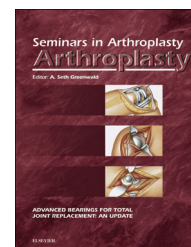


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# The mini-anterior approach: Optimizes total hip arthroplasty outcome—Affirms



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## ABSTRACT

The direct anterior approach for total hip arthroplasty has gained popularity in recent years and evidence to support this method continues to grow. Through our own research, we have noted several advantages compared to the posterior approach. In our direct anterior approach patients, we have found earlier function recovery in the initial weeks after total hip arthroplasty. Fewer deficits to hip motion and strength occur with this approach. We are also able to obtain improved precision, accuracy, and reproducibility of acetabular cup placement. For these reasons, the direct anterior approach is our preferred method in performing total hip arthroplasty.

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## 1. Introduction

Total hip arthroplasty (THA) is a highly successful surgical procedure, however, we continue to search for ways to improve our outcomes [1,2]. One area of investigation has been the use of various surgical approaches, including minimally invasive surgery [3–5]. The direct anterior approach (DAA) has gained popularity among patients and surgeons and is considered a minimally invasive technique, as it takes advantage of a true intermuscular plane interval [6].

Originally, the senior author (J.A.R.) had been trained with the conventional posterior approach (PA) for THA, but transitioned to DAA over the years. During this time, we have noted several advantages for DAA and have performed several studies to support this method. In our experience with DAA THA, we have found earlier postoperative functional recovery, improved hip strength and range-of-motion, and more accurate and precise placement of the acetabular cup component.

## 2. Early functional recovery

At our institution, we performed a level-2 evidence prospective, nonrandomized, cohort study to compare DAA THA to conventional PA THA [7]. Patients were enrolled with specific inclusion/exclusion criteria. Similar noncemented implant designs and bearing surfaces were used in all cases.

Uniform surgical technique was performed. For the DAA group, patients were positioned supine on a standard operating table (Fig. 1). Anterior capsulotomy and closure was performed. A table-mounted elevator was used for femoral exposure. The soft tissues surrounding the proximal femur were selectively released, depending on femoral mobility. Fluoroscopy was also used routinely to confirm intraoperative assessment. For the PA group, patients were placed in the lateral decubitus position. Release of the gluteus maximus, quadratus femoris, short external rotators, piriformis, and capsule was performed and repaired through bony drillholes made in the posterior greater trochanter.

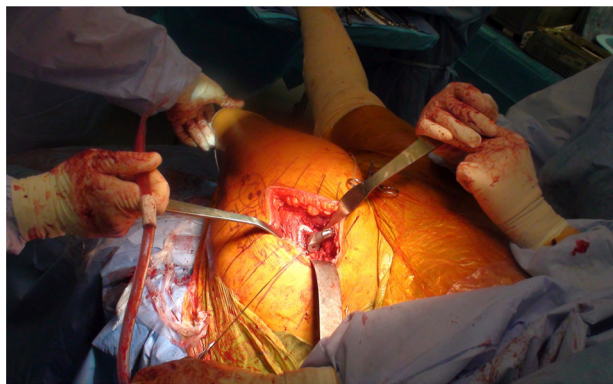
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**Figure 1 – Patients are placed supine on a standard operating table and the hip is extended for femoral exposure.**

Overall, 120 patients were retained throughout the study period: 60 DAA patients and 60 PA patients. Each group had similar demographics and preoperative evaluation scores, including Harris hip score (HHS), UCLA activity score, the motor component of the Functional Independence Measure (M-FIM), timed up and go (TUG) test, and 12-Item Short Form Health Survey (SF-12).

