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CASE REPORT

Trochanteric Digastric Approach for Chronic Hip Dislocation in a 31-year-old Man

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ABSTRACT

Chronic traumatic hip dislocations are rare, and there is little literature to guide management. Challenges include achieving adequate exposure, preserving vascular supply, and maintaining joint stability. This case shows the successful treatment of a chronic posterior hip dislocation in a 31-year-old man who presented six weeks after a road traffic accident with a 3.5 cm leg length discrepancy. The surgery was performed at eight weeks post-injury, due to restrictions posed by COVID-19. We used the trochanteric digastric hip osteotomy to optimize joint exposure, aid in reduction, and preserve the vascularity of the femoral head. Intraoperatively, significant intra-articular fibrosis was identified and excised, and the hip was successfully reduced. The patient attained a Harris Hip Score of 90 in 12 weeks, with no evidence of osteonecrosis after two years of follow-up. This case demonstrates that the trochanteric digastric hip osteotomy is an effective approach for managing chronic hip dislocations, preserving femoral head vascularity, and restoring function with minimal complications.

Keywords. chronic hip dislocation, trochanteric osteotomy, traumatic hip dislocation, open reduction, femoral head vascularity, orthopedic surgery

INTRODUCTION

In developed countries, chronic traumatic hip dislocations are rare, making literature on the topic scarce. When treating these injuries, the main goals are to achieve reduction through adequate exposure, and to prevent avascular necrosis by preserving vasculature. Even when post-traumatic arthritis or osteonecrosis occurs, patients often retain improved hip function, allowing for future interventions such as total hip replacement or arthrodesis.[1]

Delayed treatment results in significant intracapsular fibrosis and muscle contracture, making it difficult to achieve a stable and anatomically congruent joint.[2] A delay of 12 hours results in a 22 to 52% chance of femoral head avascular necrosis.[3] Even the open reduction itself can cause avascular necrosis in as many as 52% of cases. Intraoperative assessment of the femoral head and preservation of joint vasculature is crucial.

There are several possible approaches to a dislocated hip. Posterior approaches allow direct access for posterior dislocations but typically disrupt the short external rotators and risk damage to the medial femoral circumflex artery. Anterior approaches allow direct access for anterior dislocations, offering good exposure while avoiding the posterior vasculature. Minimally invasive techniques, such as the direct anterior approach, while providing better cosmesis, faster recovery, and lower dislocation rates, do not provide adequate

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exposure in chronic cases and risk injury to the lateral femoral cutaneous nerve.[4,5]

Since Ganz's detailed anatomical studies on hip blood supply and his technique for safe 'Surgical Dislocation of the Adult Hip,' the trochanteric flip osteotomy has increasingly been utilized for acute and chronic fracture-dislocations.[6] This approach provides 360-degree exposure of the femoral head and acetabulum while preserving the medial femoral circumflex artery (MFCA), minimizing the risk of avascular necrosis.[1,6] Its versatility makes it suitable for complex reconstructions, femoral head fractures, and certain deformities. The osteotomy, however, introduces potential complications, including nonunion, malunion, and hardware failure.[7] Additionally, patients may experience a longer recovery period due to the time required for osteotomy healing and the risk of transient or permanent abductor weakness.

Given the chronic nature of the dislocation in our case, the trochanteric digastric approach was selected. We explored this approach that prioritizes preserving hip vascularity and native femoral head integrity without disturbing the short external rotators.

CASE

Here, we present a 31-year-old man who arrived six weeks after a road traffic accident with a chronic hip dislocation (Figures 1 and 2).

The delay was due to COVID-19-related surgical protocols. The patient had a 3.5 cm leg length discrepancy, intact ankle and toe dorsiflexion, and no neurovascular deficits. Surgery was performed at eight weeks post-injury, using the digastric hip osteotomy approach for enhanced exposure and reduction.

