

Modified Posterior Approach to the Hip Joint

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Abstract

This is a major contribution to the Surgery of the Hip Joint in the field of Orthopedic Surgery, since it offers greater stability to the Hip Joint posteriorly as shown by the cadaveric studies before its clinical application since 1981 [1]. The posterior Approach is the most commonly used approach with the main disadvantage being an increased risk of dislocation following Hip Surgery [2]. This was devised in 1981, when dislocation of the Hip Joint were reported all over the world and was estimated as high as 2% to 8%, when Norman Capener in his Editorial in 1950 [3] was surprised that the Posterior Approach had gained an extremely poor reputation in America and Britain with regards to the dislocation of the Hip Joint, despite the Hip Joint being easily accessible along with minimal bleeding. Fracture neck of femur is the common fractures seen in the elderly and hence this modification was devised to overcome the incidence of dislocation and yet retaining the advantages of the Posterior Approach to the Hip Joint.

Keywords: Trochanteric Osteotomy; Dislocation

Introduction

There are more than 100 described Approaches to the Hip Joint in the literature, and Orthopaedic Surgeons may adopt any Approach depending on their training or familiarity. The Author's original paper in 1981 was devised with the help of Dr. Martin A Elloy, Ph. D, Bio-mechanical Engineer, University of Liverpool, UK, which conferred greater stability to the Hip Joint posteriorly when tested on cadavers by a device biomechanically, thus minimising the incidence of dislocation reported extensively in literature. The device used to test stability of the hip joint with the pelvis fixed and protractors to measure the various angles of permissible movements at the Hip Joint. The stability of the Hip Joint was tested as seen above by applying torque with the Hip Joint standardized to fixed angle of flexion and adduction (Figure 1), to mainly see whether the trochanteric fixation disrupted or the Hip Joint dislocated. In all the cadavers tested, the Hip Joint never disrupted indicating greater stability and hence this devised Modified Posterior Approach was used in patients.



Figure 1: Internal rotation torque being applied when the hip joint was standardized to a fixed angle of flexion and adduction.

(Courtesy: Photograph reproduced with the kind permission of Injury/Elsevier).

Technique

The patient is placed on the sound side. The skin incision is similar to the Southern Approach which is then deepened in layers.

The osteotomised posterior overhanging part of the greater trochanter (Figure 2) extends till just distal to the quadrate tubercle. (Figure 3 and 4).

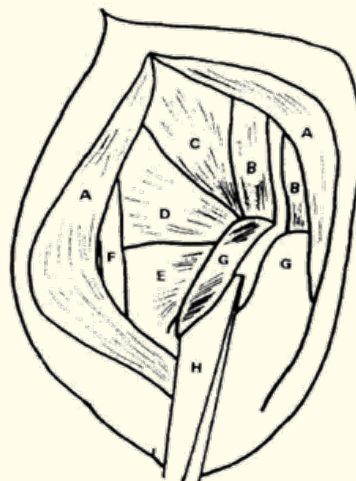


Figure 2: Line Diagram showing the osteotomy of the posterior overhanging part of the greater trochanter.

(Courtesy: Line Diagram reproduced with the kind permission of Injury/Elsevier): A, Gluteus maximus; B, Gluteus medius; C, piriformis; D, triradiate tendon; E, quadratus femoris; F, sciatic nerve; G, greater trochanter, H, osteotome.

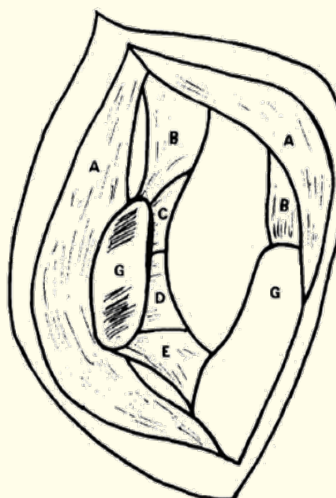


Figure 3: Line Diagram showing the osteotomy completed and the flap retracted.

