



Primary total hip arthroplasty through a direct anterior approach using a bikini incision: surgical technique

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Abstract: The direct anterior approach (DAA) to the hip has gained popularity with many potential early outcomes benefits for primary total hip arthroplasty (THA). The bikini type oblique incision has been proposed to help with the cosmetic appearance of the scar in conjunction with this approach. In this article, we describe the surgical technique of performing a DAA using a bikini incision. The important keys to the acetabular and femoral preparation and exposure during this technique are retractor placement and use of offset instruments when needed to ensure safe preparation and satisfactory seating of the final implants. The preliminary results of the bikini type incision is promising and offer all of the benefits of the DAA for primary THA, with additional advantage of an improved cosmetic appearance of the surgical scar.

Keywords: Technique; arthroplasty; hip; bikini incision

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Introduction

The direct anterior approach (DAA) for primary total hip arthroplasty (THA) has many potential advantages (1-9). Recently, a bikini type oblique incision has been proposed to improve cosmetic appearance of the surgical scar following primary THA, particularly, in the female patient population. Leunig *et al.* have compared the standard longitudinal DA incision (n=33 patients) with the modified bikini type incision (n=26 patients) (10). At 6 months of follow-up, patients who underwent THA through a bikini incision were more satisfied in the aesthetic appearance of the scar. Functional scores, pain, and complications were similar between the two groups. The safety of this modified bikini DAA incision has been also reported in a larger cohort of patients. One hundred patients underwent primary THAs through a bikini type incision with no reported complications related to numbness, thigh pain, component malposition, and leg length discrepancy (11). The aim of this article is to report the senior author's (William J. Hozack) experience and surgical technique of the bikini type incision for primary THA using the DAA.

Surgical technique

Patient positioning and the operating room table set up is performed similar to the standard DAA technique, as described previously by the senior author (William J. Hozack) (12).

The surface anatomical landmarks start by locating the inguinal skin crease. This can be easily identified with slight hip flexion (*Figure 1A*). Next the anterior superior iliac spine (ASIS) is identified and marked. The center of the bikini incision is typically either on or slightly distal [1 centimeter (cm)], but parallel, to the skin crease mark with 50% of the incision length medial and 50% lateral to the ASIS (*Figure 1B*). Making the incision distal to the skin crease facilitates exposure of the acetabulum. However, if the distance between ASIS and skin crease is more than 3 cm, the incision will be made on the inguinal skin crease. With longitudinal superior and inferior retraction to skin, the fascial layer of tensor fascia lata (TFL) is dissected longitudinally on the lateral side of the incision (*Figure 2*). It is important to minimize medial superficial dissection to reduce the risk to the lateral femoral cutaneous nerve (LFCN). Once the

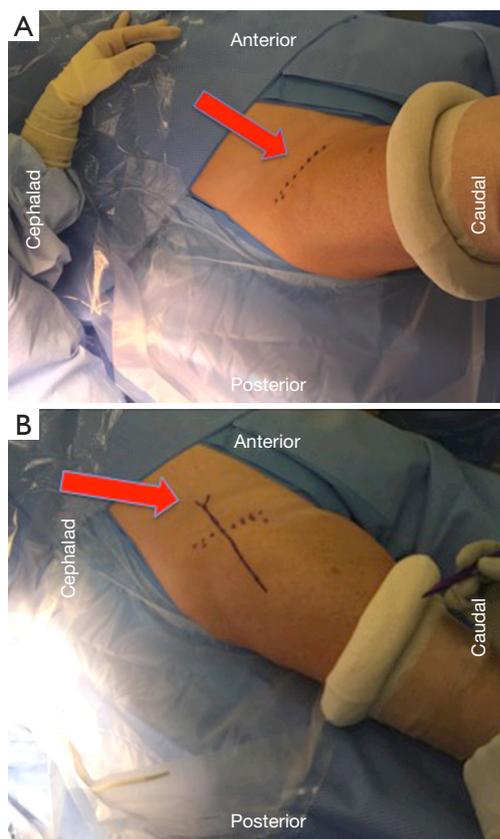


Figure 1 Incision location and surface landmarks. (A) Clinical photograph demonstrating the location of the skin crease following slight hip flexion (arrow); (B) clinical photograph demonstrating anatomical incision in relation to the ASIS (arrow).

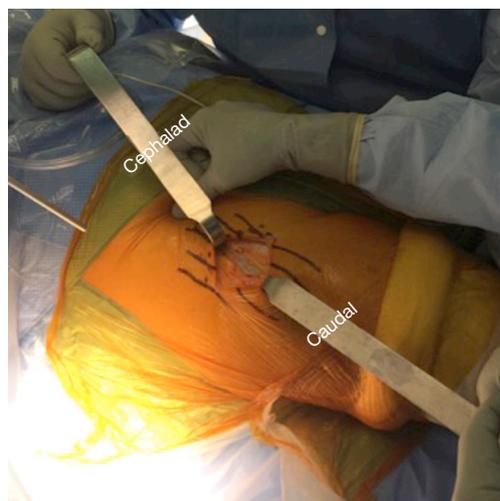


Figure 2 Intraoperative photograph demonstrating a superficial dissection view of the bikini type direct anterior approach to the hip.