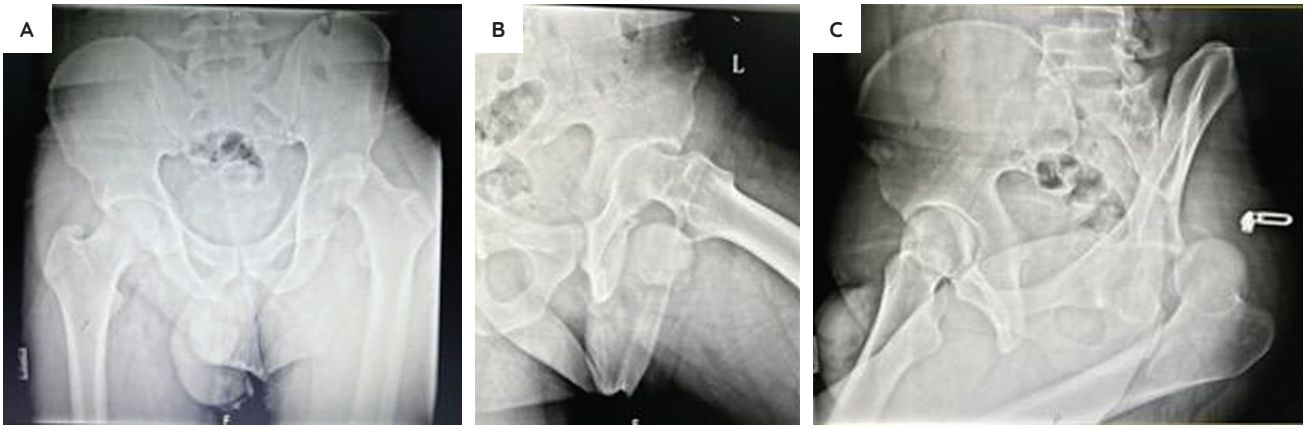

Figure 1. Pre-operative radiographs—anteroposterior (AP) pelvis **(A)**, lateral hip **(B)**, and Judet oblique view **(C)**—obtained on the day of consultation in the Emergency Room, 6 weeks post-injury.

