]. The operative trauma associated with traction and manipulation during hip surgery may render the nerves more vulnerable. The posterolateral approach is traditionally associated with injury to the sciatic nerve [20]. The reported incidence of nerve injury after total hip arthroplasty ranges from 0.7% to 3.0% for primary surgery and 2.9% to 7.6% for revision surgery [21]. Possible etiologies of intraoperative injury include direct trauma, retractor pressure or traction, stretch and/or compression of the nerve secondary to leg positioning, stretch due to excessive lengthening of the extremity, and local pressure [22]. Dislocation of the femoral head component from the acetabular socket occurs in 1% to 3% of primary total hip arthroplasties. The main causes of dislocation include inadequate patient compliance with postoperative precautions, and malposition of the prosthetic components at the time of the operation [23]. The most common technical error predisposing to dislocation is malposition of the acetabular component. Most dislocations occur within six months from the initial surgery, and most patients can be managed conservatively.

The choice of the surgical approach is made based on the experience of the surgeon or the type of patient? In short, you can create some guidelines of choice that are based on the quality of the result for the same good action implemented? My personal experience and study of the literature showed:

1. The anterior approach has produced good clinical outcomes in the short term (3-6 months postoperatively), especially in relation to a lower degree of blood loss, minimal pain and rapid recovery. This approach facilitates general patient recovery and the functional recovery of the hip treated, especially in the elderly who require a rapid functional recovery to enable a speedy return to a decent quality of life.
2. The anterior approach does not allow a good view of anatomical and job security in the event of severe hip dysplasia and ascent of the femoral head in the iliac region.
3. The quality and quantity of the ROM of the hip joint is better in patients treated with the posterolateral approach. This enhances the function of the new artificial joint, and becomes an important feature for patients with high functional demands.
4. The WOMAC and HHS evaluations showed that two years after the initial surgery, the procedures overlap in terms of results and overall condition of the patient.

The choice of surgical approach should therefore be made by taking into account the requirements of the patient, in particular in terms of pain elimination and/or total functional recovery of the joint.

To reach an ideal decision for the individual patient, is not useful or necessary the creation of an algorithm based on age, disease, the functional requirement of the patient? For me yes, to you the answer.

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