(Courtesy: Line Diagram reproduced with the kind permission of Injury/Elsevier); A, Gluteus maximus; B, gluteus medius; C, piriformis; D, triradiate tendon; E, quadratus femoris; G, greater trochanter.

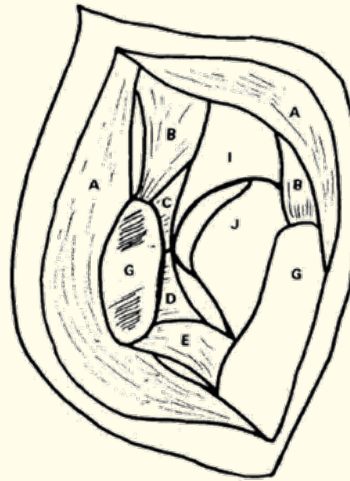


Figure 4: Line Diagram to show that the Osteotomy is completed and the flap retracted, after incising the capsule to expose the Hip Joint.
(Courtesy: reproduced with the kind permission of Injury/Elsevier)

Line diagram showing the following structures: A, gluteus maximus; B, gluteus edius; C, piriformis; D, triradiate tendon; E, quadratus femoris; G, greater trochanter; I, acetabulum; J, femoral head.

The posterior triangular flap containing the overhanging posterosuperior part of the greater trochanter at its apex is then dissected free and turned down to expose the capsule of the hip joint (Figure 5).



Figure 5

The capsule is then incised and after completing the work on the Hip Joint, the Greater Trochanter is reattached by wiring (Figure 6).
(Courtesy: reproduced with the kind permission of Injury/Elsevier) with 2 Stainless steel wires, guage 18.



Figure 6

There after the Hip Joint is closed routinely (Figure 7).

(Courtesy: reproduced with the kind permission of Injury/Elsevier).



Figure 7

Check X-rays are routinely done after the operation (Figure 8 and 9).



Figure 8: Immediate post-operative X-rays of Total Hip Prosthesis.
(Courtesy: reproduced as before).



Figure 9: Radiograph of Thompson's Hemi-Arthroplasty.
(Courtesy: reproduced with the kind permission of Injury/Elsevier).

Discussion

The Modified Posterior Approach follows the anatomical intermuscular plan and permits full exposure of both the proximal femur and the acetabulum [4-6].

Iyer, Shatwell and Elloy reported on early results in 44 patients who had a hemiarthroplasty done with no dislocation in this series [7].

Preserving the piriformis tendon seems to be superior to repairing it as is done in the Southern Approach in terms of dislocation of the Endoprosthesis or THR [8-9].

This view had also been reinforced by many other anatomical studies [10].

Mark Coventry did concur with the concept of this approach in imparting more stability posteriorly postoperatively, as compared to all other posterior approaches to the hip joint described since 1874, which either divide the short external rotators or pass between them which thereby increase the risk of postoperative dislocation of the hip [11].

After I described this Approach, it was quite encouraging that my respected teacher-Mr.F.H.Beddow-Senior Consultant Orthopaedic Surgeon-University of Liverpool, UK did a series of Total Hip Replacements by my technique and noted only 2 dislocations throughout his series [12].

Beddow and Tulloch reported on their experience using this approach in 220 cases of primary total hip replacement in which there were only 2 cases of dislocation.

James Shaw [13] did stress this approach gives an excellent exposure of both the acetabulum and femur without dissection through scarred anterior or posterior soft tissue planes or forceful retraction on adjacent tissues and that the potential for damage to the sciatic or femoral nerves or femoral vessels is considerably less. He also noted observed improvement in the postoperative function as the muscle insertions of the short lateral rotators are undisturbed, thereby restoring hip stability and leaving an intact and considerably uncompromised envelope of soft tissues on the prosthetic joint.

Terry Canale (Campbell's Operative Orthopaedics, 9th Edition, 1992) does make a reference to this approach in their chapters on Surgical Approaches and Complications after Total Hip Arthroplasty with respect to dislocations. His reference to this approach has been first mentioned in 9th Edition till the 12th Edition till to date [14]. He has been also kind to give me his forward to my book on the HIP JOINT, which is under publication by Pan Stanford Publishing, Singapore.