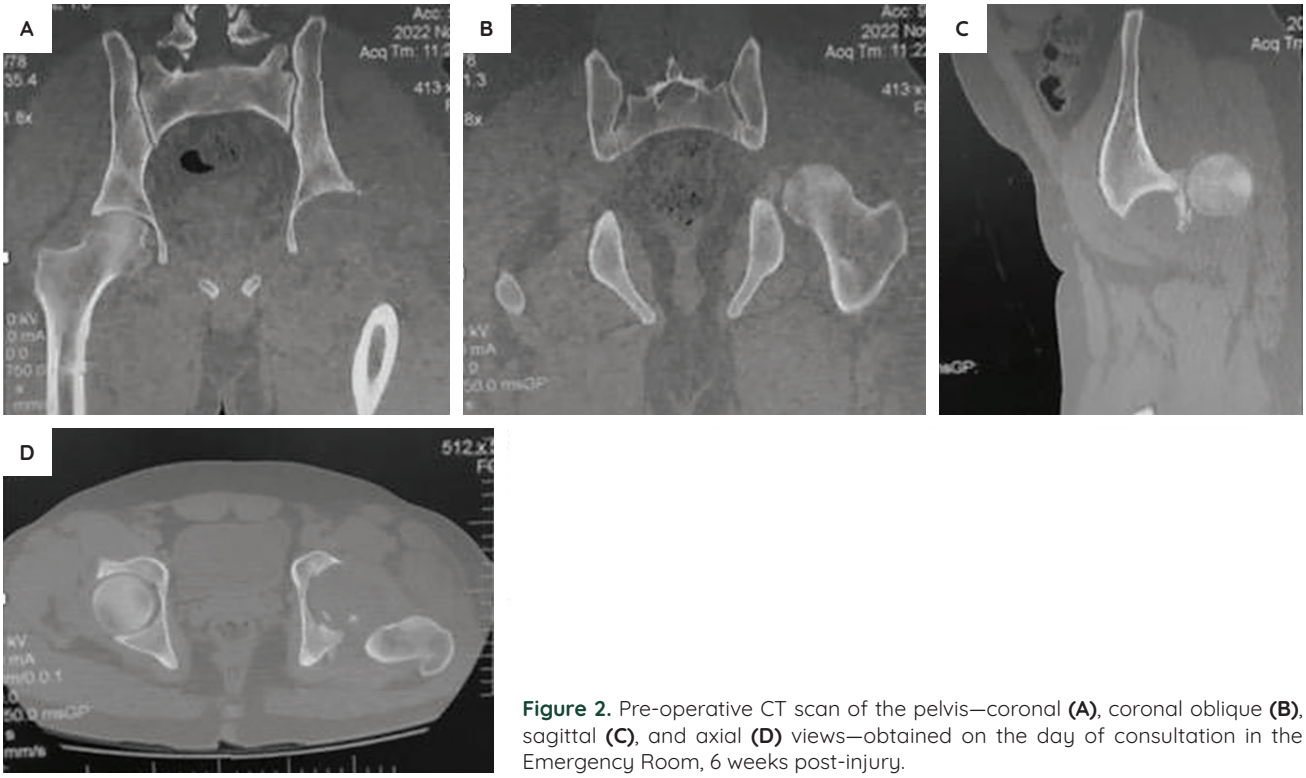

Figure 2. Pre-operative CT scan of the pelvis—coronal **(A)**, coronal oblique **(B)**, sagittal **(C)**, and axial **(D)** views—obtained on the day of consultation in the Emergency Room, 6 weeks post-injury.

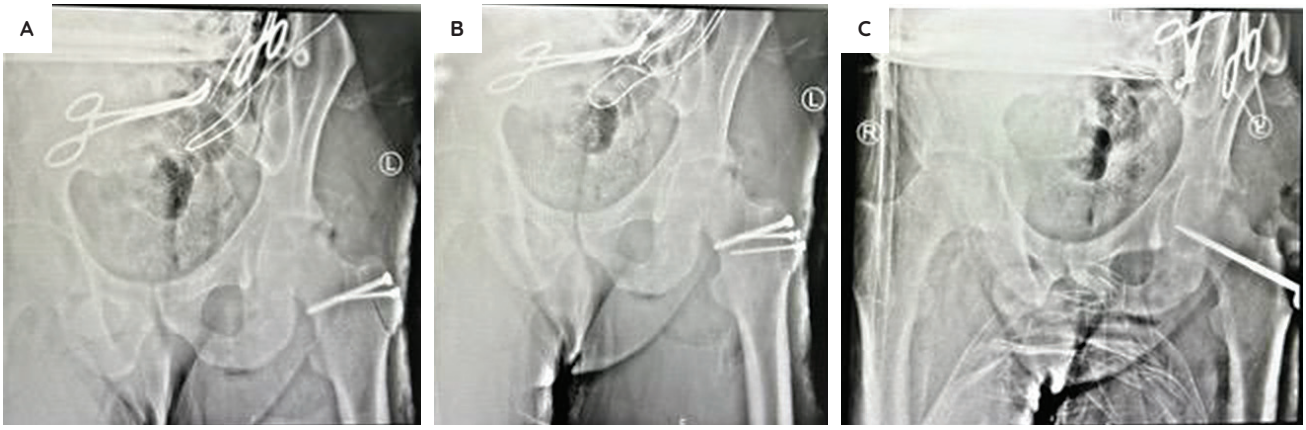

Figure 3. Intra-operative radiographs—Judet oblique **(A)**, iliac oblique **(B)**, and anteroposterior pelvic view **(C)**—obtained on the day of surgery, 8 weeks post-injury.

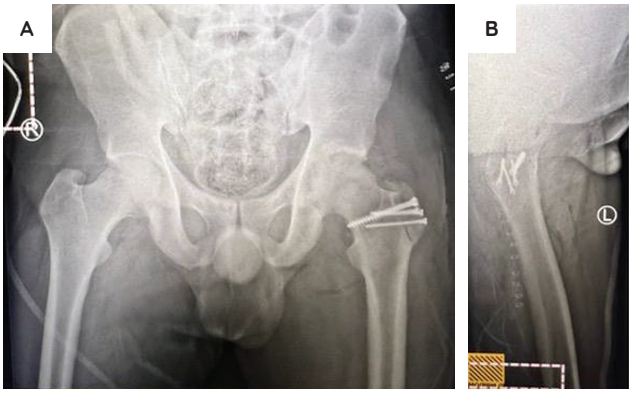

Figure 4. Post-operative radiographs—anteroposterior **(A)** and left lateral hip view **(B)**—taken on the day of surgery, 8 weeks after the initial injury.

