



Acetabular Cup Revision Combined With Tensor Fascia Lata Reconstruction for Management of Massive Abductor Avulsion After Failed Total Hip Arthroplasty

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ABSTRACT

We report on 17 patients with massive abductor avulsions after total hip arthroplasty (THA) treated with medialization of the acetabular component and tensor fascia lata (TFL) reconstruction. All patients had severe limp, positive Trendelenburg sign, and avulsion of the abductor insertion confirmed on MRI. Mean age was 69 years (range, 50–83 years), and mean follow-up period was 36 months (range, 18–78 months). After surgery, 9 patients had no limp (47%), 8 patients had a mild limp, and abductor power improved from mean 2.5/5 to mean 3.8 ($P < 0.0001$). At latest follow-up, the Harris Hip Score was excellent in 6 hips (37%), good in 7 (43%) hips, and fair or poor in 3 (23%). Two patients with mild limp were not satisfied with their procedure.

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Impaired or absent abductor function after total hip arthroplasty (THA) is a difficult management issue. It is typically the result of iatrogenic or traumatic lesions of the superior gluteal nerve [1], detachment, scarring, or necrosis of the gluteus medius muscle after primary or revision surgery of the hip in association with the Hardinge approach [2,3], following resection of the abductors for the treatment of malignant tumors [4,5] or abductor tendinosis secondary to the global degenerative process which occurs in an arthritic hip [6]. The loss of hip abductors after surgery usually results in a refractory limp and positive Trendelenburg sign [2,3,7–10], loss of joint function [11], and potentially an increased risk of recurrent hip dislocation [12].

While surgical repair of abductor avulsion can improve gait and reduce pain, the results have not been uniformly good, especially with regards to abductor defects following THA [10,13–15]. The size of the abductor defect is important, with regards to both the surgical technique and the functional outcome. Options are direct reattachment of the gluteus medius to the greater trochanter with small defects [11], primary repair in conjunction with a soft tissue reconstruction (advancement of the vastus lateralis) for medium defects [16], and soft tissue reconstruction with gluteus maximus [17]

or posterolateral transfer of the psoas tendon [18] in the setting of chronic, retracted defects.

In the setting of chronic abductor muscle deficiency, revising the acetabular component superiorly and medially has a two-fold benefit. By decreasing the perpendicular distance to the vector of the gluteus medius, it allows direct reattachment to the trochanter of the inevitably shortened muscle, and allows correct tension to be restored to the abductor musculature [19]. In this study we present our experience of treating massive tears of the abductor muscle in patients after THA, by revising the acetabular component to a superior and medial hip center, in combination with a tensor fascia lata (TFL) soft tissue reconstruction. Our hypothesis was that this treatment would result in a satisfactory outcome for patients with chronic massive tears of the abductor muscles, without major complication.

Materials and Methods

Patient Population

Between 2006 and 2011, a revision of the acetabular component to a superior and medial hip center was combined with soft tissue reconstruction of the abductor muscle deficiency in patients who presented with abductor avulsion after failed primary THA. The operation was performed in all cases by a single surgeon (JG). The initial diagnosis of abductor avulsion was made on the basis of persistent hip/groin pain after surgery, tenderness +/- a palpable defect anterior to the greater trochanter, a limp at least 1 year after

There was no external funding source for this study.

Ethics: This study was approved by the local research ethics committees and was registered in a public trials registry.

The Conflict of Interest statement associated with this article can be found at <http://dx.doi.org/10.1016/j.arth.2013.09.056>.

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surgery despite adequate physical therapy to strengthen the hip abductor muscles, a positive Trendelenburg sign, and weakness of hip abduction tested in the lateral position.

MRI

All patients had a complete, full thickness tear of gluteus medius and minimus confirmed by preoperative MRI, using techniques to suppress the artefact from the adjacent implants [15,20]. MRI was also used to confirm that the tensor fasciae lata was normal in each patient, establishing that the superior gluteal nerve had not been disturbed. This was important as the superior gluteal nerve innervates both the abductor muscles and the tensor fascia lata, and injury to the nerve can be the cause of persistent abductor dysfunction.

Clinical Evaluation

Clinical and radiographic follow up was performed at six weeks, six, twelve and twenty-four months post-surgery, and then every two