Figure 3 Intraoperative photograph demonstrating the vertical split through the fascia and proper retractor placement in relation to the oblique skin incision.

subcutaneous dissection is complete, the remainder of the exposure proceeds in an identical fashion to that described using a longitudinal incision (12). It is critical then to confirm the location of TFL. One method to recognize the muscle is visualizing the perforating vessels that enter at the mid portion of TFL. Another method to determine the TFL location is to proximally palpate the ASIS and confirm that the TFL is lateral to it. Once the muscular interval has been identified (between TFL and sartorius), an assessment of incision length and exposure is performed for potential extension laterally or medially. Small increments in incision length can substantially change the ease of exposure of the deep structures. This is followed by a longitudinal incision through the superficial fascia of the TFL muscle in line with the muscle fibers (*Figure 3*). A deep blunt dissection is then made similar to the standard DA technique and followed by ligation of the ascending branches of lateral circumflex artery. The capsule of the hip joint is carefully exposed using specifically designed retractors. Gentle release of the reflected head of the rectus aids in improving exposure. Next, an anterior capsulectomy is performed, which improves the ease of exposure of both the femur and acetabulum. The femoral neck is then cut *in situ* (napkin ring fashion) with an oscillating saw, and the femoral head is removed. Three acetabular retractors are placed (anterior, posterior and inferior) to obtain optimal acetabular exposure (*Figure 4*). Reaming is performed in the standard fashion. Occasionally offset acetabular reamers are used to facilitate accomplishing this step without excessive skin retraction (*Figure 5*). The

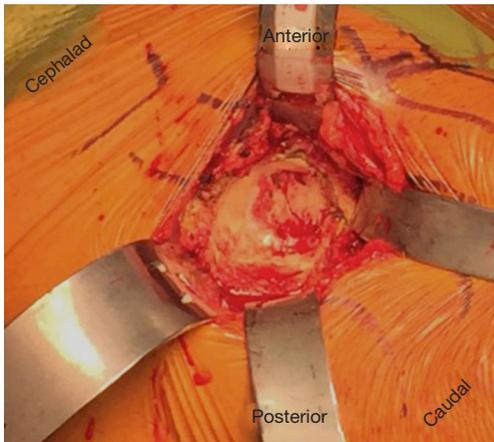


Figure 4 Intraoperative photograph demonstrating the acetabular exposure and retractors placement after the removal of the femoral head and labrum. A fourth retractor has been placed here to facilitate a picture of the acetabulum.



Figure 5 Photograph of an offset reamer.



Figure 7 Photograph of an offset broach handle.

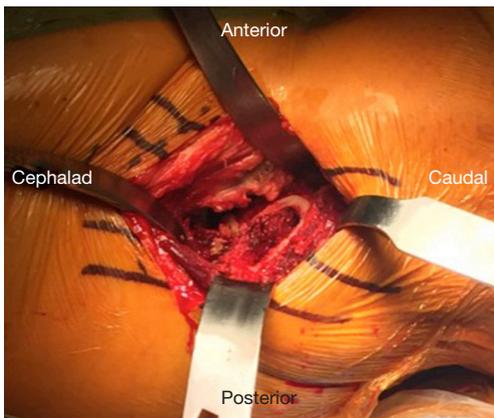


Figure 6 Intraoperative photograph demonstrating the femoral exposure after proper release and elevation, prior to preparation of the femur.



Figure 8 Leg positioning for initial femoral exposure (knee flexion, abduction, and external rotation).

cup is then inserted using an offset insertion handle. The polyethylene liner is placed by hand.

Femoral exposure is identical to our standard DAA technique. First the femur is externally rotated 90 degrees to allow elevation (*Figure 6*). With proper retractor placement, the superior capsule can be identified and partially excised. Subsequently, a superolateral double-tipped retractor is placed over the top of the greater trochanter. Additional superior capsular release is performed, and the femur is then elevated using a bone hook with the retractor holding the femur in place. The limb is then repositioned into external rotation and adduction with the knee extended. This allows for proper access to the femur for broaching and implant insertion (*Figure 7*). Before broaching the femur, distal skin retraction can be used to improve visualization (*Figure 8*). An offset broach handle is used to achieve safe broaching and seating of the femoral stem (*Figure 9*). Once



Figure 9 Leg positioning prior to initial broaching of the femur (knee extension, adduction, and external rotation).



Figure 10 Image demonstrates a patient with a healed bikini type incision (arrow) at 6 months following primary total hip arthroplasty.

the final components are placed and the hip stability, range of motion, and leg length discrepancy is checked, closure is performed in the standard fashion. Care is taken to not entwine the LCFN during the subcutaneous closure.

Preliminary results

A total of 79 patients underwent THAs through a DAA using a bikini incision performed by the senior author (William J. Hozack). There were 70 females (89%) and 9 males (11%) with an average age of 62 years. The available follow-up period ranged between 1 and 7 months postoperatively. All patients were satisfied with the cosmetic appearance of the incision (*Figure 10*) with no reported complications.

Summary

In addition to the reported advantages of DAA in THA, the preliminary results of the bikini type incision have proven the safety while improving the cosmetic appearance of the surgical scar. To protect the LCFN during this technique, minimal medial superficial dissection and careful superficial closure should be emphasized. The important keys to the acetabular and femoral preparation and exposure are retractor placement and use of offset instruments when needed to ensure safe preparation and satisfactory seating of the final implants.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/aoj.2017.03.01>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki

Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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