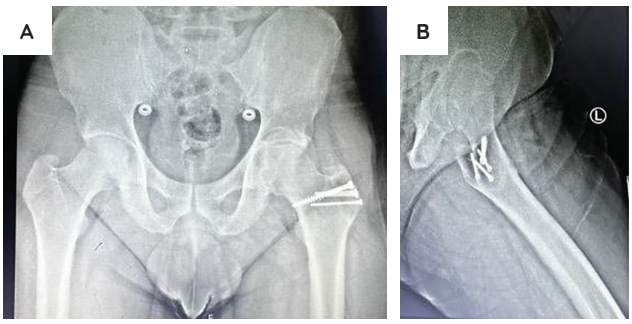

Figure 5. Post-operative radiographs—anteroposterior **(A)** and left lateral hip view **(B)**—taken on the day of surgery and at 1 year postop.

METHOD

Surgical approach/method

We followed the technique depicted in Ganz's original publication in 2001.[6]

1. **Patient positioning:** The patient was positioned securely in the lateral decubitus position.
2. **Incision:** The incision started 10–15 cm proximal to the trochanter and extended 10–15 cm distally.
3. **Soft tissue dissection:** The approach delineated the interval between the gluteus maximus and medius. The iliotibial tract was longitudinally split to mobilize the gluteus medius fascia, exposing the gluteus maximus muscle belly posteriorly.

Intraoperatively, vascular landmarks, such as the trochanteric anastomosis (which was cauterized) and the inferior gluteal artery branch, assisted in identifying the external rotator anatomy.

4. **Trochanter osteotomy:** The osteotomy was marked from the trochanter tip to the base of the vastus tubercle. A portion of the gluteus medius tendon remained temporarily attached to prevent retinacular vessel injury.

The trochanteric osteotomy (up to 1.5 cm thick) was performed with an oscillating saw, exiting just anterior to the most posterior insertion of the gluteus medius.

5. **Further mobilization:** The gluteus minimus muscle was mobilized from the iliac wing, and the vastus lateralis was incised distally from the vastus tubercle to facilitate periosteal mobilization. Flexion and external rotation of the hip improved anterior exposure for mobilizing the gluteus minimus along the superior capsule.

An anterolateral incision along the femur's long axis avoided injury to the deep branch of the medial femoral circumflex artery. The anteroinferior capsule was incised to visualize the labrum.

6. **Debridement and soft tissue release:** Fibrous tissue obstructing reduction was removed. Soft tissue contractures were released.

Intraoperatively, significant fibrous tissue within the acetabulum was noted before successful joint reduction. The cartilage on the acetabulum was intact. The femoral head exhibited good sphericity without chondral damage. No loose bodies were found. The joint was washed copiously with saline (Figures 3-5).[9]

Figure 6. Functional status at 1 year post-op: The patient was able to stand and ambulate without gait deficits and could perform a full squat without limitations.

Table 1. Post-operative timeline showing weight-bearing status and exercises performed

Timeline	Weight-bearing status	Exercise and rehabilitation
1 week	Toe-touch weight bearing	Ankle pumps, isometric quadriceps and gluteal sets
3 weeks	25% partial weight bearing (PWB)	Gentle range of motion (ROM) exercises, hip abduction/adduction
6 weeks	50% PWB	Progressive resistive exercises, stationary cycling
8 weeks	75% PWB	Increased resistance training, balance exercises
10-12 weeks	Full weight bearing as tolerated	Gait training, proprioceptive exercises and functional training

Table 2. Comparison of the operated hip with the contralateral hip at 12 weeks

Parameter	Operated hip	Contralateral hip	Outcome
Range of Motion (ROM)	120° flexion, 30° extension, 40° abduction	120° flexion, 30° extension, 40° abduction	Almost comparable outcomes noted
Manual Muscle Testing (MMT)	Grade 5	Grade 5	Symmetrical strength noted
Pain Scale (NRS)	0/10	0/10	No residual pain

Postoperative course

The patient underwent structured physical therapy including strengthening, range of motion exercises, and gait retraining exercises. The range of motion exercises and strengthening focused on open kinematic chain exercises during the post-operative period. The patient began toe-touch weight-bearing status for the first week, followed by partial weight-bearing of 25% for the second to fourth weeks, 50% weight-bearing at one month, and subsequently progressed as tolerated (Table 1).