During immediate inpatient postoperative recovery, the DAA group demonstrated better functional ability compared to the posterior approach group, scoring significantly higher on M-FIM. The FIM is a reliable tool that measures a person's ability to carry out activities of daily living. The time to achieve peak M-FIM scores was also significantly faster in the DAA group with regards to walking, bed/chair transfers, and stair climbing. The DAA group performed significantly better than the posterior group with the TUG test, a sensitive test to measure patient mobility. This difference of TUG was also seen at the week 2 postoperative mark, while the other measures equalized. Length of hospital stay was similar between groups.

By 6 weeks after surgery, there were no significant differences between the 2 groups. Patients also kept journals to record when they met functional milestones postoperatively and no significant differences were noted. Complications were similar between the 2 cohorts.

Both approaches provided excellent outcomes, but the DAA group demonstrated faster functional recovery and mobility during the early postoperative period. No differences were seen between the 2 groups after the 6-week evaluation.

Other studies have also reported improved early functional recovery, outcome scores, and cessation of walking aides in DAA THA compared to other approaches [8–10]. Bergin et al. [11] demonstrated laboratory evidence of decreased muscle damage of DAA compared to PA THA by measurements of serum CK and other inflammatory markers. In addition, systematic review and meta-analysis comparing DAA and PA THA favors DAA in regards to early patient reported pain and function outcomes, postoperative length of stay, dislocations, and postoperative narcotic consumption [12].

### 3. Gait analysis

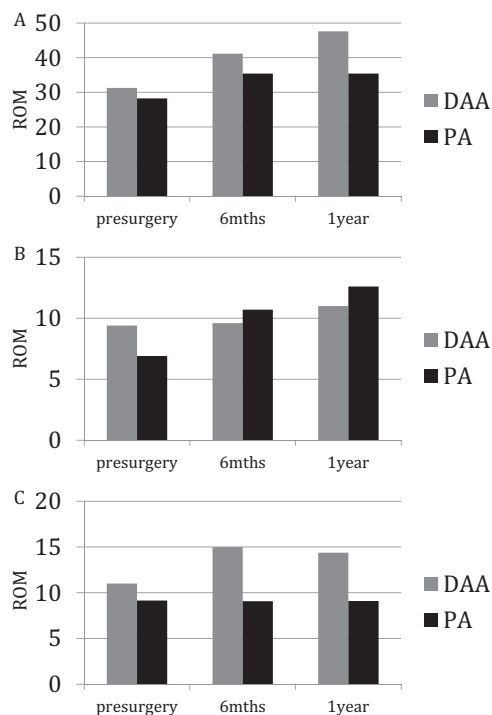
In another study, we compared changes in gait patterns after DAA THA versus PA THA [13]. Overall, 10 patients were enrolled

in the DAA group and 11 in the posterior group with the same inclusion/exclusion criteria. All cases were performed by a single surgeon with uniform technique as previously described. Both groups had similar demographics and preoperative clinical scores. Gait analysis was performed preoperatively and at 6 months and 1 year postoperatively. Motion analysis was done using reflective markers on patients and infrared cameras.

In both groups, there was similar improvement in the hip flexion/extension arc of motion and the abduction/adduction arc, comparing the postoperative gait cycles to the preoperative cycle. Internal/external ROM also significantly improved in the DAA group, however, this decreased in the posterior group at 6 months and 1 year postoperatively (Fig. 2). Gait velocity was seen to improve for both groups. Similar improvement of gait parameters were achieved for both DAA and posterior approach THA, however, decreased ROM occurred in the transverse plane (internal/external rotation) for the posterior group, while the DAA group saw significant improvement.

### 4. Muscle strength

In a prospective, comparative study, we examined hip strength after DAA THA versus PA THA [14]. A total of 15 patients were included in each group. All patients had similar demographics and preoperative clinical scores, including HHS, UCLA, and SF-12. Isometric hip strength was measured using a hand-held dynamometer preoperatively and at 6 weeks, 3 months and 1 year postoperatively.



**Figure 2 – Range-of-motion (ROM) during gait cycle: (A) flexion/extension, (B) abduction/adduction, and (C) internal/external rotation.**

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