Callaghan, Rosenberg and Rubash (The Adult Hip, 1998) preserves the original soft tissue attachments of the posterior aspect of the hip joint, as obtained with this approach [15].

Thomas Stahelin, *et al.* (2002) have stated that the failure rate of reinserted short lateral rotators was extremely high at 70% with majority of failures occurring within the first postoperative day [16]. He has also been kind enough to give me his forward to my book 'Modified Posterior Approach to the Hip Joint', which has been released worldwide in the year 2015.

Deepa Iyer (2006) was studied this fracture in detail and noted its importance for the junior doctors in training, thereby decreasing morbidity by early diagnosis and treatment [17].

Emeritus Professor Robert Cofield [18] of the Mayo Clinic conducted a study of cases by the Modified Posterior Approach to the Hip Joint when all the cases in this study were stable. Posterior approach to the hip joint through a posterior trochanteric osteotomy always united and a low rate of late instability after hip replacement [19].

I am also in regular touch with Daniel J Berry of the Mayo Clinic, Minnesota, USA who states that he uses the posterior approach to the hip for most primary hip arthroplasties, whereas for revision arthroplasties, he frequently uses the extensile approaches including extended greater trochanteric osteotomy [20].

They one important disadvantage of the posterior trochanteric osteotomy to be kept in mind is the potential for injury to the superior gluteal nerve if the gluteus medius muscle split is extended proximally more than 5 cm from the tip of the trochanter.

In the Modified Posterior Approach to the Hip Joint, bleeding is considerably less, since the plane of Cleavage through the gluteus maximus is through its middle thus leaving intact the branches of the superior gluteal artery in the proximal half and branches of the inferior gluteal artery in the distal half, and hence there is no need to worry about the amount of blood lost. Bleeding is very less as the leash of vessels which lies at the inferior border of the short lateral rotators is not interfered with. The most important advantage is that the sciatic nerve is untouched at any step in this approach, as corresponding to the level of the greater trochanter, it lies far medially. Above all, it is

clasped between the piriformis tendon and the triradiate tendon, when the greater trochanter is turned posteriorly, thus preventing any movement of the nerve.

With this modified posterior approach to the Hip Joint, the most important advantage is that the abductor mechanism is intact.

In this Modified Posterior Approach, Union normally occurs, since it is through cancellous bone and quite close to the anastomosis in the trochanteric fossa.

The concept of trochanteric osteotomy has evolved as it is used in difficult exposures and for soft tissue tensioning. Contemporary THA accentuates a streamlined approach to surgery and recovery while maximizing long-term success.

There are two types of standard osteotomy may be oblique or posterior. The standard TO was first used use in hip arthroplasty by Charnley [21].

Certain complications of trochanteric osteotomy are broadly divided into two categories (1) those related to osteotomy healing and (2) those related to the mode of fixation. Nonunion or a fibrous union of the trochanter is not a complication with clinical significance. If the trochanter does not heal by bony bridging, however, associated issues of pain, hardware breakage, or abductor dysfunction may manifest as impaired gait, Trendelenburg lurch, subluxation, or dislocation of the hip replacement. Even with the to chanter united, the patient may still have problems, such as the greater trochanteric pain syndrome which may be related to a prominent trochanter or to irritating hardware. Fraying and breakage of hardware can lead to pain, requiring an early revision.

Though Surgeons may adopt any approach to the hip joint in which they are confident, familiar or trained, this modification may be helpful when the greater trochanter is intact in cases when treating a dislocated hip joint, when the blame for the dislocation may be avoided on the posterior approach to the hip joint.

Material and Methods

I have been using this modification since its description in 1981 till today and would certainly recommend without any hesitation to the younger generation of Orthopaedic Surgeons worldwide, particularly to Orthopaedic Surgeons preferring the Posterior Approach to the Hip Joint.

Conclusion

This Modified Posterior Approach is extremely useful in cases where the advantage of the Posterior Approach is retained along with greater stability to the Hip Joint posteriorly.

Conflict of Interest: Nil.

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