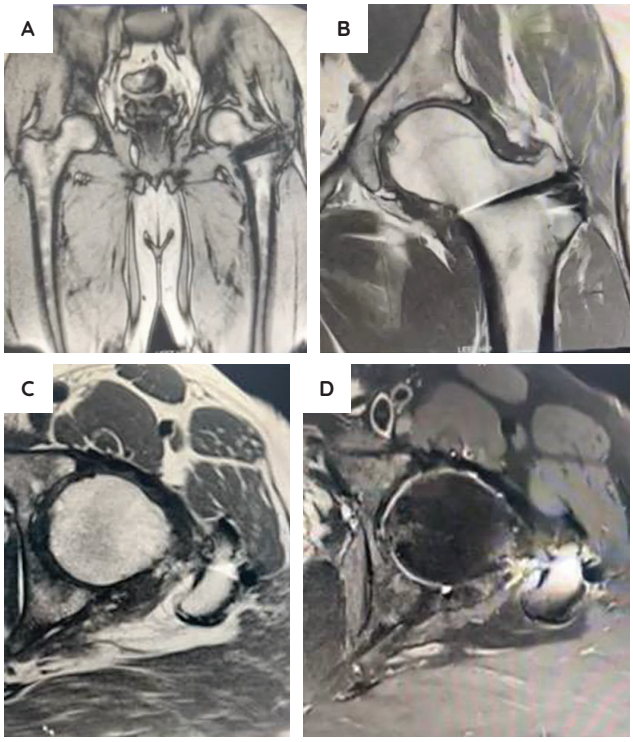

Figure 7. T1-weighted MRI of the pelvis showing no lysis of the left femoral head or the fixation over the greater trochanter: coronal **(A)** and sagittal **(B)** views taken 1 year post-op; axial cuts **(C and D)** similarly demonstrate no evidence of lysis at 1 year postop.

Notably, the patient regained pre-injury ambulatory status without a limp by 12 weeks postoperatively, achieving a Harris Hip Score (HHS) of 90. The range of motion was comparable to the contralateral hip, with flexion of 120°, extension of 20°, and abduction of 40°. Manual muscle testing showed an MMT grade of 5/5 across all major muscle groups. The patient demonstrated no Trendelenburg gait and reported a pain score of 0/10 (Table 2) (Figure 6).

Magnetic resonance imaging of the affected femoro-acetabular joint did not show evidence of osteonecrosis at one and two years post-operatively (Figures 7 and 8).

DISCUSSION

The trochanteric digastric osteotomy was effective in treating a chronic hip dislocation in a 31-year-old man.

The trochanteric digastric approach offers several advantages over other hip surgical techniques. Unlike the DAA, which provides limited exposure and has a steep learning curve, the digastric approach allows 360-degree access to the femoral head and acetabulum, crucial for addressing complex hip deformities and chronic dislocations. This enhanced exposure facilitates meticulous debridement, better visualization of intra-articular structures, and precise reduction, which is often challenging in anterior approaches. It avoids dividing external rotators and preserves the MFCA.[6]