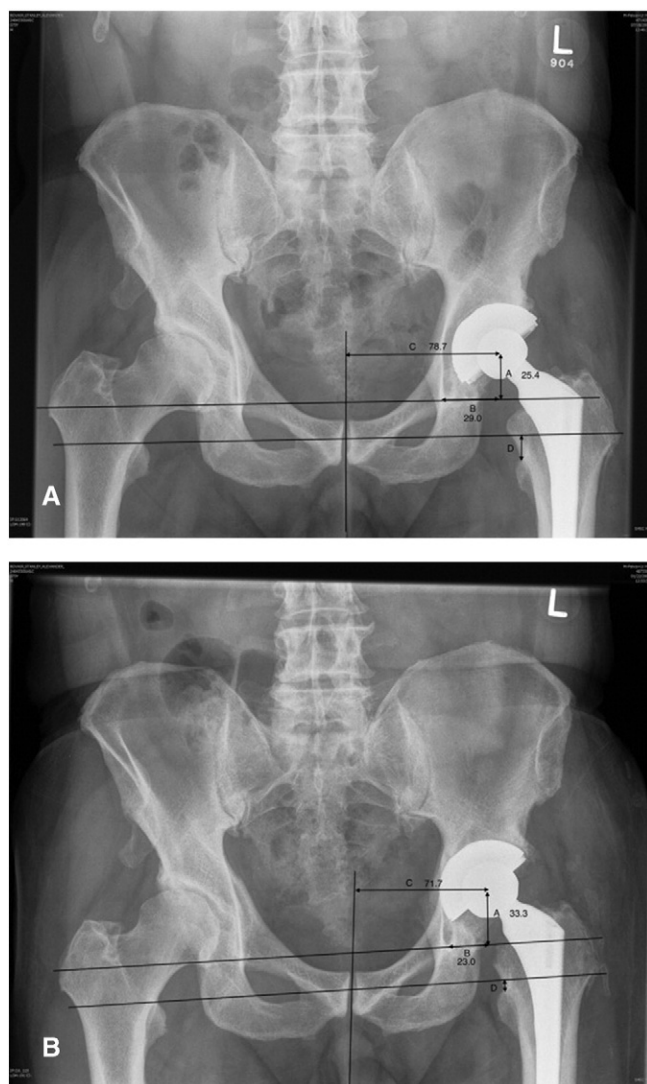


Fig. 1. (A) Pre-operative AP radiograph of the pelvis. (A) Height of the hip center; (B) Horizontal location of the center of the hip; (C) Center body moment arm; (D) Leg length discrepancy. (B) Post-operative AP radiograph of the same patient, with identical measurements as in (A). The centre of rotation of the hip has been both medialized (demonstrated by a decrease in (B) and (C) measurements) and placed more superiorly (demonstrated by a reduction in (A)). The leg length discrepancy (D) has also been reduced.

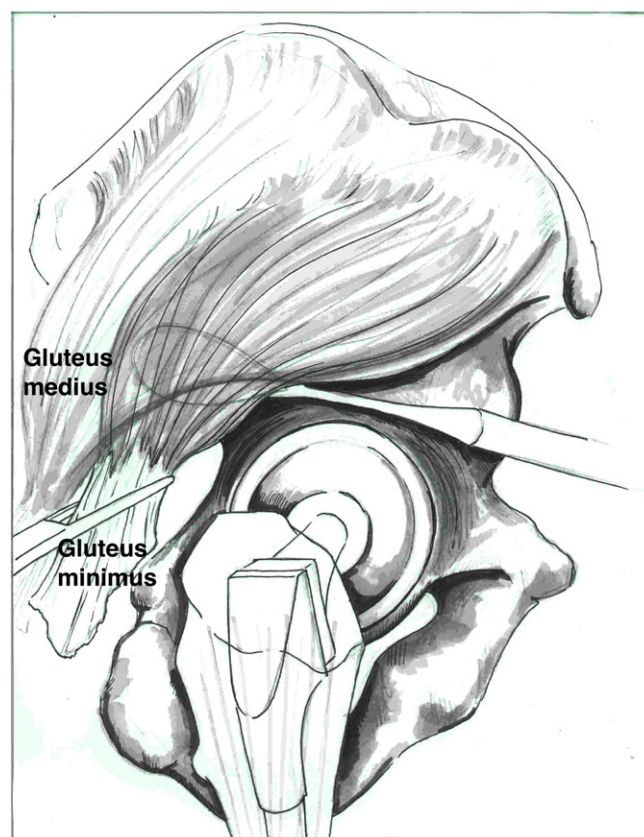


Fig. 2. Mobilization of the abductor muscles. The gluteus minimus is elevated with a Cobb from the ilium to his insertion, beginning approximately 2 cm above the superior margin of the acetabulum.

years. Clinical evaluation was carried out with the use of Harris Hip Score (HHS) [21] – the postoperative scores from the most recent follow-up appointment were used. Quality of life was measured with the short form-12 (SF-12) [22]. Patients were also asked to evaluate their condition compared with their preoperative status using a visual analogue score (VAS) pain scale (1–10), as well as their overall satisfaction with the procedure, and whether they would consent to undergoing the procedure again.

A Trendelenburg test was performed in one-legged stance with the opposite hip in 30° flexion; a positive test result was recorded if the patient was unable to elevate the opposite wing of the pelvis [3,23]. Hip abductor muscle strength was assessed with the patient lying in the lateral position and was rated from 1 to 5.

The abductor muscle quality was graded intra-operatively according to the classification proposed by Zywił et al [24]: 0 – No functional abductor mass present; I – Marked abductor defect; II – Gross fibrosis and scarring; no defect; III – No gross fibrosis; no defect.

Radiographic Evaluation

All patients underwent routine radiographs, consisting of an anteroposterior (AP) view of the pelvis (in the supine position), as well as an AP and lateral view of the affected hip. The initial six-week postoperative radiographs served as the baseline against which all subsequent views were compared. All radiographic measurements were made by 2 authors (MD, RC) who were blinded to the clinical results – mean values were calculated.

The following measurements were made as described by Russotti and Harris [20] on the anteroposterior radiograph of the pelvis (Fig. 1). (A) The height of the center of the hip (used to measure proximal displacement), defined as the vertical distance along a line

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