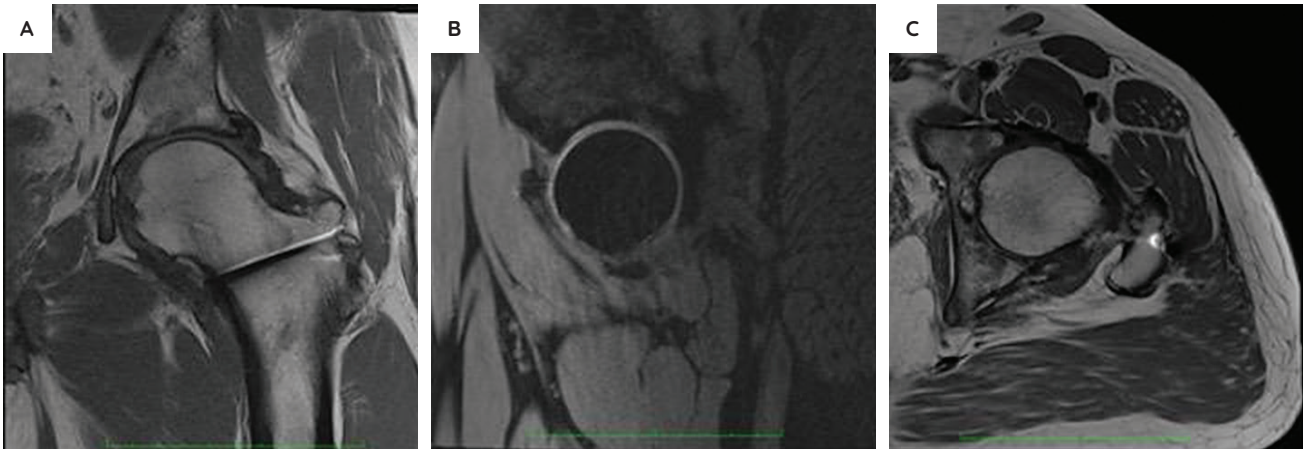

Figure 8. T1-weighted MRI of the pelvis [coronal cut **(A)**] and axial cuts on T2-weighted **(B)** and T1-weighted **(C)** sequences, taken 2 years postoperatively, showing no lysis of the left femoral head and no evidence of avascular necrosis.

Traumatic dislocations typically spare the posterior vessels if the obturator externus muscle remains intact. While a direct posterior approach risks direct injury to the MFCA, cadaveric studies reveal that modifications to this approach help avoid this. Posterolateral approaches, with short external rotator tenotomy and capsulotomy designed to spare the medial femoral circumflex artery (MFCA), reduce vascular insult.[7] Additionally, this approach preserves abductor muscle function, which is essential for maintaining hip stability and gait mechanics. The deep branch of the MFCA primarily supplies the superior area of the femoral head via two to four superior retinacular vessels. Maintaining this blood supply is vital for clinical success, mandating anterior capsulotomy.

The posterior approach also carries a higher risk of posterior re-dislocation, whereas the trochanteric digastric approach provides superior stability due to the controlled and anatomical repositioning of the osteotomized fragment.

Performing an osteotomy of the greater trochanter introduces its own set of challenges, such as nonunion, malunion, and hardware failure. Patients may also face a prolonged recovery period due to the time required for osteotomy healing and the potential for transient or permanent abductor weakness.[4] These factors highlight the importance of meticulous pre-operative assessment and a structured rehabilitation protocol to optimize functional outcomes.

Ganz's study on 213 hips over seven years, including 19 patients who underwent intertrochanteric osteotomies, verifies femoral head perfusion intraoperatively, with no subsequent avascular necrosis. This technique minimizes morbidity and treats various conditions effectively.[6]

Regardless of approach, thorough hip joint debris clearance and irrigation are crucial before reduction.[3]

CONCLUSION

In our case of a posterior hip dislocation that went untreated for two months, the trochanteric digastric approach proved a safe surgical option, preserving femoral head vascularity, and achieving favorable outcomes with no radiographic evidence of femoral head avascular necrosis after two years of follow-up.

ETHICAL CONSIDERATION

Patient consent form was obtained before manuscript submission.

STATEMENT OF AUTHORSHIP

All authors certified fulfillment of ICMJE authorship criteria.

CREDIT AUTHOR STATEMENT

NARA: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing – original draft preparation, Writing – review and editing, Visualization, Supervision, Project administration; **BC:** Conceptualization, Investigation, Resources, Data Curation, Writing – original draft preparation, Visualization, Supervision, Project administration.

AUTHOR DISCLOSURE

The authors declared no conflict of interest.

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